

# PORTFOLIO FOR HEALTH

## 2

The developing programme  
of the DHSS in health  
services research

PROBLEMS AND PROGRESS  
IN MEDICAL CARE

*EIGHTH SERIES*

*Essays on current research*

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# Introduction

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R. H. L. COHEN

*Chief Scientist, DHSS*

This second volume of *Portfolio for Health* follows the general pattern of its predecessor. As on the previous occasion, after an introductory essay on policy, the main body of the book consists of a series of research articles by named authors, followed by a list of current activities and publications. The articles are arranged in two parts, the first dealing with selected research topics and means, and the second, written by the Directors, with aspects of the work of the DHSS's research units. Together they should give a broad idea of some of the DHSS's main research interests and resources. The Locally Organized Research Scheme is not included this year as it is at present under review by a joint committee of the DHSS and the MRC, under the chairmanship of Sir Douglas Black, which expects to report by the end of the year. The list of current activities, which follows, differs from its predecessor in a number of respects which are detailed in the preamble: the entries are more numerous, partly owing to their including the Computer Programme and the in-house operational research activities; they are fuller; and the arrangement and classification have been changed. We hope that as a result the list will be found both more informative and easier to handle. The DHSS intends to update and improve it annually.

The table shows the scope and scale of the DHSS's R & D programme. The table differs from the corresponding one in the previous volume by including the NHS Experimental Computer Programme, social security research, and the internal research activities.

*Portfolio 1*, published in July 1971, marked the end of the early years of rapid expansion and forecast a period of consolidation and reorganization. *Portfolio 2*, following now some two years later, heralds the more systematic and co-ordinated arrangements for R & D that are being evolved and their



TABLE. 1972/3 (£000)

		Revenue	Capital
<i>External</i>			
1. Health and Social Care and Public Health Services	{ Research	2,300	
	{ Development	600	500
2. Equipment, supplies, and appliances		1,600	
3. Building and engineering		650	
4. Computers	{ Research	60	
	{ Development	950	1,700
5. Social Security		260	
6. Locally Organized Research Scheme		1,035	
		<hr/> 7,455	2,200
<i>Internal</i>			
7. Biomechanical R & D Unit (BRADU)		320	
8. Operational Research Service		210	
9. Social Science Research Unit		40	
		<hr/> 570	
		8,025	2,200
			<hr/> = 10,225

new working relationships within and outside the DHSS. The interval between was of necessity largely occupied with the preparations for change and with absorbing and adjusting to the several major external and internal reforms which the future arrangements for R & D would have to fit in with.

Among the new conditions to be taken into account, and already well advanced, were the plans for the impending reconstruction of the NHS and the consequent parallel domestic reorganization inside the DHSS. Unforeseen then, and still six months beyond the horizon, was the Green Paper of November 1971, containing the Rothschild and Dainton proposals for the organization of R & D, which aroused interested public debate and led to an inquiry by the Select Committee on Science and Technology. In July 1972 came the Government's decision in the White Paper, *Framework for Government Research and Development*. This finally endorsed the customer/contractor principle, together with an accompanying transfer to executive departments of a proportion of research council funds (25 per cent in the case of the MRC), and promised the introduction of a chief scientist function into executive departments as the basis of the new developments. In the following October, as a first step, I was appointed Chief Scientist to set up the new organization for research and almost simultaneously it was announced

that Dr D. A. K. (now Sir Douglas) Black, Professor of Medicine in the University of Manchester, would succeed to the post in April 1973, on long-term secondment from his university. Thus it has been possible for plans for the future to be made in collaboration between us. To this end a small group was set up to devise the new organization for R & D within the DHSS and to work jointly with the MRC to translate into practical terms the new and closer relationship required by the recent government decisions.

Against this background and from these and other discussions, with which the Scottish Home and Health Department and the Welsh Office were associated, a number of principles emerged on which it was agreed that the new arrangements should be based.

These were first that the organization for R & D should cover, and as far as possible integrate, the full range of DHSS responsibilities; secondly that 'health services research' of the kind hitherto developed mainly under direct funding from the health departments as the bodies responsible for services should continue, in general but not exclusively, to be funded and managed directly by them; thirdly that a strong outside scientific influence under the Chief Scientist should be injected into all aspects of the research programme; and fourthly that existing MRC or Social Science Research Council machinery should not be duplicated by the new advisory machinery which the health departments intended to set up but that instead a reciprocal influence should be obtained by appropriate cross-representation. Finally, it was agreed that over a large part of the health field it would be both desirable and possible for all three health departments to make use of the same organization.

Thus, essentially, the DHSS was faced with four main tasks: to set up a 'customer' function to define the needs for research and implement the results; to bring together the various research management branches into a coherent system for formulating, commissioning, and monitoring a realistic research programme; to establish the new relationship with the research councils and evolve in partnership with MRC mutually satisfactory arrangements for administering the transferred funds both in the transitional phase and for the longer term; and, fundamental to the success of all these activities and playing a key role in each, to introduce the novel figure of a Chief Scientist, with the necessary authority and independence, and create the supporting machinery, both within and outside the DHSS, to enable him to function effectively.

Some progress has been made in all these aims. The customer function is being brought gradually into existence and incorporated in the reorganized office structure under the ultimate authority of the Planning Committee, the group of top officials, lay and professional, responsible for the planning, policy, and management of all the DHSS's activities. The Planning Committee will determine broad policies on research and development in the light of advice from the Chief Scientist, who is a full member for all purposes and

will be supported by his own (largely external) advisory organization. The translation of these broad objectives into specific requirements is essentially a group activity which must involve in a balanced relationship the policy and operational divisions, the research management branches, the Chief Scientist's organization, and 'contractors' such as the research councils, universities, and the DHSS's own research teams. The customer/contractor principle has thus never been thought of in the DHSS as being a simple relationship; on the contrary it was realized from the first that to define better-informed, more far-sighted objectives and priorities for a comprehensive national health service and to incorporate these in a realistic research programme required the accumulation of expert advice from many different sources and a series of continuing interactions both between different parts of the DHSS and between these and research and service bodies outside. New procedures have been devised which it is hoped will simplify what might otherwise become a cumbrous and dilatory system.

The Chief Scientist himself will draw his support both from the research management branches within the DHSS and from a series of advisory committees of independent scientists. Among the latter, he will be primarily supported by a small Chief Scientist's Research Committee (CSRC) of members eminent in scientific fields relevant to the R & D programme as a whole, who have also demonstrated an active interest in the operation of services. The function of this committee, which will be chaired by the Chief Scientist, will be to give strategic advice to the Planning Committee on R & D in the field of Health Care, Personal Social Services, and Social Security, covering the objectives of the R & D programme and its component parts; the total size of the programme; the balance, in terms of cost and effort, within the programme between one field of research and others; and the adequacy of the arrangements for managing and evaluating the research programme and for implementing its results. It is intended that individual members of the CSRC shall serve, as appropriate, on the various subgroups concerned with particular areas of the programme. These will comprise:

1. *The Health Services Research Board* (covering also the interests of Scotland and Wales and appointed in consultation with the MRC). This will consist of members drawn from the medical and social sciences and related disciplines, including nursing and dentistry. It will be responsible for advising the Chief Scientist on the content and quality of the health services research programme (including operational research and special service developments) and on the research resources needed to carry it out.
2. *The Panel on Medical Research* (jointly with Scotland and Wales). This will be responsible for advising on commissioned biomedical research, including the use of funds transferred from the science vote of the Department of Education and Science.

3. *The Personal Social Services Group* to advise on research in the field of the personal social services and on the best arrangements for getting an effective social science contribution in all aspects of the DHSS R & D programme.

These will operate together with three more specialized groups:

4. *The Supplies and Equipment R & D Committee.*
5. *The Advisory Committee on Medical Computing in the NHS.*
6. *The Building and Engineering Research Committee.*

Some of these bodies, including the CSRC itself, exist only on paper at the time of writing, but they are expected to be appointed in the near future. The Chief Scientist will need to be concerned with most or all of them to a greater or lesser extent and in order to allow time for this and for the extensive contacts he will need to maintain with the scientific community in general he is being kept as free as possible of routine management responsibilities both within the DHSS and in his relations with research units outside.

It is hoped that these new arrangements, when they are in full working order, will go some way towards answering three of the four questions raised by Mr McLachlan in his editorial introduction to *Portfolio 1*: namely, what is the mechanism for appraising grants, what is the mechanism for monitoring the progress and quality of research, and what is the nexus between the research-funding divisions in the DHSS and the policymaking divisions.

Thus an opportunity is being created for a fresh approach to R & D over the whole range of the DHSS's interests. In the health services and biomedical fields this could achieve the priority for research to improve the effectiveness and efficiency of the NHS for which Professor Cochrane argued in his Rock Carling monograph of 1972. In health services research these hopes will only be realized if research workers with the right skills and interests and the right career prospects can be recruited and trained in sufficient numbers. In the biomedical field what is most required is a more sustained effort jointly by the MRC and the health departments to unite as far as possible service needs and research opportunities. In personal social services and social security research a firm base for future expansion needs to be established in association with the Social Science Research Council.

In *Portfolio 1* I wrote of the long-standing and intimate collaboration that existed between the DHSS and the MRC and it is from the extension of this common experience that the new form of partnership must be evolved. Fruitful as in so many ways the traditional relationship had been, however, it was time for national needs and the respective roles of the two bodies to be looked at again in the light of the lessons to be learnt from more than five decades in which the practice of medicine and the organization of medical care had both been revolutionized. Liberally interpreted and sensibly operated, as it will be, the new relationship should provide a stimulus to the

imagination and sense of purpose of both parties (and why not of the universities too?). One can only speak for oneself but I should expect that in five years' time benefits will be beginning to accrue alike to the NHS and to medical research itself.

Finally, it may be appropriate in this book published by a private organization to say something about publication policy generally. Parliament requires the DHSS to make an annual report and the first annual report on research will be given in July 1973. The first two volumes of *Portfolio* have shown what can be done by way of a public-private partnership and it is hoped that it may prove possible, as occasion offers in the future, to reconcile public requirements with the more personal and informal advantages of this kind of good relationship.

*March 1973*

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PART I

**Research  
directions**

TOPICS  
Disease, disability  
handicap

ORIOLE GOLDSMITH  
JOHN MODLE

# I

## Cancer research

---

N. R. W. TAYLOR and  
G. WYNNE GRIFFITH

### 1. Introduction

There is a long tradition in this country of public support for cancer research. The Imperial Cancer Research Fund was founded in 1902, and the British Empire Cancer Campaign, now the Cancer Research Campaign, in 1923. Both these voluntary organizations raise and dispense considerable sums annually for cancer research, while some of the expenditure on research by the MRC and in the universities can also be regarded as being specifically directed at cancer. If, however, one accepts that much fundamental research at the cellular and molecular levels is relevant to an understanding of the disease, the total investment in cancer research is, of course, considerably greater. Indeed, we estimate that about 10 per cent of all expenditure on medical research in this country is directly or indirectly concerned with some aspect of the cancer problem. There can be no doubt therefore that research into this group of diseases is being supported at least as generously as research into any other. It is against that background that the involvement of the DHSS in R & D in the cancer field should be viewed.

The justification for this considerable investment in research rests on the magnitude of the problems and the promises of their solution. The measures available to judge the size of the cancer problem, or for that matter any other disease, are fairly crude ones. Thus, as to morbidity, about 170,000 new cases of cancer arise in the UK each year, and about 4 per cent of all hospital beds are occupied at any given time by patients suffering from cancer. This proportion would, however, seriously underestimate the cost of cancer for the hospital services, since the diagnosis and treatment of many forms of the disease call for highly complicated and expensive procedures. As to mortality, cancer is the cause of about 20 per cent of all deaths but fatal malignant

disease bears heavily in childhood being second only to accidents as a cause of death. For people in their 50s and early 60s also cancer is a leading cause of death. In addition to these few objective indices one must take account of less ponderable aspects. There is widespread public fear of cancer and indeed in some parts of the country a strange stigma of guilt, deriving from attitudes whose origins are lost in obscurity, still attaches to the disease. While one can point to considerable advances in the treatment of certain relatively unusual forms of cancer the sad fact remains that the outlook for some of the commoner types of the disease has hardly improved over the last several decades, so that public pessimism is not entirely unfounded. Furthermore, people know full well that fatal cancer is often most distressing to observe and the burden on relatives can be heavy indeed, particularly where the sufferer is nursed at home.

There have been in the past, and there are today, many tantalizing promises of success in the cancer story. Radium was once hailed as the 'cure' for cancer. The discovery of specific chemical compounds having the capacity to produce cancer in experimental animals led many to hope that the 'cause' of cancer was about to be found. There have been several blood tests, urine tests, and skin tests, each in its day claimed to be a significant advance in early detection. (The proposition that presymptomatic detection always resulted in a better prognosis was until recently tacitly accepted as self-evident.)

Cancer research is being actively pursued in many directions in many countries. The role of the DHSS is to encourage and sponsor such organization and such 'applied' research and development as may be required to ensure that the benefits of any advances made, whether in this country or abroad, are available in effective and efficient ways with a minimum delay.

Developments dealt with in this chapter relate to: epidemiology and statistics; screening for choriocarcinoma and cancer of the breast and cervix; diagnosis and therapy; and cancer organization.

## 2. Epidemiology

### *a. General considerations*

British scientists have a distinguished record of contribution to knowledge of cancer epidemiology. One of the first projects embarked on by the Imperial Cancer Research Fund after it was established in 1902 was a study by Bashford (1) in an effort to determine the occurrence and distribution of neoplastic disease in man and animals throughout the world. Forty years ago Stocks (2) was meticulously mapping the distribution in England and Wales of cancer mortality by body site. The geographical differences he brought to light assisted the recognition that in many respects it is more fruitful to think of cancer as a group of disorders sharing certain features in common rather than a single 'disease' with variable manifestations. In the post-war period we can point to the notable work of Doll and Bradford Hill (3) on lung cancer, of

Case on bladder cancer (4) and of Stewart on malignant disease of children (5); while Stocks himself over a number of years conducted an intensive study into cancer occurrence in North Wales and the Liverpool Hospital Region (6). If only a few names have been mentioned it is not because they have laboured alone in this part of the cancer field: there have been others though their number is small. The fact is that epidemiological research has hitherto received little attention compared with other types of cancer research and has therefore attracted relatively little support. To some extent this may be attributed to a dearth of trained epidemiologists, and the shortage affects fields other than cancer, but there has also been a failure generally to appreciate the potential contribution of epidemiology to our understanding of cancer in man. By accurately defining the distribution of cancer within and between populations epidemiological studies can assist in the identification of high-risk groups. Such groups when compared with the generality will differ as regards genetic constitution or environmental experience in a significant manner and those differences in turn will suggest on the one hand causal mechanisms which will indicate new lines of investigation to be pursued in the laboratory, and on the other, possibilities of prevention for the consideration of health educators, administrators, and legislators. Such, perhaps, is the commonly accepted view of the place of epidemiology in relation to cancer, or for that matter, any other disease. But there are two other aspects which should not be overlooked in any account of the potential contribution of cancer epidemiology.

First, it should serve as a touchstone on which to test hypotheses of causation. In the nature of things direct and deliberate experimental confirmation of an aetiological role in man will never be obtained: we are now and ever shall be restricted to inferential evidence. Given the species specificity of many known carcinogens there will always remain an area of doubt when extrapolating from animal experimentation to man. An aetiological proposition will be tenable therefore only to the extent that it is consonant with the established epidemiological facts. Thus, for example, no hypothesis of the causation of gastric cancer can be sustained if it conflicts with the characteristic and consistent relationship between the sex-ratio and age (7).

The second aspect of the place of epidemiology in cancer studies that should be mentioned is in relation to clinical trials. In cancer, as in certain other fields, time-honoured views are increasingly under challenge. Established dogma is being questioned and dissatisfaction with accepted practice is being voiced. In the cancer field these trends are all the more significant not only because the consequences of a misplaced orthodoxy for the individual patient can be so serious but also because the costs of modern methods used in prevention and early detection, no less than in treatment, are so great. It is becoming acknowledged that only by adequate and controlled trials can scientifically valid answers be found to many of the questions involved (8). What is perhaps not so widely appreciated is that the most

advanced clinical methods and the most sophisticated statistical techniques may be brought to naught unless sound epidemiological principles have been applied to the design and conduct of these investigations. These considerations have influenced the DHSS in deciding to establish a Unit of Cancer Epidemiology, in conjunction with the MRC, at Oxford. The Unit, which is placed in the Department of the Regius Professor of Medicine, will undertake systematic studies of cancer incidence drawing particularly on registry data. It will also participate in the planning and evaluation of clinical trials and be prepared to collaborate in international studies of cancer epidemiology. When the necessary staff has been recruited (the unit was established towards the end of 1971) the unit will constitute a research facility which will include a number of disciplines which will thus be of a kind we have not hitherto had in Britain.

### *b. Cancer registration*

The figures published by the best cancer registries probably provide a close estimate of the true incidence of cancer under the age of 65 years; at higher ages precision in diagnosis of internal cancers tends to fall off, more of the patients seen attend hospital and few cancer registries provide useful estimates of cancer incidence over 80 years of age (9).

A critical review of the cancer registration scheme in this country was undertaken by an Advisory Committee set up jointly by the DHSS and the Office of Population Censuses and Surveys in 1969. The terms of reference of the Advisory Committee were wide and enabled the committee to determine whether a national scheme of cancer registration was necessary and if so how it could best be organized. The committee's report was published in September 1970 (10), one of the most important recommendations being that 100 per cent registration of cancer cases should be approached as nearly as possible. In order to facilitate this, a revised scheme of national cancer registration was put forward and came into effect on 1 January 1971. Some reduction in the amount of data to be collected was proposed with a view to increasing the efficiency of the regional cancer registries. A central proposal in the report was that cancer registrations should be incorporated in the NHS's central registry. Survival information would thereby become directly available to the central cancer register without the local cancer registries having periodically to attempt to trace individual patients.

It is desirable to secure 100 per cent cancer registration in order to monitor the incidence and survival of cancer patients and for research, particularly epidemiological studies. The conditions registerable include all those assignable to categories 140-209 of the *International Statistical Classification of Diseases, Injuries and Causes of Death* (8th revision, 1965); also registered are benign and unspecified neoplasms of the brain and other parts of the central nervous system, *in-situ* carcinoma of the cervix, hydatidiform mole, papilloma of the bladder, and glomus tumours. The revised system should do

much to improve the completeness of cancer registration and to assist the work of epidemiologists as well as offering improved data for health service planning.

### 3. Screening

#### *a. Screening for choriocarcinoma*

Recent advances in the diagnosis and treatment of choriocarcinoma have markedly improved the outlook for patients suffering from this condition. Left untreated, choriocarcinoma is nearly always fatal, the average interval between first symptoms and death being about four months. With surgery and chemotherapy, however, the prognosis can be greatly improved. In a recent series of 100 patients (11) in whom the tumour followed a hydatidiform mole, the tumour was eliminated in 95 per cent of cases when treatment was begun within six months of the evacuation of the mole, but when the interval was more than a year, success was obtained in only 40 per cent and then after much more prolonged treatment. This is one instance where early diagnosis undoubtedly affects the prognosis. The presence of choriocarcinoma can be detected by estimating chorionic gonadotrophin in the urine, but standard methods used for pregnancy diagnosis are sometimes too insensitive. Radio-immuno-assays for chorionic gonadotrophin are much more sensitive and allow a firm diagnosis to be made at a much earlier stage of the disease. The increased risk of choriocarcinoma associated with hydatidiform mole, the existence of radio-immuno-assay methods whereby the disease may be detected at an early stage and the excellent results of prompt treatment and careful surveillance, provide an ideal situation for the constitution of a national screening service. Following recommendations by the Subcommittee on Cancer and by the Standing Medical Advisory Committee, discussions were held with the Royal College of Obstetricians and Gynaecologists and the Royal College of Pathologists with a view to setting up a centralized service of surveillance by radio-immuno-assay based on notification of patients with hydatidiform mole and the scheme was inaugurated in the autumn of 1972.

#### *b. Breast cancer screening*

In England and Wales about 10,000 women die each year from cancer of the breast. The death-rate has been increasing gradually from approximately 350 to 420 per million female population over the past two decades but when adjustment is made for age the standardized mortality has remained remarkably constant over many years. The five-year survival rate of treated cases (all stages included) is about 50 per cent; it is only after 10-15 years that the life expectancy of survivors approaches normal (12). Trials comparing different treatment regimes are in progress but on present evidence there is little to choose between them, for example between simple mastectomy with

post-operative irradiation and radical mastectomy with irradiation (13), or between radical mastectomy and extended tylectomy (14). It is generally accepted that prognosis depends more on the histological grade of the tumour than on the stage at diagnosis or type of treatment (15-16). However, there is some evidence that cases without nodal involvement have a better prognosis (17), and this has led to the suggestion that early diagnosis may be beneficial.

There is therefore increasing interest in the possibility of reducing mortality from breast cancer by presymptomatic detection and treatment. Several reports on screening programmes using palpation, mammography, and thermography have appeared during the past few years; all have shown that some previously unrecognized cancers can be detected by screening. Only one of these studies, however, has attempted a randomized controlled trial of the effectiveness of screening. This investigation which is still in progress, has been sponsored by the Health Insurance Plan of Greater New York. The study, which started eight years ago, offered screening by palpation and mammography in four successive years to 31,000 women, their subsequent progress being compared with that of 31,000 control women who were not offered screening. Preliminary mortality results (18) to the end of October 1969 reveal that there were 31 deaths from breast cancer in the study group compared to 52 in the control group, the difference being virtually confined to women who had been in the study for more than two years and aged between 50 and 59 years. The further progress of this project is being followed with great interest to see whether the early promise of a reduction in mortality is maintained over the longer term. Various methods of early detection of breast cancer have been used in this country, for example, clinical palpation for women over 25 in a general practice/local health authority setting (19). This method was also used in the multiple screening clinic at Rotherham (20), and for women attending cervical cytology clinics, either as a single procedure (21) or in combination with mammography and thermography. In a recent comparison of the diagnostic accuracy of different screening techniques it was concluded that neither thermography nor 70-mm mammography was of value as an isolated screening procedure (22).

A Joint Working Group on Breast Cancer Screening (Chairman: Professor T. McKeown) was set up in June 1971 comprising members of the Standing Sub-Committee on Cancer and the Sub-Committee on Screening of the Standing Medical Advisory Committee. At an early stage the Group decided that the time was past when a controlled trial could be launched in this country with a good prospect of its being continued for a sufficient period of years to establish what effect screening had on mortality from the disease. They considered that we shall be obliged to await the results of the HIP Study, referred to above, for an assessment of the likely benefits from screening. Meanwhile, the Group has concentrated on a study of the problems that would arise, if in due course, it is decided to inaugurate a

national screening service. What advantage would mammography plus physical examination have over physical examination alone? What staff would be needed for each modality and what training would they require? How could clinics best be organized and what kind of response can we expect from the public if a service were to be offered? Can a high-risk group be defined so as to ensure a better yield for the effort made? The Group has recommended that field studies designed to provide answers to these and other questions be undertaken and projects in Edinburgh and Manchester have been approved by the Health Departments. Further studies are under consideration.

Work under the aegis of the Imperial Cancer Research Fund (23) has opened up the prospect of being able to identify by means of an assay of urinary androgen excretion, a group of women at higher-than-average risk of developing breast cancer. The possibility of a two-stage screening procedure introduces unusual implications which are being examined by the Joint Working Group.

### *c. Cervical cytology*

In England and Wales, 2,343 women died from cancer of the cervix in 1970, a number which represents for that year 4.4 per cent of deaths of females from all forms of cancer and 0.8 per cent of deaths of females from all causes (24). Malignant disease of the cervix, however, affects many women with an otherwise good expectation of life. Thus, in the age-group 45-54 years cervical cancer accounts for 4.2 per cent of all female deaths. Over the years there has been a gradual decline in the death-rate from the disease: the rate in 1960 for example being 109 and in 1970, 93 per million female population. Whether the trend is due to a declining incidence or to improved therapy or both is uncertain. The present national cervical cytology screening service began in January 1967 and over six million tests have been made since then. Examinations are carried out by hospital gynaecological, ante- and post-natal clinics, at local health authority and family planning clinics, and by GPs. Priority was initially given to women aged 35 years and over and the emphasis continues to be placed on this group because of the higher incidence of cancer of the cervix in older women. Younger women are not, of course, precluded from using the screening facilities, and indeed about half of all tests relate to women under the age of 35 years. Screening at earlier ages is necessarily accompanied by some uncertainty about the long-term management of a positive smear. Regular examinations are desirable and currently the recommended interval between them is five years. This aspect is at present under review by the Committee on Gynaecological Cytology.

In October 1971 the DHSS announced that a national recall scheme would begin in January 1972 whereby women aged 35 and over whose previous test result was negative would be invited to have a further test five years after their last examination.



To be effective in preventing cervical cancer, cytological screening of symptomless women should be most intensively applied to those most at risk. There are well-recognized risk differentials other than age. In the most recent data (25) standardized mortality ratios for cervical cancer of married women aged 15-64 years classified by their husbands' occupation show a six-fold gradient from social class I to social class V. Our information on the point is inadequate but such as it is, it does not indicate anything like a comparable gradient in response rate. This is not an unfamiliar problem in public health: those most in need are least likely to make use of the facilities provided. We need to know a great deal more about the attitudes of women to gynaecological cytotesting, particularly those at special risk. The DHSS has supported work by Wakefield and his colleagues at the Department of Social Research, Christie Hospital, Manchester, whose report (26) deals with the attitudes of doctors regarding the provision of cytotests for women at risk; how women learn of the test and what brings them to have it; why they prefer one place to another to have it done; and why some do not have tests and others fail to come back for regular repeat tests.

Because age is by far the most significant factor known in its correlation with the fatal forms of cervical carcinoma, the DHSS is sponsoring the operation of a controlled recall system under Dr A. I. Spriggs at Oxford. This investigation will examine the feasibility of a recall system using a sliding scale of interval between successive smears related to the age of the woman; women under 40 will be recalled every five years, but those between 40 and 50 every three years, and those over 50 years, every year.

Certain other aspects of cervical cytology are being studied in the Department of Social and Preventive Medicine, University of Manchester, and the Department of Pathology, Christie Hospital, and the Holt Institute. With research funds provided by the DHSS and an increased allocation from the regional hospital board the cytology service of the hospital has been developed so as to be capable of yielding large-scale population data. Comparisons will be made of the incidence of cervical carcinoma *in situ* and the incidence of invasive cervical cancer, in each case related to age and social class. The error rate of the screening procedure is also being studied and may well prove to be larger than is commonly thought. It may be possible eventually to assess the effect of screening on mortality and to evaluate any risks there may be pertaining to cytological examination and biopsy of the cervix. The opportunity is being taken of correlating the Manchester study with a computer-based screening programme in the county of Cheshire, the costs of which are borne by the Cheshire County Council.

A survey of exfoliative cytology is being carried out in Cardiff to discover the effect of the service on cancer of the cervix. A retrospective survey of new cases of cancer of the cervix in the years 1959-63 will be used as a baseline to determine what changes occurred in morbidity and mortality following the introduction of a cytological service. Epidemiological studies

will be made with the aim of providing new information on the factors associated with cancer of the cervix. This research is a co-operative effort of the DHSS, the Welsh Office, the MRC, the Welsh Hospital Board, and the Cardiff local authorities.

## 4. Diagnosis and management

### *a. Carcino-embryonic antigen*

A promising approach to the early diagnosis of certain forms of cancer has been the development by Gold and his colleagues (27) at Montreal of a radio-immuno-assay capable of detecting minute quantities of carcino-embryonic antigen (CEA) in the blood of patients with bowel cancer. Colonic carcinomas were first reported to possess a tumour, associated antigen by Gold and Freedman in 1965 (28), and as the same constituent was found in human foetal and embryonic digestive organs it was termed carcino-embryonic antigen by these workers.

The potential value of CEA as a diagnostic test for cancer of the colon is being intensively investigated following the initial series when Gold and Freedman (28) reported 97 per cent positivity in patients with the disease. Gold has since reported five cases of colonic cancer in which positive assays promptly fell to negative levels after surgical removal of the tumours, the implication being that CEA estimations might be useful in monitoring the progress of patients after treatment. The current studies of CEA have been reviewed by Zamchek and his colleagues (29), who reported that 23 cases out of a series of 26 patients with cancer of the pancreas had positive assays. Positive CEA levels have now been observed in patients with cancers of lung, breast, ovary, urinary bladder, and prostate; and in neuroblastoma, multiple myeloma, and osteogenic sarcoma.

At the present time it is not known whether these varying results are due to differences between antigens, antibodies, or the assay methods used by workers in different laboratories. Moore, Kupchik, and Dhar *et al.* (30), observed that approximately 50 per cent of selected patients with severe alcoholic cirrhosis had positive CEA assays, the levels of CEA observed usually being lower in patients with alcoholic liver disease than in those with colonic or pancreatic cancer. Lo Gerfo *et al.* (31) reported that 10 out of 31 patients with ulcerative colitis, but without cancer, had positive assays; positive assays were also found in 1 out of 29 patients with benign colonic polyps. The usefulness of the assay in helping to select for colectomy, patients who have the greatest risk of cancer of the colon, remains to be decided. It seems that the present assay for CEA is not diagnostically specific for cancer.

The biological basis of the test is not yet understood and its validity can only be established by clinical research. Much work needs to be done on the standardization of this technique before it will be suitable for general application as an aid to cancer diagnosis. Recent investigations in Britain

are described by Hall *et al.* (32). At the present time the lack of specificity rules out the test as a possible method of screening of symptom-free people.

Developments in this new field are being kept under review by a Joint Steering Committee, set up by the DHSS and the MRC in July 1971, under the chairmanship of Professor Sir David Smithers.

### *b. Leukaemia*

Although accounts of what now can be interpreted as leukaemia are as old as Hippocrates, the disease was not recognized as a clinical entity until a little over a century ago. Today leukaemia is the most important single problem in haematology and interest in the disease has been awakened by the advances in medical treatment which have been made in recent years. A number of cytotoxic agents are now available and hormones and enzymes have also been used. The potential role of immunotherapy is being intensively explored, but its value in the management of human disease has yet to be proven. Improvements in the survival of patients with leukaemia may be attributed not only to a more varied armamentarium of anti-cancer drugs but also to a better understanding of the way in which such drugs should be used. Initially in acute leukaemia single drugs were administered daily, but Skipper (33) showed that with some agents, especially methotrexate, intermittent administration was more effective. It seems that with intermittent administration of the cytotoxic agent, normal cells recover more rapidly than malignant cells, so that larger doses may be given which are more effective in prolonging remission. The regimen developed at the Memorial Hospital, New York, for example for the treatment of childhood leukaemia, has increased the mean survival from five months in the absence of specific treatment, to more than three years (quoted Fairley) (34). In 1967 Burchenal (35) collected 157 cases of proven leukaemia from the world literature, of whom no less than 103 were alive and free from the disease between five and seventeen years later. If remissions of five years or more can be obtained in children with acute leukaemia, an exciting prospect, we may well find in due course that many have been cured.

It is not possible to continue giving large doses of cytotoxic drugs indefinitely because of cumulative toxic effects and attempts have been made to overcome these limitations by administering combinations of drugs and by varying the timing and spacing of treatment. Because different classes of cytotoxic drugs have different biochemical actions a combination of them may increase the anti-tumour effect without a parallel increase in toxicity. These regimes call for an exceptionally high standard of medical care and supportive therapy. Hitherto, the use of isolation and reverse barrier nursing has been considered a *sine qua non* when massive chemotherapy of this kind is being applied. Whether such elaborate measures of protection against infection are essential has never been specifically tested. In the United Kingdom, trials of various treatments for leukaemia are organized by the MRC through the

NHS with the co-operation of haematologists on a country-wide basis. The DHSS has supported the establishment of special isolation units at the Royal Marsden Hospital in July 1965 and at Hammersmith Hospital in October 1971, for the treatment of leukaemia. It is hoped to establish another unit for the treatment of leukaemia and the medical treatment of other forms of malignant disease at the Hackney Hospital. Discussions have been held with the North-East Metropolitan Region Hospital Board and the Board of Governors at St Bartholomew's Hospital. The Hackney unit will be supported by the Dawn Trustees and the MRC, as well as by the DHSS.

### *c. Asparaginase*

The discovery of the cytotoxic property of asparaginase began with the observation by Kidd (36) that guinea-pig serum would cause regression of certain lymphomas in mice. The sera of other species such as horse, rabbit, and man were found to be ineffective. The substance responsible was shown by Broome (37) to be asparaginase. Boyse and Old and their co-workers (38) demonstrated that sensitivity to asparaginase was a common property of certain classes of mouse leukaemias, and when Mashburn and Wriston (39) were able to extract asparaginase from *Escherichia coli* in sufficient quantities it became possible to conduct clinical trials. Complete remission of acute lymphoblastic leukaemia in patients treated with *Escherichia coli* asparaginase were first reported in 1967 by Hill *et al.* (40) and Oettgen *et al.* (41).

The Ministry of Health, as it then was, undertook the development of the enzyme for clinical trial and set up a working party under the chairmanship of Dr (now Professor Sir Richard) Doll to supervise the work. The Microbiological Research Establishment at Porton Down in Wiltshire was commissioned by the Ministry for research and development funds to produce the material and successfully isolated asparaginase from an organism not hitherto used for this purpose. The bacterium was *Erwinia carotovora*, a plant pathogen causing 'soft rot' in carrots (42). When first prepared the bacterial enzyme was liable to be contaminated with endotoxins and careful purification and testing in animals were necessary before it could be used in human patients. It has been established that asparaginases from different sources are serologically distinct (42) and it may prove an advantage in clinical practice to have available enzymes possessing different immunological properties. Collaborative clinical trials have been conducted by the Leukaemia Committee of the Medical Research Council both on the *Erwinia carotovora* and *Escherichia coli* types of asparaginase.

While a wide variety of conditions have been treated, useful remissions using the enzymes as a single agent have been obtained in three: acute lymphoblastic leukaemia, leukaemic lymphosarcoma, and lymphosarcoma (43). Nowadays asparaginase is usually used in combination with other drugs such as vincristine and daunorubicin, the combination having been

found superior to asparaginase alone in inducing remissions in children suffering from acute lymphoblastic leukaemia.

The use of asparaginase is often accompanied by undesirable side-effects and allergic reactions occur in about one-fifth of the patients treated. Should these develop with an asparaginase derived from *Escherichia coli*, a switch to use *Erwinia carotovora* asparaginase may be beneficial.

Asparaginase is capable of causing a range of toxic effects: an increase in blood urea has been observed and mental confusion may occur. Serious side-effects are fortunately not common; moreover these are usually dose-dependent and reversible in most cases.

Although we would now judge that asparaginase has only a limited place in the treatment of malignant disease its theoretical importance is considerable. Normal cells can manufacture their own asparaginase but some malignant cells lose this capacity and become dependent on a supply in their environment for their continued growth and reproduction. Asparaginase depletes the intravascular asparagine without affecting intracellular levels and so deprives the malignant cells of their external source of supply. It is possible that further substances with deprivation actions similar to that of asparaginase may be found which depend for their action on the differential susceptibility of malignant cells.

#### *d. Cancer organization*

Cancer ranks second to cardiovascular disease in numerical importance as a cause of death at all ages while in middle life (45-64 years) the death-rate in the two groups is approximately the same. Apart from accidental death, cancer is the most common cause of death in children. These few facts give some indication of the importance of cancer and why it therefore demands attention. But, in addition, we find today that many of the problems concerning cancer are being looked at anew: much thought is being given to prevention, public education, diagnosis and treatment, and service needs. The Standing Sub-Committee on Cancer considered that the time was opportune for taking a fresh look at the organization for dealing with cancer within the framework of the NHS. The Sub-Committee also took the view that the effectiveness of cancer prevention and patient care could be improved and should be related more closely to relevant research work pursued through the universities, the MRC, and the voluntary bodies.

The resulting study was published in the report by the Central Health Services Council for the year ending 31 December 1970 (44) and later revised. The Sub-Committee proposed that a comprehensive service should be offered in three or four regions as trial organizations to improve and augment the use of facilities and expertise. The service should be co-ordinated through oncological centres, these centres being the hubs from which a cancer service would radiate, where special facilities and experience would be concentrated and where assessment of the value of every aspect of

organization would be arranged; and therefore that no attempt should be made to concentrate all clinical work with cancer patients in special institutes. At the oncological centres clinical experience could be widened and there would be a multidirectional flow of information between clinicians, research workers, pathologists, epidemiologists, surgeons, and others with an interest in the cancer field. The GP service would be closely involved in the oncological organization. Oncological centres would enable research teams to co-operate with special clinical study groups located in any of the co-operating hospitals. The centres would facilitate the investigation and treatment for certain rare tumours, an activity already being developed on a national scale. Within the centres, opportunities would be afforded for the continuing education in cancer of doctors, nurses, social workers, and other professions ancillary to medicine. These proposed oncological centres would be few in number and might be developed as part of a university and form an integral part of a regional organization which would include several general hospitals. The medical staff concerned would hold joint appointments in the general hospitals and the oncological centre. The internal referral of patients within a group of co-operating hospitals would be encouraged so that each patient would have at his disposal the best service available for his need. Some of the traditional boundaries in research departments and clinical disciplines would be broken down so as to encourage interactions at all levels in research, teaching, and clinical practice.

Following the publication of the report, the views of the Royal Colleges, the British Medical Association and others were canvassed and the revised version of the plan, amended in the light of the opinions expressed was endorsed by the Standing Medical Advisory Committee and the Central Health Services Council. In May 1972 the Secretary of State for Social Services (Sir Keith Joseph) announced the Government's acceptance of the recommendation that organizations on the lines indicated be established on a trial basis in three or four regions.

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# Research into terminal care of cancer patients

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CICELY SAUNDERS and  
ALBERTINE WINNER

## Introduction

The position of terminal care in this country is at present unsatisfactory. Up till about fifty years ago death was a commonplace for both doctors and public. People expected to face the deaths of their children and young adults as well as those of their older relatives, and doctors were confident in their role in the face of the inevitable. Now, with the advent of antibiotics, heart-lung machines, artificial kidneys, cytotoxic drugs, and the whole panoply of modern medicine, the picture is changed. It is now the exception for the young and early middle-aged to die, and with this has grown up an inability on the part of the public to cope with death, and a feeling of guilt, embarrassment, and inadequacy on the part of the doctor in the face of illness he cannot cure. Death is now the great 'taboo' subject and hospitals are unwilling to make beds available for incurable patients.

There are signs that this attitude is changing. A small number of organizations and regional hospital boards have set up units for the terminally ill and doctors, nurses, and social workers are coming for instruction. But much still remains to be done. In comparison with the amount of energy and effort which is expended on acute and often rare conditions, terminal care has received little attention and little research is going on in this country.

## Present position in the UK

About a third of the patients who die of cancer in the UK do so in their own homes. Many present no great problem of management but the suffering

which was revealed by the district nurses in the Marie Curie Memorial Foundation Survey of 1952 (1) is being shown again in current surveys. In *Peace at the Last* (2) Hughes showed the bewildering variety of care that may (or may not) be available for the individual patient. The situation is only just beginning to improve.

There are a number of well-recognized organizations (mainly in the London area), which cater for patients who are terminally ill. St Joseph's Hospice, Hackney; the Hostel of God; St Luke's Hospital; and St Columba's Hospital have been in existence for many years, and special units have recently opened in Sheffield and Manchester.

The Marie Curie Memorial Foundation has a number of nursing homes, also staffed by GPs, where patients with cancer can receive terminal care, and it also supports a number of nurses specially trained to look after patients in their own homes. Five years ago (in July 1967) St Christopher's Hospice, Sydenham, came into existence to try to fill the gap existing not only in the care of patients dying of cancer but also in teaching and research in this field. Its aim was to develop and extend the understanding of the management of the terminal phase possessed by the rather few staff of the existing homes so that it might be passed on to a much wider field than had been reached previously. It has a specialist medical staff and is generously staffed on the nursing side. The same pattern has been followed by St Luke's Nursing Home, Sheffield, and in part, by St Anne's Hospice in Manchester. Similar organizations are developing in other areas.

The proportion of patients who can be looked after by such special institutions is, and always will remain, very limited. Many patients die in their own homes and this can be satisfactory, especially if home conditions are such as to meet their needs. However, a recent survey by Cartwright *et al.* (3) has shown that conditions are not always right and it is the experience of those working in this field that patients may die alone, confused, incontinent, and unhappy, without anyone but a neighbour giving help. On the other hand, the devotion of many relatives is beyond praise and it is quite untrue that the majority have no concern for their old or dying relatives.

Rather more than 60 per cent of patients with terminal malignant diseases die in hospital, often in geriatric units. This can be the place of choice when the staff have a particular interest in such patients and since it is likely to continue to be so much effort should go towards improving it.

## Literature

In 1935 a small book was published in the USA based upon a course of lectures given in Harvard Medical School by a family doctor, Alfred Worcester. This was republished in this country in 1961 (4). It remains a classic and the three topics, *The Care of the Aged, the Dying and the Dead* (the bereaved family) could still be used as the most suitable headings for any analysis of

the now extensive literature concerning terminal care. It might be added, however, that to keep such an analysis up to date has become almost impossible. An increasing spate of communications has been mounting over the past ten years, much of it from the USA.

Hinton's *Dying* (5) considers the problems of the dying patient and his family in this country in a way which is both helpful and stimulating to all groups of readers. Unlike most of the writing in this field it is based in part on his own research: *The Physical and Mental Distress of the Dying*, a study of 102 matched pairs of patients in a London teaching hospital, which appeared in 1963 and is still the most or indeed the only authoritative work of its kind (6). Both he and Saunders in a review article (7) give fairly comprehensive bibliographies. A selective list from the USA was compiled with comments by Pearson in 1969 (8). The recently formed Foundation of Thanatology of New York,<sup>1</sup> is at present acquiring a far more extensive collection of references and is currently reprinting a number of articles which have appeared in the world press in recent years. Its aim is to bring together a library covering this whole area. A volume with the title *The Medical Care of the Dying Patient* is planned for 1973/4. The Foundation produces a quarterly journal, *Archives of the Foundation of Thanatology*.

Regretfully one must still conclude that in spite of all this interest most of the articles which appear in so many of the medical, psychiatric, and sociological journals throughout the world remain descriptive and anecdotal. Some of them are certainly based on extensive clinical work and show much insight into the problem, but few rest upon systematic quantitative studies. Further action will have to depend on studies presented with the authority of analysed experience.

In whatever way it is presented, one theme runs through much of this writing; a description of the isolation imposed by society, including professional workers of all kinds, upon the dying and the bereaved. Gorer's *Death, Grief and Mourning in Contemporary Britain* (9), and Glaser and Strauss in two books (10, 11), underline the isolation which is at present suffered by families and patients alike. This isolation is further emphasized by Kubler Ross in *On Death and Dying* (12). Perhaps this book more than any other has stimulated people to look afresh at the problems of terminal care. Nevertheless teaching will inevitably lack authority and the general principles which can be transferred into different settings, until there are more studies of a systematic kind such as Hinton's.

This chapter is not the place in which to describe in detail the work of St. Christopher's Hospice, but some background is necessary. It was planned as a small unit which would admit patients from all over London, teach students from a wide distribution of medical schools and from a number of professions and carry out special studies not only into the clinical problems of terminal illness, but also into the types of service patients and their families

1. 630 West 168th Street, New York.

need and appreciate. The DHSS was interested in the studies of the service aspect and supported the building of the out-patient clinic, the staffing of the domiciliary service, and research into bereavement and the control of terminal pain.

## Special studies

### *Out-patient service*

The concept of caring for terminally ill patients as out-patients is not new. Local district nurses have for many years carried out much excellent terminal care and the Marie Curie Memorial Foundation nurses have for some twenty years gone into patients' homes to care for them.

A fair proportion of the patients admitted to St Christopher's go home for short periods of a day or two, or a long weekend. About 10 per cent become fit enough for discharge for a period of time greater than a week.

Neither staff nor patients can be sure how they (and their families) will cope at home. The existence of the out-patients' department to which patients can come back for advice and assessment is a help when patients are being discharged. Just as valuable, if not more so, is that the clinic nurses visit patients in their own homes. They have become familiar with the special problem of a terminal illness and have learned how to help both patients and their families to talk about their fears and griefs. In consultation with family doctors and Hospice medical staff they review drug regimes. If the family doctor, district nurse, or clinic staff, or the patients, consider that readmission is necessary this is arranged swiftly.

Admission to St Christopher's Hospice does not necessarily occur immediately after patients are discharged from an acute hospital. They may have a period of time at home under the care of their family doctor and district nursing services. They may be supervised as hospital out-patients for a while. The out-patients' clinic is used for referral by GPs when patients need better pain control and often for those who sooner or later have to decide whether they can continue to live at home or whether they have to return to a place where skilled help is available twenty-four hours a day, seven days a week. Visits to the clinic give the patients a chance to see the Hospice and get to know some of the staff. A patient may continue to manage at home for a while with the help of the district nursing services, and some support from the home care team, but often with the arrangement that the patient is assured of admission at a later date when this becomes necessary. The clinic staff do not normally undertake any nursing duties in the home and do not intrude upon the sphere of the district nurse except in emergencies or by special request. Nevertheless, their availability at any time for consultation or reassurance, and their knowledge of symptomatic treatment in general as well as its application to a particular patient, give them a special place in the family's confidence.

The number of patients visited by the home care team each month has risen from 16 in 1969 to 79 in 1971. In the first year 117 were admitted from home through the clinic to the Hospice and 74 died there; but 21 remained at home to die. In the second year 138 were admitted to the Hospice; 69 died in the Hospice and 34 died at home. The average period for which patients have been enabled to remain at home (often after admission has at first seemed urgent) has been about three months.

The total number of patients seen by the clinic staff in the first and second years has shown a moderate increase; during 1969/70, 504 patients were seen in 1,053 home visits, and in 1970/1, 673 were seen in 1,155 visits. The clinic sessions are deliberately kept small with only four to six patients attending, each with their nearest relative. They become social occasions with individual and group discussions of obvious therapeutic value.

The clinic arrangements make it easier to establish liaison with family doctors and this greatly facilitates continuity of care for the terminally ill and does much to bridge the gap that often exists between hospital and home. It does not detract from the responsibility the family doctor has for his patients, rather, by bringing the nurse with special skills into the situation, it enables him to keep more of his patients at home for longer periods during their terminal illness.

St Christopher's has doubled the number of people who are in its care at any one time by the establishment of its out-patient service. At the same time it has been made to consider what future developments should grow from its present experience. Two needs stand out. Some families will always want to keep a patient at home to the end and this can be made possible for them if a nurse whom they know is available to stay with them during the last hours. The present staff do this when it is possible, but it taxes their time and their energies. Other patients require admission for their last days or even hours and in many cases it is best for them to come into single rooms. A new ward is being planned from which staff can go out into the community and into which these patients can be admitted when necessary.

Very little has been written about the relative merits of home, hospital, and hospice but several investigations are in preparation. Cartwright, Hockey, and Anderson have done a study on about 750 randomly selected deaths which is to be published shortly (3). Parkes has been carrying out a description and evaluation of the patterns of terminal care for patients dying of malignant diseases in two London boroughs as seen through the eyes of surviving families. This will shortly be in the press. A separate study comparing the families whose relatives died in St Christopher's Hospice and those who were either in other accommodation or at home will be following later. As this work, and the evaluation of visits and follow-up of bereaved families by staff at St Christopher's is developed more data should become available. From it we hope for some guidelines when planning and developing institutional and community services in the future.

It is not easy to assess an operation of this kind. The pattern of continuing home care as long as possible with admission for the final week or two of a patient's life seems to leave the least guilt in bereavement. The figures, which are still being collated, could be looked at in terms of so many weeks at home instead of in an acute hospital bed, but better still they should be recognized as pain relieved, personal support given, and a peaceful death.

### *Pain*

For a minority of older patients and for many of those in the younger age-groups the pain of terminal cancer remains a problem which is not always adequately tackled either in the patient's home, or in a busy general ward, where the problems of most of the other patients are so different. Studies are being instituted in an acute hospital to discuss ways of solving this problem, but there will always be a place for those special units where time is planned for reflection on the nature and management of terminal pain.

The typical pain of terminal cancer is constant in character, even when it has exacerbations, as with movement. Constant pain calls for constant control, and at this stage that control will call for strong analgesics, in most cases the opiate drugs. The teaching of the past; that doses of narcotics should be spaced as widely as possible to avoid the onset of dependence, does not apply to this situation. Drugs should be used to prevent pain from occurring rather than to control it once it is present. Pain is the strongest antagonist to the drugs given to suppress it, and it is of cardinal importance that neither its threat, nor its presence, should make any patient have to ask continually for relief. If he has to do so, he will be reminded each time of his dependence upon the drug and upon the person who gives it to him. If his analgesic is given regularly (with a slightly permissive or relaxed schedule so that no one is obsessively clock-watching), in a dose carefully assessed to cover a little longer than the chosen period, pain can be forgotten and the spiral of its self-perpetuation, dependence, and misery is never initiated.

An enormous amount of work has been carried out in the field of controlled clinical trials of analgesics and their adjuvants. Nevertheless there remains a gap in the assessment of their effects and side-effects in their long-term administration for patients with chronic pain. A search of the literature failed to find any trial comparing diamorphine and morphine in terminal cancer care and the claims made for the former still rest upon clinical impression. The trials have all been of single doses in an acute situation. This is most unsatisfactory, especially in view of the World Health Organization policy concerning diamorphine, and needs to be corrected. A preliminary double-blind trial showed that the staff of St Christopher's was unable to distinguish which patient was having morphine and which diamorphine by mouth, when both were used in a cocaine/alcohol mixture. Further double-blind assessment of the two opiates will be made in suitable patients admitted to St Christopher's Hospice. The modifying effects of commonly used adjuvants such as cocaine,

phenothiazines, and glucocorticosteroids will also be investigated. Biochemical techniques, in order to arrive at a basic understanding of the way in which the human body handles diamorphine when administered orally, are also to be developed.

Results of such work and that of others in the field should bring a rational approach to the teaching in this subject that has been lacking for too long.

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# 3

## Mental health research

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JOHN BROTHWOOD

The DHSS's research programme in mental health has continued to expand and diversify since certain aspects of it were reviewed in volume 1 of *Portfolio for Health* (1) but as always the content of the research programme depends to a large extent on the availability of trained research workers with an interest in topics of concern to the DHSS. In this volume aspects of the work of the Special Hospitals Research Unit, the Addiction Research Unit, and the General Practice Research Unit at the Institute of Psychiatry and of work being undertaken through the Institute of Education are reviewed, and an account is given in this chapter of other aspects of the DHSS's programme and of a conference held at the Nuffield Provincial Hospitals Trust.

Within the DHSS, the activities of the mental health statistics section continue, and there is now a regular publication each year of data relating to the Mental Health Enquiry and to the facilities and services given by psychiatric hospitals. Both sets of information are useful to administrators and planners at local and national level. There are also publications (2, 3) in the statistical series and recent publications have been concerned with day-hospitals (4) and the Nottingham psychiatric case-register (5). Both have aroused general interest.

Work undertaken for the DHSS by outside bodies is at various stages of development. In mental handicap, the results of surveys supported by the DHSS in Wessex, Camberwell, and Newcastle were used and published in *Better Services for the Mentally Handicapped* (6). Dr Kushlick in particular is continuing his work in this field and reference to it is made elsewhere in this volume.

One of the pressing problems of mental handicap in children is concerned with ways of teaching them to acquire socially acceptable behaviour, and in



modifying undesirable behaviour patterns. Three groups of workers are looking at these problems from different points of view. Professor P. Mittler at Manchester and Professor Jack Tizard in London are concerned with developmental aspects of behaviour, while Dr Michael Rutter at the Institute of Psychiatry is concerned with the treatment of autistic children. It is possible that, at some stage, there would be benefit to be derived from a conference involving all workers concerned with the developmental processes in mentally handicapped children.

So far as mentally ill and seriously maladjusted children and adolescents are concerned, the DHSS is supporting a study by Dr Philip Graham (Hospital for Sick Children, Great Ormond Street) into the prevalence of behaviour disorders in 3-year-old children. Medical and social (including family) correlates are being studied, and it is hoped to develop a screening instrument for use by nurses and possibly social workers, so that children with severe and persistent behaviour disorders can be identified at an early age. It is also intended to study the natural history of behaviour disorder manifesting itself at the age of 3 years, with a view to distinguishing those children who improve without treatment and those who do not improve without help. This should permit of a more rational allocation of resources than is possible at the present time. One of the particular problems of developing a policy for the mentally ill or seriously maladjusted adolescent lies in the multiplicity of facilities which are available to them, albeit often unco-ordinated. The DHSS is supporting Dr Edna Irwin in a descriptive study of adolescent problems arising in part of Birmingham, which should go some way to identifying the problem.

Another study which will make a contribution to knowledge of adolescents is a descriptive account of the work of the Brent Walk-In Centre undertaken by Dr Laufer, and to be published shortly.

The role of the nurse in the NHS generally is the subject of much discussion at the present time. The nurse is a most important member of the mental health team, and there is considerable interest in developing her therapeutic role further. Recruitment and other factors are being examined by Dr Peter McEwan (University of Sussex) with support from the DHSS, while a study at the Bethlem Royal and Maudsley Hospitals is concerned with the feasibility of systematically training nurses in the use of behaviour therapy techniques. In addition, the process of innovation and change in psychiatric hospitals, which is often heavily dependent on nursing attitudes, is being examined at Cambridge by Dr David Towell of the Tavistock Institute.

At the invitation of the Nuffield Provincial Hospitals Trust, a one-day seminar (7) concerned with the DHSS's mental health research programme was held in November 1971. It clearly was not possible to consider the whole programme during the course of a single day, and attention was particularly focused on psycho-geriatrics, district services for the mentally ill, the mentally

handicapped, and psychiatric morbidity at primary care level. Current research in forensic psychiatry, addiction problems, and child and adolescent psychiatry were not considered. Even so, the conference proved to be a very full working day.

It started with Professor Sir Martin Roth outlining some of the research findings from the Newcastle area, on the basis of which he suggested that a policy for the aged with mental disorder could be formulated. He drew particular attention to the size of the problem, the need for multidisciplinary assessment, and the need for the best use of available resources. He suggested that further work was required in identifying the social networks which enabled many old people with severe dementia to remain at home, and for those for whom admission to a hostel or hospital was required he suggested that research was needed into the type of buildings which would be best provided. Dr Arie (Goodmayes Hospital, Ilford) followed with a description of the effect of identifying the psycho-geriatric problem as a separate clinical and organizational problem under the control of a single consultant psychiatrist in a local context. His particular concern was how high morale of all involved in work with the elderly might be maintained and encouraged. In his view the appointment of a psychiatrist with a special interest in the elderly could act as a catalyst in developing a comprehensive service for the elderly with mental disorders. Both speakers stressed the size and immediacy of the problems and the need for further research.

Dr Alex Mezey (London) brought together in synoptic form a number of studies he has undertaken in north London with the support of the DHSS. He pointed out the difference in admission rates for in-patient treatment in three different local authorities all served by the same psychiatric service. Furthermore he had related the differences in admission rates to demographic and social variables. From this point, he argued that there was a need for a flexible policy in the provision of psychiatric services, and that ideally the provision in any one area should be determined after local studies had been undertaken. He had also examined the statistical relationship between in-patient and out-patient work and had concluded that for the majority of patients they were not alternative methods of care. Both services were expanding in terms of numbers seen and treated. He had also given particular attention to the accumulation in hospital of long-stay patients and had found, as others have, that the middle-aged schizophrenic and the elderly dement were the major groups represented. On the basis of practice in the area for which he is responsible, it was estimated that about 1 bed per 1,000 was required, although it was suggested that not all of these need be provided by the hospital service. A study of the psychogeriatric problem had not revealed any serious degree of misplacement as between psychiatric and geriatric services. As a group the most seriously ill were those aged 75 or over who tended to have a mixture of physical and mental symptoms.

Dr Lorna Wing described the Camberwell service, the register which

had been set up to monitor statistical trends, and some of the findings. She also described a workshop study in which a comparison had been made between a group of chronic psychotic patients (mainly schizophrenic, and all unemployed for at least a year before admission to the study) for whom special rehabilitation measures had been undertaken and a control group in which no special measures were employed. The results showed that for the patients under study, the arrangements made for rehabilitation did not materially influence the outcome in terms of social and occupational patterns. It would appear that further work is required to examine the reasons for this finding, but at first sight the argument for expansion of sheltered work facilities in the community for this type of person would appear to be reinforced.

Dr Albert Kushlick's paper was concerned firstly with the Wessex Survey of the mentally handicapped and the register which was set up subsequently. From the register it was possible to select children for two hostels, one in Portsmouth and one in Southampton. The progress of the children in these hostels will be compared with others for whom it is not yet possible to provide hostel care. Within the hostels, factors which are considered to be anti-therapeutic are being identified. One of the major factors so far isolated has been staff shortages, which are particularly critical at certain times of the day.

Dr Alison Rosen, who was supported by the DHSS in a series of studies on hostels for the adult mentally handicapped provided by Lancashire County Council, outlined some of the main findings. She drew attention to the fact that the hostels were increasingly being used to prevent admission to hospital, at the expense of those being discharged from hospital. She also pointed out that frequently wardens of the hostels were not involved in selection procedures although they had the day-to-day responsibility for clients on admission. The clients themselves were interviewed too, and virtually all preferred hostel to hospital care, although most, however unrealistically, said they would prefer to be at home. A tendency was noted on the part of some hostel staff to encourage dependency in clients, and in Dr Rosen's view there is a need to nurture independence, possibly by the provision of group homes for those with mental handicap who can manage in this setting.

Professor Michael Shepherd spoke about the large and pressing problems of mental ill health to be found at the primary care level. Few were referred to the specialist services, and he suggested that there was a need to improve methods of treatment and social intervention in the community.

Dr Brian Cooper described the development of rating scales for psychiatric incapacity and social difficulties between which was found a strong positive association. He suggested that there was an urgent need to explore these relationships further, as the results might have profound implications for the way in which doctors and social workers might collaborate.

Finally, Dr Brothwood outlined various possibilities for further research. The need for more knowledge appeared to be greatest in child and adolescent psychiatry, in operational research, and some methods of treatment in current use (for example, leucotomy).

It was generally felt that the meeting had been a success and that it had promoted a useful dialogue between researchers and those responsible for formulating policy. It was, however, suggested that any subsequent meetings might with advantage cover a smaller field, more intensively.

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# 4

## Child care and mental handicap

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JACK TIZARD

During the last two years negotiations have been under way between DHSS and the University of London Institute of Education to establish a Child Development Research Unit at the Institute. The Unit will be concerned with child care and mental handicap. The intention is that it should contribute information relevant to health service and social services planning. More precisely its objectives are (i) to study differing patterns of care provided by statutory and voluntary bodies responsible for services for normal and handicapped children and to attempt to account for these differences; (ii) to explore ways in which staff 'behave' in institutions which are differently structured and organized; (iii) to assess the consequences for children of different types of medical, social, and educational regimen. The work will necessarily involve us in ecological and epidemiological studies of families and subgroups living in differing social circumstances, and in attempts to analyse and explain different patterns of organizational structure in institutions which provide day or residential services for children. To evaluate the effects of these differences it will be necessary to make detailed observational studies of patterns of staff and child interaction in institutions which differ in specified ways, and to analyse the competencies and behaviour of individual children in different settings.

Much of the ongoing research, and that which is planned for the future, will be concerned with young or handicapped children who are, in a functional as well as a legal sense, 'dependent' upon adults, and in particular, upon their parents. It is intended therefore to carry out small-scale experimental studies to explore ways in which parents can be effectively involved in the services which are provided for their children. A major inquiry, preparations for which are now being completed, will make freely available

in selected small geographical areas an integrated health, education, and day-care service for all families with pre-school children living in the designated area. Parents, and the local community, as well as professional staff, will be involved in the service. The effects of such a service on the way of life and on the mental health of mothers, as well as its impact on the children, will be studied. An appropriate control group of families living in similar circumstances in which services are not readily available will also be studied, in order that the specific effects of particular services can be evaluated.

The research programme proposed draws upon experience and ideas developed in earlier work. Its aims are both practical and theoretical: practical in that the research is intended to be relevant to matters affecting public policy, theoretical in that it draws upon and aspires to contribute to, social and psychological theory. In the past, our work has been supported in large part by the MRC and the DHSS, but, as is appropriate in a university setting, collaboration and support have been obtained from other bodies: DES and the local authorities, voluntary societies, foundations, and the University of London.

## **Studies of mental and physical handicap**

Work in mental handicap began in 1948 in the Social Psychiatry Research Unit of the MRC under the direction of Professor Sir Aubrey Lewis at the Institute of Psychiatry in London. The earlier studies have been summarized in previous publications (1-4).

A major ongoing inquiry, formerly associated with the unit at the Institute of Education in London, but since September 1971 centred academically on the University of Southampton, is being undertaken by Dr Albert Kushlick into the epidemiology of mental handicap in the Wessex Region (population nearly two million) of southern England (5). A full account of this programme is contained in Chapter 5.

The Wessex research illustrates the manner in which conclusions reached in epidemiological studies, in pilot inquiries into alternative forms of service provision, and in analytical studies of factors affecting the quality of care, can be brought together and tested out in large-scale field trials.

Fieldwork for another large-scale inquiry, into the epidemiology of handicapping conditions of educational concern affecting children of school age, was recently completed on the Isle of Wight (6-7). A prevalence study of factors affecting the health, education, and behaviour of all children aged 9 and 10 ( $N = 2,200$ ) whose homes were on the island was carried out by a large, interdisciplinary team. Follow-up studies, of children, first seen in 1964 and 1965, at the end of their period of compulsory schooling are being analysed.

Another longitudinal study which, while not formally part of the Child Development Research Unit, has an academic link with the Unit, concerns

children with spina bifida born in 29 Greater London boroughs during the two years 1967-9. There were approximately 400 such children of whom more than 200 have died. The medical and social histories of the children are being studied, and detailed assessments of 168 surviving children are being made at regular intervals. Interviews, mainly with mothers, are carried out to elucidate family problems relating to the children and the services provided for them (8-9). Now that the oldest cohort is reaching the age of compulsory school entry further studies of the children's educational, medical, and social development are being planned.

We are currently studying factors affecting the progress of 100 physically handicapped children who had been placed in ordinary schools (10-11). The children are being assessed 'functionally' (ie in terms of physical handicap), educationally, and intellectually; information is being sought from parents and teachers about their emotional and social adjustment; difficulties in integration, and the views of parents and teachers about its value are being studied. Though such children in ordinary schools are not a randomly selected sample of physically handicapped children, the present group includes children with severe handicaps as well as others whose disabilities are not great. The study will therefore throw light on factors which facilitate or impede the integration of physically handicapped children in an ordinary school, and will make it possible to plan an experiment in which costs, benefits, and disadvantages of different types of educational placement can be assessed in appropriately planned settings, in which attention is paid to the quality as well as the form of schooling (10, 11).

## **Residential care of handicapped children**

A series of studies has recently been completed into factors affecting the structure and functioning of residential institutions serving the needs of the mentally subnormal. In essence, these were concerned with interrelations among three sets of variables: (i) certain aspects of the formal organization structure of different types of residential unit for the subnormal; (ii) child-care practices employed by staff working in different types of institutions; (iii) the behaviour and abilities of the children in residence. Objective techniques were developed which made it possible to examine, in a more systematic and rigorous fashion than had previously been done, aspects of the institutional environment which bore upon the upbringing of the children in residence. Significant associations were shown to exist between the structure and organization of certain types of establishment, the child-care practices employed by nursing and child-care staff of different grades in the differing establishments, and the types of behaviour and levels of attainment typically found among children living under different types of care. Even severely subnormal children, whose potentialities were gravely limited by primary mental and physical handicaps, displayed a range of

ability and behaviour demonstrably related to the type of upbringing they received. The child-care patterns which exerted an influence on the development of the children were in turn found to be related to sociological and organizational factors in the institutions (12). Among these organizational factors were the amount of responsibility given to the staff, the staff hierarchy, staff turnover, the location of the units, and the ideology which governed them. In this particular study other factors such as staff ratios, the size of the unit and of the establishment, and the salary and conditions of service, though clearly important, were found to be of less influence than were the factors mentioned above.

Two current studies of mentally handicapped children are following upon these inquiries. First, in order to throw light upon the prevalence and nature of handicaps of children who have *severe* mental, behavioural, and physical disabilities, we are attempting to develop scales by which to measure these. It is hoped that the scales will be able to be used both to provide baseline data regarding the prevalence of particular types of behavioural dysfunction, and also as yardsticks by which to measure treatment. Secondly, experiments in treatment of severely subnormal children, using techniques of behaviour modification, are being undertaken (13-15).

## Children in care

Handicapped children in residential care are a subgroup of the larger population of children 'deprived of normal home life', who are brought up in residential institutions. Such children number at least 150,000, if we include those in local authority and voluntary homes, special schools, approved schools, and other types of residential establishment. Too little information exists about the numbers of such children and the variations in provision and in placement policy in different parts of the country; what statistics are available about sizes of home, facilities, staffing ratios, qualifications, and such characteristics of the resident child population as mean length of stay, proportions who are handicapped, numbers with sibs in care and so on, are not uniformly available or in a readily usable form. In these respects, our information compares unfavourably with the data which are available about mental hospitals, or indeed universities.

In April 1970, we began to describe and examine certain aspects of residential care provision for children in England, using survey methods. Variations between geographical areas, and between different types of provision and different types of organization are being studied. The survey covers all residential provision for children with the exception of hospitals and private schools. Questionnaire data about institutions are being supplemented by data on the characteristics of individual children in care and on the geographical distribution of families of children in various forms of care. Findings at present being analysed by computer should provide the



first reasonably comprehensive census of residential establishments for children in this country. Two surveys of a somewhat different sort were undertaken earlier of the numbers of children in the care of major voluntary societies. Of 3,055 children under the age of 5, admitted to the care of three major voluntary societies in the years 1962, 1963, and 1964 (excluding children admitted specifically for adoption) nearly three in every five were boys; more than a quarter of the children were coloured; 75 per cent of coloured children and 54 per cent of white children were illegitimate; all but 9 per cent of these pre-school children went into residential nurseries or branch homes, though subsequently about a third of them were fostered. The proportion of coloured boys who remained in the nurseries for five years was very much higher than the proportion of white children. It seemed likely that among the children who will spend virtually the whole of their lives in institutional care, there will be a growing proportion of coloured boys (16).

The second survey was on admissions irrespective of age to a single voluntary society during the two years ending March 1967 and March 1969. All but 12 per cent of the 1,200 admissions were recorded as being 'long-stay' cases. Half of the children had been previously in care during some part of their lives; a third of them came from broken homes; a third had other sibs admitted at the same time, though an even larger proportion (45 per cent) were not 'only' children but were admitted without their sibs; less than a fifth were admitted after the age of 11; and three-fifths of all admissions were boys (17).

These data throw up some of the major problems of child care; they point to the vulnerability of families with young children; they show something of the size of the problem of children who are repeatedly in and out of care; they point to the fact of differential placements by sex, colour, and age, and throw indirect light upon reasons for such differences.

A complementary survey of older children living in 62 children's homes of differing sizes and run by local authorities or by voluntary organizations is being undertaken. Clinical and educational assessments have been made of children in two age-groups, and information about their life experience and their present social contacts is being collected. Data about staff, patterns of organization in the homes, special facilities, and special problems, are being obtained. The study will supplement the national survey mentioned earlier and will provide data relevant to the investigation of relationships between formal characteristics of children's homes, ways in which they function, and effects of these differences upon children in residence (18-20).

## **Children in residential nurseries**

Two studies have been carried out of children in residential nurseries. The first investigated thirty 2-year-old children who had spent almost all their

lives in residential care. Their development was compared with that of thirty 2-year-old children living at home in working-class families in London. Results showed that at age 2 nursery children were on average slightly retarded, less friendly to strangers, and more clinging to their nurses; they showed behaviour patterns more characteristic of ordinary children of a somewhat younger age. No gross disturbance or abnormality of the type reported by previous workers was found; the living conditions of the children were, however, much better than those reported in the classical literature. It was thought that the immaturity of the children was related to certain aspects of the nursery environment, notably the multiplicity of caretakers and the relative lack of outside contacts. The children have all been reassessed at age  $4\frac{1}{2}$  and the results are being analysed (21-24). In the second study all healthy children aged between 2 and 5 years in 11 residential nurseries (13 nursery groups) were assessed psychologically using a battery of verbal and non-verbal measures. In addition, the investigators spent a week in each of the nurseries making observational studies of general aspects of the management of the nursery and of the ways in which staff acted and talked to the children. Additional data were collected from the matron and staff nurses in the establishment.

Special attention was paid to factors influencing the development of language. All 13 nursery groups were scored on a scale of organizational structure, and associations were sought between scale scores, patterns of staff-child interaction, and language comprehension and expression of individual children. Social and organizational features of the social structure of the nurseries were found to be related to patterns of staff behaviour, and to differences in language comprehension and language expression in the children. In those nurseries where the children's language comprehension was highest, the staff spent more time interacting with the children, that is, playing with and chatting to them rather than supervising their play; a higher proportion of the staff talk was informative rather than merely time passing, and the staff answered the children more often.

Children aged 3 and 4 in nurseries which scored highest on the measures of organizational structure and child management practices had a comprehension of language which was equivalent to that of children of professional parents, whereas the language comprehension of children in the lowest scoring nurseries resembled that of children brought up in working-class homes. The differences were very substantial indeed: the equivalent of 25 points (1.55 SD) on a scale scored like a conventional intelligence test (21).

In a study at present being completed, a similar strategy is being applied in playgroups and nursery schools. The object is to investigate relations between specific aspects of the regimen and the types of activity engaged in by staff and pupils. The effect of the children's social class background is again being separately investigated.

## The quality of nursing care

Much of the work of the Unit has been concerned with the development of indicators with which to assess 'qualitative' differences in staff behaviour in residential establishments and hospitals. Once we can do this it becomes possible both to investigate reasons why apparently similar institutions function differently, and to explore the consequences, for patients or children, of different patterns of staff activity. In 1972 the Royal College of Nursing (Rcn) Project on Nursing Care became academically associated with the Unit. An account of Rcn studies is given in Chapter 15. Current work is attempting, through observational studies and interview, to develop scales by which to measure the quality of nursing care in general hospitals and to explore reasons for differences between wards.

## Conclusions

The work on handicapped and deprived children provides a basis for experimental and comparative studies which will examine more closely those specific factors which, in part, determine the manner in which children develop in different types of environment. Though the studies range over a number of fields they make up a research programme rather than a series of unrelated projects. Many of the lessons learnt have been methodological ones. However, starting with the examination of problems of current concern in child care we have been able to study matters of theoretical as well as practical importance. It is hoped that our future work will also be relevant both to social science and to the formulation of social policy.

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## Epidemiology and evaluation of services for the mentally handicapped and the elderly

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ALBERT KUSHLICK

In 1959 the Wessex Regional Hospital Board was created to provide and administer hospital services for a population of about two million living in the county boroughs of Bournemouth, Portsmouth, Southampton, and the counties of Dorset, Hampshire, the Isle of Wight, and a third of Wiltshire. This area had previously been administered by the South-West Metropolitan RHB.

The effect of this change on the hospital services for the mentally subnormal was considerable. In addition to sharing the national problem of a shortage of places and growing waiting-list for care, the Wessex Region was actually losing places because up to 1959 a large number of mentally subnormal people from the area had been hospitalized outside the Region's new boundaries. While no pressure was put on the Board to remove its patients from the hospitals outside, as Wessex patients in these hospitals died or were discharged, their places could no longer be filled with other Wessex citizens.

Thus the Board faced overcrowding in, and growing waiting-lists for, hospital places. Its senior officers approached Professor Jack Tizard for his advice on the number and type of places required to meet the needs in the Region.

After examining the available administrative data, Professor Tizard advised the Board to undertake a prevalence survey of mental subnormality in the Region as the data available from the hospitals and LHAs were insufficient for the purpose of determining needs.

A steering committee was set up consisting of representatives from the RHB, MRC, Department (then Ministry) of Health, University of Southampton, consultants in subnormality and child psychiatry, LHA, and general practice. The study was originally funded for three years by a grant

from the DHSS and the Nuffield Provincial Hospitals Trust to the Wessex RHB. I was invited to direct the survey and began work in May 1963.

Miss Gillian Cox, a social scientist joined in July 1963 and remained in the group until 1971. We had another research assistant and an administrative assistant.

The grant for this work was extended for a year up to May 1967. A re-constituted team, including another research assistant and the part-time services of a computer scientist, was funded by a five-year grant to Professor Jack Tizard at the Institute of Education. The group continued the epidemiological study and began an evaluation of the feasibility and comparative effectiveness of new residential units, set up by the Wessex RHB as a result of the survey, for mentally handicapped children.

It has now been enlarged to continue work on mental handicap and to begin a study on care of the elderly. It is funded up to 1976 by an MRC grant to myself. The grant, 75 per cent of which is paid by the DHSS, is administered by Southampton University.

Our research strategy has developed out of the need to solve administrative problems. Detailed descriptions of the work are available elsewhere (1, 2). This account attempts to summarize the approach which has developed since the work began in 1963.

The broad aim of the research is to develop and refine methods for evaluating services. The approach used is, very briefly, to assess the size and nature of the problem, to advise on the basis of these data on the range of policy options open to the administration for the development of further services, and then to compare the feasibility and effectiveness of new forms of service developed by the administration. A continuing register of all people known as mentally handicapped to hospital and local authority services in the Region is maintained to assess changes in the size and nature of the problem and use of residential and training services by the people so identified.

Data for the Register are supplied by hospitals within and outside the Region as well as by local authority social service, health, and education authorities in the Region. These authorities, in addition to authorizing the special collection of data for the team, also allow the team members access to facilities for the collection of additional data based on direct observation.

The Board has used the epidemiological data produced to plan and provide facilities. These facilities are, in their turn, now being evaluated by the team.

The team's approach to evaluation is first to try to find fairly crude answers to the following questions as they relate to large populations:

(a) What is the size of the particular 'problem' for which services are being made available, ie how many people at any time, and in a population of given size and demographic characteristics have the problem, eg mental handicap.

(b) What is the nature of the 'problem'?

(i) What are the types and ranges of disability (incapacity to do things normally expected) among the people identified? For example, inability to

TABLE I. *Wessex survey: grade, social or physical incapacity, and place of care. Rates per 100,000 total population.\**

Age	Grade	Place of care	Incapacity				Total	
			NA	All SB	SI	CAN		
Children	SSN	{	NI	4(1)	4(3)	2(1)	20(17)	30(22)
			I	5	5(2)	3(2)	5(4)	18(9)
	MSN	{	NI	1	1(1)	1	7(6)	9(7)
			I	—	1	—	1(1)	2(2)
Adults	SSN	{	NI	2(1)	2(1)	1	45(18)	50(20)
			I	6(1)	14(3)	6(1)	53(19)	80(24)
	MSN	{	NI	1	—	—	69(10)	75(10)
			I	2(1)	4(2)	1	45(16)	53(18)

\* Totals include cases where incapacity is not known. Figures in parentheses are for people receiving training.

#### Key

I	Institution.	All SB	Ambulant but all have severe behaviour disorders.
NI	At home.	SI	Ambulant, without severe behaviour disorders but severely incontinent.
SSN	IQ under 50.	CAN	Continent, ambulant, and not severely behaviour disordered.
MSN	IQ 50+.		
NA	Non-ambulant.		

Source: A. Kushlick and G. Cox (3, 4).

walk at all with help; inability to walk alone but able with help; inability to feed oneself at all; inability to talk in sentences.

(ii) What are the types and ranges of inappropriate behaviours (difficult, disruptive or potentially dangerous behaviours) among the people identified? For example, overactivity; physically aggressive behaviour; behaviour destructive of furniture, fittings, clothing, etc.; attention seeking; self-injuring behaviour.

(iii) What are the associated clinical conditions found among people identified? For example, epilepsy, spasticity, congenital abnormality (mongolism, microcephalus, hydrocephalus, heart, or other abnormalities). Estimates are made of the proportions of identified people with different degrees of handicap, inappropriate behaviour or associated clinical conditions.

(c) How are the people identified being cared for? Are the services being delivered to those who need them, ie:

(i) How many are living with their own families, and how many are in hospitals, in local authority homes, or private homes, etc.

(ii) How many are receiving defined specialist services believed to be appropriate? For example education, occupational or physiotherapy.

(iii) What are the characteristics, social as well as clinical, of the people in these categories?

TABLE 2. *Severely subnormal, 15-19 years, Wessex and all Wiltshire. Incapacity by diagnosis.*

<i>Diagnosis</i>	Incapacity (%)				<i>Total known = 100%</i>	<i>Total</i>
	<i>NA</i>	<i>All SB</i>	<i>SI</i>	<i>CAN</i>		
NK and others	5.9	11.8	—	82.3	17	17
D	2.5	6.1	0.6	90.8	163	167
MAD	28.1	9.4	9.4	53.1	32	32
CP	37.7	6.6	9.8	45.9	61	61
MA	8.1	16.2	8.1	67.6	37	37
EP	2.7	32.9	15.1	49.3	73	74
NBD	2.3	14.6	5.2	77.9	213	220
All diagnoses	7.9	13.4	5.9	72.8	596	608

*Key*

D Down's syndrome.

MAD Clinical conditions (*not* Down's syndrome), very often associated with mental handicap, eg microcephalus.

MA Major congenital abnormalities.

CP Cerebral palsy.

EP Epilepsy.

NBD No clinical sign of brain damage.

*Source:* A. Kushlick and G. Cox.

The tables illustrate the type of data generated by the survey.

Table 1 illustrates the findings with respect to mental handicap in the Wessex Region on 1 July 1963 (3, 4), and shows the crude rates of recognized mentally handicapped in a total standard population of 100,000 by age, place of care, grade, and type of behaviour. Table 2 shows how these incapacities among severely subnormal adults are related to clinical conditions very often associated with mental handicap.

Estimates of future trends cannot rely only on the cross-sectional information relating to a particular day (1 July 1963) and a continuous register of mental handicap has been set up in the Region with the object of being able to monitor changes in prevalence, service usage, and natural history (5). It is also used as a sampling frame for more detailed evaluative studies. It is now being used, with special modification, to supply data needed in connection with the sectorization of facilities recommended in the DHSS's policy document *Better Services for the Mentally Handicapped* (6).

The register is financed by the RHB and is maintained by a continuing supply of information from hospital staff (nursing, administrative, and medical) and local authority staff in the social service, education, and health departments.

Some of the results of this earlier work have appeared in several papers (7, 8) and have been used by the Wessex RHB and by the DHSS in planning and developing future services for the mentally handicapped. The survey schedules and categories of incapacity used in the Wessex census have



been used by other research workers and by the DHSS in a recent national survey.

This type of information on the size and nature of the problem reveals a number of options open to administrators and professionals in the planning and development of future services. The team is developing methods for measuring the relative effectiveness of different options (9).

Following the publication of the data on mental handicap, the research team had the opportunity to suggest to the administration a way of setting up new facilities that would allow for an experimental evaluation of different forms of residential care. When new services are set up, they are at first necessarily available only to some people and not to others. The team advised that new residential facilities for mentally handicapped children be set up to serve only a geographically defined total population of 100,000. It was also suggested that these be 'domestic' in character.

The term 'domestic' is used here to emphasize a move away from what are commonly regarded as 'institutional' characteristics in existing hospitals, towards those in 'ordinary' households. The features of 'domestic-' or 'institutional-type' units include their size (number of residents), physical design, furnishings, and fittings, as well as the way in which they are organized and in which staff and residents relate with one another. While the new units are still considerably larger than 'ordinary' family houses (20-25 residents with, at any time, about 5 members of staff) they are smaller than many existing hospital wards containing about 40 children and 8 staff. The residents sleep in bedrooms for 1-5 people as opposed to dormitories for around 20. They have a separate dining-room, lounge, and playrooms as opposed to a large single 'day-room' which doubles as a dining-room. The units prepare their own food in their kitchen rather than receiving food, prepared in a central kitchen, in trolleys. They have ordinary bathrooms which contain a single bath, wash-basin, and toilet, rather than an 'ablution-block' with up to 20 toilet bowls and basins in a row. The furnishings and fittings are those found in homes: wooden beds, cupboards, carpets, instead of iron bedsteads, lockers, and linoleum-covered floors. The staff do not wear uniforms, they sit down with the residents at meal-times and eat with them and some staff live within the units, albeit in separate flats or bed-sitters. The staff of 'domestic-type units' are recruited for that unit only, ie they cannot be transferred as in existing hospitals from one ward to another when needs arise in other wards. The new units are also locally based, ie they are sited in residential areas within the locality from which they receive their residents.

This suggestion was accepted and has been implemented; three such units are already operational. This was first put into effect when new services were provided to serve only one-half respectively of Southampton and Portsmouth (both cities have populations of about 200,000). As the remaining half of each city continues to be served by existing hospital facilities, it has become an automatic 'control' or second experimental area (9). The data in Table 1 sug-

gested that new locally based, domestic-type units of about 25 places, for all of the mentally handicapped children with the characteristics shown in the table, might meet *all* of the needs for residential care from a total population of 100,000. The hypothesis is that they would be feasible if they could meet the needs at least as 'well' as, if not 'better' than, existing hospital units which are not 'domestic' or locally based, and which have many other different features. There will shortly be five such units for children in the Region. We are evaluating four of them.

Within a few months the first locally based domestic-type unit for profoundly handicapped and behaviour-disordered adults from a total population of about 50,000 will begin operation. This unit arises out of recommendations made in *Better Services for the Mentally Handicapped* (6). The research team is also to evaluate this unit.

The approach to evaluation consists of attempting to measure the different degrees of 'effectiveness' of different methods of care. Hopefully, it should also be possible to cost the different degrees of effectiveness.

In order to measure effectiveness it has been necessary to define the aims of care in a way that makes it possible to measure (ie to quantify) whether and to what extent they are being met.

Any measures of effectiveness must be reliable (replicable), valid (measure what they claim to measure), and be agreed and seen as relevant by the people planning, administering, or running the service at all levels.

The criteria of effectiveness used by the research team were incorporated in operational policy documents and statements of administrative aims with respect to all hospital services for the mentally handicapped in the Wessex Region.

Work continues on refining these measures of effectiveness which have been divided, within the team, into two main areas:

(a) (i) Measures of change, over time, in the behaviour (appropriate or inappropriate) of the handicapped person.

(ii) Measures of change, over time, in the problems and experiences which the family of the handicapped person encounter while caring for the handicapped person, and especially in relation to contacts with the residential services for the mentally handicapped. The hypotheses are that the 'better' the service, the greater will be the 'progress' made by the handicapped people, and the lower will be the level of difficulties experienced by their families.

(b) Measures of the 'quality of care' received by the handicapped person and the families. The 'quality of care' has been operationally defined to include the following:

(i) The daily routine of the residential units for the handicapped. A complete cycle of staff and patient activities for the whole of the waking day (including weekdays and weekends) is closely examined and systematically described. This allows the collection of standardized measures including:

(a) Numbers of staff assigned to a living unit as well as those on duty at any time. (b) The time spent by the residents in groups of different sizes throughout the cycle of the day. (c) The time spent by the residents in different activities in which they might acquire or lose important social skills, (eg in getting out of bed, toileting, dressing, eating, formal training, and recreation). (d) The proportions of residents with personalized possessions and living space. (e) The extent to which the routines take account of individual differences among the residents at any time, or of all residents at different times of the week (weekends) or at different seasons of the year. This also allows the systematic description of different logistical patterns involved in caring for the residents at the same time as administering and running the living units.

From these we hope to get some idea of the factors influencing the phenomena described in (b) (ii).

We would like subsequently to compare these routines with those observed in 'ordinary' families in order to describe in operational terms the characteristics of domestic units, and to get a clear idea of the similarities and differences between 'home' care and 'institutional' care and the problems faced by the non-handicapped in these settings. The term 'domestic' has often been used rather loosely. Attention focused on 'institutional' care has not often compared it with care at home. *Differences* rather than *similarities* have been sought between these two settings.

(ii) The impact of this routine on the handicapped people. The questions asked are: (a) Over specified periods and at standard times does anyone relate with the handicapped person, and if so, in what way? (b) What are the characteristics of the contact (verbal, physical)? (c) What quality does it have (instructing people what to do, responding to their behaviour, or other)? (d) To which behaviours of the handicapped person's do the contacts relate? ie do they follow his or her 'appropriate behaviours' or 'inappropriate behaviours'?

(iii) The impact of the programmes on the families of the handicapped.

(c) Attempts are made to try to quantify all of the resources that are included in the 'care' so that estimates can be made of:

(i) The cost of different qualities of care in different settings.

(ii) The administrative problems of delivering different qualities of care in different settings.

The aim is to develop in this way measures of cost effectiveness. An economist-accountant has just been recruited to undertake this part of the work.

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# A study of psychiatric disorders of old age identified in general practice

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M. SHEPHERD

## Introduction

For the past fifteen years the research programme of the General Practice Research Unit at the Institute of Psychiatry has been chiefly concerned with the many and variegated aspects of psychiatric morbidity in the community. Although much of this illness rarely impinges on the hospital services, from a public health standpoint it constitutes the major segment of mental disorder (1). Over the past quinquennium the work has included a series of interrelated methodological, epidemiological, and operational studies. Some mention was made of the first two categories in volume 1 of *Portfolio for Health* (2). On this occasion an operational study now in progress is selected for more detailed consideration; it is focused on psychiatric morbidity among elderly people suffering from physical disease in the community.

Psycho-geriatric studies to date have not only demonstrated the high prevalence of psychiatric disorder among the elderly in the community; they have shown that the clinical severity of the illness in many instances matches those admitted to hospitals or institutions. Such disorders are often unrecognized by the patient's GP and although frequently associated with serious social impairment they are seldom referred to the mental health and welfare services. As the number of people aged 65 and over in the population is expected to increase considerably, the need to establish a means of identifying those elderly patients whose mental disorders are either unrecognized or untreated assumes growing importance if the appropriate community agencies are to be mobilized. Certain sections of the aged, living in the community, are clearly high-risk groups. The physically impaired appear to be in this category, for there is evidence to indicate a close association between physical illness and psychiatric disorder. None the less, most community

screening surveys, while indicating the wide prevalence of physical disability in the elderly, have included very limited psychiatric assessment of the population.

Large-scale psycho-geriatric screening is likely to pose an intolerable burden on the resources of most GPs who are already committed to an extensive clinical load. The use of paramedical personnel for this purpose therefore needs to be considered. To date the reliability of such personnel as psychiatric screening agents has been the subject of only one pilot study by Player *et al.* (3) who reported that health visitors when given previous training in a mental hospital are capable of detecting moderately severe disturbances in the elderly but can miss milder ones. In Scotland, where the geriatric work of district nurses considerably exceeds that of health visitors, a recent report has suggested that the role of the former could be profitably expanded (4). The district nurse is in a doubly advantageous position, first because her intimate contact with the household provides an opportunity to observe mental disturbance at close range and, secondly, because the physically impaired individuals under her care are increasingly vulnerable to psychiatric disorder.

*The aims of the current study are fourfold:* (i) to determine the prevalence and characteristics of psychiatric disorders among elderly patients with physical disease under the care of the district nurses; (ii) to assess the capacity of the district nurse as a screening agent for psychiatric illness; (iii) to evaluate disability among the patients examined. On the basis of this information it is also intended (iv) to examine the need for intervention by community health and social services.

## **Design and method**

The population studied comprises all patients aged 65 and over who are under the care of district nurses attached to several GPs in a London borough. Each patient is assessed independently by a district nurse, a psychiatrist, and a social worker, all of whom employ standardized techniques for the purpose. A control series matched for age, sex, and marital status is also being examined.

## **Preliminary findings**

1. Most of the patients have exhibited clear evidence of moderate to severe physical impairment. Among them psychiatric morbidity was strikingly high, the estimated prevalence being more than 40 per cent. The great majority of these patients were suffering from depressive states understandable as reactions to physical disability, declining social and leisure outlets, adverse domestic circumstances in the form of interpersonal difficulties within the household, grief following the loss of a spouse, or various combinations of

these factors. In about 75 per cent of cases the illness represented the first experience of mental illness, and more than half the patients had suffered from symptoms for at least one year.

2. Examination to date demonstrates clearly that the district nurse is adequately aware of psychiatric symptoms in the great majority of cases. By contrast, the proportion of psychiatric cases unrecognized as such by the GPs was disturbingly high. In consequence there was, in general a failure to take appropriate action directed towards the psychiatric component of illness even when, for example, admission to hospital was clearly indicated.

3. Disability implies dependence on others and carries important implications for social and medical care. Physical disability was evaluated in terms of the patient's mobility and self-care: mobility comprises such activities as travelling, walking, negotiating stairs, and transfer in and out of bed, while self-care involves acts of feeding, dressing and toilet care. The figures indicate that only a quarter of the elderly patients exhibited little or no restriction in mobility and that nearly a third were dependent on others for essential care.

Social disability was apparent from the inquiry into the amount of contact with friends, neighbours, and relatives. One-third of all patients were living alone. Severe restriction with other people was the rule and pronounced problems in personal interrelationships were common. Although gross financial hardship was rarely reported, about a quarter of the patient population were reported as living in poor or very poor housing conditions. In one-fifth of the cases the need for the special skills of a psychiatric social worker was apparent.

## **Implications for care**

Although incomplete, the findings of this study already furnish supportive evidence for the existence among the elderly in the community of a subgroup of patients with high psychiatric morbidity associated with physical disability. The illnesses are impressive by virtue of their chronicity and severity, whereas appropriate sociomedical care is inadequate despite the nominal availability of community services.

The successful identification, by personnel without specialized knowledge, of a large proportion of psychiatric cases unknown to the GP encourages the prospects of extending the role of the district nurse to the notification of psycho-geriatric disorders. Her ability to function in this way largely reflects the strategic advantage of intimate and regular contact with patients in the home environment. At the same time, for the most part the nurses appear to initiate very little in the way of medicosocial action except in instances of acute social distress or clinical crises, partly because they seem to accept psychiatric symptoms as being an understandable reaction to social or

physical adversity or else an inevitable accompaniment of old age for which there is little hope of therapeutic intervention.

The close relationship between psychiatric disorder and physical illness in the senium, and the evidence indicating that the clinical and social distress can be alleviated by appropriate management in many instances, both pose a challenge for future action. Such problems would best be met by a multi-disciplinary team approach including GP, district nurse, social worker, and psychiatrist. Social workers, in addition to their particular skills in psychosocial problems, are also well placed to mobilize appropriate social agencies in the sphere of geriatrics.

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## Handicapped and impaired in Great Britain

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AMELIA I. HARRIS

There has, in the last decade, been a tremendous growth in interest in the problems of the handicapped. The formation of the Disabled Income Group in 1965, the Disabled Living Activities Group (1963) as well as the many other 'specialist' organizations working on behalf of disabled and handicapped, aroused a great deal of concern both nationally and locally not only in governmental circles, but in social medicine departments in universities and hospitals. Local authorities already had powers and duties with regard to the provision of health and welfare services for this group, but there were no hard data as to the number of permanently handicapped people, what special problems they were having, and what support they needed and were being given to help them overcome their disablement as far as possible.

Indeed, there was not even a basis for defining 'handicap' or 'disability'. There is a tendency to equate these terms with the more severe and obvious physical conditions. Reference to 'the disabled' is more likely to conjure up a picture of someone in a wheelchair, a spastic, or someone 'crippled with arthritis' than someone who is totally deaf, epileptic, mentally impaired, or a chronic bronchitic. Yet these conditions can be equally and sometimes more handicapping than physical impairment.

A great deal of work had been done by a group led by Professor M. D. Warren, then Reader in Social Medicine at the London School of Hygiene and Tropical Medicine and Professor Margot Jefferys, Department of Medical Sociology at Bedford College, London, to develop objective tests of motor impairment (4), and, encouraged by their work, the then Ministry of Health commissioned the Government Social Survey<sup>1</sup> in 1968, to carry out a survey designed to give reliable estimates of the numbers of handicapped

1. Now the Social Survey Division of the Office of Population Censuses and Surveys.

people in Great Britain, and to examine what local authority health and welfare services were being made available to them. It was particularly important that the estimate of those so severely handicapped as to need someone to give help with most of their everyday activities be reliable, as the provision of an attendance allowance was then being considered by the Government.

For practical reasons, the study was limited to persons aged 16 or over, living in private households; even so, it was necessary to draw a sample of 250,000 households to be reasonably sure of finding a sufficient number of people needing special care. These households were first contacted by post, and 100,000 were asked to answer a series of questions designed to reveal *any* incidence of *impairment*, while 150,000 were sent a simpler form designed to identify those who were so handicapped as to need special care. (For full details of the methodology and copies of all documents used, see reference 1.) Eighty-six per cent of households returned completed questionnaires. From these questionnaires we selected a representative sample of 12,738 persons for personal interview. This sample covered all those who were, on the basis of the postal questionnaire, very severely handicapped, and all those aged under 65 who had any impairment, as well as one in four of the more numerous elderly impaired. Interviewing was carried out from October 1968 to February 1969.

The original purpose of the study was to get data on the health and welfare services for the permanently impaired and handicapped. This was interpreted rather widely, in that it was felt that no study of the handicapped would be complete without examining medical aid and advice, and housing conditions. Other government departments<sup>1</sup> were involved and the study was designed to cover:

1. The cause of impairment, how far impairment results in handicap as far as self-care is concerned, and the extent to which handicapped and impaired people are helped by various authorities.
2. To what extent handicapped and impaired housewives can carry out their duties.
3. Their housing conditions.
4. The effect of handicap and impairment on ability to get suitable employment.
5. The effect on social life and leisure activities.
6. The financial position of impaired and handicapped.

## Definitions

For the purpose of the study, the following definitions were used.

Impairment is: (i) lacking part or all of a limb, or having a defective limb,

1. Scottish Home and Health Department, the Welsh Office, the Department of the Environment, and the Department of Employment.

or (ii) having a permanently defective organ or mechanism of the body which stops or limits getting about, working, or self-care.

Disablement is 'the loss or reduction of functional ability'.

Handicap is 'the disadvantage or restriction of activity caused by permanent disability'.

It will be apparent that the extent to which an impairment is a handicap does not depend solely on the impairment itself. Given an impairment, say the loss of a finger or toes, most people may not find this causes any restriction of activity, or places them at a disadvantage, that is, they would not be handicapped. However, if a typist were to lose a finger, or a footballer or dancer a toe, they would be occupationally handicapped.

If two people have the same impairment, one might adapt reasonably quickly, and regard himself as being only slightly handicapped, while another makes no attempt to overcome the disability and therefore considers himself to be severely handicapped. This ability to adapt may be related to personality, intelligence, or education, or to the encouragement, negative as well as positive, received.

The environmental factor, too, must be considered; stairs, narrow doors, outside WCs and lack of amenities may all contribute to the degree of handicap.

These factors were all taken into account in devising a scale to classify the permanently impaired into (originally) nine categories. The method of classification is given in Appendix D of the report (1), but may be summarized as follows:

### *Very severely handicapped, needing special care*

Category 1. People needing care day and night (help with WCs, washing, feeding, etc.).

Category 2. People needing help some nights, and a lot of care during the day.

Category 3. People who cannot care for themselves as far as normal everyday functions are concerned, but do not need as much care as 1 and 2.

### *Severely handicapped*

Category 4. People who have difficulty doing everything, or find most things difficult and some impossible.

Category 5. Most things difficult, or three or four items difficult and some impossible.

### *Appreciably handicapped*

Category 6. People who can do a fair amount for themselves, but have difficulty with some items, or who need help with one or two minor items.

*Impaired: Little or no handicap*

Category 7. People who can do everything themselves, but have difficulty with one or two items.

Category 8. People who have no difficulty taking care of themselves.

## Estimates of impaired and handicapped in Great Britain

There are some three million impaired men and women in Great Britain (aged 16 or over, living in private households), just over a million of whom are handicapped. Twenty-five thousand are so severely handicapped as to need constant care or supervision every day and practically every night, a further 132,000 needing constant day-care. Of these 157,000 very severely handicapped, some 26,000 men and nearly 90,000 women are aged 65 or over, two-thirds of them being at least 75 years old.

There are some 100,000 men and 254,000 women who are severely handicapped (categories 4+5) and 220,000 men and nearly 400,000 women with an appreciable handicap.

Thus of the three million impaired, 1,128,000 people (365,000 men and 763,000 women) are very severely, severely or appreciably handicapped. Those aged 65 or over number 730,000, and those aged 50-64 number 281,000. In the aged population (75 and over) handicapped women outnumber handicapped men by roughly three to one.

While the proportion of handicapped per 1,000 population is very similar for England, Scotland, and Wales, there is considerable regional variation in England, the incidence being greatest in the south-west (40.1 per 1,000) and lowest in the south-east (24.7 per 1,000).

## Main causes of impairment

The greatest cause of impairment is diseases of the bones and organs of movement (1,187,000 men and women), of whom 870,000 have some form of arthritis.

Nearly 500,000 are impaired by a disease of the circulatory system (including 129,000 with coronary disease) and 360,000 have a disease of the central nervous system, (including 130,000 who have suffered a cerebral haemorrhage). A total of 285,000 men and women suffer from some disease of the respiratory system, the vast majority of these having chronic bronchitis.

## Main causes of handicap

Diseases of the bones and organs of movement are the main cause of handicap for some 530,000 men and women (mostly arthritis), 188,000 are handicapped

by a disease of the central nervous system (mostly cerebral haemorrhage), and 134,000 by a circulatory disease. Diseases of the respiratory system however, are the main cause of handicap in only 62,000 men and women.

### **Summary of other results**

One in five handicapped persons is living alone, and even one in twenty of those who need special care has no-one living with him or her, having to bang on walls to attract the attention of neighbours, provided they are at home, if help is needed during the day. Very few of these people use a telephone to call for help, and while one in five impaired persons living alone has a telephone, only one in eight housebound people living alone has a telephone in the household.

One in three people needing special care is widowed and living with children, most of the children being themselves married, and one in six with spouse and children, here the children being mostly single. Nearly one in three lives alone with a husband or wife.

It can be estimated that in the whole of Great Britain there are only 200-300 very severely handicapped men living alone, the estimate for women being some 8,000, nearly all these women being elderly, and the majority over 74 years of age. The estimate for the severely handicapped living alone is ten times as great, including some 50,000 women aged 75 or over who are severely handicapped and living alone.

Half of the very severely and severely handicapped are seen regularly, usually once a month, by their GPs, the elderly in Yorkshire and Humber-side and Scotland being almost twice as likely to have regular visits as the elderly in Greater London. The rest send for, or visit, their doctors when they feel it to be necessary. Nearly 30 per cent of all handicapped had not seen their doctor for at least three months prior to the interview.

The survey shows that 18 per cent of the very severely handicapped are registered on the local authority register of substantially and permanently handicapped persons, as are 11 per cent of the severely and 7 per cent of the appreciably handicapped, but these are likely to be somewhat underestimates. Proportionately less elderly men and women who are handicapped are registered compared with the non-elderly, and the very severely and severely handicapped in East Anglia are twice as likely to be on the register as those with similar handicap in the northern region.

That a high proportion of handicapped people are not on the local authority register does not mean that they do not receive local authority health and welfare services. Three out of four of the most handicapped people are helped by at least one of the health and welfare services, as is one in three of the other severely handicapped. The health services provide most support, through the chiropody, home help, and, particularly for the very severely handicapped, the home nursing services. District nurses visit nearly two in

three of those needing day and night care, and two in five of the rest of the very severely handicapped, usually once a week.

Over half of the severely and two-thirds of the appreciably handicapped have no on-going local authority health or welfare service. Again, some of these will have been helped by the welfare departments with wheelchairs and walking aids, or with the installation of mechanical aids, ramps, and other housing adaptations, or have been provided with holidays or improved social opportunities, as will be seen from other sections of the report, but no regular contact seems to have been maintained. Between 35 and 40 per cent of the handicapped are in receipt of Supplementary Benefit, and, on the whole, the incomes of handicapped and impaired people are lower than those for the general population.

## The impaired housewife

There are 1,537,000 impaired<sup>1</sup> housewives living in their own homes in Great Britain, of whom 488,000 are non-active, that is they are prevented by disability from doing their household chores. Although two-thirds of housewives are active, it has been shown that they may have considerable difficulties. The non-active housewives are mainly helped by their families, some four-fifths having family support.

The amount of the individual tasks a housewife can do varies with degree of handicap, but shopping is found consistently to be the household chore most affected by disability. Many housewives able to do at least a little housework or shopping have difficulty with the task concerned but proportionately few have obtained gadgets or made fitments or alterations to ease their difficulties. There is a need for a more efficient dissemination of information about what is available for, and can be done for, the impaired housewife. There is a considerable demand for help with housework, or for more help if the housewife already has a home help. The home help service would need to be at least doubled to meet this demand.

Of the 76,000 impaired housewives in Great Britain with dependent children under 12, 25,000 have some special difficulty looking after them because of their disability. The most common problems are of an emotional or mental nature, and it is difficult to see what provision, if any, could be made to help these women.

## Leisure activities

### *1. Local authority centres for the physically handicapped*

The proportions of the impaired and the handicapped populations attending local authority centres are very small. Only 2 per cent of all those impaired

1. 'Impaired' should not be confused with 'handicapped': see definition and discussion of impairment, disablement, and handicap above, pp. 54-56.

who are not housebound and not working actually attend a centre. For the appreciably and more severely handicapped, the corresponding proportion is 3 per cent and for the very severely handicapped 5 per cent. The vast majority of handicapped or impaired persons who are eligible for centres have never heard of a centre locally.

## 2. *Clubs*

Only 26 per cent of all impaired persons attend a club. Club attendance is more common among the young than the old. Largely because of very restricted mobility the proportion attending clubs among the very severely handicapped is extremely low. Except in the case of someone with a very severe handicap, non-attendance by a non-housebound person, is likely to be for a reason other than disability.

## 3. *Ability to attain desired destinations*

Three-quarters of all impaired persons are neither housebound nor prevented from going somewhere that they wish by access problems associated with the main disabilities. The proportions who are housebound or prevented from attaining a desired destination increase with age and with severity of handicap. The very severely handicapped are extremely restricted in this respect, only 22 per cent being able to go everywhere that they wish. However, these differences are largely reflections of the proportions within the groups who are housebound. Although the proportions of the non-housebound in each group who are prevented from going somewhere increase with severity of handicap, even a very severely handicapped person who is not housebound is likely to be able to get to all the places he wishes (although the 'desire' may be affected).

Where someone who is not housebound cannot get somewhere he wishes to go this is almost always because of difficulty in getting *to* the destination. Even among the very severely handicapped, less than a fifth of those not housebound but unable to go somewhere are prevented by difficulty in getting *into* the destination once the journey has been made.<sup>1</sup>

## 4. *Radio and television*

Ninety-five per cent of all impaired persons have access to radio and 90 per cent have access to television; 85 per cent have both available. The overwhelming majority of impaired persons at all ages and at all levels of handicap have either radio or television, and, where facilities are available, they are generally used. Even among the very severely handicapped, 65 per cent have and use a radio and 74 per cent have access to a television and view.

1. Of course, the problem of 'access' is not confined to the destination building. Certainly many of the difficulties in getting *to* places involve access problems for the handicapped and impaired, for example getting into and out of buses and trains.

### *5. Telephones*

Of all impaired persons 72 per cent have no telephone in the household; a further 4 per cent have a telephone but cannot use it. There is very little difference in the availability rates between age-groups or between those with various degrees of handicap. However, the ability to use telephones decreases as the severity of handicap increases. The very severely handicapped are particularly restricted in their ability to use telephones.

Only 2 per cent of those with a telephone in the household say that the telephone has been adapted.

### *6. Activities given up as a result of impairment*

Of all impaired persons 59 per cent have had to give up doing something which they previously enjoyed as a result of their particular condition. The age-group least affected is the youngest, the one most affected the middle age-group, those aged 50-64.

As is to be expected, the proportion who have had to give something up is higher among the appreciably and more severely handicapped than among those impaired with no handicap or only minor handicap (72 per cent as compared with 52 per cent).

### *7. Sense of deprivation among the impaired*

Although a sizeable minority of all impaired persons (49 per cent) and a majority of impaired persons with no handicap or with only minor handicap seem to feel that they get as much out of life as the unimpaired (or, at least, as much as can be expected in old age) the proportions claiming to miss something increase with severity of handicap.

## **Employment**

Disability may interrupt or terminate the education of impaired persons. Consequently, rather more young impaired persons are without qualifications or skills than young persons in the general population.

A third of impaired persons are retired, another third are housewives, almost one in five is working, one in ten is permanently disabled and unable to work again, and about one in twenty is off sick temporarily or unemployed.

We have estimated that there are 697,000 impaired men and women in the labour force, 554,000 of whom are actually working. The work capacity of an estimated 176,000 of them is limited in some way, either because their disability prevents them from using their qualifications or skills, or they are unable to do a full week's work, or they are earning less than they would if they were not disabled.

Disability affects work and working conditions in a number of other ways. As many as a quarter of impaired workers say they have at some time experienced difficulty in getting a job because of their disability. One in five



workers says that disability affects the chance of joining a pension scheme, although a third do not know whether it does. Other disadvantages with regard to work are a limitation in the kind of work that can be done, not being able to work so hard, difficulty doing shift work or overtime and the limiting effect of their disability on working conditions.

Sixteen per cent of impaired workers say they have some particular difficulties getting to work because of their disability and almost four in ten workers say their disability affects the distance they can travel to work.

We have estimated that there are over a quarter of a million (291,000) persons under retirement age in Great Britain who are permanently disabled and unable to work again. About one in ten persons who is permanently disabled and unable to work again has in fact never worked, one in five had to give up work before the age of 40, about one in ten between the ages of 40 and 49, about one in five between 50 and 54 and about one in three between the ages of 55 and 64.

Three in ten persons who are permanently disabled and unable to work again say they have at some time been registered with the Department of Employment as a disabled person, but only 16 per cent of them say that being registered has helped them in some way.

The 1,087 persons who are permanently disabled and unable to work again, are under retirement age and are not bedfast or housebound, were asked whether they would like a job in a sheltered workshop. Thirty-nine per cent of them expressed an initial interest. However, over half of them said they would prefer to think about it more, leaving us with 157 persons who were keen enough to want someone from the Department of Employment to assess whether sheltered employment was possible. Of these 157 persons only one was found a job, although another six are now working in open employment. We, in fact, found that many more people would like a job in a sheltered workshop than are capable of working in one.

It can be seen, therefore, that persons who, even by our definition, have a 'minor' impairment, may have difficulty getting a job, or working in open employment, or they may have difficulties getting to work or while at work.

## **Housing**

It can be estimated that 200,000 households containing persons who are very severely, severely, or appreciably handicapped need rehousing or improvement to their accommodation because they lack the basic amenity of an inside WC, and another quarter of a million households lacking this basic amenity have an impaired, but not handicapped, person in the household.

About 75,000 households with at least one member who is very severely, severely, or appreciably handicapped would benefit by the WC being placed in an alternative position, or, where this is not possible, by rehousing as would

a similar number of households where at least one member is impaired, with minor or no handicap (categories 7 and 8).

About 150,000 very severely, severely, or appreciably handicapped persons are living in accommodation which is inadequate as some rooms are inaccessible or they have to sleep in the living room because of their disability, as do 100,000 impaired persons with minor or no handicap (categories 7 and 8).

Only one-third of those without an inside WC say they would like to move, but the proportion would probably change if an actual offer of rehousing were to be made.

### Action following the study

The results of the study have facilitated administrative measures to help and support the handicapped and chronic sick. Perhaps the two most important were:

1. The introduction of a tax-free allowance (first payable from December 1971) to all people, irrespective of income, who need day *and* night attention or supervision (broadly our categories 1 and 2). Over the next two years, an allowance at two-thirds the day and night rate will be introduced for those needing day *or* night attention or supervision, firstly for those of working age, then for children and then, in two stages, for the elderly (broadly our category 3).
2. The implementation in January 1971 of section 1 of the Chronic Sick and Disabled Persons Act, 1970, whereby it is the duty of every local authority having welfare functions under section 29 of the National Assistance Act 1948, to inform themselves of the number of persons to whom that section applies, and of their needs, as well as publicizing services relevant to their needs. To help local authorities carry out surveys in their own areas, the DHSS commissioned a booklet (5), detailing, step-by-step, methods, suggested questionnaires, etc., for carrying out a sample survey.

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# 8

## Monitoring adverse reactions to drugs

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W. H. W. INMAN

### Introduction

The rapid expansion of pharmaceutical research during the past thirty years has provided the practising doctor with a wide range of potent remedies for many diseases which, in earlier times, were often untreated or untreatable. The benefits in terms of lives saved and suffering prevented are enormous, but no effective drug is completely safe and these benefits have to be weighed carefully against the risk of unpleasant or even serious adverse effects. Approximately 1,000 different pharmacologically active agents are now available to doctors in the UK. Nearly 3,000 branded products containing one or more such agents are currently prescribed in addition to many more which may be purchased by the public 'over the counter' and without prescription. It is hardly surprising that doctors are finding it increasingly difficult to keep up to date with the vast literature describing their beneficial attributes, and that they are largely ignorant of their adverse effects.

Thalidomide by virtue of its dramatic and tragic results, focused public attention on the general problem of drug safety. By popular demand, drug monitoring agencies were set up in many countries with the responsibility for scrutinizing the efficacy and safety of all the drugs currently available for human use.

It has been estimated that up to 5 per cent of admissions to hospital medical wards may be the direct outcome of an adverse reaction to a drug, and that, while in hospital, as many as 10 per cent of patients may experience reactions which either threaten life or materially affect the speed of their recovery (1, 2). In a recent study of a hospital in-patient population in which all drug administrations and adverse effects were carefully recorded, it was estimated that

drug treatment had caused or contributed to the deaths of 1 in every 250 patients (3).

In the UK, the Committee on Safety of Drugs was set up in 1963 under the Chairmanship of Sir Derrick Dunlop. With the passage of the Medicines Act 1968, the work of this Committee has been continued by the new Committee on Safety of Medicines under the Chairmanship of Professor Eric Scowen. This new Committee is served by several subcommittees responsible for the scrutiny of new drugs and by an Adverse Reactions Subcommittee under the Chairmanship of Sir Richard Doll, which is responsible for the surveillance of all drugs currently prescribed by doctors or sold directly to the public. The latter has a small permanent headquarter's staff which includes three full-time physicians, and a part-time staff of some eighty medically qualified fieldworkers.

During the past nine years, the Committee on Safety of Medicines and its predecessor have accumulated approximately 30,000 notifications of suspected adverse reactions. About half of the reports have been submitted by GPs and one-third by hospital physicians. Important though smaller contributions have also been made by family planning clinics, medical officers of health, dental surgeons, coroners, and the pharmaceutical industry. The Committee also takes note of individual case-reports published in the UK medical journals and receives summaries of death certificates provided by the Registrar-General.

Three-quarters of the reports of suspected reactions are made on special reply-paid cards (the 'yellow card'). Doctors are requested to report all the serious or unusual effects they observe following treatment with any drug, and to report all but the most trivial effects of newly introduced drugs. Some measure of the value of these reports may be obtained from the results of a recent study of a randomly selected sample of 82 reports which were investigated by the fieldworkers. The sample, which is believed to be fairly representative of the total body of data obtained by the Committee during the past eight years, included 17 reports of fatal reactions, 26 reports of severe reactions, some of which could threaten life, 17 reports of reactions of moderate severity, and 22 reports of minor or trivial reactions. After follow-up, it was concluded that 64 of the reports had described reactions which were probably drug-related while a further 11 were possibly drug-related. Only a small minority of the reactions that have been described by the reporting doctors were considered, after further investigation, to be unrelated to drug therapy (4).

### **Identification of new hazards**

After preliminary scrutiny, the essential data on adverse reactions (the numerator) is stored on a computer, and the Committee also has access to estimates for prescriptions obtained from the NHS Pricing Bureau. These

provide a denominator from which a rough estimate of the reported incidence of each type of reaction can be calculated. It should be stressed that the reported incidence of adverse reactions is generally far less than the real incidence because of incomplete reporting.

One consequence of public interest in the safety of oral contraceptives, is that nearly a quarter of all the reports of suspected adverse reactions have related to a group of drugs which are taken regularly only by about 3 per cent of the community. This has overshadowed much of the valuable work the Committee has carried out in the detection and assessment of problems relating to other drugs.

In practice, new drug safety problems have usually been identified either because the reports have been numerous, or serious, or of an unusual nature. A study of the reactions attributed to various drugs in relation to their sales has yielded information of considerable value. In 1966, for example, at a time when the sales of oral contraceptive preparations containing the oestrogen, mestranol, were roughly equal to those of preparations containing ethinyl-oestradiol, it was noted that there was a considerable excess of reports of venous thrombosis linked with mestranol (5). At first it was thought that this hormone might be intrinsically more thrombogenic than ethinyl-oestradiol, although it was realized that the doses of mestranol most commonly used were higher. Some three years later, by which time more than 1,000 reports of thrombo-embolic complications among oral contraceptive users were available for analysis, it was confirmed that there was a significant relationship between the dose of oestrogen employed, in respect of its chemistry, and the risk of thrombo-embolism. Similar data were supplied by the Swedish and Danish Adverse Reaction Committees which confirmed the results obtained in the UK (6). Following the publication of these results, the use of oral contraceptives containing the high doses of oestrogen largely ceased. There was a small and temporary reduction in the over-all use of oral contraceptives early in 1970, but since this time their use has continued to increase. In spite of the increase, there has been a marked reduction in the number of reports of serious venous thrombosis reaching the Committee on Safety of Medicines and also in the number of death certificates which mention oral contraceptives as a contributory cause of death (7).

A study of the 'adverse reactions profile' of a drug may also be rewarding. Fig. 1 shows the number of reports of suspected reactions to five analgesic drugs, together with the proportion of the reports in which one or other of five body systems was affected. The pattern of reactions is quite different in each case. Thus, for phenylbutazone, blood disorders predominate. With mefenamic acid ('Ponstan') the most numerous reports were of gastrointestinal disturbances, commonly manifest as a mild form of diarrhoea. Indomethacin ('Indocid') was associated with a high proportion of central nervous system disturbances and also a considerable number of reports of gastro-intestinal disturbances. The high incidence of jaundice among reports

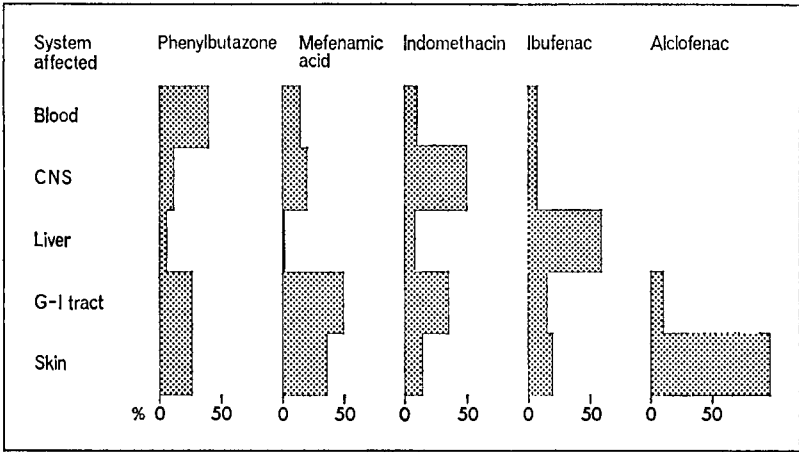


FIGURE 1. Proportion of reports in which adverse reaction affected one or more of five systems.

or reactions to ibuprofen ('Dytransin') led to voluntary removal from the market by its manufacturers. In striking contrast, no fewer than 39 of the first 40 reports to be received for the new analgesic, alclofenac ('Prinalgin') have described cutaneous hypersensitivity reactions.

It is not possible to estimate the incidence of adverse reactions entirely on the basis of spontaneous reports to the Committee. All the available evidence points to a serious degree of under-reporting. Many doctors are aware, for example, that chloramphenicol or phenylbutazone may damage the bone marrow, or that phenacetin will damage the kidneys if used excessively or that oral contraceptives may occasionally cause thrombo-embolic disease. When an event of this type occurs, the doctor may not consider the possibility that a drug has been responsible unless it is one which is already well-known to cause these effects. A hospital physician may not be aware, for example, that a drug has been prescribed earlier by a GP or he may not see the effects of drugs he has prescribed in hospital which occur after the patient has been discharged.

In 1966, in spite of the publicity surrounding the problem of oral contraceptives, Inman and Vessey (8) identified 53 GPs who were aware that their patient had been using oral contraceptives at the time of death from thrombosis, and discovered that 51 doctors had not reported the death spontaneously to the Committee on Safety of Drugs. On another occasion, it was shown that perhaps 3,500 asthmatic patients had died during the period 1961-7 as a probable result of over-use or over-dependence on pressurized aerosols containing bronchodilating agents. During this period the death-rate from asthma for the whole populations for England and Wales had

doubled, while in younger patients the effects of this 'epidemic', were even more marked. Among children aged 10-14, for example, there was a seven-fold increase between 1961 and 1966. During this whole period, only six reports were received from doctors who had suspected that aerosols might be a factor contributing to death (9). Following the publication of a warning about the risks of over-using aerosols (10), the death-rate fell very rapidly almost to the level that existed before aerosols were introduced into general use for the treatment of asthma. There was a significant reduction in the use of pressurized aerosols, suggesting that the reduced death-rate could have been due to more cautious prescription and use of aerosols, although there was no evidence that their use had been abandoned by the majority of asthmatics.

Because of the long interval between exposure to drugs during the first trimester of pregnancy and the subsequent birth, it is very difficult to associate drugs with congenital abnormalities. Many of the mothers of perhaps 20,000 congenitally abnormal babies born each year in the UK will have taken drugs during early pregnancy, yet only an average of fifty possible associations between drugs and congenital abnormalities are reported to the Committee each year. At this level of spontaneous reporting, it is apparent that the present system is inadequate as a means of detecting human teratogenicity. A new method for monitoring the use of drugs in pregnancy has been devised in which the 'drug-histories' of mothers who have borne abnormal children will be compared with the histories of mothers of normal children. This will be based on the records of abnormalities reported to the Registrar-General and the histories will be obtained by the fieldworkers during interviews with family doctors.

### **Investigation of potential hazards**

In spite of the limitations imposed by incomplete reporting, many 'early warnings' have been derived from the monitoring system. It is not always easy to decide how much priority may be given to the investigation of individual warnings and it is often necessary to conduct preliminary field investigations in order to decide how much effort should be spent on subsequent more detailed studies. When the reports suggest that a new safety problem may have been detected, the Committee's medical fieldworkers are put in touch with the reporting doctors, and they assemble more complete data by personal interview. If their preliminary investigations suggest that the reactions are likely to be drug-related, the Committee may decide that a general warning should be issued immediately, as was done in the case of bronchodilating aerosols, or they may initiate further studies to confirm causal relationship and establish the incidence and importance of the reaction.

Throughout 1966, the Committee's officers followed up all deaths from thrombo-embolic disease of women of childbearing age. They established that significantly more of the dead women had been using oral contraceptives

than would have been expected on the basis of estimates of oral contraceptive use by living and predominantly healthy controls. Other studies by the Royal College of General Practitioners and the MRC's Statistical Research Unit produced similar results in groups of women with non-fatal thrombosis, and these results were combined with those obtained by the Committee in a joint report to the MRC (11). The Committee's study involved a detailed retrospective investigation of some 500 deaths and is the biggest undertaking of its kind so far attempted (8). Other investigations of reports to the Committee have in some cases resulted in the voluntary withdrawal of drugs from the market or manufacturers have been requested to modify their sales literature to conform with knowledge gained about the risks of serious adverse reactions.

### **Feedback of information on adverse reactions**

The Committee's professional staff engage in extensive correspondence with individual physicians. As each report is received, documents are sent to the doctor which summarize the data that have been accumulated on the group of drugs that he is interested in. A total of nine pamphlets has been published in the Committee's Adverse Reaction Series and on a number of occasions doctors have been alerted to a potential safety problem by means of letters to the medical journals. A small number of papers has been published by individual members of the Committee's Secretariat.

Because of the unpredictable reactions in the public news media, it is difficult to provide adequate information to the medical profession without causing alarm among patients. The profession acknowledges the fact that no drug with worth-while therapeutic properties is likely to be completely without risk, but a balance has to be found between the risks of damaging the reputation of a useful drug and of failure to provide adequate information about its toxic properties.

The Committee is in touch with similar organizations in many parts of the world and there is free and rapid interchange of information. It is a major contributor to a monitoring system established by the World Health Organization in Geneva. This is operated on similar lines to the Committee's system and currently collects a substantial proportion of the national input of reports received by fourteen different countries. It is hoped that this will enable rare but important adverse reactions to be detected earlier than might be possible in the smaller populations exposed to drugs in individual countries.

The Committee has encouraged the development of hospital-based intensive monitoring schemes in which drug usage (denominator) and adverse effects (numerator) are accurately measured. Such schemes complement the national system and provide facilities for assessing the incidence of adverse reactions in populations of known size. They are not suitable for assessment of the serious and generally rather rare adverse reactions which can only be



done at the moment by drawing on the experience of thousands of doctors caring for millions of patients.

## Summary

Monitoring adverse reactions to drugs is a relatively new development in clinical epidemiology. Spontaneous reporting may provide an early warning of a potentially serious problem, but it is often necessary to conduct case-control investigations among patients who have experienced the adverse reaction, or to mount prospective studies in large populations of patients. With the help of its team of medical investigators, the Committee on Safety of Medicines is able to follow up large numbers of individual reports. The Committee is also in a position to encourage specialists in various disciplines to investigate the aetiology of drug reactions, and is sometimes able to conduct epidemiological studies on its own account.

Feedback of information about adverse reactions is provided on an individual basis by means of publications in scientific journals, and the Committee is constantly exploring new avenues of communication in the belief, that, as the feedback improves, adverse reactions will be more completely reported and new problems brought to light sooner than was possible before it came into existence.

Because of the numbers of women using oral contraceptives and the social importance of birth control, a major effort has been expended on the investigation of reports of thrombosis. The relatively large number of reports of suspected adverse reactions to oral contraceptives has provided basic data on which a great deal of experience has been gained which is appropriate to the investigation of all drug safety problems. A number of hazards have emerged with other drugs which, though attracting less publicity, have resulted in action leading to their safer use.

It seems likely that the size of the risk associated with the use of potent drugs has been under - rather than over-rated. Because of the limited numbers of patients who can be studied in clinical trials of new drugs, many reactions of the more serious or unusual kind, will not be detected during the course of such trials. The delay in their detection after a drug has been marketed must be minimized. Hospital drug monitoring schemes offer the possibility of bridging the gap between clinical trials and widespread use in general practice. Prompt detection of drug safety problems depends on constant vigilance by the professions, and efficient reporting of adverse effects to the central monitoring organization.

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# 9

## Coronary heart disease

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JOHN MODLE

Coronary heart disease remains the largest single cause of death in England and Wales and in 1970 was responsible for nearly 25 per cent of deaths, with just over a quarter of this mortality occurring between the ages of 35 and 64 years. Community and other studies (1-3) have indicated that up to a half of the patients under 70 who suffer a heart attack die within two hours of the onset of symptoms, and in the majority of these cases before the help of a doctor has been sought. Such facts point to the importance of research directed towards preventing or postponing the occurrence of myocardial infarction, while there is also need for further studies aimed at improving clinical management and rehabilitation measures.

The involvement of the DHSS in support of this field of research has been outlined in volume 1 of *Portfolio for Health* (4), and a discussion of the outcome of some of the earlier work is now given, along with details of present activities and problems.

### Prevention

The ideal goal, of primary prevention, ie prevention of occlusive disease of the coronary arteries, is an area of special interest to both the DHSS and the MRC and includes the epidemiological aspects, for example, the wide differences in the mortality from ischaemic heart disease for apparently similar countries such as Sweden and Finland (5), and the smaller differences between the mortality in soft and hard water districts (6); the basic research in pathology and haematology, and trials of treatment with prophylactic dietary regimes or drugs.

The value of implementing those measures which at the present time are

thought to be beneficial in counteracting the development of ischaemic heart disease, for example, propaganda on smoking, diet, and exercise, along with the treatment of hypertension and hyperlipidemia detected by screening the population under study, is being explored in a multiple factor study organized by Rose (Part III, no. 216) which was referred to by Ford in the first volume of *Portfolio for Health* (4); but it is likely that several years will be necessary before an answer is forthcoming. Anticipating that some form of intervention will probably become available, further research is needed in the field of health education to discover the most effective ways of persuading members of the public to accept advice about known risk factors and this might seek not only to resolve the question of who gives what advice; but also of how great, if any, is the benefit of advice at the individual level after screening for risk factors, as opposed to group propaganda. The effect of advice from GPs, about risk factors, is being studied at present by Baric (Part III, no. 226), and this work is supported by the DHSS. A working group of the Committee on the Medical Aspects of Food Policy is at present weighing the evidence for giving dietary advice to the public with the objective of preventing ischaemic heart disease. The effectiveness of clofibrate (a drug which lowers serum lipid levels) in primary prevention of ischaemic heart disease is being explored by means of an international trial supported by the MRC and based on Great Britain. As one facet of a study of the prevalence of sub-clinical hypothyroidism determined by measuring thyroid-stimulating hormone levels in the blood in a defined population, which the DHSS is helping to support at Newcastle, Hall is investigating the strength of the association with ischaemic heart disease. If the association were shown to be strong this would open up the possibility of trying to counteract the influence which sub-clinical hypothyroidism might be exerting on the development of ischaemic heart disease.

However, these approaches are but one line of attack on the problem, and studies of the value of preventing or delaying the onset of heart attacks in patients whose coronary arteries have already been damaged, are also in progress. Angina has recently been the subject of much interest because of the findings from two randomized controlled trials (7, 8), that patients with angina who were treated with clofibrate experienced a lower heart attack rate and mortality in the succeeding five years than did similar patients who were given a placebo. Bearing in mind that the patients entered in the Edinburgh/Newcastle trials were a selected group from the total number of persons in the community who were experiencing angina, there now appears to be some indication of a need for further trials to discover whether acute myocardial infarction can be prevented in a population of patients with angina identified by screening the community for angina. This question is being considered by the Sub-Committee on Screening in Medical Care of the Standing Medical Advisory Committees of England and Wales and Scotland.

## **Treatment of myocardial infarction**

The purpose of coronary care units and mobile coronary care units is essentially to combat arrhythmias. To date, the failure of the heart as a pump following myocardial infarction has been found unresponsive to all forms of treatment, although it is, of course, possible that treating rhythm disorders by the use of drugs may be preventing the development of cardiogenic shock in a few cases. Most of the deaths from myocardial infarction occur very soon after the onset of symptoms, but even when subjects who have suffered a heart attack do not die immediately or shortly after symptoms begin, there is usually a considerable delay before a doctor is summoned. Thus it is clear that coronary care units and mobile coronary care units can have at best only a small effect in reducing mortality, while in the case of a patient who suffers a heart attack in his own home it could be argued that moving him to hospital might introduce hazards which would have been avoided if he had been treated at home. If the benefits of coronary care units were precisely counterbalanced by the hazards associated with moving the patient, then the anticipated result from a randomized controlled trial of home versus hospital care would be to find no significant advantage for the hospitalized group. Using the mortality at twenty-eight days after myocardial infarction as a measure, this was precisely the result obtained in the West Country randomized controlled trial (9) supported by the DHSS. It proved possible to randomize only 28 per cent of the patients who might potentially have been entered into the trial, the patients themselves rather than the participating GPs probably being responsible for the majority of the elections to either home or hospital treatment. The patients in this trial have now been followed-up for one year and analysis of the findings, by the staff of the Institute of Biometry and Community Medicine at Exeter (see Chapter 19), has shown no significant difference between the over-all mortality (randomized cases only) at one year of those who were treated at home and those who were treated in hospital, although for the milder cases the mortality at one year was significantly lower (at the 5 per cent level) for the home-treated cases.

This trial has been criticized on account of the small proportion of patients randomized and because of the fact that the average number of patients randomized by each participating GP was only 0.7. Although it is questionable whether a repetition of the trial in another area would allow a higher proportion of heart attack patients to be randomly allocated to the two treatment groups, the trial has undoubtedly provoked much critical thought about what intensive care facilities can contribute to the management of myocardial infarction, and has highlighted the importance of trying to discover whether there are particular groups of patients who are likely to derive benefit from intensive care, bearing in mind that even though the results of the West Country trial are inconclusive it is very unlikely that the

over-all benefit of intensive care in myocardial infarction can be a marked one. For example, the importance of looking for ways to identify those acute myocardial infarction patients who have a high probability of later developing ventricular fibrillation or asystole, while at the same time seeking drug regimes effective in preventing the onset of these potentially fatal disorders of rhythm, seems to be more keenly appreciated. If it were discovered that only a minority of patients are at such special risk it would become clear that little could be gained by providing intensive care facilities for the remainder. Another facet of this story, which it would also be interesting to explore further, is the question of whether, after a heart attack, rhythm disorders occur more frequently in patients moved to hospital than in those who remain at home. In the present state of knowledge and taking into account the heart attack rate, and the finding that for the elective and randomized groups combined in the West Country study and also for the community studies (1, 2) already mentioned, a majority of patients were admitted to hospital, current policy must continue to be the establishment of coronary care facilities in district general hospitals so as to provide the best possible level of hospital care to the local population.

The high mortality very early after the onset of symptoms of myocardial infarction has led to attempts to provide intensive care at an earlier stage, for example by the provision of mobile intensive care units. A final evaluation of the contribution of one such mobile unit at Birmingham, a study which the DHSS supported, is awaited; and a similar study at Hammer-smith Hospital, jointly supported by the British Heart Foundation and DHSS, is still under way (Part III, no. 211). However, preliminary findings from these studies support the view of Smyllie *et al.* (3) that the contribution of such mobile units cannot be other than small. The possibility that newly acquired angina, or a change in the pattern of existing angina, might allow identification of a group of patients at imminent risk of acute myocardial infarction led to the study of persons with these symptoms who had presented themselves to doctors in a defined community in Edinburgh (10) (Part III, no. 191). By so doing it was hoped that it might be possible to have coronary intensive care facilities at hand for those patients when their heart attacks occurred. However, the preliminary results suggest that only one-tenth of such cases develop infarcts or die suddenly within four weeks and that of infarct patients around one-tenth die within four weeks. During the total study period reported, 79 sudden deaths occurred in individuals who had either not experienced angina or had not reported their angina to a doctor, while there were only three sudden deaths among the patients studied.

If specific symptoms relating to the onset of acute myocardial infarction could be reliably identified and patients encouraged by means of health education to report these symptoms at once, it seems possible that a reduction in the delay time for admission to anti-arrhythmic units (ie intensive

coronary care units) might exert considerable effects in lowering mortality. Furthermore the question arises as to whether the delay before patients come under intensive care could also be shortened if subjects who suspected that they had suffered heart attacks made direct calls upon some form of mobile coronary care, possibly initiated by specially trained ambulance personnel. Such a move would represent a radical departure from the established pattern of medical practice in Great Britain and it could be argued that the over-all effect on relationships between patients and GPs would be unfavourable, while there is the possibility of a high percentage of false alarms with fruitless journeys for the mobile unit team as a result. However, the natural history of myocardial infarction from the time of onset of symptoms is such that it is necessary to consider setting up studies to determine the advantages and disadvantages of this type of service in a limited area. Special health education activity would be needed.

As yet, the place of coronary artery bypass graft surgery is not clear. It has been employed in the acute phase of myocardial infarction mainly in the USA, and more widely at a later stage in the course of the disease, but has not as yet been subjected to a randomized controlled clinical trial. The International Cardiological Society is arranging for such a trial to be carried out and has recently held discussions with the MRC and the Health Departments. The primary objective of the proposed trial is to evaluate the effect of aorto-coronary bypass surgery on the incidence of death and myocardial infarction in patients with angina pectoris. The secondary objective of the trial is to assess the effect of this surgery on the symptoms of angina and on patients' working capacity as defined by psychosocial and physiological measurements. Patients with unstable angina will be excluded from the study because the operative mortality for such patients has been found to be much higher than the mortality during a follow-up period of six months in the Edinburgh study (10) of unstable angina.

### Rehabilitation after myocardial infarction

In the UK, research into coronary heart disease has so far been concentrated mainly on treatment of acute heart attacks and on prevention, but there is an urgent need for research in the field of rehabilitation. There have been studies on early discharge from hospital and McC. Boyle *et al.* (11) have reported that the majority of their patients who had suffered a heart attack were discharged within 10 days of admission, and that this was not harmful during a one-year follow-up. A study comparing mobilization at 5, 10, 20, and 30 days when combined with discharge from hospital 5 days later is at present being carried out by Dr Benn at Musgrove Park Hospital, Taunton and Dr Mather at Southmead Hospital, Bristol, with the help of the locally organized clinical research funds of the South-Western Regional Hospital Board. Advice on the design of the trial, as well as the collation and analysis

of the results, is being given by the Institute of Biometry and Community Medicine in Exeter.

Although there is some evidence that resumption of the patient's former work, or starting a new job within nine months of the attack is possible without any special help for at least two-thirds of the patients previously in employment, who have overcome the acute phase of myocardial infarction (12), steps still need to be taken to determine whether the delay before resuming work might be shortened without ill effect, by planning for it from an early stage in the convalescence. The work by Groden *et al.* (13), who set up an assessment/resettlement clinic, suggests that rehabilitation facilities might result in a much larger proportion of patients returning to work after a heart attack and returning sooner, than is the case at present. One of the objectives of the register of myocardial infarcts in Tower Hamlets, London (Part III, no. 230), which the DHSS is supporting, is to collect data about social problems caused by myocardial infarction, and about return to work. Data on return to work have also been collected in the course of the West Country study of home/hospital care mentioned earlier, the follow-up being continued for one year after the infarction, and this is at present being analysed.

The value of a positive exercise and recreational programme in convalescence has received a certain amount of study, but to date, so far as is known, has not been subjected to a randomized control trial. However, there is a little evidence to suggest that moderate, regular, physical activity following myocardial infarction brings an improvement in subjective state and physical fitness, including a reduction in the heart rate, in ventilation, and in blood pressure for a given workload.

Assessment of the fitness of patients who have suffered a heart attack might be either within or outside the hospital. In some countries, hospital assessment units form the key link in the whole chain of activities planned to restore the patient to his optimum condition and are replete with medical and paramedical personnel plus all the necessary equipment for periodical review of the patient's physical fitness. In Great Britain such units could possibly be integral parts of departments of cardiology or general medicine. The industrial rehabilitation units of the Department of Employment which, on the incomplete evidence at present available, are attended by only a minority of patients who have suffered heart attacks might perhaps be strengthened by adding to them facilities for objective tests, which would need careful clinical supervision. The most effective and efficient organization including the most suitable siting and activities of assessment units needs to be determined by experimental studies.

Much remains to be discovered about the psychological problems of patients who have suffered heart attacks, although some work has been carried out by Dominian and Dobson (14) with the support of the DHSS, and of how far these problems can be lessened by the positive approach of rehabilitation. It is commonly thought that stress is an important aetiological



factor in myocardial infarction, but there is a lack of good evidence to support this contention (15). Moreover, little is known about whether special efforts to avoid stressful home or work circumstances after the heart attack are likely to pay dividends by prolonging survival, or of the magnitude of any such effect.

## The future

Coronary heart disease seems likely to remain a major cause of morbidity and mortality in the UK for the foreseeable future. Research directed towards determining the most effective means of delivering health care related to this disease will therefore continue to be an important interest of the DHSS.

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## Nutrition and public health in the United Kingdom

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JOHN WATERLOW

An article on nutrition surveys in volume 1 of *Portfolio for Health* (1), described briefly the planning and execution of surveys by the DHSS. The object of such studies is to provide a scientific basis for national food policy. It was also stated that plans had been made to transfer the work of nutrition surveys in stages to the Department of Human Nutrition at the London School of Hygiene and Tropical Medicine. A suggested advantage of such a move is that the studies can be seen to be under the aegis of a disinterested body, one moreover in which other relevant disciplines are strongly represented. The early stages of this phased transfer of responsibility have been initiated.

At this time, therefore, it is perhaps more pertinent to discuss the problems of nutrition research from a general rather than from any particular viewpoint. We have inherited from wartime the tradition that it is a part of the responsibility of the public health service to keep an eye on the nutrition of the nation<sup>1</sup>. The original objective was to make sure that people were adequately fed, that is, to prevent undernutrition. Superimposed on this is the emerging menace of over-nutrition in an affluent society. Naturally these opposite forms of malnutrition present different problems from the point of view of administration, monitoring, and research. They have, however, this obvious point in common, that both are departures from normal health. The subject of nutrition is at the crossroads of disciplines (medicine, epidemiology, biochemistry, etc.), but from the practical point of view nutrition is part

1. On the whole, western countries and the USA, if they accept responsibility at all, do not seem to regard human nutrition as of major importance. By contrast, many eastern European countries have large official institutes of nutrition which are concerned with research as well as with surveillance.

of preventive medicine, and prevention is only possible if measurable deviations from normal can be detected at an early stage. This is the crux of the problem, which will be considered at greater length below.

## **Overnutrition**

It is clearly established from estimates of life expectancy that to be overweight is a hazard to health. Obesity is associated with major pathological conditions, such as diabetes and cardiovascular disease, and with minor disabilities, such as osteo-arthritis.

Again, the evidence of geographical pathology suggests with great force that our sophisticated diet plays an important part in the production of ischaemic heart disease. Many different dietary factors have been incriminated: sugar, unsaturated fats, softness of water, and lack of fibre in the diet. A third group of conditions which have been attributed to the 'affluent' diet includes diseases of the gall-bladder and large intestine. Furthermore, the processed foods of industrialized societies contain preservatives and additives which are harmless as far as the available evidence goes but this is rarely, if ever, as complete as one would like.

All these possibilities are well known. What, from the point of view of public health, should be done about them? Laboratory and clinical research into the mechanisms of these diseases must be part of the strategic plan, but the execution of this research is outside the scope of public health. The first essential is the systematic and widespread collection of facts about mortality and morbidity. Mortality rates are readily available, but these need to be supplemented, as they are being, by epidemiological studies of prevalence. Most of the conditions mentioned above are probably of multifactorial origin. Experience in several countries has shown the great difficulty, expense, and inconclusiveness of prospective studies in which an attempt is made to control one causal factor, for example, the effect of the level of saturated fat in the diet on the incidence of ischaemic heart disease.

We are very ignorant of the natural history of these so-called nutritional diseases of affluence, but increasingly it looks as if the pathological processes may start early in life. Obesity is a case in point: there is evidence that obesity is becoming a serious problem in schoolchildren, and some workers believe that it may be initiated by feeding practices in infancy. This is a worthwhile field for public health fact-finding or research, because it may lead to immediate practical measures in the form of education about nutrition in clinics and schools.

This whole field of the relation between nutrition and the diseases of affluence is one in which there is much activity in many countries. The body of knowledge being built up is very large and it is necessary to devise machinery for keeping a continuous watch on new developments abroad as well as in this country. At present no one can predict when the point will be

reached, if ever, at which an attempt should be made to alter national food habits, perhaps with the backing of legislation.

## Undernutrition

Surveys of national diets and of the national availability of food are useful as a check on the adequacy of intakes, but they are a blunt instrument because they do not give information about individuals. A recent analysis by the FAO (the Food and Agriculture Organization of the United Nations) suggests that even in well-to-do countries, there is likely to be a residual 5–10 per cent of the population whose needs for the major nutrients (energy and protein) are not fully met. This is because individual requirements, particularly for energy, vary widely. At the same time intakes vary for economic, social, and other reasons, and there is no guarantee that everyone's intake will automatically match his needs. As a consequence, even in the UK it is necessary to be on the watch for marginal undernutrition in some individuals or families in the lower socio-economic groups. This kind of surveillance is always necessary, as a matter of principle; it should not be regarded as a temporary measure enforced by particular circumstances, such as changes in the provision of welfare milk, or an increase in the cost of food which may follow changes in economic policy.

This raises the problem of diagnosing marginal malnutrition. The most vulnerable subject is the growing child; many factors may affect his growth-rate, but it is probably safe to suppose that, if growth is satisfactory, the nutritional state is also satisfactory. The reverse, however, does not necessarily hold. In some areas children of the lower socio-economic classes are significantly smaller than those of the upper classes, but it would be rash to conclude without supporting evidence that the difference is a result of nutrition. Moreover, we do not know whether it matters in any way for children to be small. On the other hand, a factor which would not be apparent on physical examination, and which may be of much greater importance, is that a deficiency of energy intake could limit a child's physical activity, and hence his social contacts and general development.

The problem of how to diagnose minor degrees of malnutrition, particularly in children, is world-wide. In developing countries frank malnutrition may be common enough, but the marginal degrees of malnutrition, the so-called 'submerged parts of the iceberg', are more important, in that they involve far greater numbers of the population and therefore constitute a public health problem. Marginal malnutrition is being increasingly studied. Thus the work being done overseas is of relevance in the UK and it is important that our connections with this work should be continued.

This applies particularly to biochemical measurements of nutritional status. It is reasonable to suppose that deficiencies of nutrient intake will at an early

stage produce changes in some biochemical functions. As knowledge and technology advance, we place more and more emphasis on biochemical tests and 'profiles'. If a biochemical measurement is considered to be abnormal, but there are no alterations in clinical state, growth, etc., a diagnosis of 'sub-clinical' deficiency is suggested. This unsatisfactory, but no doubt necessary concept is familiar in relation to rickets and scurvy, but is capable of much wider extension. It can be interpreted in two ways: it may mean that the subject is in a state of downward progression towards disease, ie at risk. This, for example, is the significance attached to low levels of serum vitamin A, which indicate that body stores are exhausted. The second interpretation of a subclinical deficiency state is that it represents a new equilibrium which has been attained: but at a cost. An example is the maintenance of body weight on a reduced energy intake, at the expense of reduced physical activity. This can only be detected by functional measurements. Such a concept adds a new dimension to the subject of nutritional testing and surveillance. It is not enough to think only in terms of physical and biochemical measurements: the nutritional scientist has also to work closely with those who are able to assess development and performance.

### **Special groups**

The previous paragraphs have been concerned with the question of general undernutrition or sub-optimal nutrition. There are also special problems in particular groups. Immigrants form one group which seems, at least in certain areas, to have unusual problems such as a high incidence of osteomalacia. Rickets is still reported from time to time in children and vitamin C deficiency in old people. Some workers claim that folic acid deficiency occurs in pregnant women in this country. Iron-deficiency anaemia is still common in women of the child-bearing age. In these examples the existence of a few cases of clinical disease, for example, rickets or scurvy, raises the presumption that there are many more subclinical cases which can only be diagnosed by special means, biochemical, radiological, or functional.

Perhaps the most important of all special groups is that of the elderly. Body composition as well as function alters with age, and we have very little idea of the characteristics of healthy elderly people. Ageing, in the sense of loss of physical and mental function, could be regarded as a disease with multifarious manifestations, which affects some people much earlier in life than others. It may itself lead to secondary malnutrition, but more important is the question whether the onset of degenerative changes is influenced by nutritional factors, deficiency or excess, earlier in life. A possible example of such a process is the suggestion that osteoporosis in old age may result from inadequate deposition of bone in early life, rather than from any abnormal rate of destruction or loss in later years.

## Conclusion

Whether we are dealing with over- or undernutrition, one general problem is the same: the meaning of small variations from the so-called range of normal. Do they represent individual variability, or successful adaptation to environmental differences, or are they indications that the subject is at risk? This puts in question the whole concept of the 'range of normal'. We are reaching a critical phase when a marriage has to be made between the concepts of public health, which deals with groups, and the concepts of clinical medicine, which deals with individuals. To some extent this new situation arises from the increasing possibilities of measurement in medicine. In every group there is a range of variability of any characteristic which can be measured. The problem is to identify the individuals who have some characteristic which puts them at risk. Logically, the only way to do this is by longitudinal studies in depth. We cannot know whether a given finding has any significance until we know what happens in the future to the person in whom it is observed. This approach has long been used in clinical medicine, although not always systematically, in studying the evolution of conditions such as diabetes and essential hypertension. It has been systematized in studies such as those of the Medical Research Council on the blood pressure of a whole population. It is the path which nutrition also has to follow in the future.

Although the diseases of over- and undernutrition have general scientific problems in common, from the practical point of view there are obvious and important differences. The diseases of affluence which may be related to nutrition are there for all to see, for example obesity and coronary heart disease. In the present state of knowledge we cannot prevent them because we do not know the mechanisms involved. By contrast, the kinds of undernutrition which are likely to be found in the UK are mostly not dramatic, they tend to be hidden, and to occur in just those people who have fallen through the meshes of the social services. It is difficult to diagnose marginal undernutrition, whether of energy, protein, calcium, or vitamin D; it is difficult to discover and enumerate the people who suffer from any of these deficiencies; but when they are detected treatment is possible, and the problems of prevention are socio-economic rather than scientific.

It is important that the administrative services which are concerned with public health nutrition should be wide enough to deal with such different situations. In the present context, however, we are concerned with the research which is necessary for defining policy and action in the field of nutrition rather than with the methods of executing policy. The organization of research includes three elements: scientific advice and decision-making; execution; and administration. Of administration all that need be said is that it must be flexible, since none can predict the needs which may suddenly appear or the directions in which research may open up. For scientific advice the DHSS has its Committee on Medical Aspects of Food Policy, with help

from expert panels and sub-committees. Closer integration with the MRC is desirable, but the important point is to create a climate of opinion which accepts the challenge of applied research and which recognizes that nutrition has an intellectual as well as a practical content.

Most difficult of all is the question of how to arrange for research, which is considered to be necessary, to be carried out. The DHSS itself has a small professional staff which has been very successful in organizing surveys of various kinds. These may be regarded as fact-finding or field research. In the last few years strong support has been given to some university departments, for example the Department of Social Medicine at St Thomas's Hospital and the Department of Human Nutrition at the London School of Hygiene and Tropical Medicine, to enable them to organize and execute research on behalf of the DHSS. Some help has also been obtained from MRC units. Nevertheless, there are few university departments which have any interest in or knowledge of the subject of human nutrition, and a great shortage of scientists and doctors with suitable experience. It would be logical for support to be provided for training in nutrition at an advanced level, but this would accomplish little unless there are also career opportunities. Progress is therefore likely to be slow without an increase in the academic potential on which those responsible for policy can rely.

Finally, it is important that close contact should be maintained with nutritional work in other countries, particularly with developing countries where important advances are being made. It is an axiom in physiology that the way to understand an equilibrium is to disturb it. If nutritional disturbances are less severe in the UK it is all the more necessary to profit from the experience of those who are less fortunate.

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## II

# Current dental research

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H. M. HUGHES

A Nuffield report in 1962 (1) stated: 'Dental disease is one of the most common of all kinds of illness, and one that causes a good deal of pain and misery, inconvenience and economic loss.' This remains true and it should be remembered that in the case of dental disease the whole community, including the very young and the very old, is at risk.

Cohen (2) has described the DHSS's role in R & D as 'for purposes directly relevant to the operations of the NHS and the Personal Social Services'. Dental activities form a part of this role and the DHSS's support in the field of dental research and development aims first at preventing or postponing dental disease. Secondly, it attempts to ascertain the most appropriate ways in which dental care can be given and to improve the techniques employed. Thirdly, it seeks to develop better materials for use when dental treatment is required.

The Chief Medical Officer in his Annual Report for 1970 (3) wrote: 'The most efficient and safest method of reducing dental caries is, of course, by fluoridation of the public water supply', and 'Few preventive medical procedures are better authenticated, so totally free from risk or so certain of achieving a universally favourable result'. The DHSS's interest in fluoridation now extends over twenty years. It was in 1952 that a dental officer of the then Ministry of Health took part in a mission to North America in order to study the fluoridation of water supplies as a means of controlling dental caries. The report of the mission (4) was mentioned by Martin (5) in his essay on fluoridation.

Todd (6) has reported on a national dental survey which related to adults aged 16 years and over. Complementing that survey the Secretary of State has now commissioned the Office of Population Censuses and Surveys and the



London Hospital Medical College Dental School to conduct a survey into the dental health of children of school age. Planning is in hand and the field-work is likely to be carried out in the spring of 1973.

Surveys add to our information on the prevalence of dental disease and the volume of dental treatment received, together with the community's attitude to dentistry. They help in assessing the amount and quality of dental manpower required in order to provide optimum care. The survey on adult dental health was particularly revealing about those people who attended a dentist regularly and about those who did not. The forthcoming children's survey will make available more detailed information on the dental health of children and children's attitudes to dentistry. It is extraordinary how dental ill-health is taken for granted. When care is needed it is often ignored until pain or discomfort make it imperative. Because of this factor it is particularly difficult to distinguish between the need for dental care and the demand for treatment. From a comprehensive knowledge of the nation's dental health it may be possible to estimate more clearly the over-all number of dentists required and their most useful regional distribution. From detailed information as to type of treatment needed and provided, the most effective composition of the dental team may be determined.

Professor G. L. Slack, H. Allred, and R. Duckworth, with their colleagues, have set up an Experimental Dental Care Unit at the London Hospital Medical College Dental School (list no. 383).

Methods of training dental health teams are being evaluated and the dental care given by the teams is being assessed. The degree of ancillary help for the dentist varies but dental surgery assistants, dental hygienists, and dental auxiliaries are all involved.

Following preparatory work the project commenced in the spring of 1971. Account was taken of previous experience in Europe and the USA particularly at Louisville Centre. An eight-chair clinic giving maximum flexibility of available facilities was constructed. The design allowed for either left- or right-handed operation by the dentists. Particular thought was given to the dynamic instrumentation necessary and the radiographic facilities which were required. The unit was fully functioning by January 1972. The data obtained in this project will be processed, stored, and recalled by the use of a computer. The ultimate aim is to provide information about the relative efficacy of differing methods of delivering dental care to defined communities.

With the improvement in survival rate, increasing numbers of physically and mentally handicapped children will require dental care. These children's mouths are often neglected. There are a number of reasons for this but it is particularly sad to realize that some of the children are unable to communicate properly even when in pain. Since 1968 the DHSS has supported a project under the care of Professor W. J. Tulley of Guy's Hospital Dental School (list no. 79) to look into the dental problems of physically and mentally handicapped children. A mobile unit has been used to visit special

schools, nurseries, and training centres in south London. The final report is expected this year but an interim report already suggests that 95 per cent of the children attending the mobile unit were able to receive their dental treatment without any form of sedation. The problems associated with patients who receive dental treatment on a day-bed basis are now being studied by Professor E. D. Farmer and his colleagues at the University of Liverpool School of Dental Surgery (list no. 201). There is co-operation between the School of Dental Surgery and the Departments of Psychiatry and Anaesthesia of Liverpool University in comparing those patients receiving treatment in the day-bed units with patients receiving similar treatment but staying for a period of three days. It is hoped that the study will help to identify those people for whom day-bed treatment is preferable. Comparisons are being made between the reactions of day-patients treated under local anaesthesia and those who are given a general anaesthetic. The latter are also being compared with in-patients receiving similar dental treatment under general anaesthesia.

A study is now taking place under Professor F. E. Hopper at the Leeds Dental Hospital in order to ascertain the most satisfactory instrument supply and sterilization system for a new dental hospital. In particular a central sterile supply department system and an internal sterilization department system are being compared.

Whilst the DHSS has supported some research into improving dental equipment most of the work done in this field is sponsored by industry and the development work is carried out by commercial concerns. In recent years the DHSS has become increasingly interested in improving dental materials.

The Atomic Weapons Research Establishment, Aldermaston, is undertaking a number of medical engineering projects (list no. 295). In the dental field these include the development of improved anterior filling materials, work on reinforcement of denture-base materials, and radio-opaque denture materials. The anterior filling material problem has been approached in two different chemical ways. In one case a fast-setting inorganic cement which resisted erosion by mouth acids was sought; in the other the research was concerned with obtaining strong, rapidly polymerising organic polymers, and studying filler contents, and the effect of the oral conditions on their physical properties. In regard to denture materials, the mode of fracture of denture-base polymers was studied and methods of toughening these materials by chemical modification of the polymer structures were investigated. Research also continues for a suitable radio-opaque denture material. Dentures and artificial teeth which do not show on radiographs are a particular danger when embedded in tissue following an accident. The problem may also arise when a denture or a part of a denture, even an artificial tooth, is swallowed.

The Eastman Dental Hospital has co-operated with the Atomic Weapons Research Establishment at Aldermaston in a continuing programme sponsored

by the DHSS concerning two separate subjects. The first is the degradation of anterior dental fillings in the mouth. A novel replication method has been developed to study fillings *in vivo*, and the models are examined with a scanning electron microscope and photographed. Comparison is then made with previous information about the same restoration and also with other restorations present in the same mouth where different filling materials have been employed. These clinical and laboratory studies are duly correlated and the chemical and physical factors which contribute to the failure of the restorations assessed. The second subject is the cutting action of dental burrs. It is felt that some burr shapes used for years in the conventional drill could be redesigned for greater efficiency in the high-speed turbine-driven drills used by dentists today. The generation of heat and the removal of debris by different burrs is a part of this study.

Research is now taking place at the National Physical Laboratory on the use of platinum alloys for bonding to aluminous porcelain for dental crowns. It is hoped that this project will lead to the production of improved bonded crowns and incidentally may add to our understanding of crown fracture. Strength for strength, it may be possible to use much less platinum alloy than the gold alloy at present required for these crowns, and in addition there should be a substantial saving in the laboratory time required for their production.

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# Research directions

MEANS  
Technology  
personnel  
environment

ORIOLE GOLDSMITH  
JOHN MODLE

## I2

# Computers and health services

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JOHN C. A. RAISON

Present efforts in the use of computers for health care spring from several roots. Regional hospital boards have for a long time undertaken financial, payroll, and some administrative computing activities, and provided limited assistance to clinicians or researchers. Medical staff of local health authorities have promoted and implemented some most successful applications, particularly immunization programmes. Medical statisticians and epidemiologists in research and government bodies have exploited the increased power afforded by computers in terms of data storage and manipulation. These roots were later fertilized by the technological development of facilities called by various combinations of the words 'on-line, real time, rapid response', that is to say the computer is directly connected for performance of a procedure either to the person concerned, or to apparatus, and it performs its task sufficiently quickly to affect usefully the outcome of the procedure, usually more efficiently than by previous methods. Commonly the computer performs several tasks apparently simultaneously, called multiprogramming. In such an environment the DHSS finds that it has a role to cultivate further trial and development, justifying the establishment of a centrally financed and managed effort. The potential value of using computers to improve health services, ranging from care of the individual patient through various levels of management activity to central planning of health care services, has been widely foreseen, as well as risks or problems. It is certainly not correct to think of computers solely as huge file departments and fast mathematical calculators. Nor should their capability be considered simply as that of providing information systems unless 'information' is interpreted in the widest sense as comprehending all forms of handling of signals, data, and logical manipulations of these; the communication and action aspects of any

health-care procedure may have substantial elements capable of computer assistance.

### The need for a central programme

It would not have been sensible to hope for adequate progress by unco-ordinated independent activities on the part of research and health service authorities. 'Medical computing' suffers, not surprisingly since it is the application of a new technology which is developing faster than the skills it serves, from independent, ambitious, and expensive trials that have failed, and the tendency for teams to 'reinvent the wheel' by ignoring the work of others.

Additionally a general viewpoint emerged that since large-scale computer developments, such as might substantially affect health care and management for the better, were both unexplored and likely to be very expensive, it was appropriate that such investigations should be organized centrally for the benefit of all authorities.

The introduction of automation into any procedure calls first for a detailed analysis of it, followed by a logical design of the computer-based replacement for it, usually with major improvements in it. Indeed it has become well recognized that because of an inherent resistance to more than small changes in established human 'manual' activities, changes which cannot be avoided if one is to employ the less perceptive logic of computers, preparing for the latter often brings about improvements which do not actually require the computer, sometimes called 'computer catalysis' (1). It is important to emphasize here that there is no implication of computer-based systems *dictating* how procedures shall be performed by humans, but rather that the terms under which the machines work shall be precisely laid down. The concept of standardization is one which rouses strong emotional reactions as well as reasonable cautiousness. But with the possible permutations of a large number of potential computer uses, the large number of potential user units (hospitals, community services, etc.), and several patterns of equipment provision, it is essential that there be some degree of national co-ordination and standardization. Much of the alarm about constraints of standardization can be mitigated by allowing for some variation of input and output characteristics to suit local conditions. To the extent that this control can be achieved, with resultant saving in manpower effort, time and equipment costs, the DHSS can make a considerable and valuable contribution. During 1971 the Secretary of State decided that regional hospital boards should thereafter standardize on the ICL Series 1904A or S models for replacement of existing installations, and it is notable that an early consequence has been agreement that there shall be co-ordinated effort, led by the DHSS, in development of standard applications for these machines, not only of the largely financial work they already do, but in the provision of new management and medical applications. With the possibility that computers may bring widespread benefits for many

different types of NHS user, and with migration of staff, the advantage of standardization does not lie wholly on the side of economic provision; there is the security of being familiar with the basics of a computer system when staff move, and it should be possible to ensure better training, both for ordinary users and technologists, with national co-ordination. The establishment of suitable career paths in medical computing, and of the various required forms of training, form important elements of the DHSS Computer Programme, which began in 1967 and currently spends £5 million annually on hardware and revenue. This programme is intended to co-ordinate and control national effort within a pattern from the first 'research' concepts of a computer application to the planning of its service use, if the latter becomes justified. This justification imposes a heavy burden. Perhaps because of the very large equipment and development costs, adequate cost-benefit studies of applications are required to be carried out, which has transferred to the Computer Programme a need to develop methods of evaluation of procedures which have hitherto been almost nonexistent. By some this is seen as requiring almost the same amount of human effort as that for analysis and design, and very large costs. There is also the problem that devising techniques will take time which may not be completed in time for the 'before and after' measurements of computer-changed procedures which are considered desirable. This was a difficulty in evaluation of the first phase laboratory automation trials (see below). A number of the experimental projects supported by the DHSS have been enlarged to include staff for evaluation, and recently a small central evaluation team has been set up. There is need for central co-ordination of work in this field, and, if possible, establishment of national standards.

## **Development of the Computer Programme**

When enthusiasm was first shown in this field it appeared that the hospital was the unit whose many functions might be most successfully improved by computers, a view still held by many. The DHSS's first source of funding for the Experimental Computer Programme was from the hospital vote. Drive and proposals came principally from teaching hospitals and resulted in a number of fairly large-scale real-time projects, the first being established in 1968. It was anticipated that up to five years would be required before any practical results became available. As well as these, other experiments were promoted to use smaller computers for a single activity or group of very closely related activities in a particular hospital department. In 1970 this Programme was modified to provide a greater proportion of enterprises based on well-tried computing techniques rather than on the newest, less widely tested methods. By 1971 sufficient experience across the broad front had been gained in the UK to call for a critical review of progress. The conclusions reached now form the basis of departmental policy and the programme flowing from it and have been published in a review report (2).

## **The Programme and its control**

The computer report considers potential computer uses in terms of applications, procedures which may be assisted by computers, and groups together related applications.

At present some eighteen Application Groups have been described (see Appendix) and arranged in priority for action, based principally on assessment of the impact which a successful outcome of such effort can be expected to have on the tasks of health care, allocation of resources, best use of resources, and improvement of the quality of care, tempered by estimates of technical and operational feasibility and probable time-scale to success. For most feasible and desirable applications there are a number of different possible technological methods. Also, and in particular relating to the applications expected to be of most significance in improving the use of resources, if they can be developed, testing should not be limited to their isolated activity but rather be of the effects of integrating a number of those applications which interact, to minimize demands on human performance, if the full potential of computers is to be tried. This results in a considerable number of potential 'experiments' and it is not realistic, in terms of cost and probably of manpower and other resources, to set up the full range of experiments that could be premised to minimize the effects of all independent variables. Considerable selection from the possibles has been necessary, and it is the intention of surveying and controlling progress of the co-ordinated programme that conclusions may be drawn from trials at the earliest possible moment to speed progress by redirection of effort and to reduce prolonged unfruitful experience. For this control, work on applications is to be considered as being in one of three stages; 'Experiment' in which technical and operational feasibility and potential performance in terms of costs and benefits are tested; 'Development', in which systems justified by experiment are made fully operational so that they can be adopted elsewhere, and are subjected to a definitive judgement of their costs and benefits; and 'Implementation', in which fully justified systems are put into widespread service use with only minor changes. The terms 'justified' and 'fully justified' imply progressive degrees of certainty that the benefits brought by the service operation of such applications outweigh their costs. An annual review of progress, in which a rolling five-year programme of development is updated has now been set up. The DHSS obtains considerable help from the Advisory Committee on Medical Computing, under the chairmanship of Professor G. M. Smart, and its sub-committees, the Small Computer Advisory Group and the sub-committee on the Definition of Modular Applications. The Scottish Home and Health Department also has a programme of computer R & D collaboration is organized to avoid useless duplication and to spread the total effort in a balanced way. For example the SHHD are supporting a trial of computer ECG interpretation services for hospitals, later extending to



general practice, and information from this, including evaluation should allow conclusions as to the worth of further developments or services provision of such a system, without a similar trial in England. Similarly the SHHD looks to England and Wales for development in the fields of on-line visual planning of radiation treatment and of large-scale hospital systems in which a number of applications may interact.

## **The hospital projects**

Five hospitals now have computers installed or about to be delivered. The common characteristic of these systems is the use of medium to large computers having a considerable fast-response facility available, apparently simultaneously, to a variety of users at a large number of terminals in the hospital for a variety of activities. They concentrate on application groups 3, 4, 5, 6, 10, 11 (see Appendix) but applications from groups 2, 7, 12, 14, 15, and 17 are also being developed. There the primary emphasis is on management, whether of care of the individual or group of patients, for example, automated appointments waiting-list systems, or test requesting and reporting procedures; or at the hospital itself, such as monitoring the occupation of beds, or use of resources, or controlling stocks and re-ordering. There already existed much practical experience of batch-processing systems at University College and The London Hospitals. The Nuffield Provincial Hospitals Trust, which played an active role in promoting medical computing in the early days (3), and later, by organizing symposia, provided the Queen Elizabeth Hospital, Birmingham, with a computer on which several years successful practice with a punch-card patient management system has been gained.

One of the potentially important features of these large systems is that their full impact may only be achieved when a number of different applications are completely co-ordinated automatically. And with all operating on the same data base, which is essentially the computer files of (i) patients receiving hospital care, (ii) their needs, and (iii) the resources to meet them, effective economic operation should be possible. This form of trial is more complex than the well-known computer systems of airlines and banks. Hospitals engaged in such projects are King's College Hospital (list no. 458), the London Hospital (list no. 463), North Staffordshire Royal Infirmary (list no. 468), the Queen Elizabeth Medical Centre, Birmingham (list no. 473), and the Exeter Community Health Service project (list no. 485). The period of analysis, design, and installation for each project takes two to three years, and several further months pass before the first applications go live; perhaps at least a year of practical experience is required before first conclusions can be drawn from the trial, so results as yet are few.

Another consortium of hospital projects, those at University College Hospital, which also had considerable well-known earlier success with a wholly batch-processing machine, St Thomas's Hospital, the new Charing

Cross Hospital, and Addenbrooke's Hospital, Cambridge, is working jointly to devise mixed real-time rapid response and batch systems for the same applications groups, using similar hardware (computer equipment) and operating software (the programs running the computer which permit operation of the various specialized application programs). In addition, plans are being made to develop application programs which may be transferred when successful from one of these hospitals to another. If this bold attempt can be carried out, the joint work, always extremely difficult in a new undertaking, will make an enormous contribution towards productions of 'model systems', ie fully developed applications which can be transferred to new sites with minimum alteration and with less development costs. It is hoped that these projects will become operational during 1973.

There are a number of later developing projects dealing with similar applications using different forms of computer facilities. The Oxford Computer Project is to use a network of small computers, serving information rooms or patient administrative centres in a group of hospitals. The North-West Metropolitan Regional Hospital Board is to investigate the scope of such activities which can be performed by a much smaller computer installed in a hospital. Leeds and Newcastle Regional Hospital Boards are to use terminals in selected hospitals linked to their board computers. The United Manchester Hospitals and the United Liverpool Hospitals are to develop hospital applications using adjacent RHB computers. An interesting application is to be tried in Manchester, where the computer is to assist the scheduling of patients in a unit devoted to clinical investigations being carried out at greatest possible speed and practicality. Thus the hospital programme is widespread in terms of complexity of computing and applications to be tested.

## **The medical record**

The establishment of a computer-based medical record, albeit variously conceived in nature and size by different interests at this time, is the basis of many computer trials, and the many different uses of the same data items is perhaps justification for practical trial of a number of different approaches, none of which can be agreed in abstract to be the only right method.

At King's College Hospital where the computer was installed in 1969 one objective was computer provision of the full patient clinical record, in two medical wards. This was to be compiled, and retrieved, for usual clinical practices, by staff through visual display units (VDUs, cathode ray tubes similar to television screens) on the ward. The premises were that such an arrangement would ensure a systematic and full record, thereby improving its quality; make available the same information to several users simultaneously if required, thereby eliminating the difficulty when notes are needed in investigation departments; increase the legibility, intelligibility, and

reliable storage of the record; eliminate the repetitive writing of many elements, particularly identification, required in manual recording systems; by its systematic construction enable much fuller use to be made of it for clinical analysis and research; build up a retrievable data-base for clinical teaching; provide a record which could be more easily, and automatically, used for management purposes, of both patient care and the hospital; and provide contributory experience to the objective of being able to verify and link functionally all the significant elements of a person's health and disease record, wherever used outside or inside hospital, and eventually over his life-span.

To some considerable extent the first and a difficult, goal has been achieved. The recording of a patient's history and clinical examination through a VDU, using a structured 'tree-branching' format of questions, wherein the answer to a question determines which of several available sets, or branches, of questions is next provided for consideration, is carried out for most or all patients on two wards, and a computer-printed version of this record ('hard copy') is produced in duplicate, one for the responsible house physician/student team, one for the professor, before each formal ward round. Two main problems have emerged, of which an attempt to solve the first has led to the second phase and an expansion of the project. If anything more than a limited summary-type clinical record is to be computer-based, it becomes important to avoid adding to the complexity of present manual record handling by dividing the required information between these and the computer-based element on the VDU. Therefore reports produced by investigation departments, X-ray and laboratory, must also be computer-based. And if writing is to be reduced to a minimum, requesting procedures for these tests should be via the computer, thereby simultaneously recording for the ward that the request had been made. But it is not practical, if any assessment is to be made of the effect of using a computer in the hospital, to ask these investigation departments to operate two systems in parallel: the computer system for two wards, the old for all others. Therefore a computer-based requesting and reporting procedure must be set up for *all* wards, and the second phase of this project, during the next two years, is the provision of a computer-based VDU communication network throughout the hospital. This will also contribute greatly to the trial of a number of the other systems for management being developed in the hospital. The second difficulty may be more significant. It takes longer than by writing to compile a record, although it may be a more complete one. It is harder to 'retrieve' a specific required data item than for a doctor familiar with his established and briefer pattern of written recording, although it may be easier for a person unfamiliar with that possibly idiosyncratic method. And there may be a fairly deeply imbedded 'traditional' aversion to using this machine-oriented method for recording all the information obtained during the personal doctor-patient interview and examination. It is said, however, that young doctors

trained in such a system as medical students accept more readily the impositions of the method. There is need for considerably more work on the purpose, structure, and methods of selective retrieval if the full clinical record as such is to be computer-based. What has already emerged, both from the enthusiastic use of the same system for recording nurses' orders, and from a short trial of a limited, fairly strictly coded but highly manipulable general practice record for patients (4) is that a brief systematized computer record may prove to be wanted well before studies of the extended clinical computer record produce a system for service use.

As well as at King's College Hospital, trials of the longer form of clinical recording are being developed in the Guy's/Essex project (list no. 456) and at the United Birmingham Hospitals, but clinical experience of its use is not yet available. In the former of these the subject matter is a clinical record suitable for general practice and hospital medical needs. The Exeter project has already successfully demonstrated the use of a short, structured but manipulable general practice record (4) and summary clinical records, for day-to-day care, are to be tested in University College Hospital and St Thomas's Hospital.

There is, too, the matter of linking elements of a person's medical record which are at present separated geographically or in time. The pioneer work of the Oxford Record Linkage Study (5) continues and is now closely linked with the Oxford computer project (list no. 490) setting up patient administration centres, notably in maternity and geriatric hospitals, and a community health project in which brief clinical general practice records are associated with a patient register. At Exeter the GP record, test, and appointment requesting systems are to be linked with the hospital computer records.

### Laboratory computers

The six laboratory computer trials described in *Portfolio for Health*, vol. 1 (6) became operational during 1970. They have confirmed the expectation that both the immediate handling of signals and consequential calculation from automated instruments, usually called data acquisition, and the tasks of registration, work-lists, and the preparation of clinical reports, loosely called data processing, can be undertaken under service conditions. They have already shown improved laboratory accuracy and performance. Progress in clinical demand for tests and in computer technology call for further developments. The capacity of the original systems prevented the computers operating in both modes, data acquisition and data processing simultaneously, so that it became necessary to undertake these activities sequentially. This has limited the work of the laboratories, even though it had been greatly increased by the performance of these first computer systems. Several methods of dealing with this problem are now being investigated. At Warwick Hospital the original Elliott 903 computer is continuing the data

acquisition work, whilst a small Nova computer is dedicated to data processing. The Sheffield Laboratory is examining the possibility of linking with and using the RHB computer, and this approach is also to be examined linking a small laboratory computer to the North Staffordshire Infirmary main computer. And a major effort, expected to be operational within two years, at University College, the Royal Postgraduate, and Poole Hospitals has been set up to provide simultaneous operation of the two phases, using CTL Modular One computers with disc facilities, which were not available on a British machine at the time of the original project. Projects at the Queen Elizabeth Hospital, Birmingham (list no. 472), using an IBM 1130 and disc, and at King's College Hospital (list no. 459, Digico Micro 16) have become operational and now require evaluation after a period of running.

The DHSS placed considerable emphasis on evaluation of the original laboratory computer experiments, and much work was done by its O & M branch in establishing baseline methods of measurement of performance. These have indicated some of the improved quality maintenance in laboratories, but the effect of growth of demand limiting the systems became apparent before evaluation was completed.

At University College Hospital the new project is to provide services for the Haematology Department also, and in Cambridge a dedicated computer, with disc facilities, is to be concentrated on the Haematology Laboratory. It is the intention of the DHSS to explore computer facilities for all laboratory departments. It is considered possible that all data acquisition for pathology laboratory services can be undertaken by a single dedicated machine.

## **Patient monitoring**

The use of computers to improve the monitoring of acutely ill patients has some strong advocates. Its potential in data acquisition and recording, correlation, and display of data have been well demonstrated abroad, and more recently in experiments now being undertaken at the Royal College of Surgeons (list no. 477), St Bartholomew's Hospital (478), and Cambridge (454). Another special potential, the ability to make new or more accurate measurements which may be significant for care, hitherto impossible, in critical situations (7) has been demonstrated. But what ought to be the biggest contributions of the computer to this field remain to be developed: the building up of a well-annotated data file for more precise study and automated reference, and the production of algorithms for very early identification of trends of deterioration which requires considerable further pathophysiological study. Up to the present, almost all units undertaking this work in America have been observed to slip into an open-ended development outlook, rather than to progress by determined phases with defined practical objectives, so that after several years they are ignored by the bedside nurse and practical doctor, and their use is largely confined to patho-

physiological research. Hardware and software costs are still relatively high in relation to the number of patients who may benefit.

Research must continue, but really promising progress depends on one or more of a number of break-throughs: new understanding in pathophysiology; a different organization of clinical measurement and monitoring; reduced computing costs, either by use of smaller, cheaper hardware units as modules built up specifically according to local needs, or perhaps ultimately by combination of this facility with one for laboratories. This field remains challenging but of third priority.

## **Therapeutic radiology**

The planning of radiotherapy treatment, both for external beam and intracavitary methods, is already well established using batch-processing computers. A real-time system, by which the physicist may plot on a VDU the outlines of the patient, the area to be irradiated and other areas where high dosage is to be avoided, has been most successfully developed at the Royal Marsden Hospital (8; list no. 476). He may then examine, on the screen, the effects of various combinations of beam treatment, automatically calculated, before choosing the best and obtaining a print-out of this. The system, using a dedicated computer, is already being adopted in several other hospitals. The 'turnround time' for treatment planning, from request to production, is reduced from at least a day to about fifteen minutes, and both physicist and radiotherapist claim greater satisfaction with the plans produced. A further project, at the Middlesex and Addenbrooke's Hospitals (list nos. 452 and 466) will attempt to produce the same facilities using VDUs linked by telephone to a single large computer. The DHSS intends to promote a study to evaluate these two methods, and the batch-processing method. It will be very difficult, or impossible, to determine any clinical changes from using these methods, but a comparison of costs per treatment and staffing implications should be possible.

## **Other projects**

Image improvement, and new forms of dynamic study (changes over time), using computers associated with gamma cameras or ultrasonic apparatus are being keenly studied and are thought to be promising but, like patient monitoring, are several years away and much critical examination will be necessary before developments can be evaluated for service.

## **Prospects**

This relatively large programme will require three to four years before results, and assessments of these, from which determinations about the

worth of implementing many systems can be made. It is easy to be confident of the very considerable impact which computers will make, within ten years, in many spheres of health care, treatment, and health services; beyond the safe assertion that simplest methods will bring first results one cannot predict the pattern of medical computing more than five years hence. One element seems certain; the coincidence of two events will mould demands for computer developments in this period.

The reorganization of the NHS, bringing together three hitherto largely separate health systems, each with their own records, and problems, together with the fresh emphasis on sound management, from peripheral personal care to central planning, calls for reworking of the information systems which must act at all levels in an integrated and economic manner. And secondly there seems the prospect, after completion of current government inquiries into the privacy of the individual and confidentiality of records, that for health care, in which accuracy and completeness of whatever information is required to provide adequate service are essential, it will become possible to establish the sort of data files which can serve personal needs for health surveillance and the management of treatment, whilst deriving from them information to manage and improve services. Some of the work described in this report clearly leads in this direction. The recently mounted Executive Council Study in which computer operations of the administrative work associated with executive councils are to be tested, and the special study of information flow requirements for the NHS and DHSS, recommended in the computer review (2) which is to be started, will contribute to this objective. With so much research in progress, it is improbable that many new trials will be promoted in the near future. The next direction of effort for computer development must be the integration of information requirements for the reorganized and integrated health service.

## Appendix: Application groups<sup>1</sup>

GROUP 1. COMMUNITY HEALTH REGISTER AND RECALL SYSTEMS	<i>priority</i>
1.1. Age- and sex-based registers	1
1.2. Multipurpose child surveillance and recall registers	1
1.3. Surveillance registers	1
1.4. Disability registers and recall systems	1
1.5. Multiphasic screening	3
GROUP 2. COMMUNITY HEALTH SYSTEM	
2.1. Appointments	<i>all applications 2</i>
2.2. Registration	
2.3. Work-lists	
2.4. Staff allocations	

1. Changes in priorities and in groupings agreed during the 1972 annual review of the Computer Programme have been incorporated in this appendix

2.5. Supply provision	
2.6. Drug prescriptions	
2.7. Hospital appointment/test bookings	
GROUP 3. HOSPITAL OUT-PATIENT ORGANIZATION SYSTEMS	
3.1. Pre-registration	<i>all applications</i> 2
3.2. Index and tracer systems	
3.3. Appointments	
3.4. Work-lists	
3.5. Registrations	
3.6. Patient scheduling and routing	
3.7. Discharge	
GROUP 4. HOSPITAL IN-PATIENT ORGANIZATION SYSTEMS	
4.1. Waiting-lists	<i>all applications</i> 1
4.2. Admissions	
4.3. Bed state	
4.4. Patient scheduling and routing	
4.5. Discharge	
GROUP 5. HOSPITAL PATIENT SERVICING SYSTEMS	
5.1. Nurse allocation	2
5.2. Other staff allocation	2
5.3. Nursing orders	2
5.4. Nurse dependency	2
5.5. Supply provision	1
5.6. Menu and diet planning	1
5.7. Service department requesting and notification systems	1
5.8. Patient monies	1
GROUP 6. PERSONAL MEDICAL RECORD SYSTEMS	
6.1. Basic patient record	1
6.2. Abbreviated patient record	1
6.3. Extended clinical record	3
6.4. Integrated patient record	2
6.5. Personal health record	3
6.6. Nursing reports	3
6.7. Direct medical history taking	3
GROUP 7. PHARMACEUTICAL SYSTEMS	
7.1. Drug prescription	2
7.2. Drug ordering	2
7.3. Drug records and stock control	1
7.4. Drug administration recording	2
7.5. Hospital drug prescribing: statistics	2
GROUP 8. LABORATORY SYSTEMS	
8.1. Test requests	<i>all applications</i> 1
8.2. Work schedules	
8.3. Instrument measurement and control	



*priority*  
*all applications*

- 8.4. Result calculation
- 8.5. Report preparation
- 8.6. Quality control

GROUP 9. PATIENT MONITORING, CLINICAL MEASUREMENT AND NUCLEAR MEDICINE SYSTEMS

- 9.1. Patient monitoring *all applications 2*
- 9.2. Clinical measurement
- 9.3. Nuclear medicine

GROUP 10. RADIOTHERAPY SYSTEMS

- 10.1. Treatment planning *all applications 1*
- 10.2. Staff safety
- 10.3. Automatic treatment machine operation

GROUP 11. RADIOLOGY SYSTEMS

- 11.1. Result reports 3
- 11.2. Record retrieval 3

GROUP 12. PHYSIOLOGICAL SIGNAL ANALYSIS SYSTEMS

- 12.1. Analysis 3
- 12.2. Result reports 3

GROUP 13. CLINICAL DECISION-MAKING SYSTEMS 3

GROUP 14. WORKS SYSTEMS

- 14.1. Computer-aided design *all applications 1*
- 14.2. Job costing
- 14.3. Engineering design activities
- 14.4. Planned preventive maintenance
- 14.5. Project Network Analysis
- 14.6. Quantity surveying

GROUP 15. FINANCE SYSTEMS

- 15.1. Payroll *all applications 1*
- 15.2. Financial accounting
- 15.3. Purchase and stores accounting
- 15.4. Responsibility cost centre accounting
- 15.5. Subjective cost accounting
- 15.6. Commitment accounting
- 15.7. Cash control
- 15.8. Budgeting control

GROUP 16. ADMINISTRATION SYSTEMS

- 16.1. Stock control *all applications 1*
- 16.2. Equipment scheduling
- 16.3. Manpower information
- 16.4. Transport management and control

## GROUP 17. HEALTH CARE STATISTICS SYSTEMS

- 17.1. Hospital activity analysis (in-patients)  
 17.2. Hospital activity analysis (maternity)  
 17.3. Hospital activity analysis (out-patients)  
 17.4. Hospital in-patient inquiry  
 17.5. Mental health inquiry  
 17.6. Cancer registration  
 17.7. Births and deaths registration  
 17.8. Statutory disease notifications  
 17.9. Executive Council register-based statistics  
 17.10. Effectiveness (performance) reporting

priority  
 all applications 1

## GROUP 18. MISCELLANEOUS SYSTEMS

- 18.1. Blood transfusion 1  
 18.2. Organ matching 1  
 18.3. Medicines Commission 1  
 18.4. Prescription pricing and statistics 2

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## Operational research service

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D. Y. COOMBER and A. G. McDONALD

In *Portfolio for Health* (1) the scope and methods of operational research were discussed and a whole range of studies and study areas was referred to briefly. These indicated how operational research, as an aid to the solution of management problems, could be and was being applied at the strategic, operational, and service levels. At that stage the operational research strength in the DHSS, its use by management and its general impact in the field of policy formulation were small. Reference was made to the formation of the DHSS's own Operational Research Unit and its intended role in the research programme into health and welfare services.

The Unit has been in operation since the spring of 1970 and has just reached the level of twelve research scientists. During this period the major part of the team's efforts, and those of several external consultants working with the team, has been devoted to the strategic problem known as the 'Balance of Care' study, which is concerned at the national level with the allocation of resources under various policy options. Recently the position of operational research in the DHSS has been redefined as part of the new Central Planning and Support Research Division. This places more emphasis on its service relationship to other divisions and, through them, with the NHS as a whole. The change of emphasis is opportune, for the work is now at a stage when it requires wide and critical discussion with different groups of professionals in the field.

At the operational level another large section of work has been the continued study on behalf of the DHSS of logistic problems by the Operational Research Executive of the National Coal Board. It is with these two areas of studies that this chapter is mainly concerned although further studies at the operational level of aspects of the reorganization of the ambulance service

and of issues of importance to the centralization of pathology services within area health authorities are under way.

Work on the application of operational research to local service problems has continued at the Universities of Lancaster, Reading, Birmingham, and Exeter, at the University of Manchester Institute of Science and Technology, and in several regional hospital boards.

### Strategic study: balance of care

In the summer of 1970, soon after its formation, the Operational Research Unit was asked whether it could help to answer two questions of strategic importance, namely:

What is the best size to build new district general hospitals?

How should national health care resources best be allocated between hospitals and the community-based services?

The following few months were spent in discussions within the DHSS to identify the most important aspects of these questions and to determine how they might be tackled and whether this could be done effectively. In the spring of 1971 the Unit's findings were presented and a programme of work for the ensuing eighteen months was agreed. This programme consisted of eight separate studies, four in each of the two major areas, hospital size and balance of care, and the projects and studies are described below. As the work has proceeded it has become more and more apparent that these problems are not discrete and that the study of hospital size can fairly be regarded as part of the over-all balance of care project.

#### *Hospital size project*

In volume 1 of *Portfolio for Health* (1) it was argued that the essence of operational research is the use of mathematical models. The aim of the hospital size project has been to determine, using such models, the likely effect on costs of building hospitals of different sizes: on revenue costs (staffing and operating); on capital costs (land, building, and engineering); and on accessibility costs (patients' and visitors' travel and inconvenience). It has also been concerned with the effect of size on staffs' and patients' attitudes and with the minimum acceptable hospital size based on medical opinion and criteria.

Three cost models have been used to estimate the total cost of providing 3,200 beds for a population of 600,000. Three different types of area (rural, mixed urban/rural and urban) and two ways of providing the beds (100 per cent in district general hospital, and a 70/30 per cent split between district general hospitals and community hospitals of 60 or 120 beds) have been considered.

The approach in the revenue cost model has been to seek estimates of

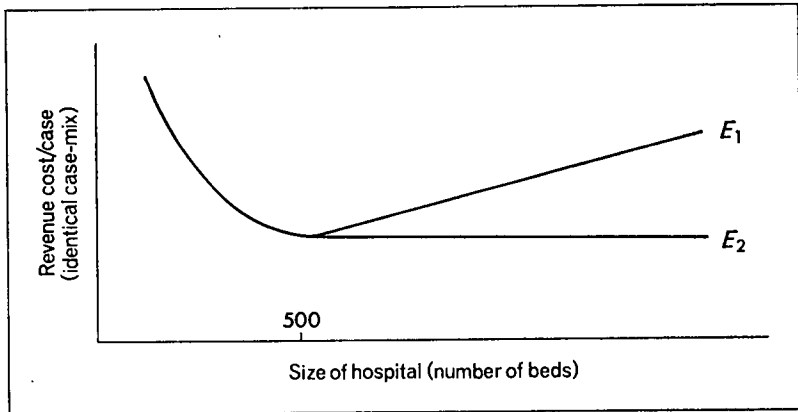


FIGURE 1

revenue costs, for in-patients and out-patients, in both acute and non-acute specialties. An analysis of historical data has shown that these costs rise with size of hospital for hospitals larger than about 500 beds in total. This rise could be due either to larger hospitals being less efficient and more bureaucratic or to their dealing with more severe and consequently more expensive cases within particular specialties. The model has produced two estimates of the variation in revenue cost with size, as illustrated in Fig. 1, which show that if the assumption is correct, and if the lower efficiency of large hospitals proves to be ineradicable, then they are more costly to run ( $E_1$ ). If, on the other hand, the determining factor is the severity of cases, then large hospitals are no more costly to run ( $E_2$ ).

Work is being carried out to elucidate which of the two assumptions is the truer description of the situation and hence which estimate,  $E_1$  or  $E_2$ , is the more valid representation of revenue costs.

The variation in capital cost with size has been studied by constructing notional hospitals, of varying sizes up to 3,200 beds, on the basis of medical, nursing, and building professional advice. Estimates have been made of the cost of building each of them, using current standard departmental cost allowances together with additional design cost allowances and crude estimates of land costs and on-costs. This work is now complete and is beginning to yield results, but further work is being carried out on land costs and on-costs. For a given type of site and a fixed number of beds, the total amount of land needed would be greater for a 'small hospitals' policy than for a 'large hospitals' policy. This is particularly important when considering maximum economic size of district general hospitals on expensive central urban sites.

In studying accessibility a model has been developed to determine broad

estimates of the costs incurred and time spent by staff, patients, and their visitors in travelling to and from hospital. Various modes of travel have been costed and the proportions of patients using each mode have been estimated from an analysis of survey data. For the given area the model also takes into account factors such as supply and location of beds by specialty, density of population surrounding each hospital, and number of patients by specialty requiring hospital treatment.

In addition to the three cost models a fourth group of studies has been concerned with examining factors which cannot currently be costed. One of these studies has been examining the effect of hospital size on staff communication and morale. It was based on an analysis of a survey covering approximately 10,000 nurses. Another topic has been the determination of the minimum size of a district general hospital as derived under subjective constraints such as having at least two consultants per specialty or having a certain minimum number of beds in each specialty. This minimum number of beds was determined from an analysis of medical response to a survey and also from a statistical analysis of beds per specialty in existing hospitals. Each subjective constraint gave rise to a different minimum size of hospital and further work is being undertaken to test the medical, nursing, and administrative opinion of the size ranges produced.

### *Balance of care project*

This project is concerned with:

1. The allocation of national resources where, for certain types of patient, acceptable alternative modes of care exist: this study has been developed for the DHSS by Scientific Controls Systems Ltd.
2. The provision of out-patient sessions in the community: a patient-care event model has been developed by Arthur Andersen & Co.
3. The care of the elderly: a patient flow model has been developed by the Institute for Operational Research.
4. The behavioural/psychological factors relating to the interchangeability of care and the extent to which different alternatives are viable: a mode model is being developed by Novy, Eddison and Partners Ltd.

The project, as it affects one particular class of patients, the elderly, is described more fully in the proceedings of a seminar on *Needs of the Elderly* shortly to be published by the University of Exeter (2). It is now being used to provide data for an interdepartmental study of how resources can best be allocated to the elderly.

The study of the allocation of national resources has so far concerned itself with, in addition to the elderly, certain groups of surgical patients, maternity patients, and GP's patients, where alternative forms of care already exist. The model can search among the alternatives to find the 'least cost' solution and to show which resources, if increased, could bring cost benefits to the

health service. It also allocates the gross number of patients to each alternative form of treatment and gives the amount of each resource that such an allocation would consume. In addition, it can determine which broad principles of allocation are robust (ie insensitive within wide ranges of data and assumptions), and it can indicate those data and assumptions to which allocations are sensitive and where accuracy of inputs is therefore extremely important. It cannot, of course, decide which alternatives are professionally acceptable, yielding the same quality of care.

The patient-care event model evaluates the economic merits of providing out-patient sessions in the community for some consultant specialties, supported at least by simple diagnostic X-ray facilities, for comparison with the system in which all out-patient services are provided at district general hospitals only. It simulates the out-patient sector and describes alternative systems of delivering out-patient care and the effect of the GP and in-patient service sectors of health care on those systems. From the resultant understanding of patient care events, it has been possible to identify certain key variables and to develop a set of relationships between those variables which can be used to determine the likely cost and resource consequences of providing local out-patient units to serve communities of different sizes and at varying distances from the nearest district general hospital out-patient unit. The sensitivity of the conclusions to changes in the values of population, episode length, ambulance costs, unit attendance costs, consultant time, and travelling costs has been explored.

The patient flow model is a detailed simulation of the annual flows of elderly patients (over 65) to and from various locations and the provision of services at those locations. Day-to-day effects on the movement of people through the system can be tested for a large number of policy options and each run of the model produces an estimate of the resource costs, the benefits, and the probable effects on such items as waiting-lists, utilization of resources, and areas of resource constraint. The benefits are essentially the levels of service provided to the elderly population as judged by the numbers receiving that form of care which professionally has been given first or second preference. In the long term it is hoped that indicators will also be developed to assess changes in their social and physical conditions. The model is still being developed but eventually it will be possible to indicate those policies and allocations of resources necessary for the system to work in an acceptable manner, and to show the extent to which old people could receive alternative forms of care.

### *Integration of the projects*

Individually the current studies can generate indications of the consequences of different policy options on allocation of resources, but these indications can be strengthened considerably by integration of the studies into a consistent cohesive whole. In this way some of the assumptions implicit in

individual studies can be tested for their effect on other studies and assumptions. This approach may also bring to light and permit the study of factors which so far have not been included or considered.

It has been necessary in the hospital size project to make assumptions about the proportionate content of future district general hospitals. However, possible changes indicated by other models may alter significantly the future load on these hospitals. Also the length of stay of various types of patient has been reducing steadily over the last decade and therefore, if this trend continues, the requirement for beds may change significantly in the future. In the short term the implications of these changes will be tested by means of field trials and the results then fed back into the balance of care work to examine their effect on other parts of the system.

The intention is to produce an integrated set of models which can be used from time to time in order to explore probable consequences of different policy options. With the passage of time patterns of care will change, and the quality of data used can be expected to improve. The models will, therefore, require periodic adaptation and modification and they are being built with this need for responsiveness in mind.

### **Operational study: logistics**

Since 1969 the Operational Research Executive of the National Coal Board has been carrying out a series of studies for the DHSS's Hospital Supply Division. This work was originally concerned with internal hospital supply, stores centralization, and stock control but since the end of 1970 it has been extended to include frozen food catering, pharmacy, and sterile supplies. It is being done as part of a long-term programme and among possible future areas for investigation are laundries, laboratory services, engineering, maintenance, and the feasibility of creating industrial zones away from hospital sites at which several or all of these services would be based.

The work on internal hospital supply has been to assist the Architects' Division, through the Supplies Sub-Group of the Harness Project (3), with the design of supplies systems for Harness hospitals. Studies have been made of the supplies storage requirements on wards and of the capital and revenue implications of different washing-up systems for beverage crockery. A comparison of several methods of delivering linen to a hospital from a laundry, on- or off-site, indicated very little cost difference provided that the linen was delivered direct to wards. An examination of the systems, based on lifts or ramps, of distributing supplies and meals around a hospital using the Harness trolley showed that, in general, ramps are preferable for one- and two-storey buildings, whilst a lift system is better for three storeys and above. These conclusions have been applied to the new Harness hospital at Dudley. A study has also been completed of the supplies distribution system for the proposed new St Mary's Hospital in Paddington.



Following the writing of a research paper 'The Centralization of Hospital Stores' in September 1970 (4), several studies have been carried out on the centralization of stores to serve the wards and departments of a number of hospitals. In Newcastle a study was made of the economics of the provisions distribution for the whole region and it was shown that the best option was a commercial warehouse. On behalf of the Welsh Office the economic consequences of substituting for the existing system one or two central stores for all supplies items in South Wales was examined. Potential savings were estimated at £160,000 pa. The most recent study has been to consider the merits of more centralized arrangements for both purchasing and storing supplies on an area basis for the seven teaching hospitals in the South-West Metropolitan Region. These studies have led to further work to determine how large such stores should be.

A major effort has been made in the field of stock control which has resulted in a decision to implement a new manual system in one hospital store in each region. A booklet describing the steps of implementation has been written and the implementation programme is now proceeding. To date the system has been introduced at stores in Lewisham, Bristol, and Peterborough, and timetables have been drawn up for stores in four other regions. In the near future an appraisal will be made of computerized stock control presently practised in the service to determine the type of store to which this is best suited.

An assessment of the economics of frozen food catering and their comparison with the best of current conventional hospital catering has been in progress since May 1971. The work is based on the experiment at Darenth Park in Kent and on the planning stages of the DHSS's trial at Newcastle (see Part III). As a result of these studies, the cook/freeze production unit at Darenth Park has reduced its range of products and the kitchens in the user hospitals have thus been enabled to handle the required amount of conventional vegetable preparation without increasing the staff costs. Also, the plans for Newcastle have been modified to bring them more into line with the revised system at Darenth Park by the omission of peripheral kitchens when using frozen food. A survey of conventional catering costs has been completed and a general cook/freeze cost model is being formulated. This will be used in the investigation of major policy issues such as determining the optimum size of production units and the variation with size in the costs of units for reconstituting frozen food at hospitals.

An examination of the economics and of the criteria for planning and organizing the 'manufacturing' activities of a hospital pharmacy in production units of various sizes was begun in mid-1971. In particular this has been concerned with bulk fluid preparation and prepacking using data from pharmacies at St Thomas's Hospital, London, and from Wycombe General Hospital. Liaison is being maintained with the Scientific and Technical Services Branch, Engineers' Division, and the DHSS's Pharmaceutical

Section and a draft report will soon be prepared recommending a detailed study in one region to establish the validity of the estimated level of savings which could be achieved by centralization.

In the middle of 1970 a study of the constitution of sterile packs was undertaken and the results were reported to the Steering Committee on the Standardization of Supplies from Central Sterile Supply Departments (the Cunliffe Committee). This led to a study of economies of scale of in-service manufacture and a cost comparison with direct purchase from industrial sources. Subsequently the Cunliffe Committee authorized an investigation of the operating theatre instrument service and this is now under way. Data is being collected from hospitals at Glasgow, Leeds, Gillingham, Torquay, and in the Birmingham Region. A report will be issued towards the end of 1972 comparing the present operation of hospital and theatre sterile supply units with a larger, more centralized service.

The future programme of work by the National Coal Board Unit on behalf of the DHSS is currently under review but is likely to include some of the logistic areas which so far have not been looked into as well as a continuing contribution to the accessibility aspect of the DHSS's strategic study.

In most of the work of the DHSS Operational Research Service particular attention is, and will be, given to savings which can be made without detriment to standards of care.

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## Research in nursing

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### *Introduction*

H. MARJORIE SIMPSON

*Nursing Officer Research, Department of Health and Social Security*

Research in nursing is relatively new. It is newer still for nurses to research into their own professional problems. Over the last ten years the DHSS has played a leading role in building up a framework within which research in this field can develop. The framework has three main aspects, building up a coherent research programme, preparing nurses for research, and encouraging the dissemination and use of research findings. The first volume of *Portfolio for Health* (1) described the way in which the DHSS was seeking to foster a research programme in nursing. On this occasion five brief reports are presented to illustrate the way in which this framework for research in nursing is developing.

### **The research programme**

Building up a coherent research programme is an ideal and, like many ideals, is not wholly attainable. The aim is to develop research into service, education, and practice in all branches of nursing: in hospitals, local authorities, and the GP services and for people of all ages; and into the promotion of health and the care of special groups such as the physically and mentally ill and the handicapped. Moreover if the work is to provide useful guides for policy or action the studies must move from the descriptive stage to experimentation and evaluation and if necessary to field trials. Eve Bendall (p. 120) mentions the vast areas for research and the lack of foundations on which to

build. Under these circumstances wasted effort through unplanned duplication or failure to follow up promising findings is particularly undesirable. R. G. S. Brown (p. 115) presents a descriptive study, in the areas of education and service, designed specifically to fill a gap in existing knowledge. He mentions *Threshold to Nursing* (2) which itself was commissioned by the then Ministry of Health to provide a summary and evaluation of some seventy existing studies of nurse recruitment, selection, and wastage. Brown's study, typically of descriptive studies, illuminates the subject, quantifies information previously expected but not demonstrated and dispels certain misconceptions. It indicates situations which are unsatisfactory but cannot, of itself, demonstrate ways of rectifying them.

Jillian MacGuire's study (p. 117) of educational and service problems attempts an evaluation of a programme already in progress. Interesting aspects of it are the development of methods of evaluation, the policy of early publication providing usable information well in advance of the final report and the reorganization of existing records to make them more informative.

Jean McFarlane (p. 118) reports on the early stages of a study of nursing practice; an evaluative study arising out of previous research. This is a very difficult area of research but vital, as she points out, if changes are to be assessed. The study illustrates the help given to nurses in the early development of research programmes by experienced research workers from other disciplines. The project also forms part of the programme for preparation of nurses for research.

## Preparing nurses for research

No information on research is included in the nursing curriculum. Hence a training programme has been developed at three levels: the preparation of nurse researchers, mainly graduates; the training of mainly non-graduate nurses who take part in research as part of their normal work; and the induction of the many members of the profession who need to appreciate the potential of research and read research reports and implement findings.

Jean McFarlane described one project where special efforts were made to prepare nurses, graduate and non-graduate, to undertake research. Some research assistants were registered for higher degrees. Eve Bendall (p. 120), herself a research fellow, describes another method of preparation. Lisbeth Hockey (p. 121) picks up the story in her description of the research appreciation facilities, which also illustrate another aspect of the DHSS policy: that of co-operating with voluntary organizations to provide a needed service.

The most difficult training problem is the provision of suitable facilities for non-graduates to learn enough to be able to take part in research and to study their own working problems systematically. On an experimental basis nursing research liaison officers are being appointed, financed by DHSS

R & D funds, to three regional hospital board areas to develop, advise on, and co-ordinate research in nursing in the area.

### Dissemination and use of research findings

Included in the research appreciation programmes Lisbeth Hockey describes, are courses designed to feed back findings from completed single studies or groups of studies to the people working in the field who can use them. The DHSS also disseminates information from completed research and assists as occasion arises with the publication of reports. A new development mentioned by Eve Bendall is the agreement reached by the DHSS to sponsor the publication of research theses by the Royal College of Nursing and the National Council of Nurses of the United Kingdom.

Research in nursing subjects is still at an early stage, many of the most difficult areas are still untouched but within the framework now developed a healthy growth should be possible and the brief reports below indicate some of the first fruits.

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### *Male entrants to nurse training*

R. G. S. BROWN

*University of Hull*

In *Threshold to Nursing* (2) Jillian MacGuire reviewed the state of research on nurse recruitment and training and drew attention to certain gaps, including the lack of information about pupil nurses, male recruits, and the effect of hospital characteristics on success in training. The Hull University study of male entrants was deliberately designed to help fill these gaps.

The survey population consisted of 542 men who commenced student or pupil nurse training in 57 hospitals in 1968. This comprised approximately 1 in 6 of all men who started nurse training in England and Wales in that year. The men were interviewed soon after the start of training and asked about their education, previous employment, reasons for taking up nurse training, and expectations about the future. Some of these views were tested again at a second interview a year later, when they were also questioned about their reactions to first-year training. A tutor's assessment was obtained for each entrant, and supplemented wherever possible by personality and intelligence tests. Information about individual entrants has been plotted against information about the training school, including staffing ratios, recruitment policies, and an informal GNC assessment of its over-all qualities as a training school.

The whole population is being followed up to qualification and for two

years beyond, which means that the survey will not be complete until early 1975. The findings from the survey so far can be summarized under the headings of recruitment, training, and contribution to nursing.

The over-all quality of these male recruits was good, if measured by intellectual capacity rather than by formal educational attainment, which was not high on the whole. Among entrants to each field there was a fair proportion of men with a capacity for leadership in their profession. Overseas entrants (25 per cent of the sample) were better qualified educationally than the home entrants. In terms of personality the male recruits were more extrovert and less neurotic than the normal population and seemed to have the appropriate profile for nursing. The entrants can be divided between (i) a minority who entered nursing with a strong vocational commitment at the minimum age and (ii) those who came in, often in their late 20s, after a relatively unsuccessful career elsewhere. Many had been recruited locally. Very few had been in HM Forces. Both groups were attracted by the intrinsic worthwhileness of nursing and by the opportunity to obtain a qualification. It is reasonable to infer that more could be attracted to nursing if it were presented as a legitimate career for men in these terms. Training schools, however, did not seem to have satisfactory instruments for assessing male applicants: many were hostile to male students in principle and others seemed to want them merely as pairs of hands. Some overseas entrants, particularly, were relegated to pupil nurse training which was almost certainly below their capacity.

Their training departed in many respects from the approved pattern. The men were often left in charge of wards or given early and excessive periods of night duty. But on the whole they welcomed this responsibility and the variety resulting from frequent changes of ward. These factors were not associated with wastage. The main dissatisfactions arose from poor staff relationships and lack of support (particularly in general hospitals), poor organization, pay, and irregular hours. Similar dissatisfactions have been found among female trainees in previous studies; their recurrence emphasizes the need for improvement. Additionally hospitals which train men should give special consideration to their needs, including the desire of older men for more responsibility and autonomy. Many of the men, however, also needed special help and reassurance over formal study.

Wastage amounted to 25 per cent during the first year and about 40 per cent over the whole training period. There was very little wastage among the overseas entrants. Most of the population intended to remain in nursing, often to take a further qualification, after completing their training. Except in the mental field the men were not particularly bothered about the possibility of being subordinate to women. Their career aspirations were realistic and, if anything, too modest. Many lacked information about career opportunities. Those undergoing a first training did not see any distinctive nursing role for men, but post-registration students were inclined to see a special place for male nurses in administration.

These findings suggest that male recruitment should be encouraged as a source of entrants who will make a substantial contribution to the permanent force of qualified nurses. The potential of recruits from overseas seems to be particularly underestimated. There are, however, some specific problems about retention. Pupil training tended to be seen merely as a stepping-stone to full registration. The stated intentions of both pre- and post-registration students suggested the possibility of a drain from the psychiatric field, and especially from mental subnormality.

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## *Evaluation of experimental programmes of nursing education*

JILLIAN MACGUIRE

*General Nursing Council Research Unit*

The GNC Research Unit is involved in a series of interrelated projects concerned with the education of nurses and has aimed to process information quickly and to make results available in papers in the nursing press. The core of the Unit's work is the long-term evaluation of experimental programmes of nursing education. In the course of this work, data have been collected about entrants to such courses in 1969, 1970, and 1971. Additional information has also been sought on the characteristics of entrants to nursing training as a whole, on applications and admissions to experimental courses, on the pool of nurses with graduate qualifications and on the career expectations of finalists. It is intended that findings on experimental programmes should be seen against the background of this more general information.

An important product of the work so far has been the preparation of a series of norms for student nurses, pupil nurses, and trained nurses on a variety of standard cognitive and personality tests. Some of this material has been published by the National Foundation for Educational Research Publishing Company in their Test Information Series. This information is of direct practical value to those schools of nursing using intelligence and personality tests in their selection procedure. In the long term it will be possible to demonstrate any relationships between test scores of students and results in the final examination. The information available so far gives a clear picture of the similarities and differences between students enrolled in experimental courses and students in ordinary three-year courses. Students enrolled in experimental courses tend to be brighter and to have better formal educational qualifications than students in ordinary courses in the same schools. This is the direct outcome of the selection procedure in the schools where the general practice has been to offer places on the experimental courses to those applicants with above-average attainment levels.

A special survey of applications and admissions to experimental courses in 1969 indicated that there was considerable demand for places and that expansion of courses did not appear to be limited by lack of suitable applicants. In all, 15 per cent of the available places were unfilled. This finding led to greater publicity being given to the courses and to further discussion about the relevance of some central clearing system for applicants.

A survey was also undertaken to determine the size of the pool of nurses with graduate qualifications. The majority of the 275 nurses located had graduated *outside* the experimental schemes. There are now about 150 special places each year, though the full impact of this expansion will not be felt until 1976.

Work has also been carried out on the index data held by the GNC making information available for the first time on the characteristics of entrants to training. This should help in the planning of numbers of experimental places in relation to educational attainment levels.

Further work is planned in relation to modular programmes and in the development of modes of assessment of progress in training.

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## *The study of nursing care*

JEAN McFARLANE

*Royal College of Nursing and National Council of Nurses*

Arising out of the Hospital Services Study into the Deployment of Nursing and Midwifery Staff (1963/4 and 1964/5) it was recognized that an effective deployment policy would require not only quantitative but also qualitative measures of care. Adequate measures of quality were moreover seen to be an essential tool in solving many management problems for only against such measures can changes in nursing methods, management, or education be assessed.

It was decided that nurses themselves should be trained to study the quality of professional care and a project was set up with three main objectives:

1. To develop techniques for measuring the quality of nursing care.
2. To involve nurses fully in the study.
3. To develop a pattern of preparation for nurses to take part in and understand research procedures.

Six nurses were recruited as research assistants in 1967 and the first three months of their two-year appointments were spent in the study of research methods, including those in both the clinical and social sciences and in



statistical method. Completed nursing research was subjected to critical analysis in seminar sessions organized by the project leader.

Because nurses with research skills were not available a steering committee was set up jointly by the DHSS and the Rcn to advise on method and guide the study. In addition to DHSS and Rcn members the Committee comprised a doctor of medicine, a sociologist, a statistician, and a nurse, all experienced in research. Where the research assistants wished to use the techniques of some other discipline an adviser was found usually through registration of the research assistant for a higher degree in an appropriate discipline.

Previous approaches to measuring the quality of nursing care by measuring nurse performance against criteria developed by a consensus of experts were discarded and the research assistants were guided into a phenomenological approach. They undertook a series of descriptive studies of aspects of nursing care which revealed factors affecting quality. A second group of six research assistants was recruited in 1969 under the leadership of Mrs U. Inman who has led the project from that time. It has now entered its most complex phase in which an attempt will be made to design a scoring instrument which will incorporate the factors shown to be critical in the individual studies.

The first six studies described:

1. The organization of preoperative fasting.
2. The care of the 'unpopular' patient.
3. The role of the nurse in relieving the anxiety of patients on admission to hospital.
4. The deviations from taught procedures in nursing practice.
5. The management of patients' bowel habits in hospital.
6. The emotional care of children in hospital.

The studies are being published individually by the Rcn and will be useful guides to the improvement of nursing practice. The first publication describes the study as a whole and provides a classified summary of previous work in this field. The first of the reports on individual studies was published in 1972. The studies seem to show an association between quality of care and:

- (a) The individualization of patient care, replacing regimes of convenience by the assessment of individual needs both in basic and technical nursing.
- (b) The extent to which the nurse is equipped to recognize her own psychological reactions to patients which can influence the care she gives.
- (c) Good communications between nurses and patients so that anxiety is reduced.
- (d) Knowledge of the principles underlying nursing procedures.
- (e) More adequate supervision given to students.

(f) Recognition by the nurse that emotional care is an integral part of the nursing role for which time must be allowed, particularly in the care of young children.

These studies have pioneered methods of assessing nursing practice. The principles underlying their findings are of general application and are such that nurse administrators or tutors could use them as guides for improving patient care.

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## *Preparation of nurses for research*

### **1. Research fellowships**

EVE BENDALL

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The DHSS provides an opportunity for nurses to receive research training, by offering nursing research fellowships for full-time study for higher degrees. Currently ten nurses hold such fellowships at different universities: Brunel, Cardiff, London, Manchester, Salford, Surrey, and York; and two are receiving assistance on a part-time basis. Disciplines differ: the majority are sociologists, but others work within the framework of the biological or physical sciences and education. Nearly all are graduates working for a master's or doctoral degree but a few are non-graduates who have gone straight to a master's course.

Fellowships provide a salary at approximately the level at which the nurse was previously employed in the health service, plus fees and research expenses. In some cases the fellows are on the staff of the university concerned and have teaching commitments: in others, they are not.

All fellows meet at the DHSS twice yearly, to share experiences and discuss problems. These tend to be comfortingly similar: at first one faces polite incredulity that any nurse should have academic capability: later, when some proof has been given, colleagues and superiors become more interested, but there is a great ignorance of nursing problems. One advantage is that the researchable areas in nursing are vast, since so little has been done: the obverse of this is that there are few foundations on which to build.

While the main aim of providing fellowships is to train the nurse in research techniques for use in the future, the projects conceived and carried out for higher degrees often provide useful additions to nursing knowledge. Research fellows usually opt to study problems which they encountered while working in the health service and about which they have first-hand knowledge. First projects are unlikely to solve such problems, but they often

throw considerable light on their cause and may uncover facts not known before. Examples of projects completed in 1971 are, a study of the optimum position of hand-rails on baths for the disabled (MSc in ergonomics, Loughborough University); a study of the difference in the amount of group teaching carried out by health visitors (MSc in sociology, Salford University); and a study of the effect on student nurses' learning, of having theory before practice or vice versa in any clinical area (MA in education, London University). All three theses to some extent refute points in existing literature or contradict commonly held beliefs, and all have a practical application.

When the project is complete, a report of the findings is sent to the DHSS, but publication rights remain with the author. To facilitate prompt and inexpensive publication where the author so wishes, the DHSS negotiated in 1971 with the Rcn to publish a research series based on the theses with financial backing from the DHSS's R & D funds. The editor was appointed in June 1972.

In the past there have been few nursing research posts and few people to fill them; it is hoped that now the two will grow together.

## 2. Research appreciation

LISBETH HOCKEY

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Research has an application to professional activity in a number of ways and at different levels and a variety of research appreciation programmes are provided, most of them by voluntary organizations.

Unless the profession has a questioning critical approach to all aspects of its activity, research will be merely academic and removed from, or even unaware of, the problems which require to be studied. Similarly, research reports will be sterile and fall on stony ground unless the profession is able and willing to read them with intelligent understanding.

It was urgent, therefore, to introduce nurses at all levels to the basic principles of research with the objective of giving them an appreciation of its value. The Queen's Institute and the Rcn have been running short courses of this nature at a number of centres throughout the UK for some years. Numbers of participants and demand for places have been increasing steadily. Although it will be some time before this particular need will be met for all nurses, it is reasonable to assume that this kind of programme will eventually become obsolete as research appreciation will be built into regular nursing education at basic and post-basic levels.

Research findings cannot be used unless they are known, and unless their implications are understood and discussed. The King Edward's Hospital Fund for London has provided this service by arranging conferences for invited audiences to whom specific reports have relevance.

Fieldworkers are often asked to collect data, but only too rarely are the results of their efforts communicated to them. The Health Visitors' Association has initiated a programme particularly designed to provide its own members with a feedback service which can be expected to stimulate their interest and encourage co-operation in the future.

Research, like any other specialized discipline, requires specialized skills and knowledge which nursing education has so far not provided. Yet nurses are becoming involved in research activity for which they have no adequate preparation. In order to cater for their immediate needs, the Rcn, as part of its DHSS-financed project, has made a day-release programme available, and at its Birmingham Centre a two weeks' course has been provided annually.

Two further groups with particular research needs are nurse tutors and managers. If research appreciation is to become a useful part of nurse education, tutors must be helped to teach it and to advise those students whose courses include research projects. The Rcn has pioneered special programmes for tutors.

Nurse managers have different kinds of research responsibilities over and above research appreciation and an ability to evaluate and use research reports. They must know when and how to initiate research, how to plan and budget for it, how to deploy and counsel nursing officers with research responsibilities and how to initiate change on the basis of research findings. The Queen's Institute has organized courses of this nature for the last two years.

A recent development has been the provision at the University of Surrey of a platform for nurses who have completed projects to discuss them, with particular reference to the research method employed, with research audiences from the academic and health service fields.

Historically, voluntary effort has been concerned with pioneering and experimental ventures, and research programmes of the kind outlined follow this pattern. The DHSS's role, however, has always been considerable. First, it has provided encouragement and counsel for course organizers through the research officer in its Nursing Division, who also participates in most courses. Secondly, the DHSS promotes the courses by publicity, and acknowledgement of their value by giving them recognition for grant purposes. Thirdly, the DHSS has provided a forum for course organizers to facilitate co-operation and evaluation of programmes. In doing this it has also promoted co-operation between the voluntary organizations themselves.

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## Medical equipment and supplies: research and development

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### *Introduction*

E. L. STEVENS

The purpose of this programme under the Scientific and Technical Branch of the DHSS's Supplies Division is the development of equipment and supplies which will improve the care of patients. The immediate reasons leading to the initiation or support of projects are several. They include the need for improved apparatus for established clinical procedures, as well as entirely new devices to facilitate the application of advances in medicine, and also support for projects which industry, the ultimate supplier of hospital requirements, is unlikely to undertake entirely from its own resources, either because of the large development costs involved (for example, neutron therapy equipment) or because clinical usefulness, and hence the market, is as yet uncertain. The development programme is complemented by clinical and laboratory evaluations of existing commercial apparatus. The knowledge gained here of the performance of equipment and the needs of users, benefits development projects as well as giving hospitals guidance in their selection of equipment.

Nearly all the equipment R & D work is carried out as specific projects by government or other R & D establishments, by universities, hospitals, and industry. User assessments are, of course, undertaken at hospitals. The allocation for the programme in 1971/2 was £1,400,000. Project fields include radiotherapy, haemodialysis, laboratory equipment, surgical appliances, and invalid transport. Activity is not restricted to equipment and appliances and work is also being carried out for example on enzymes, vaccines, the biological compatibility of materials, the properties of metals used in surgical implants, and the development of improved dental materials. Developments

which have been supported by the DHSS and are now available commercially include cardiac pacemakers, a gamma camera, isotope renography apparatus, an oxytocin infusion pump, an ultrasonic foetal heart monitor, and a cerebral function monitor. Other information about the programme, and also papers on individual projects, are given in Part III of this book.

Those activities selected for discussion in the four papers which follow have not been chosen to reflect the balance of equipment R & D supported by the DHSS. However, they represent important developments within specialized fields of medical practice, and therefore should prove of interest to readers of this volume. Another five subjects were discussed in volume 1 of *Portfolio for Health*.

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## *Development of ultrasonic equipment for diagnosis*

N. A. SLARK

During the last few years the application of ultrasound in diagnosis has increased considerably and continues to do so. Equipment using ultrasound is no longer found only as a research tool in teaching hospitals or where a particular clinician or physicist has a special interest in the technique. It is now bought by many hospitals for a wide range of applications and it is for this reason that the DHSS is involved in a number of evaluation and development projects related to ultrasonics.

All ultrasonic diagnostic techniques are based on the fact that if a beam of very high frequency acoustic energy (ultrasound) is directed into the body, some of this energy is reflected by tissue boundaries and may be detected and then processed electronically to give qualitative and quantitative information. Frequencies used are 1-10 MHz, and the beam may be pulsed or continuous depending upon the application. Energy levels used do not normally exceed a few tens of milliwatts per square centimetre for diagnostic and monitoring applications. Although the basic principles are simple, the design of equipment to give a good performance requires the application of sophisticated techniques (1).

### **A-Scan systems**

The simplest form of diagnostic ultrasonic equipment is based on the use of an A-Scan display in which the ultrasonic echoes are displayed as the deflexion of a trace on a cathode ray tube. This can be used to detect the echoes arising from the mid-brain structures when a beam of ultrasound is directed

through the skull. Determination of the displacement of these structures may be important in the case of head injuries or other cerebral lesions. Results of a technical and clinical evaluation of six varieties of the instrument have already been issued by the DHSS<sup>1</sup> and four more are being evaluated. The A-Scan technique has been used by some cardiologists for measuring the displacement and rate of closing of the mitral valve.

## **B-Scan systems**

The B-Scan technique is another more complicated method of obtaining information about the structures inside the body and displaying this information in the form of an image of a cross-section of the volume of tissue being examined. In this technique, a transducer, carried on a pantograph arm and emitting a pulsed beam of ultrasound, is moved over the surface of the patient's body. Knowledge of the precise position of the transducer is derived from the movement of the arm. By combining this positional information with the echo information (from reflected ultrasound) a display is produced on a cathode ray tube which shows a cross-section of the tissue and interfaces traversed by the beam. A major application of this technique is in obstetrics in which the obstetrician is enabled to visualize the presentation and position of the foetus and the position of the placenta and is assisted in diagnosing placenta praevia, anencephaly, hydatidiform mole, abdominal pregnancy, and some other conditions (2). Of particular importance is the ability to measure the bi-parietal diameter of the foetal skull, serial measurements serving to aid in detecting retarded foetal growth, and also in determining maturity (3). Apart from obstetrics this equipment can also be used for examining other soft tissues, in particular kidney and liver. Because of the importance of B-Scan equipment the DHSS has undertaken clinical and technical evaluations of several equipments now on the market, and results of the first phase of the evaluation will shortly be published in *Hospital Equipment Information*.

## **Doppler systems**

An alternative method of employing ultrasound is to make use of the Doppler effect to detect echoes from moving structures within the body. Owing to the change of frequency (Doppler effect) of the reflected echoes, they are readily distinguished from the echoes arising from fixed structures which are not required to be detected. One application of this technique is in monitoring of foetal heart rate (FHR) during labour. Changes of frequency of the scattered ultrasound, caused by the movement of the foetal heart, are detected and converted to a measurement of FHR. Correlation of changes in this rate

1. *Hospital Equipment Information*. This is a DHSS bulletin with a circulation limited to hospitals in the NHS.

with uterine contractions helps to allow early diagnosis of foetal distress. The DHSS has also been involved in the development and clinical assessment of this equipment which is now available commercially.

Another application of ultrasonic Doppler techniques is the qualitative and sometimes quantitative determination of blood velocity. Simple Doppler units have been available for some time and are widely used. In order to overcome the limitations of this technique when employed to determine the patency of vessels in connection with deep vein thrombosis, the DHSS is currently supporting the development of a range-gated Doppler system (detection of reflections from given depths only). Range-gating is also being applied in an ultrasonic scanner designed for rapid scanning of soft tissues such as the heart and kidney. This project is also supported by the DHSS.

Other development interests of the DHSS include processing of ultrasonic data, using computer techniques in order to obtain information about diffuse tissue changes and to enhance the quality and usefulness of the B-Scan display.

## Conclusion

Ultrasonic techniques are now established as a valuable diagnostic tool in several fields, and as ultrasonic equipment finds wider applications it will be necessary to develop even more complex systems than are at present in existence. It is the aim of the Scientific and Technical Branch of the DHSS to support such developments and to encourage the manufacture of commercial equipment for use in hospitals.

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## *Development of equipment for nuclear medicine*

R. T. ROGERS

Although radio-isotopes have long been used in diagnostic procedures, many new techniques have been introduced recently and the advent of new radio-pharmaceuticals has greatly contributed to these developments. In particular, radio-isotope imaging with scanners and cameras has become a routine



procedure and the number of installations of such apparatus is increasing rapidly. Development of nucleonic equipment can involve a considerable financial commitment and, before undertaking new design projects, manufacturers need to be reasonably sure that the resulting product will find general acceptance within the hospital service. Users, on the other hand, need assurance that any machine they purchase will be reliable and appropriate to their needs and circumstances. It is important, therefore, that expert advice on user requirements be available to manufacturers and that equipment evaluations be carried out to provide guidance to purchasers.

At an early stage in the development of gamma cameras the DHSS set up a panel to advise on user requirements in the production of the second generation of British apparatus of this type. Six Mark III production models were purchased for evaluation (1) and the findings used in designing the Mark IV version. A life-size X-ray film recording system and an improved detector arrangement have been developed with DHSS support. Two Mark IV cameras and a range of accessories have been evaluated in hospital departments. Guidance and when appropriate, development support funds, continue to be provided to ensure that the design of the camera and its accessories is continually improved to keep pace with changing user needs.

Conventional gamma cameras use sodium iodide crystals for radiation detection, basically because of the high sensitivity which can be achieved. However, materials such as silicon, lithium-drifted germanium and intrinsic germanium, although of lower sensitivity, yield far better energy resolution. Extensive investigations have been undertaken to see whether such detectors could be incorporated into imaging equipment to provide improved image definition. The use of germanium for a gamma camera was investigated at the Atomic Weapons Research Establishment in collaboration with the Royal Marsden Hospital and initial results have been published (2). A prototype camera with a very small field of view was made and demonstrated the expected improved resolution.

Renography has proved to be a valuable way of assessing kidney function (3) and, with the existence of haemodialysis units and the increasing number of kidney transplants, it was thought desirable that specialized apparatus be available. Therefore, with the assistance of staff at the Middlesex Hospital, a survey of apparatus and techniques was undertaken. The DHSS formed a small working party and provided funds to assist a manufacturer in the design and production of a renography unit. This is a mobile, specially designed couch incorporating the radiation detector units and it allows easy examination of supine, semi-reclined, or seated patients. Electronics for automatic blood background subtraction were incorporated and particular care was taken to ensure that all controls were simplified to eliminate the need for highly skilled scientific personnel to be in attendance during the test. A prototype and subsequently three production models, were evaluated in hospitals and as a result an improved system of electronics was designed.

The effective development of new equipment is only possible when based upon a knowledge of present equipment, techniques, and requirements, and also of the potential market. For this reason a detailed study of radio-isotope equipment and techniques in hospitals in England and Wales was undertaken by the DHSS at the beginning of 1971. A Departmental report (4) was written and widely distributed within the hospital service. It constitutes a valuable body of information and will be updated annually.

Radio-isotope scanners have been supplied almost exclusively by overseas manufacturers, but in 1970 a British firm introduced a brain scanner which was seen to have significant potential. The DHSS has set up a working party of clinicians and hospital physicists to advise the manufacturer about the production of a fully competitive scanner suitable for all types of examinations. A prototype unit is being evaluated and this will be followed by several production models.

As mentioned earlier, materials other than sodium iodide have a significant potential for improving positional resolution in radio-isotope imaging. With funding from the DHSS a double-head scanner with lithium-drifted germanium detectors was built at the Hammersmith Hospital and initial clinical results look promising. A full clinical trial is in progress and results are being compared with images from conventional scanners.

Although individual hospitals undertake evaluation of equipment, for example, to check that optimum performance is being obtained, inter-comparison of data from different sources is often difficult. A working party has therefore been formed to consider methods for making a standard assessment of the performance of imaging equipment. A device, the 'Williams Phantom', was designed both for routine testing and for teaching and has been issued free of charge to all radio-isotope imaging departments. Although information about the physical parameters of an equipment is generally available, the working party was aware that there was no standard method for comparing the clinical performance of imaging equipment. Consequently, anatomically 'realistic' phantoms of a brain and a liver were designed and 'realistic' abnormalities incorporated. These are to be circulated to hospitals throughout the country to be imaged under various sets of conditions.

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## *Computerized transverse axial tomography of the head*

N. A. SLARK

### **Problems in the investigation of intracranial space-occupying lesions**

Investigation of the brain, in order to identify the position and nature of space-occupying lesions, requires the use of very specialized techniques based on a range of physical principles involving the use of X-rays, gamma rays, and ultrasonic energy. In order to arrive at a diagnosis it is frequently necessary to use more than one technique, and some of these involve discomfort and even some risk to the patient.

Although ultrasonic scanning of the head is of very limited value at present, owing to difficulty in interpreting the images obtained, the gamma ray imaging techniques are much more successful in indicating the general area in which the lesion of interest lies. In order to obtain the final diagnosis, however, it is normally necessary to undertake further examinations using X-ray techniques. Conventional X-ray techniques almost all require the use of a contrast medium, which may be a radio-opaque substance injected into an artery (angiography) or a radiolucent material introduced into the ventricles of the brain via a lumbar puncture (cerebral pneumography). Administration of these contrast media is painful and requires that the patient be given a general anaesthetic or be heavily sedated. In addition, there is always a small risk of an adverse reaction to the contrast medium in the case of angiography. Both these techniques normally provide only indirect evidence of the presence of a lesion, and the radiologist frequently has to infer its presence from the displacement of blood vessels or ventricles.

The shortcomings of these existing techniques clearly indicate the need for a type of examination capable of giving accurate quantitative information about the position and nature of the lesion. The technique of computerized transverse axial tomography achieves this aim and provides a revolutionary new tool for the neuroradiologist.

### **Development of the new system**

Following the invention of the basic system by an engineer in an industrial company, and the successful completion of a feasibility study and laboratory trials partially funded by the DHSS, it was decided to go ahead with the design and manufacture of a prototype system to be purchased by the DHSS for clinical trials. Detailed design features of the system were arrived at by close liaison between the industrial development team, scientific, medical, and technical officers of the DHSS and radiologists and physicists from hospitals.

## **Computerized transverse axial tomography of the head**

The system is based on the use of a narrow beam of X-rays which, after passing through the patient's head, is intercepted by a highly sensitive detector. Both the X-ray tube and the detector are mounted on a gantry which allows them to be moved backwards and forwards and rotated relative to the patient's head. The detector measures the intensity of the emerging X-ray beam and the information is recorded on magnetic tape. Processing of this information, using a digital computer, enables the absorption value of each element of tissue within a thin slice of brain, roughly perpendicular to the long axis of the patient's body, to be calculated. The results of these calculations are then used to produce a picture on the face of a cathode ray tube from which the radiologist can identify differences in tissue composition.

A scan takes four minutes to produce information on two slices, and the X-ray dose to the patient is less than for a single normal radiograph. In practice this represents a considerable reduction of dose to the patient as some conventional X-ray examinations may require twenty or more radiographs to be taken.

## **Clinical trials**

Clinical trials of the prototype have been conducted by a consultant radiologist. The equipment was installed in September 1971 and during the following six months over seventy patients were examined using this equipment. Expectations of the potential of this system were quickly justified. In addition to delineating some of the normal anatomy of the brain such as the ventricular system, including its associated structures such as the septum pellucidum and choroid plexuses, it was found possible to see the position and size of cysts, tumours, and haematomas. A differentiation could also be made between haematomas and infarcts. It appeared to be possible to differentiate between blood clot, fluid, necrotic tissue, and tissue exhibiting increased density due to calcification, gliosis, and other conditions altering the consistency of tissue. A paper on computerized axial transverse tomography was presented by J. Hounsfield and J. Ambrose at the Congress of the British Institute of Radiologists in April 1972. Even during these clinical trials the technique rapidly established itself as a valuable addition to the procedures in routine use, even though, owing to the computing situation, results of the examination were not available until the next day.

## **Further development**

Development of local computer facilities is in hand, and production models will incorporate this feature. It will thus be possible to view the results within a few minutes of completion of scanning. Consideration is also being given to the extension of this technique to other parts of the body, but difficulties associated with organ movement will first have to be overcome.

## Conclusions

Equipment based on a revolutionary new principle has been developed and evaluated and has been shown to be capable of giving information at present unobtainable by other means. The availability of a production model will give neuroradiologists a powerful new tool which will permit a reduction in the number of examinations requiring the administration of contrast media and will also permit a more rapid and certain diagnosis in many cases. Further exploitation of these principles will also open up new possibilities for examination of other parts of the body.

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## *Electronic aids to patient monitoring: a review of current developments*

J. F. A. THOMAS

1. Early warning of any deterioration in a patient's condition, particularly during critical illness, can be of real value in providing time for proper planning and performance of corrective measures. It is no surprise therefore that hospital care procedures have always included arrangements for the close surveillance (monitoring) of patients nor that these arrangements have proved particularly important in such areas as critical illness, anaesthesia, and labour. Unfortunately, whilst these conventional arrangements for monitoring have undoubtedly been effective they have often made heavy demands on the time of skilled nursing staff and it is largely for this reason that electronic aids have been so widely sought. Once developed however these devices have often proved of additional value in facilitating continuous rather than intermittent measurement and in providing ready quantification of data as well as recording facilities. Collection of continuous, quantified data by automatic systems of this sort often greatly reduces record keeping but, more importantly, it may also allow the easier recognition of subtle changes in patient condition. It is not surprising in view of all these advantages that British hospitals have been quick to utilize monitoring aid devices of this sort. This trend has of course been particularly evident in the many intensive care facilities which have recently been established. Unfortunately, however, whilst existing devices have met many user needs they are by no means fully developed and a number of areas of difficulty have emerged. In particular, the problems of initial signal acquisition by sensors or transducers and of subsequent provision of comprehensible information displays have proved especially troublesome and it is therefore in these areas that Departmental support has been concentrated.

2. In the case of data acquisition, the development aided by the DHSS which is now nearest to completion is an improved arterial pressure transducer mounted at the tip of a catheter. Devices of this sort, being designed to sense internal pressures directly, are considerably less susceptible to certain artefacts than the more generally used external transducer. Initial tests suggest that the new device will not only be considerably cheaper than existing transducers but will also be significantly more robust and capable of withstanding repeated heat sterilization. Pre-production models of this device are shortly to undergo clinical trials and comparison with imported devices. Consideration is also being given to mounting a pressure transducer of this type, together with an electrochemical oxygen sensor, on a single sampling catheter. In parallel with this work on multisensor systems, a further programme is in hand on replacement materials and designs for conventional open-lumen catheters which, it is hoped, will eventually allow the replacement of existing imported and more costly types.

Yet another project of interest under the heading of data acquisition is the development of an on-line blood-gas analyser utilizing the principle of the mass spectrometer. This device, with its ability to provide immediate and accurate identification and concentrations for all blood gases, may prove to be of value in respiratory and anaesthetic research. It is expected that bench development of this project will be completed very shortly.

The simple acquisition of a signal relating to a changing physiological parameter, although often difficult enough, is, however, by no means the only problem in effective monitoring. Thus, it is clearly of importance that the information already gained should be displayed to users in a clear and immediately comprehensible fashion. Indeed, this problem of ensuring error-free and rapid transfer of information from machine to user has become increasingly pressing by recent expansion in data rates and complexity. In this context, three DHSS contracts are probably of special interest. The first of these resulted from a proposal by SE Laboratories Ltd for the development of a twin-channel monitoring display with greatly improved but still inexpensive memory facilities. These devices, although resembling conventional scopes in general appearance, incorporate some of the most recent advances in micro-electronics and consequently are able to offer greatly improved trace 'viewability'. The core of the design consists of solid state memory units into which each waveform after digitization, is placed. The contents of these memory units are then repeatedly read out on to the screen whilst at the same time being laterally displaced by a selected increment at each repetition. The effect of this procedure is to produce a clear trace which moves from one side of the screen to the other whilst remaining fully visible throughout its passage. It will be evident, that depending on the speed of displacement selected, events occurring at the trailing edge of the display will be, for example, 5 seconds old whilst new events will of course be visible at the leading edge. An alternative displacement speed gives a 'memory' of  $2\frac{1}{2}$  seconds whilst by

'cascading' one channel into the second a total of 10 seconds can be achieved. Provision for connection to recording devices is also included.

The second of these instruments, known as the Histogram is also being produced by SE Laboratories and is a variant of the first device. This machine has a normal memory display on the first channel but the second is used to build up a graph of R-R interval times (the 'R' features is a particularly obvious event in the waveforms describing electrical activity resulting from individual heartbeats). Up to 13 minutes' data on R-R intervals can be displayed in this way and this facility thus goes some way towards providing a 'context' against which individual arrhythmias spotted on the memory channel can better be assessed.

Both the memory scope and the Histogram are undergoing clinical trials at the present time.

3. A further and more ambitious programme in this general area of *data presentation* is aimed at the development of a (computer-based) 'electronic notebook' cum filing system. It is intended that this system will automatically sample the various intensive-care patient-parameters (for up to eight beds), store corrected data and subsequently display selected extracts on command. Read-out will be controlled by a simple button manipulation and users will have the option of displaying, for example, all or selected period readings of any or all of the parameters monitored. The possibility of further data processing to provide such facilities as trend data, statistical analysis, and cross-correlation data between parameters, etc., is also under consideration. The system, having been constructed at the University of Essex is to be installed for clinical trials at University College Hospital in the near future.

4. Finally, another DHSS interest in the general monitoring area concerns *simple, low-cost ECG monitors*. At the present time there are numerous makes of widely differing standards of construction, price, and safety. In co-operation with instrument users and designers, the DHSS has therefore, prepared an agreed specification for this class of device and has placed contracts with firms for the production of prototypes. These will be subjected to comparative evaluation and if trials are satisfactory, central purchasing will be considered. In due course, if demand requires it, the extension of this procedure to other monitoring instruments may well be arranged.

## The hospital environment

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R. MANSER

The old hospitals with Nightingale wards, high ceilings, and generous original space standards merely required adequate heating on cold days to provide a reasonable standard of environmental comfort. Since those days almost all the pressures, both internal and planning, have tended to aggravate rather than improve the situation.

Externally traffic noise in cities has significantly increased to the point where it is a planning factor. Aircraft noise in particular is already so serious that in certain locations the entire building design can be affected. Two investigations have been commissioned by DHSS with the Southampton University College Research Unit on this subject, particularly to assist in providing basic guidance data. Internally the high cost of hospital building and the much greater interest in economics has resulted in activity data analysis of medical and nursing techniques aimed at establishing the minimum space required for each medical and nursing need. Similarly, ceiling heights have been reduced to the point at which they are aesthetically and psychologically acceptable. Studies of the economics of building design have in general resulted in increasingly deeper planning since simple constructional considerations dictate a cubic or spherical basic optimum shape and a greater depth of building gives an inherently more adaptable space. Fenestration has changed markedly in the past few years since high-rise buildings provoked the production of more sophisticated windows which are both watertight and airtight when shut.

Every one of these trends tends to produce a deterioration in the 'natural' environment within the hospital and requires improved or extra services to counteract the deterioration and make the internal environment both aesthetically acceptable and an efficient working space.



DHSS R & D in this field is aimed mainly at the problems peculiar to hospitals and the NHS, though occasionally the need to find solutions to questions raised by building programmes such as the new 'Harness' techniques produce solutions which are of wider interest to others engaged in the construction industries. The growing tendency to separate 'industrial' functions and facilities from the 'medical' side of hospitals has tended to ease the technological problems. Laundries for example can now be constructed to a good standard of industrial practice with suitable refinements for dealing with infected and heavily soiled linen and these are more and more often nowadays provided in an industrial area giving a service on a group basis to a number of hospitals.

One of the contributions that modern engineering can make to the care of highly vulnerable patients is in the field of sterile environments. By providing accommodation of exceptionally smooth and easy to clean characteristics, and allying this with a controlled atmosphere using air filtration of such standards that bacterial contamination is virtually eliminated, ie exposed culture plates show no colonies, the risk of airborne contamination can be reduced to almost zero. There are two special techniques used in this connection, both employing air filtered to a very high standard. One technique utilizes air change rates of the order of twenty changes per hour, which is normally considered adequate to dilute the inevitable minor clouds of bacteria and contamination which arise during the nursing and treatment of patients. The second technique is more sophisticated and was originally developed from the aerospace technology and utilizes bodily movement of very large air volumes either from wall to opposite wall or from ceiling to floor. In general the velocities used are kept just below those which cause a perceptible draught and the resulting number of air changes is very high indeed. Using this second method, generally known as laminar flow, techniques of visiting and nursing can be devised whereby the intruder approaches the patient from downstream and the risk of airborne contamination is virtually eliminated.

A sterile nursing unit (1) has been developed by the Atomic Energy Research Establishment, Harwell, under DHSS grants and control. Originally intended for patients suffering from radiation sickness this unit has been used for extensively burned patients and patients vulnerable from certain treatments and has so far proved highly successful and has attracted international interest. An experimental laminar flow ward built as a DHSS R & D project has been in use at Clare Hall Hospital, South Mimms, Herts., and has yielded interesting results (2). A laminar flow ward for nursing amputees is being designed for Queen Mary's Hospital, Roehampton, and is intended to be built as a DHSS R & D project.

The modern operating theatre is an example of the fully controlled environment, the air supply normally being controlled in respect of cleanliness, sterility, temperature, and humidity. A Working Party was sponsored by the DHSS and the MRC to consider the environmental conditions for

operating suites. The report is expected to be published early in 1973. Apart from acute operating theatres interest has centred on two further developments mainly concerned with operations in which the patient is very highly vulnerable to infection.

The work of Charnley at Wrighton Hospital, Affley Bridge, has attracted international attention. His system originally intended for one particular type of operation, hip replacement, involves the use of an inner sanctum of glass or perspex sheets finishing a few inches from the floor. The patient's body is within the inner sanctum but his head and the anaesthetist are outside. Within the inner zone only the surgeon and his essential assistants operate whilst a large volume of sterile air is fed in at the top and emerges between the inner walls and the floor. Additionally the members of the team within the inner walls are hooded and have a piped air extract from their suits.

Other interest has been focused on the possibility of using laminar flow as discussed above in operating theatres and Glasgow University, with the support of the MRC, have built an experimental unit capable of providing either horizontal or vertical downward laminar flow of sterile air (3).

It must be clear that these contributions of technology can only be considered as adjuncts to good medical and nursing techniques but they may have a role in nursing patients highly vulnerable to infection. Effectively, when the engineer has said that the risk of airborne contamination has been reduced for practical purposes to zero then any infection of the patient is likely to be due to self-infection or direct transmission from another person.

The environment of any given room in a hospital may be considered to consist of the internal decor allied to the view from the window, if any; the lighting, which may be compounded of both daylight and artificial lighting; and the air within the room, which can vary in respect of temperature, humidity, cleanliness, and freshness, with the comfort effect of all this being modified by the general temperature of the walls, ceiling, windows, etc., known as the mean radiant temperature. The term cleanliness of air can also be taken to embrace the sterility. It is clear that once the change is made from the opening window as an all-in-one temperature control, ventilation, and air freshness device, then the control of the environment can become increasingly sophisticated, limited only by the capital and revenue costs of the plant involved. Similarly any standard of lighting may be achieved in respect of both colour spectrum and intensity.

Much recent research and development work has centred round the DHSS's 'Harness' hospital building system. Preliminary work showed that there were inadequate data on the natural ventilation effects in the open and courtyard-type planning which is inherent in the building system being developed. Twin research programmes were therefore mounted allied to work known to be going on in certain university departments, one programme being aimed at deriving a purely mathematical solution to proposed

building designs, whilst the other was an analogue or model technique allied to measurements at full-scale to prove this method of forecasting ventilation rates prior to the construction of actual buildings.

As a generalization it has been found that natural ventilation is subject to an unexpectedly high variation in the air-change rates of the accommodation of the modern hospital. The ventilation rates for some of the working areas have been shown to fall below acceptable levels for significant portions of the year. The R & D programme on natural ventilation can therefore be said to be aimed at rationalizing the extent and scope of the necessary artificial ventilation system within the general DHSS policy to use natural ventilation and daylight as far as possible, so as to maximize the effectiveness and economy of this service.

The deeper planning which modern building studies have shown to be more economic over-all has, and will, demand the use of Permanent Supplementary Artificial Lighting (PSALI) at the inner end of the rooms. In addition of course, certain inner rooms require total artificial lighting. Considerable work has been done on acceptable colour standards from the medical and in particular diagnostic viewpoints and further work is in hand on this subject both in respect of fluorescent lamps and of tinted window glass as used to counteract heat gain. It has already been remarked that DHSS policy is to use natural ventilation and daylight as far as possible, and the role of the window, or the general subject of fenestration of modern buildings, is of particular interest in connection with hospitals.

In large buildings, particularly office blocks of the last decade, the pendulum has already swung away from the over-fenestrated designs, with solar gain problems which could be beyond the control of air-conditioning and cooling systems however elaborate and expensive. In the reappraisal architects and engineers are considering whether windows should essentially be viewing orifices or means of daylighting accommodation space. If provided only for the view, there is a choice between the vertical and horizontal. Hospital designs have, in general, avoided the extremes with their particular problems but still have a natural tendency to follow general national current practice. It seems likely that, as a trend, window areas will decrease, changing in part from a 'daylight' function to a 'view' function. In hospital construction such a change may be less marked and slower to take place than in industry since in clinical situations there remains a strong preference for natural daylight for diagnostic work. This opinion, possibly reflecting the art rather than science of medicine, is strongly held in many quarters in spite of the undoubted ability of engineers consistently to produce light of any given spectral characteristic.

Apart from the more generally accepted environmental factors mentioned above attention has increasingly been focused on noise as an environmental factor or a pollutant. As with other factors, the more careful matching of space standards to tasks resulting from activity data analysis is tending to increase

the noise generated within the hospital and therefore the problem of its absorption or suppression: whilst external noise remains for hospitals as for other buildings an ever-increasing problem.

It is possible that the factor of external noise, in particular motorway and aircraft noise, is the strongest factor indicating that some future hospitals will be fully air-conditioned throughout. Already some of the large teaching hospitals which have recently been rebuilt in city centres for historical reasons, have been fully air-conditioned with sealed windows. Whilst such a policy also provides for substantial improvements in cleanliness within a city environment, the main point is that this is the only feasible method of combating high external noise levels. This will probably tend to its increasing use in today's increasingly more hostile urban environment. It cannot be overlooked that some countries with climatic ranges not much greater than that of the UK already air-condition their hospitals as a matter of policy.

With so much interest in noise as a pollutant it is interesting that piped music is already part of the hospital scene. This is an established industrial service and has justified its cost in industry by improved performance of semi-skilled tasks. There are already indications that it may become a desirable provision in certain patient areas and it could have an eventual future in evening out, and making acceptable, the inevitable hospital background noise and, in special places, assisting in the privacy of consultations.

## Conclusions

It has been said that the ideal environment is that of a cool bright spring day with gentle irregular zephyrs. This could be synthesized but at an unacceptable cost. Meanwhile a slow withdrawal from the 'natural' to a more controlled hospital environment seems inevitable, but the windowless hospital is very far away.

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PART II

**Making use  
of concentration  
of skills**

ORIOLE GOLDSMITH  
JOHN MODLE

## The Wolfson Research Laboratories

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T. P. WHITEHEAD

The Wolfson Research Laboratories, to which reference was made by Wilson in *Portfolio for Health*, volume 1 (1), were commissioned in February 1972 to develop automated and computer-supported methods of laboratory investigation. They were built as the result of a generous gift of £140,000 by the Wolfson Foundation and an agreement by the Department of Health and Social Security to equip the laboratory and meet the running costs of £90,000 a year. The laboratories occupy an area of approximately 11,000 square feet at the Queen Elizabeth Medical Centre, Birmingham, and they have a central position on the site between the hospital and the medical school. Prior to occupying the new building the laboratories were temporarily housed in two parts of the Centre and thus had an 'embryo existence' of approximately one year.

The laboratories form an integral part of both the Queen Elizabeth Medical Centre's and the University's Departments of Clinical Chemistry. The relevance and importance of such integration is discussed later.

### Increased requirement for laboratory investigations

The number of patients who have laboratory tests performed as part of the process of clinical diagnosis and treatment increases each year. In addition, the number and type of tests performed on individual patients also increases. Such increases are due, in part, to developments in the scientific investigation of disease. It is not many years since the admission of a patient with myocardial infarction did not involve the clinical chemistry laboratory in any additional work. Today, severe myocardial infarction may result in requests for several determinations of acid/base state, arterial oxygen

tension, and various serum enzymes which are released into the circulation as a result of the infarction. Similar escalation of demand has occurred in other clinical conditions.

This increased demand for laboratory investigation has particularly involved clinical chemistry laboratories but other laboratory disciplines are also involved. It is of interest to note that similar trends have been recorded in the USA, Scandinavia, Australia, New Zealand, and the northern European countries.

Such increases in laboratory workload have produced problems for those responsible for funding hospital laboratories and those responsible for the equipping and the organization of individual laboratories.

The Wolfson Research Laboratories have been established to study and help in solving such problems since there is no doubt that they can only be solved with the use of automation and computers. However, such solutions will not be effective unless modern managerial techniques are also employed.

What has become clear during the embryo existence of the Wolfson Research Laboratories is that the introduction of such techniques of study and problem-solving have, by their very nature, introduced many new and challenging concepts in patient investigation. The study of such new concepts in patient investigation and the use of computers in the interpretation of results is also being studied by the staff of the Wolfson Research Laboratories.

There are five areas of activity within the laboratories. These will be described under separate headings but they do not exist as separate organizations.

## **1. The development laboratory**

It is a salutary experience to walk around a modern hospital laboratory, particularly in those areas concerned with clinical chemistry and haematology. If the laboratory is responsible for a large number of hospital beds and requires automated laboratory equipment then it will be predominantly concerned with the use of equipment which has been produced by companies based in the USA. The term 'salutary experience' is not meant to imply a parochial approach, it rests upon the important premise that the UK scientific instrument industry has not kept abreast of the demands of the UK hospital laboratories. If the UK hospital laboratories are to maintain their high international standing then they must be supported in the main by the UK scientific instrument industry.

The Wolfson Research Laboratories have an important role in pioneering developments of instruments. It is postulated that this is best initiated in hospital laboratories and allowed to progress to the prototype stage before involving industrial development. Hence, the setting of these laboratories within a busy hospital laboratory and the establishment of an engineering

laboratory. Two new pieces of apparatus, one at prototype stage, and the other at the drawing-board stage, have already been designed by the development laboratory staff. One is concerned with the fast measurement of micro quantities of blood serum for use with the GeMSAEC apparatus devised by Dr N. Anderson at the Oak Ridge Laboratory, Tennessee, USA (2). The other is concerned with the automatic analysis of enzymes in blood serum.

Work is also being conducted on the analysis of specific protein concentrations by immuno-assay using light-scattering techniques.

## **2. The engineering laboratory**

A graduate engineer and four technicians are responsible for design and prototype production of laboratory equipment. The laboratory has well-equipped electronic and mechanical engineering workshops and will require close liaison with the UK scientific instrument industry if equipment is to be progressed to the production stage and take its place in hospital laboratories.

## **3. Evaluation and trials laboratory**

This laboratory has been specifically built, equipped, and staffed to evaluate new methods of patient-investigation and new equipment used in hospital laboratories.

### *Profile techniques in patient-investigation*

The Department of Clinical Chemistry has been investigating the use of 'profile' techniques in patient-investigation over a period of many years. The term 'profile' is used to describe the performance of numerous analyses on a patient's blood specimen. The analyses performed include those that normally would have been requested at the discretion of the investigating clinician and in addition tests which would not have been requested on the basis of the patients' clinical signs and symptoms. Thus the profile almost invariably includes some screening tests, ie tests performed without a clinical indication.

Such techniques of investigation have been studied on admission of patients to hospital, on attendance at a hospital out-patients' clinic and on attendance at GPs' clinics. This work has been extensively reported in the literature (3-8). How best to assess the effect of such techniques on patient care is currently being studied. In addition, certain so-called 'well populations' have been studied.

### *Equipment evaluation*

The expenditure of NHS hospital laboratories on equipment is considerable. Several million pounds have been spent in the last few years in clinical



chemistry laboratories alone. Expert reports on new equipment, prepared by those with time and the necessary resources to test equipment in a hospital setting is essential if wise purchasing decisions are to be made.

During the early phase of development of the Wolfson Research Laboratories, such activity has been limited, but the Laboratory has evaluated the Micro-Medics Micro Dilutor and the Baird and Tatlock Analmatic apparatus. At the present time the laboratory is evaluating the SMA 12/60 instruments for biochemical analysis and the specific protein analyser of the Technicon Company. Evaluation of foreign equipment is not excluded from the work provided it breaks important new ground in instrument design.

Evaluation of equipment, besides providing vital information for prospective purchasers within the NHS, also provides background knowledge for all parts of the work of the Wolfson Research Laboratories.

### *Evaluation of laboratory services*

The Wolfson Laboratories are maintaining some routine services for the Queen Elizabeth Medical Centre. This activity not only gives a basis for comparison of different methods of analysis under actual working conditions but also provides information to the DHSS concerning the organization of highly automated analytical laboratories. Such laboratories are planned to be part of the laboratory services in the UK.

Evaluation of equipment and laboratory methods needs to go beyond scientific assessment since the cost of analysis is an important additional factor which needs to be known when assessing the use of laboratory services. Similarly and most importantly, the clinical usefulness of tests needs to be known. For example, the Evaluation and Trials Laboratory, in collaboration with Dr R. White and his colleagues at the Birmingham Children's Hospital, has conducted a trial of the screening of schoolgirls for bacteriuria. This work has been financed on the recommendation of the Joint MRC/DHSS Committee on Screening for Bacteriuria. This project exemplifies the broad approach taken by the Wolfson Research Laboratories and that it is not solely concerned with the production of new apparatus. It also emphasizes that its work extends beyond the hospital population and includes more than one discipline of pathology.

Briefly, approximately 1,000 schoolgirls between the ages of 5 and 11 years have, with the permission of their parents, been tested for the presence of bacteria in their urine using four different laboratory methods of detection. One accepted test was adopted as 'standard' but was known to be prohibitively expensive even if the incidence of bacteriuria amongst schoolgirls was established to be as low as 2 per cent. The other three methods used were essentially screening tests to be compared with the standard method for the occurrence of false negatives and positives, acceptability to the subjects being tested and cost. The costing was undertaken by members of the

Management Services Unit of the Queen Elizabeth Medical Centre. The results of this work will be published in full elsewhere.

#### **4. The computer section**

The Wolfson Research Laboratories have two computers. One is devoted to capturing data from analytical equipment (Super Nova, Data General), the other is used for processing data (IBM 1130).

The Department of Clinical Chemistry at the Queen Elizabeth Medical Centre has been amongst the first to pioneer the use of computers in hospital laboratories and the IBM 1130 has been in use for three years. Much work has been published regarding its use of computers (9-11) but much remains to be done. The following techniques and uses are currently being investigated.

(a) There is frequently a need to attach a computer to analytical equipment, since modern analytical techniques of blood analysis produce data with a speed and frequency which require a computer to handle it. We have attached computers to different analysers and now have expertise in the problems of interfacing the equipment.

(b) Providing information on the quality of analytical results ('quality control') is an important role of the computer in a clinical chemistry laboratory. The computer not only performs the essential statistical analyses but also has a role in keeping operators informed of variations in the analyses and therefore of any decrease in the precision of the analytical methods.

(c) The computer also has a role in associating results for individual patients during the course of treatment. The production of so-called 'cumulative' reports is routine in the laboratory but the various methods of presenting reports is still a subject of study.

(d) An extensive study of the production and utility of management data is being conducted at the present time. Preliminary results indicate how valuable such data is in the efficient management of large laboratories.

(e) Work on pattern recognition of profile results when fourteen tests are performed on every patient has, in our experience, for the first time, begun to produce valuable results, by indicating the presence of unsuspected patterns in biochemical quantitative parameters in certain disease states.

#### **5. National quality control scheme**

This area of work was not contained within the original plans for the Wolfson project but has become an important part of the work of the laboratories.

Monitoring the accuracy and precision of busy hospital laboratories is a considerable problem to all those concerned with their organization. There are a variety of methods of quality control practised by hospital laboratories and the Department of Clinical Chemistry at the Queen Elizabeth Hospital Medical Centre has been active in this area for many years (12).

A method of assessing the success of quality control methods in a particular laboratory is for it to receive a specimen which is part of a large batch of material, processed by a central agency, portions of which have been sent to other laboratories. Results are then centrally collected and a particular laboratory can compare its results with those reported by other laboratories.

This had previously been done on two occasions in the UK, between 1950 and 1970. Since 1970 the Wolfson Research Laboratories have sent out material every fourteen days to approximately 400 laboratories performing clinical chemical analyses in the UK. An essential part of the scheme is that the laboratories perform the analyses straight away and return the results immediately so that before the next distribution of material there is a computer analysis of the performance of each laboratory. This work is directly sponsored by the Standards and Quality Control Sub-Group of the DHSS Laboratory Development Advisory Group. Analysis of the data is performed on the Wolfson Research Laboratories computer. A scoring system has been developed and the performance of a laboratory over a period of time can be compared to that of other laboratories of the same size and using the same analytical methods.

The data indicates that there is room for considerable improvement in some areas of laboratory work in the UK. The whole scheme is operated anonymously using number codes rather than the names of individual laboratories. Recently, the results have shown considerable improvements in laboratory precision which can fairly be claimed as a direct consequence of the scheme.

## Laboratory staff

The staff of the laboratory is drawn from various disciplines (chemistry, biochemistry, medicine, physics, and statistics), all of whom will play an increasing role in the teaching of medical and science graduates at both graduate and undergraduate levels.

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## Brunel Health Services Organization Research Unit

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ELLIOTT JAQUES

The Brunel Health Services Organization Research Unit (HSORU) was established in 1966 at the invitation of the Ministry of Health, as it then was, to study organization and management in the hospital service. The objectives of the research had certain special characteristics. First, the work was to be practical: it was to seek modes of organization and management in the service which could provide improved services for the community from given resources. Second, the developments were to be precisely formulated so as to make for effective communication of results throughout the service. Third, training and other methods were to be tested to assist others to implement the results in a practical way. In short, the objectives were to combine research and training in organization and management, develop improved methods, and achieve widespread implementation of results. The occurrence of the NHS reorganization has markedly stimulated the work of the Unit, but that development will be described at the end of this report.

The work of the research team has been based upon the method of social analysis.<sup>1</sup> In essence this method is similar to some clinical research. It calls for the establishment of a consultancy research relationship with the members of institutions. The research team must wait to be invited to collaborate in solving practical problems, in this case problems of organization and management in hospitals. Working co-operation is established with members of the organization who seek the assistance of the researchers. The working relationships are confidential. Nothing is reported until and unless those concerned are ready to report the results of their work to others. But, as

1. A method developed in the Glacier Project: see, for example, Jaques, E. (1965), 'Social-analysis and the Glacier Project', *Glacier Project Papers* (London: Heinemann).

reports are released, a comprehensive picture of the organization and its management is gradually built up. This material can become the basis of change in the institution, and eventually, if agreed, the source of reports for others outside.

The role of the research worker is to help members of the institution to analyse their problems and to formulate them more accurately. The kinds of problems which have been raised have had to do with lack of clarity about such matters as: the authority of a consultant in relation to a ward sister; the joint accountability of group secretaries and of consultants for superintendent radiographers or physiotherapists; the organizational position of a group engineer or group pharmacist; the meaning of functional organization; the role of a 'Cogwheel' chairman; the comparability of different grading levels; the meaning of 'tripartite management'; what is meant by accountable management.

The method of work is first of all to clarify and define what the actual or extant organization is, as opposed to that which may appear upon an organization chart (the manifest organization), or as opposed to the varying assumptions which different people make as to how it is supposed to function (the assumed organization). Thus, for example, a group secretary, a superintendent radiographer, and two consultant radiologists asked to discuss how they should best organize a radiography department. The manifest organization showed the superintendent radiographer to be 'administratively' accountable to the group secretary and 'clinically' accountable to the radiologists. The assumed organization, however, differed considerably from this neat picture: the group secretary felt he had little control over the situation in any way; each of the radiologists felt that he was really in charge; and the superintendent radiographer felt that she had a number of people telling her what to do, but no one who was really willing to be accountable either for her work or that of the department. Moreover, further contradictions were to be found in the fact that, although the budget for the department was in the financial account of the HMC, that body could not exercise any control over the consultants who generated the radiographic expenditure.

In separate discussions with each person, the following picture emerged. Only one of the two consultants was directly involved in managing the department, consulting his colleague when necessary. Both of them, however, used the facilities of the department equally. The superintendent radiographer tended to refer to the managing consultant on such matters as staffing and personnel in the department, and received help from the group secretary and his staff in recruitment. The group secretary provided personnel services, and monitored the expenditure of the department.

The organizational construction from these data was that one consultant was managerially in charge of the superintendent radiographer who in turn managed the department. The group secretary had no managerial authority;

he monitored the work to ensure adequate general conduct and adherence to contract; he provided personnel services; and he co-ordinated the departmental expenditure with that of other departments, on behalf of the HMC.

It may be apparent from this simple example, that the teasing out of extant organization requires the development of a sufficient range of clearly defined concepts. A systematic set of concepts has gradually been developed, including such essential concepts as managerial accountability and authority, monitoring and co-ordinative relationships, professional independence and clinical autonomy, the prescribing authority of clinicians, and so on.

In the example used, however, the extant organization did not satisfy all the requirements of the situation. It did not resolve, for instance, the question of how the accountability of the consultants for the effectiveness of an HMC-financed department could be discharged. That question, and also the sorts of question raised by the Zuckermann Report, have required more extensive analysis, going into the structure of 'Cogwheel' organization and the relationship of radiography staff to other scientific staff. These questions are too involved to discuss here. But it can be said that clarification of the extant situation proved helpful by itself. The more general question of the development of requisite organization is being pursued.

Once the extant organization has been identified, it becomes possible to help the clients to consider what is requisite. To do so, it is essential that the clients be able to state what their objectives are—what they think they are trying to achieve. In so doing, the organization can eventually be assisted to a comprehensive review of its policies and objectives. Against these policies and objectives, different patterns of organization can be worked out and their likely consequences analysed.

Given patterns can be chosen by the clients for trial and, if found useful, implemented. The change may consist in nothing more than the implementation by all concerned of an explicit and agreed formulation of the extant organization. Or it may be decided to modify the extant pattern of organization. In either case, when the new situation is brought into being, members of the research team take part in follow-up discussions during the succeeding months, in which any problems attendant upon the changes are taken up, and if necessary additional modifications may be introduced in the light of the experience gained.

Moreover, once methods have been tried and found useful, there is usually little difficulty in the public release of a description of the results. Findings thus become available for others.

Working in this way, the research team, varying from five to eight members, found itself fully occupied from the very start. The team was invited by the administration at the Westminster Hospital to help with the development of administrative organization. That project soon expanded, with invitations from nursing and paramedical services, and eventually from the Medical

School and the Medical Executive Committee. The team is thus in working relationship with the total institution including the Medical School.

Projects were next begun with King's College Hospital and with the Redhill and Netherne HMC Group. At about the same time, a large-scale development of work was undertaken at the request of the North-West Metropolitan Regional Hospital Board, in connection with their management training and development programme. The agreed objective of the work was to analyse the organization of the Regional Board itself, and of some HMC groups in the region on a pilot basis. From this analysis there would be developed a systematic Board policy on management and organization. This policy would then be used as the practical foundation for the training programme in the region for management and organization.

This programme has led to intensive fieldwork in five HMC groups in the region as well as in the Board itself. As material is worked through and cleared, it is reported to a project steering committee of the Board. This steering committee has prepared reports for adoption as policy by the Board, and has sanctioned pilot organizational changes in the hospital groups. This work has been executively handled by a staff development officer (SDO) appointed to the Board Secretary's staff. The SDO co-ordinates the project work from the Board's point of view and organizes and progresses its work in the region.

Pilot change projects, in which new patterns of organization are being tested as described above, are now underway in several of the hospital groups in the region. These projects include: organization of administration, nursing, engineering, and paramedical services; medical-nursing-administrative relationships; group-level and hospital-level relationships; RHB-HMC relationships; the provision of services, monitoring and co-ordination by administrators; development of personnel services; 'Cogwheel' organization, including the monitoring role of divisional chairmen.

In connection with these research projects, a continuous programme of training conferences has been conducted at the University. These conferences range from three-day meetings for consultants to two-week conferences for senior and middle-level staff. The object of these conferences is to disseminate and discuss the results emerging from project work, and to seek a critical evaluation and assessment by those who attend. Over 400 staff from the region have now attended these conferences, including all senior administrative, nursing, and paramedical staff, chairmen of MECs, and other senior consultant staff. The results of research and the emerging Board policies have thus been steadily tested, modified as necessary, and disseminated to all hospital groups in the region.

Recently this conference programme has been modified to provide discussion opportunities for members of particular professional and occupational groups; for example, the regional treasurer and all group treasurers, regional secretary and all group secretaries, regional nursing officer and all CNOs,



etc. One of these groups which may be of particular interest is composed of senior administrators (group secretaries or deputies) from ten HMC groups. They will meet regularly from month to month to discuss problems connected with organization and organizational development. In due course it is anticipated that this group will pilot the role of 'organization specialist'.

With the planned reorganization of the NHS, the work of the research team has taken a significant new turn. It was invited by the DHSS to cooperate with the management study team which was to work out proposals for the management structure of the new Service. In addition, Professor Jaques, the Unit Director, was a member of the Management Steering Committee.

The research team thus finds itself heavily involved in the NHS reorganization programme. It has provided a series of working papers based upon its fieldwork ranging from definitions of essential concepts to papers on clinical freedom, ranking and working levels, medical administration, the functioning of self-co-ordinating teams, etc. In addition, team members have been intensively involved in working discussions with members of the DHSS and of the steering committee. This involvement has provided a concentrated outlet for the practical application of all the work done so far in the research.

This brief outline illustrates how the research team made its services available on a collaborative basis, and was invited to take part in a heavy programme of fieldwork. In the course of this work access has been gained to the inner functioning of both HMC and teaching hospital groups and a regional board. The research work has from the beginning been tied to training and dissemination of results: research leading to training, and training providing the opportunity for research in the sense of practical testing of results. Moreover, it may be noted, the training has not been based upon what the University thinks the NHS ought to do about management and organization, but upon the practical results of collaborative fieldwork.

Linked to these developments is the work of another Brunel research unit, the Social Services Organization Research Unit. Using the same methods, the SSORU has been involved in collaboration with several local authorities on Seebohm development. A national training conference programme is connected with the research programme. The two programmes together are providing the opportunity for first-hand analysis of the problems of developing collaboration between health services and local authority social services.

The work of the two units is planned to continue at least to August 1976, so that practical follow-up of work will be maintained up to and beyond 1 April 1975, when the new organizations will be implemented.

It may be apparent that the research described has a heavily practical orientation. But it must also be stated that it has an equally strong theoretical objective. The access in depth to problems of organization and management in the health and social services is providing publishable data which it is hoped will make its contribution to the growth of a systematic theory of

public and social administration. This theme cannot be pursued here, but some of the emerging results are described in the references listed.

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University of Exeter  
Institute of Biometry and  
Community Medicine

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J. R. ASHFORD and N. G. PEARSON

### Introduction

Between 1966 and 1969 a variety of research projects had been jointly developed in Exeter by the Department of Mathematics and the Postgraduate Medical Institute of the University of Exeter. These included a large-scale morbidity survey, studies of the biology of low birth-weight, a multicentre coronary care evaluation study, and twin surveys of disability in Exeter and Edinburgh. Additionally, members of the two departments were already actively engaged in the development, for the then Ministry of Health, of a computer-based information system to serve all branches of the health services in the Devon and Exeter Clinical Area.

All of this work was essentially interdisciplinary in nature, involving both medical and numerical disciplines and requiring considerable flexibility in the deployment of staff and other resources, although studies were each separately funded and formally located in one or other department. The same research workers had also helped to initiate studies which led in late 1968 to a recommendation to the Ministry of Health to establish a Health Services Operational Research Unit in the Exeter area.

In order to develop further the programme of work and capitalize on the foundation of information about community health, the existence of essential experience and interdisciplinary skills, the record of fruitful collaboration with all branches of the local health services and so as to integrate and co-ordinate all of the activities, it was decided to vest them in an independent unit attached to the University of Exeter.

The new Institute of Biometry and Community Medicine was established on 1 April 1969, with financial support for an initial period of six years from the DHSS and the Nuffield Provincial Hospitals Trust. It was already en-

visaged that a postgraduate teaching function would be developed through attachments to the University, initially covering the application of the numerical sciences, in the field of medicine, however, the Institute was intended to be, and is, primarily a full-time research unit. As such it was felt that it could not only continue to develop its long-term research themes, some of which were of a more fundamental nature, but that it could also be more flexible in responding rapidly to commissioned research requests of diverse nature than would be possible for a research group based in a conventional university department with a prime responsibility for teaching.

The scope of the Institute's present activities is reflected in its structure which comprises three divisions, namely, Epidemiology, Numerical Sciences, and Operational Research; and in its established programme of local, regional, and national research. Whilst fundamental research into the causation of disease is maintained, the work of the unit as a whole has an operational bias and, as previously mentioned, lays emphasis on studies based on the community and the totality of its health services. There follows a description, for each division, of some of the work carried out which illustrates the diverse but nevertheless interrelated nature of their activities. The full research programmes of the three divisions are listed in Part III.

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## *The work of the Epidemiology Division*

D. C. MORGAN and N. G. PEARSON

### **Introduction**

Within the framework described in the introduction, the Epidemiology Division has the primary function of undertaking those activities concerned with the measurement of states of health of population groups and with the evaluation of procedures designed directly to prevent or treat ill-health. While many projects may be the joint responsibility of two or more divisions, others which are the main responsibility of the Epidemiology Division benefit from the support which is readily available inside the Institute. Its main services to the other two divisions have involved advice on medical aspects of their projects and the provision and collation of information derived from the various agencies of the health and social services. Where the information is not already available it can be collected by means of special censuses and surveys carried out by staff of the division.

This account selects and describes some of the projects undertaken by the division in order to exemplify the way in which it performs its defined function.

## **Exeter Community Health Research Project**

Originally developed by the Postgraduate Medical Institute and Department of Mathematics, University of Exeter, the Exeter Community Health Research Project has been continued by the Epidemiology and Numerical Sciences Divisions. It aimed to provide a description of morbidity in the community and of the over-all usage and interaction of the health services in order to assist in their future provision and planning. Information was collected over a period of one year about the use made of family doctor and hospital services by a population of 70,000 people and related to their social, familial, and environmental characteristics. Records of 250,000 contacts with family doctors and 100,000 contacts with hospitals were made during the survey year and preparation of the data prior to computer input formed a substantial proportion of the early work of the Division. The results already presented (1) have shown the number of contacts associated with broad diagnostic categories and with such characteristics of the population as age, sex, social class, and marital status. The analysis has been extended by describing the work of individual GPs and hospitals, hospital departments, and consultants. The uses made of the data in constructing mathematical models for predictive purposes are described in the Report of the work of the Numerical Sciences Division.

The large amount of data has created its own problems. For example, it proved impossible to maintain a continuous and regular flow of information for data-processing during the survey. Although checks were made to ensure that records were being maintained, it was not possible to start processing the majority of the general practice information until the end of the survey year. In the event, it took a further two and a half years before all the data was available for computer analysis.

Even with large second-generation computers the size of the data base entailed the use of long periods of computing time. It was inevitable that a queue of items was formed in the programme of analysis. Unforeseen difficulties were also created by the amount of recorded data. Thus, when the Atlas Computer Laboratory of the Science Research Council transferred its work to a new machine, the necessary reconstitution of the data base taken from some half a million punch cards was not a straightforward matter.

There is a case for periodically monitoring the morbidity experienced by a population in relation to its demand for services. This project has shown the possibility of obtaining information about the morbidity experience of specific individuals and their use of general practice and hospital facilities, although the problems arising in handling the data have restricted the use to which it has so far been put.

It has formed an invaluable reference base for all divisions of the Institute as their investigations may be related, when required, to a detailed description of a representative population. In addition, the experience which was gained

has been widely applied within the Exeter Health Services Computer Project of the South-Western Regional Hospital Board. This latter project is being developed in close association with the Institute and under the same directorship. A consideration of the need for similar surveys in the future suggests that information for building models of the health services based on the 'business transactions' represented by the various types of contacts could be obtained by a smaller investigation based on repeated intermittent sampling. An assessment of the Project's success in describing the prevalence of various diseases and their relationship to the demand for medical care has not yet been made.

Morbidity surveys on the scale of the Exeter Community Health Research Project are expensive in staff and resources and it would be unwise to mount another similar exercise without ensuring that its predecessor had produced results commensurate with the resources employed.

### **Accident and emergency services in England and Wales**

The problem of staffing accident and emergency services is not new and a number of proposals have been made to alleviate the present situation. In 1962 the Platt Committee reported to the Standing Medical Advisory Committee of the Ministry of Health and made recommendations about the national organization of care for the injured. They were accepted by the then Minister of Health and with few exceptions remain the standard for present services.

At the request of the British Orthopaedic Association, the Epidemiology Division made a postal inquiry of consultants in charge of accident services in order to determine how present levels of staffing and accommodation met the Platt Committee recommendations. The study reported on the situation in 1969 and 1970 and was based on the replies from 228 hospitals in England and Wales representing a response rate of 75 per cent. It showed that the number of designated accident beds was about half of the requirements for the population served. Staffing of the Accident Services was 24 per cent below the 'Platt standard'. In the casualty department some 64 per cent of the posts were of senior house officer grade and in 1970 one-third of these positions had been vacant for a month or more (2).

Only a minority of services (29 per cent) were able to give information about the nature of new cases attending the casualty department. An average of 30 per cent of these cases were considered by the consultants in charge not to require specific hospital facilities, including X-ray examination, although there were marked variations in this proportion from department to department. This represents a considerable load of work which could in theory be met in general practice.

In contrast to the staffing difficulties it was reported that most casualty

departments were either provided with, or had easy access to, physical facilities such as operating theatres, plaster rooms, and X-ray equipment.

In 1966, the Ministry of Health conducted a national inquiry into the implementation of the Platt recommendations by questionnaires sent to regional hospital boards. The form of the Division's survey allows comparison with the earlier inquiry in a number of respects. However, being addressed to the consultants in charge of the individual accident and emergency services, it provided the opportunity for more detailed replies on some aspects of accommodation and staffing.

The inquiry cannot supply an answer to the difficulties still facing the accident and emergency services. It does provide important information required to assist in planning their future development.

### **Provision of primary medical care**

More detailed studies have been made of the provision of primary medical care. Devon is in the van of the development of health centres and by late 1972, 40 per cent of the doctors based in the county practised from this type of accommodation. By 1975 it is hoped this proportion will rise to 50 per cent. The premises are designed to meet local needs and individual requirements, so that no two are identical, and investigation of the way in which centres of different sizes and with differing organizations functioned seemed likely to provide guidelines of use in future planning.

The main inquiry covered twenty-six health centres in Exeter, Devon, Somerset, and Gloucester, and combined the collection of information from executive councils and local health authorities. A questionnaire was sent to the doctors concerned and a follow-up visit made by Dr J. Edwards, a local GP, who played the leading part in the study.

The variety in design of the buildings and organization of work was confirmed, although it was a common problem that the allocated space was inadequate within a very few years. A number of factors were responsible and included population growth in the area served, and the national trend towards increased numbers of consultations and less home visiting. The majority of doctors and local health authority staff welcomed a closer liaison and felt that the health centre had helped in this respect, although as might be expected, personality clashes were sometimes aggravated. Other constraints included the limited availability of records between one professional group and another. It has been suggested that the centres would encourage a number of developments which might include a closer working relationship between family doctor, local health authority, and social services staff; increasing opportunities for specialization; increased scope for clinical investigation, provision of consultant sessions at health centres; and closer co-operation between doctors leading to the rationalization of such features as common prescribing policies. The survey indicates that while the provision of health centres can facilitate

their attainment it will by no means automatically bring about such developments.

The criticism has been made that health centres have been created for the convenience of their staff rather than the patients. Specific points have been raised with regard to the inconvenience caused by the centralization of services and an impersonal approach due to the increase in size of the health care organization.

A sample of patients on the list of six GPs working from a health centre was approached to discover their views on this form of medical care, and any difficulties they might have experienced in its use. A total of 532 patients (98·7 per cent of the people contacted) agreed to be interviewed in their homes and questioned about their use of the health centre and any difficulty or inconvenience that they experienced.

The attitude of these patients can be summarized from their answers to a general question on whether health centres are a good way of providing health services to the public. Of those who had attended within the previous six months, only about 2 per cent felt that centres are not a good way of providing these services. Because of the heterogeneity of health centres this encouraging response can only be taken as an indication of what may be found in other localities. Detailed analysis of this survey is awaiting publication.

Patients living in rural areas may be at some disadvantage in obtaining primary medical care because of the difficulty in attending a central surgery. This had led a number of GPs to provide branch surgeries but often these do not have the same standard of facilities for investigation and treatment as in the main surgery premises. A general practice group requested the Institute to consider alternative methods of providing medical care in these circumstances. As a result of a feasibility study carried out by the Operational Research Division, a mobile surgery was introduced with specifications that allowed a standard of care equal to that provided in the main surgery. The Epidemiology Division has defined the practice population in terms of age and place of residence and is collaborating in the monitoring of changes in the work of the practice, and of the use made of the mobile surgery. In the meantime there is no doubt that the service has been enthusiastically welcomed by patients. A combination of an ageing population and a contraction of public transport suggests that the provision of services in rural areas may become an increasing problem.

### **Ischaemic heart disease**

Ischaemic heart disease continues to attract considerable attention because of its heavy toll in terms of morbidity and mortality. Such changes in management as an increase in numbers of patients being treated at home or in hospital have considerable implications in terms of medical and social resources (3).



An important development in the treatment of myocardial infarction has been the provision of coronary care units. In the light of favourable results reported by many units, a conference convened by the Ministry of Health under the chairmanship of Lord Platt recommended in 1967 that studies should be made to examine the place of intensive coronary care in the management of acute myocardial infarction.

In association with clinical centres at Bristol, Exeter, Plymouth, and Torbay, the Division organized a randomized controlled trial in which, subject to certain safeguards, a number of family doctors allocated patients to treatment either in hospital (initially in a coronary care unit) or at home. In order to obtain statistically reliable distinctions between the two groups, the trial took place over three years so that the experience of a sufficient number of patients could be recorded. A further year was required to complete the follow-up of the last patients entered in the trial, which ended in March 1972. An interim analysis was carried out to ensure that the trial was proper and ethical (4). Of 169 patients allocated to hospital treatment, 14.2 per cent had died within the first 28 days compared to 9.8 per cent of the 174 patients treated at home. There were no significant differences between the two groups in terms of age, past history, or frequency of initial hypotension, all of which were shown adversely to affect outcome. A further analysis of a larger number of trial cases over a longer period of time entirely supports the interim results. The final analysis will relate outcome in the two treatment groups to a number of characteristics of the patients entering the trial in order, it is hoped, to suggest indications for the future selection of patients for home or hospital treatment.

The comparison of domiciliary treatment and hospital intensive care has given support to the present practice of many family doctors in treating a number of cases of myocardial infarction at home. As the Division will be examining other problems in the treatment of myocardial infarction such as the need for additional rehabilitation procedures, studies based only on patients entering hospital intensive care may not give results representative of all patients who have suffered from this condition. A register is therefore being compiled of all cases of myocardial infarction aged less than 70 years occurring within the 300,000 population in the area covered by the Exeter and Mid-Devon Hospital Management Committee. Notifications are obtained from a number of sources although the value of the register is heavily dependent on the excellent co-operation of the family doctors practising within the area. Diagnostic criteria for inclusion of cases in the register are laid down but no examination or investigation is carried out in addition to those made in the routine clinical care of the patient. However, special post-mortem studies of cases of sudden death are being carried out by the Cardiac Department, Royal Devon and Exeter Hospital.

Observations over a period of nine months showed some 40 per cent of patients were treated in the smaller hospitals throughout the area, mainly in

GP beds, whilst about 28 per cent of patients were treated at home and 28 per cent entered a hospital with an intensive care unit. About 4 per cent of patients were transferred from one hospital to another during the course of their illness. Surviving patients in the district hospital providing initial intensive care stayed on average 22 days compared to the average for patients in other hospitals of 28 days. In both types of hospitals females had, on average, a longer stay than males. Interpretation of these figures must await a further analysis of results in terms of the patients' characteristics and the nature of their illness.

Ever since myocardial infarction has been recognized as a clinical entity, bed-rest has been recommended as a mainstay of treatment. However, the recommended duration of this treatment has varied over the years and there has been little firm evidence to suggest how the outcome has been affected by the differing recommendations. When carried out in hospital, shortening or lengthening the period of bed-rest has obvious implications for the demand for beds.

In collaboration with the physicians at Musgrove Park Hospital, Taunton, a randomized controlled trial was begun in January 1969. If agreed criteria of fitness are met, patients are allocated to treatment groups differing in the length of bed-rest followed by a standardized mobilization regime and are then discharged home. In the early stages of the trial patients were followed up for six months, but later the follow-up was extended to one year. The mortality rates were low in all the groups in which the period of bed-rest was completed on the day indicated by the trial design and it became necessary to extend the trial to a larger number of patients in order to conclude the study in a reasonable period of time. Physicians at Southmead Hospital, Bristol, are now also participating and, since there has been a general tendency to shorten the period of bed-rest, a new treatment group receiving five days bed-rest is being included in the trial design for this centre. It is unlikely that one type of treatment will be applicable to all patients and it is hoped that a study of the personal characteristics of the patients in the trial together with the nature of their illness will provide a guide to future treatment.

There is as yet little firm evidence from the trial that earlier mobilization adversely affects outcome in terms of mortality, although there is a suggestion that the risk of suffering from subsequent angina is marginally increased.

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## *The work of the Numerical Sciences Division*

J. R. ASHFORD

Research involving the application of the numerical sciences, mainly statistics, mathematics, and digital computing, in the fields of biometry and community medicine has been carried out at the University of Exeter since 1963. The initial stimulus and much of the subsequent activity in this area has resulted from the efforts of the staff and graduate students of the Statistics Group within the Department of Mathematics. Financial and other support has been obtained from a variety of sources, notably from the Nuffield Provincial Hospitals Trust. When the Institute of Biometry was set up in April 1969 some, but not all, of this programme was incorporated in the Numerical Sciences Division. Graduate teaching and research arising out of this teaching by members of the Department of Mathematics and certain research projects, financed mainly from foreign sources, have remained outside the ambit of the Institute. Research projects of this type include studies of the action of drugs in human subjects, field surveys of perinatal mortality and morbidity in populations outside the UK, and the comparison and evaluation of alternative policies for providing care for the mentally ill. Graduate teaching includes a one-year course in information processing in the health services leading to the MSc degree.

The work of the Numerical Sciences Division of the Institute may be divided into two parts. The first consists of projects sponsored by the Division, which are in general founded upon the application of the techniques of mathematics, statistics, computing, or economics and may be carried out in co-operation with particular groups of health service staff, with the Epidemiology Division of the Institute or with other research groups. The second involves the provision of a consultancy service (mainly in statistics and computing), for the Epidemiology Division and also for certain outside organizations and interests. Members of the staff of the Division also participate in the postgraduate course in information processing.

When the Institute was first set up the work of the Numerical Sciences Division was determined largely by the existing commitments. Since that time priority has been given to the completion of these projects and to the development of a coherent long-term research policy. The choice of new projects has been conditioned by the general objectives of the Institute and attention has therefore been concentrated upon operational problems of health-care delivery. In the current programme, particular emphasis is being given to two main lines of research: (i) studies of the maternity services, and (ii) studies arising out of the Exeter Community Health Research Project and, in particular, the development of mathematical models of the health services. In addition, economic studies of health services activities were introduced in the early part of 1971. The further extension of this aspect of the

work of the Division will depend upon the success of the existing programme, which for the present is concerned largely with problems of the delivery of maternity care. As the main interest of the Division is being focused upon operational problems, the need to establish close working relationships with the health services at all levels is becoming increasingly apparent. In project work generally it is currently the practice to involve all relevant health services disciplines in every stage of the study, by the formation of 'project steering committees', and this will continue in the future.

The Division is concerned extensively with data processing and computing. Wherever possible, equipment is shared with other research projects or with the teaching activities of the Department of Mathematics. This is an economical arrangement which is beneficial to all parties. Equipment available exclusively to the Division and its immediate associates includes an Elliott 4120 computer system with graph-plotting facilities, an ICL 7020 direct entry terminal connected to an ICL 1906A computer system and a range of unit record machines. Extensive use has also been made of an ICL Atlas computer system.

When the Institute was first established, research into the application of computers in medicine formed a substantial part of the programme of the Division. A feasibility study was carried out of a community-based medical computer system and this led to the establishment of the Exeter Community Health Services Computer Project, which is now a major element in the 'experimental' programme of the Computer Development and Policy Branch of the DHSS. This project which has been described in detail (1) involves the establishment of a comprehensive medical information system available to all branches of the health services. The emphasis given to medical computer applications has since been reduced and the present programme is concerned with research studies of particular problems associated with the Computer Project, including the choice of terminal handling equipment and the construction of a data base.

A second major field of interest is the maternity services. Initial studies have been concerned with perinatal mortality in England and Wales and have been based largely upon the annual returns by local authorities to the DHSS. The importance of birth-weight and gestation in determining perinatal mortality in populations has been investigated and a series of publications has been concerned with the effect of these and other factors upon variations between different parts of the country and upon temporal changes during the past two decades (2-4). As a result of these investigations a procedure has been developed for the regular monitoring of perinatal mortality and other factors associated with the performance of the maternity services.

The data available from the local authority returns are concerned mainly with medical matters and take no account of social and environmental factors. In order to obtain a more comprehensive record of each birth, a system has been introduced whereby the information collected by the local authorities is

matched with the particulars at the civil registration of the birth. Data for one calendar year from local authorities in the south-west of England have been linked and an analysis of the results has been carried out to investigate the effects of social class, parity, maternal age, and other factors on the birth-weight distribution. Proposals have also been made to establish procedures whereby the linking of medical and other information about each birth can be undertaken on a national basis. Coupled with certain changes in the content of the information collected at each source, the introduction of the proposed system would permit a more effective and timely scrutiny of the performance of the maternity services than has been possible hitherto.

Starting with what are essentially statistical and demographic studies, the research in maternity care has evolved logically towards the evaluation of the maternity services in social and economic as well as medical terms. In the first place a study has been made of the very wide variations in perinatal mortality between different local authorities within England and Wales. Having taken due account of differences in the population structure and general environment, the residual variation between different local authorities is being assessed to determine whether and if so to what extent, existing variations in the delivery of maternity care (for example, in terms of the proportion of domiciliary births) are associated with differences in perinatal mortality and birth-weight distribution. Unfortunately, however, many of the more relevant items of information about the organization and methods of delivery of maternity care in different geographical areas are not collected on a routine basis and special investigations in particular local authorities are required.

The second direction in which progress is being made is by means of the evaluation of alternative policies for the delivery of maternity care. This involves the specification of the range of possibilities which are likely to be acceptable and the calculation of the consequences in terms of 'input' and 'output'. The assessment of the input in terms of financial, physical, and human resources has presented a wide variety of methodological problems, including the formulation of accounting conventions to apply generally to expenditure in the public sector of the economy. As far as the performance of the system is concerned, perinatal mortality provides only a crude measure of performance at the existing levels and other indicators have been derived. These include a critical study of the use of resources by different classes of patients. The maternity services comprise only one of a number of different sectors of the health services which will be affected by the coming administrative re-organization of the NHS, and the methodological approach employed in this study may be of more general application.

A further main research topic of the Division is the construction and testing of mathematical models of particular parts of, or particular activities within, the NHS. The main source of data available for this purpose is the Exeter Community Health Research Project, during which record was made of each patient-contact with the NHS arising from a general population of

some 70,000 persons over a period of one calendar year. This provides a unique source of information about the usage of a particular set of health services resources by a population of known structure and characteristics (5). Analyses have been carried out of the usage of the various types of resources in general practice and in hospital out-patient and in-patient departments, in terms of personal characteristics, including age, sex, smoking habits, social class, family size, housing conditions, and residential history; and the results obtained are being summarized in a series of publications (6). The next stage in the modelling process is the study of the effect of differences in the resources available on health services usage and the determination of the relative importance of the various constraints upon usage which exist within the system. The numerical information contained in contact rates, waiting-lists, and similar sources is being augmented to produce a comprehensive assessment of the input and output, under a range of assumptions about resources and population structure. It is considered that the construction of a mathematical model on these lines is the key to the proper understanding of the NHS and an essential preliminary to major improvements in the efficiency and the effectiveness of the services provided.

Other current research interests of the Division include studies based on the Exeter Community Health Research Project, aspects of analytical biochemistry, including the establishment of a 'quality control' system and an analysis of the distribution of blood parameters, and biological time series, such as ECG and EEG records and statistical data recorded periodically. Although the basic activity of the Division is concerned with the application of numerical techniques, considerable attention has also been given to the solution of some associated theoretical and methodological problems in statistics and applied economics.

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## *The work of the Operational Research Division*

R. W. CANVIN and N. G. PEARSON

On establishment of the Division two main projects were formulated: the 'Health and Welfare Care of Old People Project' and the 'Cogwheel Project'.

### **'Health and Welfare Care of Old People Project'**

The 'Health and Welfare Care of Old People Project' is defined in the following terms:

To determine the effects on the health and welfare services generally of problems arising from the medical treatment, care and welfare of old people and to develop a model of the deployment of resources by the hospital authorities, local authorities, GPs, and any other organization which may be concerned.

From this study of the existing and past situation to develop a model for planning and predictive purposes so that the health, welfare, and care needs of old people may be met.

The importance of the 'Health and Welfare Care of Old People Project' can be judged by the magnitude of the problems presented by this group (ie those aged 65 or over). The number of old people in England and Wales rose from 5.5 million in 1961 to an estimated 6.4 million in 1971 and is expected to rise to 7.3 million in 1981 (1).

By reason of their increased morbidity rate and their slower response to treatment compared with younger people, old people occupy a disproportionate amount of hospital bed-days. Thus in 1967 old people used over 45 per cent of hospital bed-days although they represented under 13 per cent of the total population (2). Also, it is estimated (3) that in 1968/9 of the £1,500 million cost of the NHS, £475 million was spent on old people.

In our study area, which is the clinical area of the Exeter and Mid-Devon HMC group of hospitals, covering about 1,000 square miles, an average of approximately 17 per cent of the 300,000 population are old; and this rises to over 35 per cent in some coastal urban districts of the area. The local problem of providing health and welfare care services for old people is thus considerable. The problem is perhaps best illustrated by the fact that most of the consultants of the local (general) hospital group consider that old people are their major common problem. Indeed 54 per cent of all patients in the group are aged 65 or over. In the local psychiatric hospital group the proportion is 45 per cent.

Initially, the work of the Division has been to obtain a better understanding of the individual major components of the services, how they interact and who uses them. This has entailed a number of descriptive studies. These

include a demographic survey of the area; censuses of old people in psychiatric and other hospitals and in private, voluntary, and local authority residential accommodation; a survey of supplementary pensioners; the provision of housing in Exeter County Borough; the provision of all health and welfare services in an urban and rural district; the role of small hospitals in a county town in the study area and a detailed examination of the operations of the social services department as it affects old people. This information thus augments and complements the data obtained from the Exeter Community Health Research Project described in the Numerical Sciences Division report.

The extensive use by the hospitals, particularly the psychiatric hospital in the study area, of private registered homes for the placement of discharged patients who cannot return home has led us to make valuable comparisons between the type of residents in this accommodation and in local authority and voluntary accommodation. The Division is further involved in the planning of the immediate future use of this provision by local hospitals. This activity will also directly link with proposed work in the psychiatric field which will be discussed later.

Currently, the Division is engaged upon a study to evaluate the extent of misplacement of old people in the various forms of care in the study area. The study is designed to show what alternative or preferred forms of care are considered appropriate by those responsible (for example, consultants, social workers, etc.) for allocating services to these old people. An estimate will be made of what facilities should be provided now and in the near future to meet the present demand using the services preferred by the responsible person allocating them. These services will be costed and compared with the costs of alternatives which they consider could be prescribed. Restrictions to implementing the changes will be assessed in order to show what modifications will be necessary in order to achieve an improvement in the system. This study requires close collaboration with the appropriate consultants, social workers, and administrators, so that the results will be practicable and acceptable to them.

To date, samples of elderly patients in acute medical and surgical wards, in geriatric assessment and long-stay wards, in psychiatric long-stay wards, in residential homes and sheltered housing, and those at home receiving domiciliary services provided by the local authorities have been assessed as to whether or not alternative methods of care would be preferable (if resources were available) to the care they are currently receiving. Because the samples of patients are small, it would be unwise at this stage to draw firm conclusions, and it is intended to repeat the surveys during the winter months and to continue in this way until consistent results emerge. First results, however, suggest that, whilst a large number of patients are receiving the kind of care and treatment best suited to their needs, there is in each of the forms of care a sizeable number of patients who might be



better cared for in another way, eg about 25 per cent of the bed-days used by the elderly in acute medical wards and 10 per cent of the bed-days used by the elderly in acute geriatric wards might be provided elsewhere, while 75 per cent of the long stay geriatric hospital patients might be cared for in residential accommodation with nursing staff. Moreover, the first results suggest that in most cases there is only one suitable alternative.

In order to estimate the provision of care for old people required over time, a basic flow model has been formulated and will be developed towards the end of 1972. This model will describe the flow of old people within the health and welfare care system. It will include the psychiatric and non-psychiatric hospital services, local authority and executive council services as well as certain private services. The model will be used to predict the effects of various actions which might be taken in the future and to indicate those changes which will give maximum benefit. To complement the model we are considering methods of comparing the costs and measurable effects of long-stay hospital care, residential homes, warden-supervised dwellings, and home help services on the elderly. Although there are formidable problems of definition, design, and methodology, the results arising from a successful study would provide new information essential to effective long-term planning of these services.

Because there is so much to be done in securing improvements to the present system which is providing a service to meet a declared need, no attempt has been made to define 'need' or to measure unmet 'need' in the community. The problem of defining poverty is difficult enough. A Committee chaired by Professor Donnison said that 'the poor are those who fall sufficiently far below . . . average standards' (of the community) (4). But it did not say how far below this level is sufficient to qualify. The problem of defining need of all the other health and welfare services simply compounds the difficulty. However, in order to assist us to understand the nature of the problem of the needs of old people for the health and welfare services, what the parameters of need are, and whether, and how they can be measured, a seminar on the subject was held in March 1972. Eight papers by leading national experts in the fields of health and welfare for old people were presented and discussed by an invited group of fifteen senior officers of the local services. A report of the seminar is to be published by the University of Exeter (5).

### **'Cogwheel Project'**

The 'Cogwheel Project' was originally defined in the following terms:

To develop a system of organization of medical work in hospitals and in the first place, to test the hypothesis formulated in the report of the Joint Working Party, on the Organization of Medical Work in Hospitals ('The Cogwheel Report') produced in 1962.

The hypothesis is that a representative group of (hospital) clinicians can, by (i) undertaking a continuous review of hospital activity; (ii) participating

in the co-ordination and planning of services; and (iii) providing effective liaison with the community services outside the hospital, improve the efficiency of the medical care provided by the hospital as well as by the GP and community services.

The Division established an active collaboration with the Medical Services Committee (the name preferred by the consultants to that of the 'Cogwheel' Medical Executive Committee) of the Exe Vale Psychiatric Hospital. This group provides the mental health hospital services to over 560,000 people in the County of Devon excluding Plymouth and its surrounding rural districts. Exe Vale is a single specialty HMC group, one of 63 such groups in England and Wales serving only mental illness or mental handicap (these 63 HMC groups represent about one-fifth of all HMC groups in England and Wales). The management problems of a single specialty group are, moreover, similar to those of a multispecialty group, although the communications may be simpler. The management task is to ensure the smooth and economic running of the procedures concerned with diagnosis, treatment, and care of in-patients and out-patients (6). The need for a 'constant awareness of the effect of one action on others' (6) is as essential in a one-specialty group as in a multispecialty group if efficient management is to obtain.

It was realized from the outset that it would be difficult to separate the effects of any changed form of management from other causes, but in order to test part of the hypothesis, the subject matters, conduct, and outcome of meetings were analysed before and after the initial implementation of the 'Cogwheel' recommendations. The results showed a changed attitude towards management problems and that the consultants had accepted their extended managerial role. There was, however, evidence to show that the new system still lacked the capacity properly to define and deal with the wider and more important subjects which it was designed to tackle, particularly those with relevance to medium- and long-term planning. Detailed proposals (7, 8) from the Operational Research Division for the revised role and structure of the Medical Services Committee were accepted and largely implemented.

Although the full effect of the establishment of a framework for the greater involvement of the clinicians and others in management problems, and particularly in the planning of future services, on the care of patients would become apparent only over time, it was clear that, if the Medical Services Committee were to tackle the more important management problems, there should be an early infusion of operational research into their activities. The necessity of such support was indeed foreseen by the 'Cogwheel' report (6). Consequently the project was recast as follows:

The O.R. activity should be directed towards the production of effective methods for:

(a) Assisting in the development of future plans for a better mental health service involving not only the hospital services but also the local authority mental health service and, as necessary, the contribution of GPs;

(b) Assessing current performance of the Exe Vale Hospital in dealing with the mental health of the community;

(c) Conveying the lessons learned from the participation in the monitoring and planning work of Exe Vale Hospital to other Medical Executive Committees, especially Cornwall and West Somerset.

The development of plans for the future mental health service is directly linked to the development of a unified mental illness service for Devon, linking the psychiatric, geriatric, and local authority services. In late 1971, the Chairman of the Exe Vale HMC set up a working party (the Chairman and Secretary of which were members of the Institute), which produced a report entitled 'Unified Community Mental Illness and Related Geriatric Services for Devon'. The report outlined the kind of unified service that should be provided and put forward proposals for a multidisciplinary study group to carry out a detailed study and to prepare plans for the implementation and evaluation of a pilot project in Devon.

Because of our close involvement with the implementation of 'Cogwheel' at Exe Vale, our advice was sought in April 1971 by the first chairman of the West Somerset Medical Executive Committee about the organization and role of the committee. We have continued to give *ad-hoc* advice on such problems. The Division has also reviewed the operation of 'Cogwheel' in other areas.

## Other projects

As a matter of policy, the number of other projects tackled by the Division has been restricted. A project that has been carried out in collaboration with the Epidemiology Division was to evaluate alternative methods of improving GP services to the Bodmin Moor rural community. This was in order to assess whether a proposed mobile surgery was a viable method of achieving this aim. The study showed that it was, and now the effect on the practice workload and delivery of medical care caused by the introduction of the mobile surgery is being evaluated.

C. West Churchman (9) defines operational research as 'the securing of improvement in social systems by means of scientific method'. In keeping with this definition, the Operational Research Division is working in close collaboration with the various local health and welfare agencies, not only to define problems and arrive at their theoretical solutions, but also by experiment and subsequent implementation to secure improvement in the existing services. Whilst the work is mainly in Exeter and mid-Devon, the aim is to ensure that the methods and results are applicable nationally, and close liaison is maintained with the DHSS and other groups working on similar projects.

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## Alcoholism Studies and the Addiction Research Unit

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GRIFFITH EDWARDS

The Addiction Research Unit (ARU) came into official being when in April 1967 the already existing alcoholism research team (at that time funded by the Nuffield Foundation) joined up with a newly recruited drug research group supported by the Ministry of Health. The Ministry had at the same time given money for the erection on the Maudsley campus of a 24-roomed semi-permanent building which was to house both the alcoholism and the drug research groups, and to which was to be added later an MRC smoking research group. A number of further short-term MRC grants were also received. By April 1971, all funding was consolidated in terms of joint MRC/DHSS support. The Unit is a section within the Department of Psychiatry of the Institute of Psychiatry (London University) and as such is responsible to the professor of psychiatry. There is an advisory committee with MRC and DHSS representation.

A short history of the general development of the Unit has been given elsewhere (1), and this paper will be concerned solely with work on alcoholism. Such an arbitrary segmentation is for present purposes convenient, but it is not of course a division which can ultimately commend itself to the investigator. The Unit is essentially concerned with patterns and determinants of psycho-active substance use, the mishaps which occur with such use, the response of society to users, ways of averting accident and ways of helping the person to whom accident has befallen. On this occasion, writing especially on alcohol and alcoholism, one would not wish accidentally to connive in the idea that alcohol is other than a drug among drugs.

The original alcoholism research group and the alcoholism section of the ARU represent the evolution of one team, and this paper will therefore be concerned with work from 1964 onwards. It would be eminently satisfactory if a

review of these studies could take the form of a sequential description of a nicely unfolding and logically linked series of investigations. Such cannot be the case, for we were drawn to an area of endeavour where the first job was simply to familiarize ourselves with the scene, and then on the basis of some exploratory studies attempt to define the important questions. The shape which this review will therefore take will be a consideration of what at the present moment seem to be the crucial questions, with our previous work brought in to illustrate certain matters. A fuller review would have to range over a much wider literature than the work emanating from our own Unit, and this is a moment to acknowledge the generous help which the Unit has received, during the years of its growth, from other and more experienced alcohol research workers both in this country and abroad. Our relatedness to the Bethlem Royal and Maudsley Hospitals is obvious. The closeness also of the Unit's involvement with various community agencies has been invaluable. We would hope that this inevitably Unit-centred review will not be mistaken for egocentricity.

The five key questions today would appear then to be these:

1. Why do people drink, and why do different people drink differently?
2. When does drinking behaviour become 'alcoholism' and what is the nature of this condition?
3. Within any agreed terms of definition, what is the count of alcoholics and where are they to be found?
4. How are alcoholics to be helped?
5. How is alcoholism to be prevented?

This checklist looks disarmingly simple-hearted, and a critic might well point out that it is the list which anyone concerned with alcoholism would, from Dr Thomas Trotter (2) onwards, have made out on the back of an envelope. We would have to agree that the listing is indeed very ordinary, but these apparently simple-hearted questions have in fact hidden within them in each instance the question, 'What does the question mean?' The answers will only come from studies involving a number of disciplines.

## 1. Why do people drink?

During the autumn of 1965 the alcoholism research team carried out a survey of drinking habits in Camberwell (3-6). The focus was on the determinants of normal drinking, with the belief that extrapolation might lead to better understanding of the abnormal.

Of 1,039 adults in the drawn sample, 928 were interviewed, a success rate of 89 per cent. One of the surprises of this study was the willingness of the ordinary citizen to talk to the research worker about drinking habits and about varieties of untoward happening. The main conclusions were these. Heavier

drinking is correlated with male sex, higher weekly income, Roman Catholic as opposed to Church of England affiliation, having had a heavy-drinking parent, and with higher E (extraversion) but not N (neuroticism) score on the Eysenck Personality Inventory (7). Subjects with a high N score were, however, over represented among those reporting trouble with drinking. Inquiry was also made into stated motivation for drinking: two factors were class-related but did not predict trouble with drinking, while a third factor was not class-related but was predictive of heavy drinking and of trouble.

A drinking study was also carried out among university students at two London colleges. In the male subgroup a 75 per cent response rate was obtained, yielding 1,064 completed questionnaires. The most important factor associated with alcohol consumption was peers' drinking, but attitudes towards drinking and parents' drinking were also shown to be of some significance. The most important correlates of the individual's own 'concern over drinking' were, however, quite different, and lay mainly in leisure interest factors and in personality.

The interpretation and possible practical significance of these two studies are discussed in the original papers. In essence the provisional message would seem to be that determinants of abnormal drinking may to some useful extent be seen as extrapolation of the normal, but to understand the roots of causality it may be necessary to focus particularly on certain areas of personality and drinking motivation. It becomes very clear that the question as to 'why people drink' can only be approached by analysis of the interaction between many different variables, and whether we yet have the conceptual framework (or statistical methods) to handle this complexity is still very open.

## 2. What is 'alcoholism'?

One answer to this question could be that alcoholism is in large part a socially constructed label. It is then the job of the sociologist to discover the rules governing the use of this word, to discover the actual practical criteria which are employed by different persons and institutions, to determine whether a particular individual's behaviour or condition merits this label, and finally perhaps to describe the consequences to the individual of being thus labelled. This line of research is being pursued in the Unit by Dr David Robinson. There is, of course, no contradiction between a formulation which focuses on the fact of labelling, and alternative formulations which seek to discover whether there is an underlying disease entity (or entities) to which the label is (perhaps somewhat haphazardly) being applied. Is there a condition or group of conditions called 'alcoholism' which can be defined in terms of any sort of underlying pathology? Other projects recently embarked upon are looking at the possibility of defining a typology of alcoholism in terms of the degree of 'dependence'.

Dr Hershon is seeking to design scales which will measure dependence in

terms of concepts derived from psychological theory, while Dr Litman is employing a series of intensive single case-studies with observation of the covariance of craving, mood, and drinking behaviour. It is hoped that at the end of twelve months' preliminary work these three research workers will be able to compare their initial findings and further decisions will then be made as to the direction in which these projects may go. The projects have as their common aim the design of typologies, and we would suppose that an important basis for an alcoholism typology might be in the description of types of underlying personality. The literature on alcoholism and personality is confused, but there would appear to be some fruitful research leads (8).

An alternative theoretical basis is to see alcoholism in terms of a continuity. This is implicit in a model of dependence put forward by one member of the Unit (9), which takes as central the clinical fact of ambivalence, and lists the testable hypotheses that this model generates.

An empirical solution is to focus not on drinking or on withdrawal, but simply on the observed adverse mental, physical, or social consequences of drinking. A 'problem drinker' is defined in terms of some arbitrary cutting point (4, 5). This model is attractive, but it confounds the particular type (or types) of drinking with an adverse end result much coloured by social and personality factors; it has been shown that what happens to 'the alcoholic' is associated with class and with neuroticism, lower class and higher neuroticism carrying the greater disadvantage (10).

It is particularly with the attempt to build the fundamental models of dependence that the Unit would wish to break through boundaries between drugs and work on smoking seems relevant (11).

### **3. The count of alcoholics and where they are to be found**

The sample survey to which reference has already been made suggested a prevalence in Camberwell of 31.3 'problem drinkers' per 1,000 adults aged 18 or over (4). A parallel 'reporting agency' survey (12) was conducted at the same time in the same area, and sought to determine the prevalence of subjects who had been 'labelled' as having a notable drinking problem by any one of the wide variety of 'reporting agents'. These reporting agents included, among others, courts, clergy, employers, GPs, psychiatric and general hospitals, and statutory and voluntary welfare agencies. This study gave a labelling prevalence of 4.7 adults per 1,000 aged 16 or over. A further study which looked specifically at GP reports (13) confirmed Parr's earlier finding (14) that fewer alcoholics are reported from larger practices, and a detailed study was conducted of alcoholics known to employers (15). Reviews on the epidemiology of alcoholism have been prepared (16).

Besides these general community studies, a number of special populations have been investigated. Reports have been published on London's Skid



Row (17); on 279 residents of a large reception centre among whom 25 per cent were found to be physiologically dependent on alcohol (18); on 151 drunkenness arrestees at two London courts where 50 per cent were shown to be severely alcohol dependent with a further 25 per cent manifesting considerable alcohol problems (19); and on a prison population where 188 (55 per cent) of short-term and 312 (34 per cent) of long-term prisoners reported symptoms of alcohol dependence (20, 21).

The question of how many alcoholics there are (and where they are to be found) clearly rests on the criteria employed. Our researches to date would suggest that, with any sensible definition, the problem is one of magnitude and that, although crossing all class boundaries, alcoholism is established as a particularly serious problem among homeless men and in a recidivist population. The 'drunk' is seldom a casual roisterer.

#### **4. How are alcoholics to be helped?**

Ultimate questions which may here have to be tackled relate to the basic premises of the 'medical model'. The disease concept of alcoholism has recently been discussed in a paper written by a member of the Unit in terms of 'the alcoholist's addiction' (22). Are we as a result of recent history too caught up with the notion that alcoholism is a medical problem? Is it more properly a medico-social problem, the responsibility for which should largely be thrown back on a community (aided and abetted by 'the specialist') rather than its being seen as something to be given into the specialist's hands?

As well as pursuing a debate on what may to some seem rather esoteric matters, the alcoholism research group has been much involved in the down-to-earth business of conducting clinical trials. Hypnosis has been shown to confer no special benefit (23), and patients randomized between in-patient and out-patient care did equally well (24). The research value of these earlier trials lay particularly in the methodological problems which were thrown up. The Unit has since invested considerable resources in a controlled trial which randomized 100 patients between two graded modalities of care; results are in the process of analysis. The coping behaviour of wives of alcoholics has been studied. Miss Elspeth Kyle has been following up by record search a cohort of something over 900 alcoholics treated 10-15 years ago at four different hospitals.

Members of the Unit have also been interested in studying specialized alcoholism rehabilitation hostels (25) and a major continuing study undertaken by Mr Jim Orford and Miss Shirley Otto, looks at three such facilities. Other community-based helping agencies which have been topics for brief descriptive studies have been Alcoholics Anonymous (26), and the Alcoholism Information Centres run by the National Council on Alcoholism (27).

It would probably be a fair summary of the Unit's present outlook to say that we are today more puzzled as to how best to help the troubled drinker

than we were at the start of our investigations. Calculations suggest that the ratio of 'needful cases' to cases in contact with an 'apposite agency' lies between 4:1 and 9:1. And as yet we have no assurance that supposedly apposite agencies are in fact so apposite. The seemingly esoteric question may not be all that esoteric.

## 5. How is alcoholism to be prevented?

The entry under this heading had better be short, simply as a token of admission that the Unit's thinking on the matter is still at the earliest stages. That the entry is short is perhaps symbolic not only of the state of affairs within the Unit, but also the state of affairs in the country. Prevention has for too long been the neglected optional extra.

A discussion under five different headings must in the process make it evident that the separateness of headings belies the close interlocking of the matters put under each spuriously separate head. Unless we know with what it is we are dealing we will not be able to count it, treat it, or prevent it, whatever 'it' or 'them' may be.

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## The Special Hospitals Research Unit

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T. G. TENNENT

The Special Hospitals Research Unit was set up in January 1969 both to undertake research on its own behalf within the three Special Hospitals and also to encourage other staff within the hospitals to follow their own research interests and to provide them with assistance in doing so. The work of the Unit is supervised by a Departmental Steering Committee which includes representatives from the Home Office, Home Office Research Unit, and Institute of Psychiatry as well as from the DHSS and the Special Hospitals. The Director of the Unit is a consultant psychiatrist, who also holds an honorary appointment at the Institute of Psychiatry. A principal assistant (a psychologist), a senior registrar in psychiatry, three assistant social workers, four clerical officers, and four clerical assistants constitute the rest of the staff.

The first of the English Special Hospitals was opened in 1863 (Broadmoor) and it would be wrong to assume that no research had been carried out within these hospitals prior to 1969. Rampton Hospital, and particularly the Psychology Department of that hospital, has been involved in many research projects and much of the early work on the extra Y chromosome was carried out within these hospitals. However, the setting up of a Research Unit permitted, for the first time, an integrated research programme to be established. In this programme priority has been given to (i) a description in clinical and demographic terms of the population within the Special Hospitals with a view to obtaining information about the natural history of their disorders and to defining reliable criteria for successful discharge from a Special Hospital; (ii) an examination of the factors leading to a request for admission to a Special Hospital; and (iii) technical help to staff wishing to do research.

Two early projects set up within the Unit were to follow the development

of the Special Hospitals through an examination of the available statistics and to examine the composition of the total hospitals population in respect of certain demographic data. For this a cohort sample of all patients admitted to the hospitals between 1 January 1961 and 31 January 1965 was identified and details extracted from the case-notes according to predetermined criteria. These details included information about how they came to be in the Special Hospitals, some limited information regarding their family background and work history together with information regarding their previous psychiatric and criminal history. Information which will provide some knowledge as to how they function in the community is also being collected on those patients in this cohort who have been discharged from hospital. This study is now at the stage of being coded prior to analysis.

The demographic studies drew attention to the inadequate quality, for research purposes, of information available in the patients' case-records. This information is collected in a non-systematic manner and is of varying quality, quantity, and reliability, and early on the Steering Committee recognized the need for some method of data collection for research purposes which would be common to all three hospitals. A number of methods were considered and after much deliberation it was proposed that a modification of the case-register method as employed at Nottingham, Camberwell, and Aberdeen would best meet the needs of the Research Unit and, at the same time, would be a valuable addition to the clinical work within the hospitals. It has been proposed that this register should contain admission and pre-admission data, in-patient treatment, and post-discharge information. The DHSS has agreed to support such a register for a trial period of two years, during which time a number of feasibility studies will be carried out. This project is only at the earliest stage of development. Documents are still being developed and interviewers trained.

The Special Hospitals contain a unique but highly selected population, and at a fairly early stage it was decided that a study of the way in which patients were selected for these hospitals would be of general interest. Such a study will enable an estimate as to possible bias in research results to be made. As a first step towards an investigation of this process a project is currently under way which attempts to look at those patients already either in hospital or serving sentence in prison, for whom a place in one of the Special Hospitals has been requested. In the first instance, this study has been restricted to those classified as suffering from either mental illness or psychopathic disorder and, by the use of Wing's Standard Psychiatric Interview Schedule, an attempt is being made to see whether there are any psychiatric factors which differentiate between those who are accepted for the Special Hospitals and those who are rejected. At the same time, other information is being obtained from the referring doctor as to what criteria he considers before making such a request and, similarly, by a retrospective study of letters from Special Hospital consultants to referring hospitals to try to obtain some idea

of the concepts which underlie the decision to accept or reject these patients for Special Hospital treatment.

Other research has focused on groups with particular or peculiar characteristics who, perhaps because of the selection factors for admission, are found in relatively large numbers in the Special Hospitals and are much less common in other community or institutional groups. False conclusions can easily be reached from the study of very small numbers of cases and it is important that early results be confirmed or disproved on larger samples wherever possible. Two particular sets of studies are worthy of mention: those on patients with chromosomal anomalies and those on patients who have been involved in sex offences. Collaboration with outside units and personnel has been an important feature of both these series of studies. Studies into patients with chromosomal anomalies has involved collaboration with workers at the Department of Genetics at Sheffield who, as well as karyotyping the patients, have studied their social and environmental backgrounds. The Institute of Psychiatry, London, has looked at the hormonal output of these patients and has also carried out electroencephalographic studies, and physicians from the National Hospital for Nervous Diseases, London, have also assisted with neurological studies.

In conjunction with the Professorial Unit of Psychiatry at Oxford, a number of studies have been carried out exploring possibilities in the assessment and treatment of those patients who have committed sex offences or who have severe sexual problems that interfere with their social adjustment. Problems arise with this group in evaluating the most appropriate form of treatment and in assessing the effectiveness of whatever treatment is given. Such assessment presents methodological difficulties. Transient changes in sexual behaviour may follow the use of many drugs, particularly when such an effect is anticipated by the subject. Subjective reports must be of doubtful value, particularly with sex offenders who may be highly motivated to conceal certain aspects of their behaviour or interest. The main emphasis of the research programme so far, has been to establish a method for assessing the efficacy of drugs affecting sexual drive, rather than any other form of treatment where the treatment variables themselves may be less easy to control. A combination of different measures has been used. These have involved ratings of overt sexual behaviour; ratings of sexual fantasies; measurements of sexual attitudes using semantic differentials; and measurements of physiological responses to sexual stimuli, in particular, penile erection by means of penis plethysmography. Estimations are also being made of changes in testosterone and gonadotrophin levels in the blood.

Within the hospitals, doctors and other professional and nursing staff have assisted and been assisted in a number of different research projects and with the statistical analysis of data. Students have been employed during university vacations to undertake specific studies, both assisting the Unit in its work and also strengthening its links with other university departments, and it has

been gratifying to note the number of persons who have been prepared to work in this difficult area of research.

For the future, it is suggested that the work of the Special Hospitals Research Unit might develop in two major ways. First and most important is the development of the register as a tool for systematically recording detailed information about patients, from the time they are admitted to a Special Hospital for treatment through to the period of their discharge and after care. It is hoped that in due course, reliable predictive indices of post-discharge outcome will become available for clinical use.

Secondly, it is expected that clinical studies will continue, selecting as appropriate a variety of groups of patients for study. While it cannot at present be said that this approach offers any hope of a spectacular breakthrough in treatment, it is work that must be done if the body of knowledge in forensic psychiatry is to increase.

(For references see Part III, section 3.)

## Health Services Research Unit, University of Kent at Canterbury

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JOHN BEVAN, JOHN BUTLER, and  
MICHAEL WARREN

The Health Services Research Unit at the University of Kent at Canterbury was formed on 1 June 1971 by the appointment of the director and the grouping together of staff at the University who had previously been working on a number of projects on grants from the DHSS. The main research commitments of the unit are in the study of health centres and group practices (1), the distribution of general medical practitioners (2), the effects of deploying nurses (3) and other professional workers in general practice, and the social factors influencing utilization of health services and the needs for, and effectiveness of, rehabilitation and other services for handicapped persons (4) (see Part III). This contribution concentrates on research in general practice; it discusses some general points about such research and reports on two particular studies started before the formation of the Unit which have recently been completed.

### **Research and general practice**

Significant features in the development of general practice during the last fifteen years have included the trend towards more and larger partnerships and groups, the attachment of local health authority nursing staff to practices, the building of health centres, the employment of ancillary staff by practices, direct access to certain hospital facilities (for example, pathology and X-ray services), and the resurgence of interest in the possibilities of integrating some aspects of general and hospital medical practice, as for example in the concept of the 'community hospital' (5). Accompanying these developments there has been an increasing volume of research into all aspects of general practice; much of the research has been of an interesting descriptive nature,



but little attempt has really been made to evaluate innovation by tracing the causal relationship between the introduction of new techniques or forms of organization and the benefits to the patients, the practitioners, or the service.

Obvious reasons for these shortcomings in research planning are the absence of any agreed definition of the scope of general practice itself; the lack of suitable indicators of the effectiveness of medical care in the general practice setting where a substantial part of the work is concerned with the continuing care of the chronically sick; the lack of an accepted accounting or costing system; and the complexity of and interrelationship between the variables involved in most innovations, thereby confounding the establishment of proper controls against which to assess the precise impact of the innovation. Ideal control groups can be established only if the programme to be evaluated is applied to individuals rather than a practice population in general. The idea that one practice can act as a control to another is only as good as the initial matching of the practices, their staff, and their populations. The enthusiasm of the staff and their involvement in innovation and experiment also limit the general applicability of findings obtained in only one or two practices. This is not to decry the work of the pioneers nor in any way to belittle the contributions of those who have described their innovations and observations. The point that is being made is that it is *difficult* to progress beyond these pilot studies.

In the development of health services, research data may be used at two levels: the strategic and the tactical. These levels can be seen as the two ends of a continuum along which most projects are ranged. Much research is neither wholly strategic nor wholly tactical, but provides information which might be applied at either level. At the strategic level the data may be used by central or regional authorities for defining objectives and deciding on priorities in allocating resources for the development of services. At the tactical level, they can provide criteria, usually in a local context, for deciding among a range of alternative ways of achieving the chosen objectives within the limits of the allocated resources. At the tactical level, therefore, the research question may concern the most economic way of achieving a given unit of service, or, equally important, the most humane way. To ascertain these, it may, for example, be necessary to break down the work involved into its component parts and then to consider by whom each of these parts has actually to be done, which could be delegated to those with lesser or different training, and which could be mechanized. Some of the problems at the tactical level of examining an innovation which has already been decided upon (although hopefully not actually introduced before the research starts) are discussed below in relation to the study of the impact of moving practices into health centres on the work of the practices and on the attitudes of patients; and also in connection with the examination of the needs for administration and management of health centres. In most of these tactical

situations, assumptions are being made about the efficacy of treatment and the general benefits of the service. One is seeking efficiency and acceptability within that context, without questioning whether or not the broader objectives are valid.

Strategic planning, by contrast, *is* concerned with ultimate objectives, and sees units of service as resources to be used in achieving them rather than as ends in themselves. For example, the ultimate objectives of health services are the prevention of illness, diagnosis and treatment of disease, prevention of pain, disability, and premature death, and the rehabilitation and continuing care of the chronic sick and handicapped. These objectives should be reflected in measures of *output*; the measures which are so often used, for example, number of doctors, number of nurses, number of health centres built, and number of attendances by patients, are measures of *input*. The approach must be to identify the health or medical care need of the individual or population and then to consider across the whole range of possible services how this need can be satisfied at least cost. In pursuit of these goals, various alternative experimental projects may have to be set up, and examined at the tactical level.

Both tactical and strategic research must be pursued in the health services. One approach is not necessarily more important or more worthy than another, as both are necessary for a full evaluation. Much of the knowledge gained from tactical studies will be essential in planning the local implementation of the recommendations stemming from the results of the strategic studies. Evaluation of health services involves the comparison of a service with appropriate criteria and/or a control situation. To obtain valid results from such comparisons requires that the objectives of the service have been clearly stated and that its elements are measurable. In much of this work in relation to general medical practice we are only at the beginning.

## **Studying the impact of moving practices into health centres on the work of the practices and on the attitudes of patients**

Moving to a health centre or new group practice premises<sup>1</sup> is typically associated with several changes for a practice and its patients. There is some change in the location of the surgery and the administration of the practice and premises. Although the GPs remain independent contractors, a health authority may become responsible for the premises and its servicing and be the employer of most of the professional and other staff based at the centre. The centre is organizationally and physically more complex than conventional surgery premises and generally better equipped and serviced. The move to

1. The ownership of health centres is vested, under Section 21 of the National Health Service Act, in a health authority whereas group practice premises are owned or leased as a whole by a group of GPs.

such a centre may become the occasion for making other changes in the practice, for example, the introduction of an appointments system or of health visitors into the team; and the organization in the centre will tend to change after its opening, as modifications are made in the light of operating experience or in response to altered conditions.

A study based on a group-practice centre in an industrial town in north-east England (1) gave some indication of the problems involved in, and type of results obtained from, an investigation of the effects of moving into a centre on the work of the practices and on the attitudes of the patients.

The centre housed the only consulting rooms of six doctors from three practices and was used as a branch surgery by a further partnership of three. The previous premises of all practices were situated in small terraced houses in side streets about a quarter of a mile from the shopping precinct of which the new centre was a part. The results quoted relate only to the practices using the centre as their main surgery.

In the first year following the opening of the centre the numbers of patients seen per week by the doctors was about the same as just before the move (list sizes were also unchanged). A somewhat higher proportion of patients were being seen in the surgery, however, except for the elderly who appeared to find difficulty in negotiating the busy streets around the centre. The variation between doctors in their proportions of new to return consultations reduced after the move, probably because one doctor prepared weekly charts of these statistics for display and discussion in the common-room. Generally speaking, demands made on hospital services were unchanged following the opening of the centre except in the case of pathology tests, requests for which increased markedly from three doctors in the centre, both in comparison with their behaviour before moving to the centre and with that of other doctors in the town. This increase was associated with the introduction of a collecting service for specimens, laid on specially for the centre.

A small sample of patients was questioned by post three months, and again two years, after the centre had opened. There was a swing in favour (from 40 to 60 per cent) of seeing the doctor at the centre (as opposed to the old surgery or to not minding where). The swing was mostly accounted for by a change in favour of the centre among the majority of those who originally did not mind where they were seen. This counteracted the contrary movement of a quarter of those who were originally in favour of the centre to a neutral position. The survey also investigated whether patients had strong preferences to be seen by 'their' individual doctor. Over-all there was no change in the proportion of patients preferring the doctor of their choice; although, again, a number of patients changed their views.

Such studies are to be seen as simple monitoring exercises useful in appraising and adapting arrangements and correcting misapprehensions.

They may also be helpful in the formulation of questions about the impact of the move to the centre on the medical care provided.

As a preliminary step in the development of research into the management of health centres, the unit organized a short working conference in the University of Kent on 6-7 April 1972, which was sponsored by the DHSS (6). Following the conference, proposals for a research project involving the unit and a number of the conference participants have been prepared. In its initial phase this project will develop systematic ways of describing and analysing (i) the content of general administrative work relating to the running of health centres; (ii) the decision-making bodies and officers: their activities, responsibilities, and powers, and the formal and informal relationships between the various decision-makers. Only when this work is completed can adequate consideration be given to the need for a trained manager at the level of a health centre.

The development of these studies illustrates the desirability of collecting information at the tactical level in order to understand the nature of the decisions to be taken at the strategic level. To return to the military analogy, some reconnaissance sorties and intelligence are required before strategy is decided.

## Designated areas and the distribution of general practitioners

The aim of the 1946 National Health Service Act to secure a more even geographical distribution of GPs was effected through the creation of the Medical Practices Committee, which was given responsibility for defining and classifying medical practice areas according to average list size, and prohibiting the entry of new and/or replacement doctors in areas with relatively low numbers of patients. This negative control has been supplemented since 1948 by the Initial Practice Allowance, and since 1966 by the Designated Area Allowance, which is currently a two-level addition to the Basic Practice Allowance for GPs in areas with average lists above 2,500 or 3,000 patients, respectively.

The impact of these controls and incentives on the distribution of general practitioners in 1970 has been studied (2). The objectives of the study were: (i) to devise and apply methods of measuring inequalities of distribution; (ii) to identify the major migration routes of GPs and the effects of mobility on distribution; (iii) to elucidate the factors influencing doctors' choice of practice locations; and (iv) to describe the major professional and social differences between designated and other areas.

It was found that from 1962 to 1966 the proportion of GPs in designated areas *rose* annually, while the range in list sizes between designated and restricted areas *narrowed* during this period. The introduction of the Designated Area Allowance in 1966 did not have much apparent effect: 90

per cent of areas qualifying for the allowance in 1966 were still designated in 1970, and the reduction in the range of list sizes, begun in 1961, did not alter after 1966.

Most GPs changed residence at least once during their careers, but the earlier a doctor married the less likely he was to move. Some regions and counties were short of manpower because of their inability to attract new doctors setting up in general practice, some because they could not attract enough established doctors moving from other practice areas, and some because they failed to retain GPs who had once practised there. The main 'wastage' migration routes have been to the south-east and south-west.

The majority of GPs practised fairly close to their family homes and their medical schools. The more ties a doctor had with an area the more likely he was to be practising there. One way of bolstering recruitment to general practice in some under-manned areas would therefore be to encourage more doctors originating from those places to return to them when qualified, and one way of doing this would be through the provision of more local medical schools.

The differences between doctors in designated and non-designated areas were not consistently in the favour of either group. Those in designated areas were less likely to have direct access to NHS hospital beds or diagnostic facilities, and they were more critical of those services which were available. Against this, they were more likely to be in regular touch with a post-graduate medical centre or teaching hospital, and they rated their opportunities better for postgraduate and refresher courses.

These results carry several implications for the future of the designated areas. There is a need to integrate the roles of the Medical Practices Committee, the Health Departments, and the Review Body on Doctors' and Dentists' Remuneration in manpower planning in general practice, and also to clarify the nature and objectives of financial incentives. For example, attention should be given to the definition of medical practice areas, to the problem of disincentives, and to the criteria by which an adequate distribution of family doctors is to be judged. Some of these tasks fall inevitably upon those directly involved in the development of policy; others demand further research and the collection of new data. In this way the project aptly illustrates the fruitful partnership that can emerge between academics and administrators, in which research data amassed and synthesized by the former can be applied strategically by the latter in their quest for greater efficiency and effectiveness.

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The Medical Care Research Unit  
The Medical School  
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D. J. NEWELL and J. H. WALKER

The Unit was formed in 1969 and has gradually built up a staff of lecturers in medical economics, medical statistics, medical sociology, and community medicine. The recent appointment of a management scientist completes the range of the disciplines which it is at present planned to include in the Unit. Within its general task of studying the organization of medical care, the Unit is particularly concerned with relations between the different parts of the NHS and with possible means of improving collaboration. Reorganization of the administration of the service in 1974 will not automatically solve the problems that there are in achieving really effective collaboration in the care of patients and this emphasis in the Unit programme will be maintained as the service evolves in the years ahead.

The tripartite structure of the NHS has led the Unit to plan studies in three groups, each concerned with the relations between one pair of the present local health authority, hospital, and general medical services. There has been particular concentration on the relationship between care given by doctors in hospital and care given by GPs and on the social and economic effects of technical and managerial advances in the hospital service. The other relationships have been studied in a number of the Unit's recent and current projects and will be mentioned towards the end of this report, but the Unit's longest experience has been with the relationship between medical practice in hospital and in the community and it is this that we will consider first.

### **Background to the first study**

Although administrative unification of the NHS will provide a framework

for improvements, increased efficiency and better quality of patient care must, to a great extent, depend upon collaboration between doctors.

The 'Cogwheel' pattern of organization provides a means for developing collaboration inside the hospital, while a similar advance is occurring in general practice with the development of group practice and the accelerating health centre building programme. A major problem that remains is the working relationship between the specialist and the generalist. An unfortunate concomitant of the increasing specialization of hospital practice has been the isolation of doctors in hospital from those in the community. Although all GPs have had some experience of hospital medicine, an increasing proportion of specialists have little personal knowledge of general practice and its particular problems. Medical schools have been slow to include primary medicine in the curriculum and this has had a substantial effect both upon the attitude of hospital doctors to general practice and upon recruitment to general practice itself. For a while it appeared possible that general practice as we knew it would disappear but recently the outlook for this branch of medicine has improved as advances in the organization of general practice have been followed by the development of vocational training programmes.

Doctors who take part in these vocational training programmes work in both hospital and general practice and gain an experience which highlights the natural interdependence of hospital and community care. This natural interdependence, however, is not often reflected in arrangements which encourage working together and even when these have emerged, they have generally evolved haphazardly rather than been based on purposeful analysis and planning. Although during the first twenty-five years of the NHS, the GP and the consultant have continued to meet over individual clinical cases, they have rarely met to define and resolve common problems in the use of resources or the organization of work, far less to discuss the apparently abstract problems of respective roles. As concern with the balance of care grows, however, the definition of roles becomes of increasing importance, just as does the development of close working relations and a system capable of defining and resolving the common problems.

### **Aims and methods: the practice elements**

The initial project of the Medical Care Research Unit in Newcastle, therefore, was in the field of the roles and relationships of GPs and hospital doctors. It consisted of an assessment of the total use of medical care services by a defined practice population and a study of the work of the GP and the specialist respectively in providing it. The objective was to identify areas in which the doctors' roles could be more clearly defined or tasks more appropriately shared between them and it was proposed that the study might be followed by trials of new ways of working suggested by it. The method



employed was the analysis of normal general practice and hospital records, together with a limited amount of special recording.

The study was based upon a group practice of eight doctors serving a population of 17,500 patients and working from adapted premises situated within half a mile of a district general hospital. It was launched before the recruitment of the present team and the work was undertaken under the supervision of the directors, a statistician, and by two doctors especially employed, on a part-time basis, to interpret and transcribe information from the records. The initial task was to create a recording system which monitored practice activity without interfering with the service commitment of the practice or its staff. In particular, it was decided not to risk modifying GP behaviour by involving the doctors in routine morbidity recording. Almost all the information used was collected by extraction from existing sources. Practice workload was assessed from appointment books, home visit forms, and normal GP records; the work of the practice nurse from her daily book; the work of the district nurse and health visitor from the records they normally maintained; the work of the midwife from the obstetric records; and laboratory investigations and open access diagnostic procedures from the appropriate routine source. Definition of the basic population involved the creation of an 'age/sex register': an undertaking which although useful for the practice itself, highlighted the difficulties of comprehensive population recording in general practice.

An obvious problem in research based upon routine records is the variability in the quality and quantity of the data. In this study, for example, it was not always possible, from the records of individual doctor-patient contacts, to distinguish the end of one episode from the beginning of the next, nor to identify the point at which a decision to involve the hospital services was taken; many minor episodes in particular were incompletely recorded. These difficulties made the accurate description of the morbidity pattern of the practice particularly difficult and it was decided that this should be assessed by two sample weeks of special diagnostic recording by the GPs themselves, the risk of bias being accepted for this purpose.

### **The hospital element**

A more detailed study was undertaken in the Unit of patients from the practice who attended hospital. These patients were identified by recording new referrals from the practice as they were made, by checking hospital progress and discharge letters sent to the practice about existing attenders and also by scrutinizing the registers of casualty departments. The staff of the casualty departments attempted to identify all patients from the practice for us, but to achieve this reliably proved to be an impossible task; that the total search involved approximately 75,000 records exemplifies the disadvantages of basing research upon normal service records. The hospital

records of the patients who had been identified as attending hospital were scrutinized and, when each episode was complete, the details of both out-patient and in-patient episodes and of the pattern and content of correspondence with the practice were recorded, so as to provide an over-all picture of the nature and duration of each episode and of the services provided for the patient.

The scale of the data handling involved in the project is indicated by the following list of the items of service occurring in the year. In all, detailed information was collected for the out-patient attendances of 1,300 patients referred during the year, 700 patients referred previously but continuing to attend during the year, and 2,000 patients who spontaneously attended the casualty department. There were over 300 emergency admissions to hospital, 600 admissions following out-patient consultation, and a further 200 admissions for childbirth. The concurrent work of the practice involved 66,000 doctor-patient consultations and 25,000 contacts by a patient with a community nurse. Ninety thousand items of service in general practice, and in hospital, approximately 10,000 out-patient attendances and 10,000 in-patient days represents a considerable allocation of resources to the practice's population of 17,500 persons. Using existing records it is possible to make only a rough assessment of how effectively these resources are used but despite the many difficulties it was possible to build up a reasonably clear picture of existing GP-consultant relationships in some specialities, to assess such points as the extent to which out-patient consultations take place which make no call on the hospital's technical resources and thus to consider the possibilities for trying new ways in which GPs might obtain a second opinion for their patients.

### **New ways in collaboration**

The first experiment of this kind is to hold out-patient clinics in the practice, so that the specialist can discuss the case with the patient's GP after the consultation. For eighteen months a consultant paediatric clinic has been held at the practice premises and has been monitored in economic and educational as well as clinical terms. Improvements in the care given to the children in the practice have been noted; children with developmental and functional disorders have particularly benefited from the ready availability of specialist advice. The doctors involved have embarked on joint discussions which are intended to define the most appropriate criteria for referral.

Similar work at this practice is planned involving other specialties. A related study will consider the problems of establishing similar out-patient clinics in rural areas, far from the consultants' hospital.

### **Self-referral to 'casualty'**

The results of the original project were of particular interest and importance concerning the use of accident and emergency services. The strikingly high

rate of self-referral and the suggestion that direct use of accident and emergency departments for many purposes is regarded as normal by the local population has led recently to a more intensive multidisciplinary study of the reasons for attendance at local accident and emergency departments and of the social and medical characteristics of those patients who are particularly likely to use them. Naturally enough these patients are characterized by particularly warm attitudes towards hospitals but, on the other hand, they show very varied attitudes towards GP care. The accuracy of patients' assumptions about the extent to which GPs provide care for minor trauma was assessed by a postal survey of GPs; this also provided information about the doctors' own attitudes to accident and emergency departments and to emergency services in general. This work suggests that it is important for doctors to reach clear agreement on the respective roles of the hospital accident services and the GPs in the care of minor trauma and to give the public consistent advice and education on the use of the two types of service.

The research described so far indicates the approach of the Unit to the relationship between general practice and the hospital; the initial study has led to experiments and to further studies both suggested by the results.

### **Other studies**

One aspect of the relationship between general practice and community services provided up to now by the local authorities is the degree to which care given to normal children by general practice, hospital, and local authority services overlap or leave gaps in the service; a short study has confirmed that both these defects occur. Another subject which deserves further consideration is the role of the social worker in general practice, and a study of this is planned by this Unit to start in the near future.

In studying the relationship between hospital and care in the community, a number of different approaches have been taken. Three facets of the relationship are being studied currently. The first study concerns the social and psychological implications of a radical life-saving technical advance, namely the modern surgical treatment of spina bifida; a study using partly structured 'in-depth' interviews examines the effects on the parents, the community, and, later, on the patients themselves. The second is looking at the social and economic implications of a different kind of desirable advance in care, one intended to make it simpler and more efficient, namely, day-case surgery for hernias and haemorrhoids. Previous clinical studies suggest that operations for these conditions are just as successful without a period of post-operative care in hospital; our study, which is being carried out in partnership with a surgeon working in the Newcastle Region, is designed primarily to check on the acceptability of day-care surgery and on the social and economic consequences for the patient, his family, and the community services; but of course we shall once again check that the results are medically satisfactory. The third study concerned with the relationship

between the hospital and community health services, involves the analysis of the records of all the births, including both those in hospital and those at home, which took place in the City of Newcastle during a ten-year period. The information has been collected by the University's Department of Obstetrics as the Newcastle Maternity Survey; the Unit has undertaken the service of analysing the great volume of information available, using a computer. It is hoped that other collaborative activities of this kind, in which the Unit uses its skills in analysis and data processing to assist clinical departments in projects with implications for the organization of medical care, will become a regular part of the Unit's activities.

## **Conclusion**

This brief account of the early days of the Medical Care Research Unit shows something of the range of work which becomes possible when scientists from a variety of disciplines are brought together to study the organization of medical care. The future success of the Unit depends upon our success in continuing to blend the skills and temperaments of researchers with diverse training and experience, a task which is made less difficult because all of them share the common aim of increasing the effectiveness of the health service by improving relationships between its constituent parts.

## The MRC/DHSS Epidemiology and Medical Care Unit

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T. W. MEADE

The Epidemiology and Medical Care Unit was set up jointly by the Medical Research Council and the Department of Health and Social Security in 1970. The purpose of siting the Unit at Northwick Park was to enable community-orientated studies to be carried out in collaboration with the other disciplines at the hospital and in the MRC's Clinical Research Centre. The Unit studies the causes and natural history of disease, and the practical and health services implications of disease patterns in the community. Epidemiology is the basic discipline underlying these two areas of study, and for this and other reasons no sharp distinctions are made between them in planning the Unit's programme of work. The interests of both the MRC and the DHSS are thus pursued by concentrating on topics that are of mutual concern to both as the list of current activities shows (see Part III). Most studies are of this kind, though, from time to time, some may be for the MRC or the DHSS alone. Part III also gives the names of those outside the Unit with whom collaborative work is in progress.

The Unit's main work currently falls under three headings:

1. Evaluation of treatment and management methods.
2. Collaborative studies of economic aspects of medical care.
3. Epidemiology and prevention of arterial disease.

### **1. Evaluation of treatment and management methods**

Examples of the Unit's approach to assessing the value of standard treatment methods are its studies in the field of rehabilitation and physical medicine.

Over the last few years it has become only too clear that there are large

numbers of disabled people whose handicaps are due to a wide range of underlying conditions (physical and mental) and for whom methods of management are limited either by their effectiveness, or their availability, or both. In many cases, it is our failures to cure or prevent that result in disability: heart attacks, strokes, much rheumatic and psychiatric disorder; in others it is medicine's successes (some, perhaps, of doubtful value): the treatment of spina bifida and the management of very severe head injuries, for example. Rehabilitation is labour-intensive and costly, and our large elderly population and the effects of a host of social factors also have to be borne in mind in planning the relevant services. The result of all these interacting factors is a classical 'effectiveness and efficiency' problem of the greatest urgency: high levels of need and demand, frequently by socially disadvantaged groups, inadequate resources, and many treatments of unproven value.

The Unit's approach to these problems, which are largely those of establishing priorities, is to assess the effectiveness of standard methods of treatment (in both clinical and social terms) and the factors associated with successful or unsuccessful rehabilitation, and to complement these assessments with cost-benefit analyses (see section 2 below). There seems only limited point at present in trying to define the needs and organization for rehabilitation services very precisely; the needs are only too apparent, and their accurate definition is to some extent academic in the absence of firmly based information on the outcome of methods used, and on factors that determine this outcome. As regards organization, clearly we ought to be creating services based on methods that are known to be effective. We badly need to identify, out of the welter of time- and resource-consuming treatment methods currently available, those that really help, so that efforts to provide these can be encouraged, rather than those of no value.

The Unit is involved in three studies concerned with the effectiveness of rehabilitation and physical medicine treatment methods: two are randomized controlled trials, and one is a prospective observational inquiry.

The first study is designed to compare three general approaches to rehabilitation, in order to achieve some idea of the over-all framework within which rehabilitation for certain conditions and groups of patients may best be provided. This is a pilot trial, intended as much to study the methods and feasibility of a larger-scale inquiry as to produce definitive results, and is just about to start, following detailed preparations. It is hoped to recruit about 150 patients in a year, and to follow each one up for a further year. Patients with strokes, or major fractures of the lower limb, will be studied initially, though other conditions may also be included later on. Each patient will be randomly assigned to one of three groups for rehabilitation after discharge from hospital. One group will receive very intensive rehabilitative measures (for example, frequent physiotherapy, occupational therapy, speech therapy, retraining); another will receive conventional treatment,

management being what the clinicians concerned would usually prescribe in the ordinary day-to-day clinical setting. The third will receive a minimum of routine rehabilitation (except where some overriding clinical reason arises) but will be regularly and frequently seen by a health visitor who will arrange for further medical consultations and referrals as the need arises. Clearly, the possible implications of this study are very large. If the third group does as well as the first (and this is an entirely open question: the trial would otherwise be unethical) considerable savings and more effective use of resources may be possible. If in any particular condition the first group does much better than the other two, then the situation is one in which treatment is effective but very expensive, and the question would be how (or whether) the best service could be made available to everyone in need of it.

The second study is one to assess three of the physical medicine methods used in treating low back pain with sciatica: exercise, manipulation, and traction. Because these treatments are seldom used on their own, the trial (also randomized) has been designed on a factorial basis, with eight treatment groups representing the different ways in which the three individual methods can be used singly or combined. An initial pilot trial (to validate methods, etc.) on about fifty patients will probably be followed by a large, multicentre trial.

The third study is an observational inquiry into the outcome of people admitted to a combined medical and industrial rehabilitation unit. It is known that the speed with which such patients return to work and normal living varies very considerably, but the reasons for these differences remain unclear. If we had more accurate information on the effects on return to employment, of age, extent of disability, delays in retraining, motivation, etc., it would probably be possible to identify groups or individuals with particular difficulties, and to give them special attention.

The centre at which this work is being carried out admits about 750 patients a year who were in employment before becoming ill or being injured; those admitted during a two-year period will be included in the study, and each person will be followed up for at least a year. This approach is thus complementary to that of the two other studies; it attempts to define people who require special attention, while the two clinical trials (particularly the first) assess some of the ways of trying to meet their needs.

The Unit's role in these studies is to provide advice to the clinicians involved on the design of the inquiries, and to deal with the data-processing and analysis of results.

Systematic investigation of many aspects of rehabilitation is badly needed, and is now increasingly under way. Progress is, however, bound to be slow for several reasons. For example, there are serious but critical problems in measuring 'end-points'. While return to work (or not) is fairly easy to define and apply as an 'end-point' in a man of 45 (though not, obviously, in areas of high unemployment), what represents success or failure of rehabilitation in a

housewife, or a 75-year-old woman? Clearly, we want to know about the ease or difficulty with which the latter manage their daily living activities; but objective, repeatable, and valid measurement of these is difficult, so that there is a real need for studies of methods before the results of trials which depend on them can be confidently accepted. In addition, the organization of rehabilitation studies is not easy. Hospital, local authority (medical and social), and general practice services and some services under the control of the Department of Employment (to name only the most obvious) have to be integrated with one another in a way that not only suits a particular study's design and purposes, but would be practical and realistic in a health service setting.

## **2. Economics in medical care**

Decisions about the implementation of services have increasingly to take account of the costs involved to the NHS, and to the patient. The days are past when treatment could be freely prescribed, regardless of its expense and effectiveness, and present-day priorities in health care must be largely determined by considerations of this sort. Cost-benefit analysis has an undoubted and important part to play in establishing these priorities. This is not to say that cost-benefit analysis will often, if ever, provide an exact or unarguable answer to a particular problem. What the method can do, however, is to establish guidelines for reaching decisions where several possible courses of action exist. For example, in the trial of general rehabilitation methods discussed earlier, if it were found that very intensive treatment was definitely though only slightly better than conventional management and that the latter, in turn, had a slight edge over the third method, decisions on which course to follow would have to take account of the cash and manpower implications of each, as well as of the relative clinical effectiveness of the three methods. Neither the trial nor the cost-benefit analysis, singly or together, give 'the' answer, but they do provide a framework for rational planning as a substitute for guesswork.

The Unit is thus working in collaboration with the Department of Economics at Essex University on questions of this kind, one of its scientific staff posts being an economist working under the supervision of Professor A. B. Atkinson. A start has been made on a detailed analysis of the medical and economic consequences of smoking: an important though under-investigated topic, which also has the advantage, in the early stages of this collaboration, that each discipline has some idea of the issues involved in the other. It is hoped to build up an expertise that can later be applied to a wide range of clinical, preventive, and organizational problems in medicine.

## **3. Epidemiology and prevention of arterial disease**

The Unit has recently started a prospective study of arterial disease (ischaemic heart, or coronary artery; disease and cerebrovascular disease) in a nearby



industrial population. The main object of this study is to introduce tests, not hitherto used in work of this kind, which may indicate increased thrombotic tendency and improve the prediction of those at risk of arterial disease. These tests estimate fibrinolytic activity (the ability of the blood to dissolve the fibrin laid down in thrombus-formation), and clotting factor levels and platelet activity, which are involved in initiating thrombus formation. Blood carbon monoxide levels are also being determined, these possibly being important in the effect of cigarettes on the development of atheroma and arterial disease.

The Unit is also involved in preparations for a large-scale study to detect those with symptomless, mildly raised blood pressure; and to assess, by means of a randomized controlled trial, the effects on cardiovascular morbidity and mortality of treating individuals with diastolic blood pressures of 90-109 mmHg. It is known that such intervention at higher pressure levels is effective, particularly by reducing the likelihood of strokes, but it is not clear what the benefits at lower pressures may be, and whether it would in fact be valuable or necessary to try to detect those in this group as a matter of public health screening policy. Studies of this kind require large numbers of participants. The MRC has set up a working party to encourage and coordinate the necessary trials; one of the Unit's staff is scientific secretary of this group, and is also planning the Unit's own study in conjunction with the medical staff of a large industrial population whose members will be asked to take part.

Another study, using the records of the Oxford Record Linkage Study, is looking to see whether the onset of clinical arterial disease at any particular site (the heart, brain, and peripheral arteries) 'breeds true' or not: in other words, if an individual develops ischaemic heart disease, will subsequent episodes of arterial disease he may experience be of this kind, or of the other kinds? An answer to this question may help to explain some of the interesting but puzzling epidemiological similarities and dissimilarities between different types of clinical disease.

Finally, a collaborative long-term study of atheroma is also in progress, whose objects are to provide data on coronary artery pathology by the criteria also used in other centres and countries, and on secular changes in atheroma.

## Research at the Institute for Social Studies in Medical Care

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ANN CARTWRIGHT

The Institute for Social Studies in Medical Care was set up in 1970 to study the social aspects of health care. Before that it was the Medical Care Research Unit of the Institute of Community Studies. The most distinctive feature of the Institute's work is that it tries to look at health services from the viewpoint both of patients, or potential patients, and of professionals. The way this dual approach can help our understanding of the functioning of services can be illustrated by a brief description of the Institute's studies and some of their findings.

*Patients and their Doctors* (1) was a description of general practice as seen by a random sample of people and by their GPs. It considered the main features of general practice (family, personal, domiciliary, preventive, and primary care) and described the care given in each of these fields and the attitudes of both patients and doctors to that care. The dual approach enabled us to compare the perceptions of patients and their doctors and to identify areas of uncertainty which could adversely affect collaboration between general practice and other parts of the health service as well as relationships between doctors and patients.

The problems arising from the different perceptions of the doctor's role by patients and GPs were explored in two further studies which concentrated on more specific aspects of general practice: *Medicine Takers, Prescribers and Hoarders* (2) and *Parents and Family Planning Services* (3).

*Medicine Takers, Prescribers and Hoarders* (2) was also based on a random sample of people and their doctors. It was concerned with the recent increase in the consumption of both prescribed and non-prescribed medicines. Changes in the threshold at which people felt it appropriate to seek relief for symptoms, shown by comparisons with similar data from *Patients and their Doctors* (1), seemed to account for at least part of this increase.

A comparison of the views of doctors and patients on whether medical consultation was appropriate for certain conditions revealed that adults often did not consult their doctors about depression, persistent headaches, acute sore throats, and boils when doctors felt that consultation would be appropriate. On the other hand they tended to consult about sleeplessness and heavy colds more readily than doctors felt was reasonable.

Further evidence that patients often did not consult about conditions which doctors could relieve comes from a study of *Transport Services in General Practice* (4). This was an experimental study carried out in five practices. Essentially it was a comparison of doctors' workloads and patients' experience and views before and after the introduction of a transport service which brought to the surgeries some patients who would otherwise have been visited at home. Additional data were also obtained about four 'control' practices. Again consideration of the viewpoints both of patients and of professionals was an essential ingredient of the study. The transport service reduced the ratio of home visits to surgery attendances, but although most patients liked the service or the idea of it, there was some suggestion that bringing elderly patients to the surgery instead of seeing them at home meant that doctors might be less aware of their needs for help in the home. Another drawback was the cost of the service.

The problems of elderly people were looked at from another angle in our study *Life before Death* (5). This was based on interviews with a relative or friend of a random sample of adults (aged 15 and over) who had died. We tried to find out about people's needs in the year before their death and the care they received from hospitals, GPs, district nurses, other community services, and from relatives and friends. Their GPs described the problems they encountered in looking after patients with terminal illness at home, and district nurses told us about the care they gave to the people in our sample as well as their views about the adequacy of services caring for such patients. Again the juxtaposition of different points of view was revealing. Reports of relatives showed that as many of the people dying at home as in hospital suffered from incontinence. Most GPs said they had difficulty in arranging admission to a suitable NHS institution for elderly patients with long-term nursing needs. Although these doctors were critical of the lack of suitable hospital beds they tended to be more complacent about existing, or non-existent, community services than the evidence from relatives seemed to warrant. District nurses seemed more aware of the burdens that inadequate community services created for relatives caring for the dying at home.

Another study which developed from our interest in general practice and concern about the different ways in which patients and doctors perceive the GP's role was *Parents and Family Planning Services* (3). A sample of legitimate births was the starting-point for this study which encompassed mothers, fathers, GPs, health visitors, and family planning clinics. We found that one reason why more women were not obtaining help from their

doctors about birth control was that doctors generally tended to expect patients to raise the subject themselves if they wanted help, whereas many mothers, mainly because of diffidence and embarrassment, hoped that doctors would initiate a discussion. Another reason was that the help given by GPs was heavily concentrated on a single method of contraception (the pill) often without any attempt to ascertain or overcome the doubts that most women entertained about its health risks.

The main fieldwork for this last study was done in 1967/8 and the Abortion Act has since come into force. This Act seems to have stimulated interest and investment in contraceptive services. To map recent changes and to try and pinpoint some of the effects the Institute is currently doing a *survey of birth control services* in fifty-two areas of England and Wales. Samples of married and unmarried women in the same areas are being surveyed by the Social Survey Division of the Office of Population Censuses and Surveys. The professionals we are studying include GPs, health visitors, domiciliary midwives, and consultants in obstetrics and gynaecology, psychiatry, urology, and general surgery. We are also looking at the family planning clinics and domiciliary services in the fifty-two areas. We have found that abortion rates were low in areas with a high proportion of GP's who had a conscientious objection to termination (6), and births to women who already have several children were uncommon where GPs tended to raise the subject of contraception routinely (7). Health visitors were more active than in 1967/8 in raising and discussing birth control although, still, half would not raise the subject with mothers who did not have social or health problems (8). Domiciliary midwives were even less likely to offer birth control advice (9). Both health visitors and midwives were more active when they shared premises with a family planning clinic.

Professionals' attitudes to abortion will also be viewed in relation to the *experiences of abortion patients* which we are looking at in a survey for the Committee on the working of the Abortion Act (10). In this study we have attempted to interview a random sample of women having abortions. Our aim is to describe the process of procuring an abortion: the number and types of professionals consulted, the delays involved, and the reasons for the delays. The contraceptive practices of the women having abortions will also be studied to try to identify some of the reasons underlying the need and demand for abortion.

This brief outline of our past and present studies indicates our main fields of interest. All our studies have been concerned to some extent with general practice. We developed a particular interest in birth control services largely because family planning seemed to exemplify many of the distinctive features of general practice: personal, family, preventive, primary, and to a lesser extent domiciliary care. Because of their great needs and because these needs are often not converted into demands we have also become concerned about services for the elderly. Our interest in the relationship between different

branches of the health services has been heightened by our findings of gaps and inadequacies.

In pursuing our interests we have tried to develop our survey techniques. In a number of studies we have incorporated methodological experiments. We tried, unsuccessfully, to reduce the number of calls on an interview study by sending a letter asking for an appointment (11). We compared the response rate of GPs to a postal questionnaire under different circumstances (12). We experimented with an advance letter in an interview inquiry to test its effect on response (13). We are planning, in a new study for the Office of Population Censuses and Surveys, to ascertain what differences, if any, emerge among fathers of young children in their reported use of contraceptives, when they are interviewed by women or men.

Another distinctive feature of much of our work is that we are concerned with needs rather than demands for services. In general our samples have not been identified in terms of people receiving care. (The main exception is the study of abortion patients. We would have liked to interview samples of people requesting but not obtaining termination, but we did not know how to identify such a sample.) We have usually taken samples of people either from the electoral register or from birth or death certificates.

Most of our studies have been done in a randomly selected sample of at least twelve areas in England and Wales. In some, Scotland has also been included.

A small independent research unit has both advantages and disadvantages. We have tried to exploit the first and minimize the second. Our smallness and independence could result in isolation and an 'ivory tower' view. To overcome this we rely on our Advisory Committee, our contacts with the DHSS and on many other professional relationships, both formal and informal. We are interested in doing studies which have a bearing on social policy. This implies a concern for practical issues but one which is not dictated by the day-to-day issues of practical administration. Some of our studies, for instance the experimental study of transport services in general practice, have arisen from a direct request from the DHSS. In others we have tried to anticipate needs for research findings. For instance the study of *Parents and Family Planning Services* was planned in 1966 before there was so much departmental interest as there is today. Our independence has also enabled us to undertake studies which it would have been difficult for a government department or medical school to do. At the time when we did the study for *Patients and their Doctors* I doubt whether a survey of what patients thought of their doctors could have been undertaken from many other units or departments.

Finally it seems appropriate to say something about our ethics. Our code of procedure in undertaking interview surveys embodies the following principles:

We explain to the people we interview who we are, how we identified them,

how we plan to use any information they give us, and what we mean by treating information confidentially. No individuals can be identified in our published reports. These explanations are given both orally and in writing. All our staff sign an agreement about the confidentiality of the data they handle.

We are concerned not with identifying individual needs or abuses but in pinpointing areas of need and ways in which services and needs could be more appropriately matched.

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# The work of St Thomas's Hospital and Medical School's Social Medicine and Health Services Research Unit

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W. W. HOLLAND

The simplest way to describe the work of a large, multidisciplinary research unit is to compile a catalogue of the various research projects being undertaken. To try to assess the implications and effectiveness of the research is rather more complex.

The Social Medicine and Health Services Research Unit at St Thomas's Hospital and Medical School which I have described elsewhere in this volume, is large and contains a number of different disciplines. It was established five years ago and it now seems appropriate to consider some of the results obtained from our work and the implications of these for medical care. In an attempt to do this meaningfully, and to highlight some of the requirements and difficulties involved in the planning and carrying out of multidisciplinary research on this scale, I would like to consider our research programme under five main headings:

1. Research and policy.
2. Allocation of health resources.
3. Data collection.
4. Experiments in medical care.
5. Problems of implementation.

## **1. Research and policy**

The first aspect is perhaps the most fundamental to the work of the Unit. I will therefore cover this in detail. Although health services research can be carried out in a theoretical framework, and much important work in this field is entirely theoretical, research can generally be more effectively designed

and carried out if it aims to answer questions posed by those involved in the actual delivery of medical care. When research questions are framed and hypotheses suggested, it is therefore essential to draw on the experience of those responsible for the service so that the research can be made relevant to their situation, and can help to answer policy questions in the most constructive manner. The following six examples of studies undertaken by the Unit were all in some way occasioned by questions of policy.

### *a. Lambeth studies*

Our first studies in Lambeth centred around the policy problem of planning the services of St Thomas's Hospital to meet the needs of the local community. The question asked was 'If St Thomas's is to take over responsibility for providing total hospital care for the community of Lambeth, what hospital facilities must be provided?' The problem here was to determine the need for health services in the local community. It was impracticable to attempt to measure all possible needs but we felt that, by using a number of indicator conditions and measuring their prevalence in the community, we would be able to make an assessment of unmet needs in terms of hospital services. Methods of undertaking this study have been discussed elsewhere (1, 2). The following four conditions, chosen to illustrate different types of health care needs, were used in the study: (i) *chronic cardio-respiratory disease*, (ii) *functional disability*, (iii) *skin disease*, (iv) *duodenal ulceration*.

Having demonstrated the prevalence of these conditions in the local community, we were able to measure the use of certain services by individuals in the four disease categories. Our findings showed that, with the possible exception of functional disability, there was no demonstrable gap between need and demand in terms of hospital services: in other words, individuals suffering from the conditions studied who required such services were, in fact, able to have them (3-5). But although in this case we were able to answer the broad policy question posed, we were overtaken by events. The proposed reorganization and unification of the health services means that we cannot now consider hospital services in isolation from those provided by other parts of the NHS. So what was a real and important question in 1966 when the research began becomes irrelevant in 1972, and with the time-scale of the study it would not have been possible to have answers earlier. This underlines an inherent conflict between research and policymaking with their different objectives and time-scales.

### *b. Frimley studies*

The second group of studies designed to answer a specific policy question arose in connection with the building of a new 'best buy' hospital at Frimley. The idea behind this is to provide fewer acute hospital beds per thousand population, with more diagnostic and treatment facilities per bed, linked to



comprehensive community services, with the aim of achieving higher turnover and with implicit emphasis on a policy of community care. To test the validity and examine the consequences of this policy we are undertaking two main studies. The first of these is a randomized controlled trial of early discharge from hospital following operation for two simple surgical conditions, hernia and varicose veins. Most GPs and three surgeons in the area agreed to co-operate, and patients with these conditions who were considered suitable either for the normal seven-day stay in hospital or for discharge after forty-eight hours were allocated at random to one or other duration group. As well as assessing clinical outcome, the aim here is to assess the effect of early discharge in terms of the social, psychological, and economic impact on the patient, the family, and the health service.

The second example of our research in Frimley is a current study of the care of all those in the area who are identified as requiring medical care for a stroke. A register of stroke patients has been set up and we are looking at all forms of hospital and community care. The study provides a unique opportunity to examine all aspects of care through every stage of the illness, in order to assess the strengths and weaknesses of the present system and to provide a methodological basis for the design of future studies of alternative forms of care.

We hope that these two studies will indicate some of the consequences of adopting a policy of community, as opposed to hospital care, and will give the policymakers some idea of the cost and social impact involved. So in this case the policy question asked can be answered, although of course, the wider application of these findings in this geographical area for these particular conditions would be unwise without further study.

### *c. Basingstoke studies*

The expansion of the area in and around Basingstoke after its designation as a New Town, meant that the existing medical services were inadequate to meet the rapidly growing demand. All those involved in the planning of medical care were anxious to establish an integrated health care system and to use Basingstoke as a prototype for new ideas and techniques in health care in other similar areas in the future. Obviously, in this situation, many questions of policy arose and the Unit became involved in helping to identify areas where change might usefully take place and in evaluating the changes made. Two of these are relevant here. First, in the psychiatric field it seemed likely that some form of community care would develop, since, at the time of our first studies, the traditional mental hospital was the only major provider of care for the mentally ill and clinical information suggested that there were long-stay patients who could function adequately in the community. Selection of patients suitable for life in the community is extremely difficult however, since no single individual can be aware of the precise abilities of large numbers of long-stay patients. In an attempt to develop a reliable tool for such

selection we are therefore undertaking a study of functional ability in about 1,000 patients in Park Prewett Mental Hospital.

A second area of change was underlined by the building of a new district general hospital in an area previously served by small local hospitals. For many years, GPs in the area had enjoyed free access to in-patient hospital facilities and the regional hospital board and consultant staff were willing to continue this if it met the needs of patients and practitioners. We were asked to try and determine what types of in-patient facility were most appropriate for GP use, and whether the outcome of GP supervision for certain types of medical patient in hospital could be considered equivalent to that of consultant care of similar patients.

We therefore undertook a study in which we described all medical patients from a defined area receiving in-patient hospital care under consultants or GPs, to find out what types of patient were admitted and what types of care they received. We found that although GPs and consultants tended to admit the same diagnostic mix of patients, they were using in-patient hospital beds for quite different types of patient. Patients admitted under the care of GPs tended to be older, to be in more terminal stages of illness and to require far fewer diagnostic facilities than those admitted under consultant care. These results raise the further questions as to what type of hospital in-patient facilities are required by GPs and whether one can define more clearly the precise types of patient for whom such facilities are essential; and we are now developing methods of measurement for this purpose.

#### *d. Nutrition study*

Changes in government policy also pose questions to be answered by the research worker. A clear and recent example of such change is the withdrawal of free school meals and milk, which provides the opportunity to assess the influence of these on the health and nutrition of schoolchildren.

As a result of the changes in policy, and using our work on the heights, weights, and food intake of schoolchildren in Kent as a basis (6, 7), we are now developing a national system of surveillance of growth and health of primary school children in England and Scotland. We have chosen a sample of twenty-nine areas of England and Scotland according to level of poverty, and are measuring height, weight, skinfold thickness, and several other characteristics in a sample of primary schoolchildren in these areas. The objectives of this work are to assess whether any changes in rates of growth occur in subsequent years and thus to detect possible harmful effects of government policies such as withdrawal of school meals and milk, at a time when such effects can be reversed.

#### *e. Screening study*

Public pressure may also influence policy. For many years there has been a public demand for the introduction of screening and methods for the early

detection of disease to be developed in this country. If screening is to be introduced into the health care system, then it must become an integral part of that system (8). To try to answer the question as to whether it might be valuable to establish multiphasic screening of middle-aged individuals in this country, we are undertaking a controlled trial in two large group practices in south-east London. Patients aged between 40 and 64 registered with these practices have been allocated at random into two groups. The first group is being screened at two-yearly intervals, the second is receiving only normal clinical care.

The objective here is to assess the value of this repeated multiphasic screening in terms of the utilization of medical and social services, patients' illnesses, absences from work, and mortality (9, 10). Finally, we will attempt to see whether a change in the delivery of care and in the health and activity of individual patients has occurred in the two practices as a result of the screening process. We hope that from the results of this we may be able to influence the policy which the DHSS will adopt towards the important question of the introduction of screening, which would inevitably increase the GP's workload.

#### *f. The responaut study*

A final example of a study occasioned by policy matters is our investigation into the possibility of life in the community, for responaut patients. The origin of this investigation was the political decision that it would be worthwhile to try and find out whether patients with a very severe degree of disability could be cared for in their own homes, and what consequences this would have.

We have now been working on this study for about eighteen months and it is yielding some worthwhile results. It shows the difficulties of providing care within the community for patients with very severe disabilities. Great variations exist in local authority attitudes and in the provision of community services so essential for responaut patients. Difficulties arise in the types of nursing and auxiliary staff available to look after these patients twenty-four hours a day. We hope that the information we collect may have practical results in encouraging the special recruitment and training of workers for this purpose, and in prompting central government to indicate more specifically the necessity for local authority help (11).

These examples provide some idea of how the work we are undertaking can answer policy questions, influence the planning of policy, and help to shape the future provision of health services.

## **2. Allocation of health resources**

One of the major tasks in health services administration and research is to decide how best to allocate limited resources; whether, for example, to spend more on hospital or preventive services, to intervene in the disease process, or

to treat a particular condition. For this kind of planning adequate data are needed, and units such as ours have to provide information that may be helpful in deciding the best allocation of resources. This data can be obtained by means of descriptive epidemiological studies or descriptive medical care studies.

### *Descriptive epidemiological studies*

The aim of this kind of study is to provide information about the natural history of a specific condition and to assess whether certain groups of individuals have a greater risk of developing that condition than others. A good example of the work of the Unit in this field is our investigation of the development of chronic respiratory disease in children in Kent and Harrow (12-16). These studies on defined population groups have identified a number of factors relevant to the allocation of resources. Results have shown that the roots of respiratory disease lie in childhood, and that pneumonia and bronchitis in the first years of life do influence the later development of respiratory disease and level of ventilatory function. This underlines the need to develop effective methods of treating, or ideally preventing, such diseases, in early life. Area of residence and pollution level are also found to affect the incidence of bronchitis and level of ventilatory function in children, and this indicates the desirability of trying to reduce levels of pollution in industrial areas. Social class appears to have an independent effect, individuals from the lower social classes having a greater risk of developing respiratory disease and requiring more treatment and support than those from the higher groups. Finally, and perhaps most important of all, our findings show that cigarette smoking has a significant effect on the prevalence and incidence of respiratory symptoms in children, and we must now try to find methods of discouraging them from taking up this habit (17).

### *Descriptive medical care studies*

Here the general objective is to study demand by different groups of individuals for various forms of medical care. The General Practice Studies in Lambeth are one instance of how the Unit is involved in this area of research. The development of a general practice in Lambeth, with doctors trained in research methods and supported by the research scientists of the Unit, made it possible to study the demand for and delivery of GP care. From 1967 to 1971, a series of studies was carried out. These measured the patterns of demand for care by individuals with different age, sex, and social class characteristics. They described the content of different types of consultation, and identified different types of skills and resources required to manage various groups of diseases. They also related the role of the hospital to the over-all medical care of a defined population (18-21). Experiments were carried out to measure the effect of changing the pattern of delivery on the demand for care and use of resources (22).

This descriptive work provoked questions about the factors which influence demand for medical care, questions which in a prepaid system of medical care delivery are highly relevant to the distribution of resources. To provide answers, a multidisciplinary research effort was needed and social scientists were drawn into the research in the practice. Current work is concerned with developing and testing more sophisticated research methods in order to clarify what determines when a patient who perceives symptoms of disease decides to consult a GP.

Knowledge derived from the studies in general practice is constantly fed back into both undergraduate and postgraduate educational programmes (23), and it is expected that the results will be applicable in deciding priorities in the fields of primary diagnosis, the management of minor illness, health education, and the use of personnel other than doctors in the provision of medical care.

Two further examples of descriptive studies which attempt to identify priorities for the allocation of health resources for planning or research are our investigations into the use of services for the elderly and for the mentally ill in Basingstoke. Data on utilization of services for the elderly indicate that the majority of referrals are to hospitals in the area. There are wide variations between different parts of the catchment area of the new district general hospital, and further work is needed to explain these, but alternative facilities for the care of the elderly appear to be so limited that provision of these is undoubtedly a priority.

The psychiatric studies using a one-day census and a cohort study have described the in-patient population of a large, long-stay mental hospital, in terms of numbers (for hospital planning). We are now completing our study of functional ability referred to earlier, which, by identifying patients suitable for care outside the hospital, will draw attention to the gaps in existing community facilities.

### **3. Data collection**

There are various problems associated with the collection of data in health services research which we have identified in the course of our studies and in some cases solved. The most fundamental of these concerns identification of the study population. The relative value of different sampling frames for population studies has been described (24), and the deficiencies in GPs' 'lists' as sampling frames have also been analysed in detail (25). Population mobility presents special problems in long-term studies, such as our work in Harrow, and demands special measures if data is not to be lost.

Medical care is often concerned with recording events rather than objective measurements. Defining events in a way which is acceptable and will be rigorously applied by the various workers involved in large-scale medical care studies, requires lengthy discussion and careful training, and ensuring

that events are recorded, often under considerable pressure and in less than ideal surroundings (for example, emergency domiciliary consultations), needs continuous support and encouragement. The problems concerned even in small-scale studies are multiplied when the workers are numerous and geographically dispersed. The importance of validating data collected from one source against alternative sources of the same data is illustrated by our experience in our studies of GP utilization of in-patient hospital beds in Frimley. We obtained the co-operation of all GPs in the area and asked them to record their referrals to hospital over a certain period of time. On checking the data recorded, we found that completeness of recording varied considerably from one GP to another. This experience underlines again the inadequacies of current methods of recording utilization data (24).

Another problem to which we are particularly addressing ourselves, is the need for validation. We are basically concerned with the health status of defined sections of the community and the intention is usually to obtain, from an appropriate measure, an estimated value which will summarize the health status of the particular group under investigation. From these descriptive values, the future behaviour of the group can be predicted to some extent and this makes it possible to forecast future demands and needs relevant to the health services and to formulate new policies or modify existing ones. The reliability of decisions arrived at in this way depends to a considerable extent on how close the basic information collected is to the truth, and how the bias or deviation from the truth varies from one individual to another. When the information is obtained using measuring instruments, the precision which is inversely proportional to bias, and the reliability which is highest if repeated measurements on the same individual are the same, can usually be determined relatively simply, as for example, with blood pressure. But when the information required can only be obtained by means of a questionnaire, the situation becomes much more complicated. This is principally because there is rarely a simple way of establishing the correct answers with which those given in the completed questionnaire can be compared. However, the reliability of a set of questions used to obtain specific information can be assessed by using the same questionnaire several times on different groups who may reasonably be expected to be similar to the one under investigation. This emphasizes the need for the pilot studies with which we start each project, before a new questionnaire can be accepted as a reliable means of collecting the relevant information. Bias in information collected in this way is much more difficult to assess than reliability. Fortunately, when two or more groups are to be compared, a consistent bias in all groups will cancel out and will not affect the comparison. It is only when a particular measure is required for its own sake, that some estimate of bias is essential. In this situation the information obtained by questionnaire must be obtained again from the same subjects using another method, such as an intensive interview, and the answers compared. This method has been used

in our studies of smoking in 10- and 11-year-old schoolchildren in Kent and Derbyshire, although here the results were influenced by an unavoidable time lag between the administration of the questionnaire and the interview.

#### **4. Experiments in medical care**

Health service research units have, on occasion, to attempt to introduce new methods of health care into the existing system with the ultimate aim of improving the service. One of the difficulties in doing this arises in obtaining the co-operation of the individuals who are directly responsible for delivering the service.

Three of our studies can serve to illustrate the absolute necessity for such co-operation. The first two, the trial of multiphasic screening and the early discharge study, have already been described. The third concerns the treatment of moderately raised blood pressure. Clear evidence exists that treating individuals with markedly raised diastolic blood pressure ( $> 115$  mmHg) reduces mortality and morbidity. The number of individuals so affected is small and treatment can be carried out in specialized centres. There is also some evidence that treating lower levels of blood pressure is beneficial. If this finding is confirmed and it is shown conclusively that individuals with diastolic pressures above 90 mmHg should receive treatment, the very large numbers involved will pose serious problems to providers of medical care. A randomized controlled trial designed to measure the feasibility and cost of the treatment of minimally raised blood pressure in the general practice setting is being carried out in males in the general practice research unit. Once the methods have been developed and tested, the trial will be extended to other general practices to determine the outcome of treatment.

In each of these studies it has been necessary to obtain the agreement of doctors, nurses, and other health and social service personnel, both in the hospital and in the community, to experiment with modes of care. In such situations those responsible for the individual patient must be satisfied about the ethics and objectives of the research and must also be prepared to submit themselves to the discipline of research evaluation. That such experiments, responsibly formulated, are desirable is difficult to challenge, and the success that we have had in the three studies described has been largely due to the willingness of large numbers of health personnel to give their co-operation and assistance.

#### **5. Problems of implementation**

This final aspect of our work brings me back to my starting point, to the necessity of asking questions relevant to the situation of those actually involved in the delivery of medical care. If this is successfully carried out, it should follow that at least some of the research findings can be implemented.

Even so, in the often uneasy relationship between the administrators, those responsible for giving care, and the research workers, misunderstandings can arise.

For example, a question may have been posed but the policy it is seeking to study has already been implemented; or the research worker may be ahead of the policymaker in his ideas for future changes in provision. Alternatively it may be that research is required urgently before an intended policy can be put into effect and a conflict arises between the administrator who wants quick results and the research worker who is reluctant to undertake a hurried and possibly unsatisfactory study.

It is not easy to change the habits and attitudes of those involved in the delivery of a service such as medicine. It is unrealistic to expect that major changes of practice, such as the early discharge of every patient following a hernia operation, can be made overnight, or by the command of an administrator, or by the publication of a paper in a medical journal. To have any effect on changing patterns of practice, research has to be linked to education. Evidence to support changes in practice should be brought into the teaching not only of medical students but also of practising doctors, administrators, nurses, and all those involved in the delivery of the health services.

The physical siting of a health services research unit such as ours is also important in considering the implementation of research findings. Such a unit must be closely associated with a teaching body so that it can transmit its ideas easily and it must also have strong clinical links.

In the future, the research worker must develop a closer relationship with the administration of the health service within a specific area in order to ask research questions relevant to the needs of that area and to provide adequate answers. The Board of Governors of St Thomas's and the King Edward VII's Hospital Fund for London are moving in this direction by appointing a senior administrator who will be responsible for the implementation of research findings from this unit. We hope that this individual will also work with us in trying to pose realistic research questions at the appropriate time and so enable us to have some positive effect on the policies of the health services of the area.

## Conclusion

The work of the St Thomas's Unit described in this chapter appears to indicate a wide variety of interests. To find the thread of continuity which links these interests, it may be helpful to consider briefly the way in which the work has developed.

Originally, we were concerned with basic epidemiological studies, mainly in the field of chronic cardio-respiratory disease. As knowledge in this area of medicine increased, it soon became apparent that, in addition to the classical environmental and social factors investigated in these basic studies, we must



also concern ourselves with the personal and health service matters that could influence the onset and progress of such conditions. This implies the development of research in defined population groups, designing and using a variety of research instruments. The co-operation of individuals responsible for the health care of a number of population groups has enabled us to undertake intensive study and to develop various instruments for the measurement of health characteristics, for example the respiratory disease questionnaire, and a method of measurement of blood pressure without observer bias. This in turn has led to further development of other more complicated instruments.

The work that we have undertaken has been usually within the realm of our own competence and has emerged from small beginnings, with questions we have asked generating other questions. Our interest in the establishment of a national system of surveillance for growth and nutrition in schoolchildren for example, stems from the questions originally posed on variations in height and weight among schoolchildren in Kent. Our interest in experiments in health care, such as the controlled trials of moderately raised blood pressure and early discharge, results from the acknowledgement that descriptive medical care studies can only go so far. Then experiment must take place.

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# POSTSCRIPT

## Administration of a large research unit

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W. W. HOLLAND

In the present organization of health services research in the UK a variety of styles of research exist. However, in considering how best to provide for research in an integrated health service, the particular importance of multi-disciplinary units must be recognized. The experience of the combined Department of Clinical Epidemiology and Social Medicine and Social Medicine and Health Services Research Unit at St Thomas's Hospital and Medical School, in this field, is perhaps not unique but I have been unable to find any published expression of the philosophy, organization, and administration behind a research unit which has the function of both undertaking research and of teaching as well as the bringing together of a number of new disciplines. The difficulties of the administration of such a unit are perhaps not often realized.

### History

Before 1962 teaching in social medicine at St Thomas's Hospital Medical School consisted of a series of ten lectures provided under the aegis of the Department of Bacteriology.

In 1962 I was appointed as a senior lecturer in social medicine within the Department of Medicine and for the first eighteen months my responsibility was to develop teaching and research in social medicine. (For the purposes of this paper 'social medicine' implies epidemiology and studies of the health care needs of groups and communities, epidemiology being the study of the distribution of the determinants of disease in populations.) In 1964 a separate Department of Clinical Epidemiology and Social Medicine was established under my direction. For the first four years research was undertaken piecemeal and funds for it were obtained from a variety of sources, in particular the

Ministry of Health, the Endowment Funds of the Hospital, and the Nuffield Provincial Hospitals Trust. It soon became clear that, in order to continue to develop this research, particularly in epidemiology and the application of epidemiological and other techniques to health services research, longer-term support was required in view of the protracted nature of the projects under consideration. At the same time the rebuilding of St Thomas's Hospital meant that the hospital was increasingly interested in looking at the health care needs of the populations of Lambeth and how to meet them.

This led to the realization that what I was concerned to develop for my own department and for St Thomas's might well coincide with the growing interest of the DHSS in promoting health services research. Discussion with the DHSS resulted first in a project grant, and subsequently, in 1968, in support of the research activity of the Unit for seven years in the first instance. This support is for a broadly defined programme and scale of activity, for which account is given to an Advisory Committee on which university, hospital, regional hospital board, and the DHSS are all represented.

## **General philosophy**

Some of the special problems which arise in the organization of a combined research unit and department derive from its multidisciplinary nature. This applies not only to the knowledge and skills of the personnel involved but to the different roles they have to fulfil. There are three main roles: 1, service; 2, education: undergraduate and postgraduate; and 3, research.

One of the basic philosophies underlying the Unit is that there should be no distinction between those undertaking research and those undertaking teaching and that all academic personnel must be involved in both activities. No differentiation is therefore made between individuals or their activities on the basis of the source from which their salary is paid.

The Department has about 70 individuals working in it, both full and part-time, and of these about 30 hold academic appointments. In addition there are usually from 3 to 5 visitors from other countries. There are 7 major current projects and about 20 others in various stages of completion. However, these numbers mean very little because the complexity of each investigation varies considerably.

The experience of the last four years has shown that the Unit has increased its capabilities and stature because of the ability of those teaching to draw on research findings. Similarly, the opportunity for research workers to communicate their findings through teaching has helped them to clarify their objectives.

## **Service**

Service responsibilities of the Department and Unit lie in four main directions:

1. The provision of a primary medical care service for 9,000 patients resident in Lambeth. This general practice makes available to the Department and Unit personnel with a special expertise in studying primary medical care and also provides an advisory service for hospital consultants on matters concerning general practice.
2. The provision of clinical care for a limited number of patients with specific disease conditions of special interest to the Department and Unit; for example, chronic bronchitis, or patients with raised blood pressure.
3. The provision of advice and assistance by the Department to many people involved in statistical work in the hospital, school, or outside who come for help in the analysis of information, planning of experiments, and so on. The Department also administers a computer link to the University CDC 6600 and provides computer programs for research.
4. Advice on the use of epidemiology and the social sciences to individuals outside the Unit, in the medical school, the hospital, and other health institutions both nationally and internationally.

The service responsibilities will not be discussed further in this paper but certain inherent problems must be recognized. Particularly acute difficulties arise for those members of the Department involved in clinical care, who may at times be asked to balance the need of the individual patient against the demands of teaching or research. The involvement of the Department with the provision of primary medical care within the general practice unit has highlighted this difficulty and has called for great tolerance on the part of research staff and clinicians in achieving satisfactory integration.

## **Education**

To a lesser extent, the same problems exist for research workers concurrently involved in teaching, who must plan their time according to priorities.

### *Undergraduate teaching*

Teaching occurs throughout the clinical period and is integrated as much as possible with other forms of teaching. Our programme has been fully described elsewhere by Clarke (1).

We first see the student during his introduction to clinical medicine and explain briefly to him the practice of medicine outside the hospital setting. The principles of medical care are then explained in a series of seminars, and ward rounds are used to demonstrate the relevance of epidemiological and preventive medicine. During the period of gynaecological teaching, each student spends one and a half days a week for eight consecutive weeks in the general practice unit where he comes into direct contact with disease in the community. Three teaching activities take place in collaboration with the obstetric unit. The first is a short course in family planning, the second is a

combined tutorial in which various aspects of foetal and infant mortality are discussed; and the third is based on a family attachment scheme described by Holland *et al.* (2). We end with a series of seminars on epidemiological methods and the epidemiology of common conditions. This teaching takes place during the special pathology course with the participation of lecturers from both departments.

In addition to this formal teaching, members of the department take part in joint teaching with obstetricians, surgeons, and physicians on problems of mutual interest. The relevance of social medicine is therefore brought clearly into focus for the medical student at all stages of the curriculum and the importance of this kind of combined teaching has been stressed in a recent paper (3).

One advantage of the multidisciplinary nature of the department which should be emphasized in this context is that the teachers have been able to gain experience in the field and can illustrate their teaching with problems of which they have first-hand experience, always one of the great strengths of clinical teaching which we can use to the advantage of social medicine. The social scientists and statisticians in the unit have been able to acquire possibly unique experience by working full-time with clinical disciplines in the solution of problems relevant to medicine.

We are now beginning to expand our teaching in the undergraduate field by introducing courses on statistics and the social sciences in the pre-clinical period. We have also given a large number of short seminars on topics such as the allocation of resources, medical statistics, and computing in medicine.

### *Postgraduate teaching*

For the past two years, we have been running a course on the Organization and Planning of Health Services. This course was funded by a special grant from the King Edward's Hospital Fund for London and is run jointly by the Institute for Operational Research and St Thomas's Hospital Medical School. The course is intended for clinicians, medical and professional administrators, nurses, and other health service personnel. The general objectives can be summarized as follows:

1. To explain techniques of description and evaluation and when and how these techniques may be applied.
2. To describe the uses to which data can be put and how they can be used in planning and evaluation.
3. To teach course members the methods of research into need and demand and to enable them to plan services, to carry out their own research and to evaluate other research projects.
4. To give course members an understanding of the approach of operational research in defining and tackling problems in planning and to introduce some of the basic methods and techniques used for problem solving.

Two courses are held every year, at the moment on one day a week for a period of thirteen to fourteen weeks, and fifty participants have so far attended.

Participants appear to value the course highly and we are now in the process of developing this range of teaching which we feel is not only effective but beneficial both to ourselves and to those who attend.

## **Organization of research**

One of the greatest benefits of longer-term support from the DHSS has been the provision of a sound base on which to plan research investigations. Most studies in health services research take a considerable time to develop and implement so that a stable financial base is essential.

Furthermore, research of the kind carried out in the health services requires a multidisciplinary approach. This implies a specific need to encourage not only medically qualified individuals, particularly epidemiologists, but also social scientists and statisticians, to become involved in this type of work. There are problems in the recruitment of both social scientists and statisticians to work in medical units. Very few adequately trained social scientists have expressed any interest in this field of work; some of those who are suitably qualified and interested do not have sufficient knowledge of quantitative methods to make a valuable contribution, and at the same time the supply of statisticians does not meet the demand. It is therefore important that multidisciplinary units are sufficiently well established to be able to train their own specialists in these fields.

Once a multidisciplinary research team has been established, the difficulty of maintaining co-ordination between its members and ensuring that all their interests are focused on the same objectives becomes apparent.

Another common problem is that the multiplicity of projects put forward by the various disciplines may swamp the resources available. It is often difficult for a team to carry through the original objectives of just one project without being side-tracked into other interesting possibilities. Moreover, those who plan a project and those who actually carry out the research frequently have insufficient contact with each other since most health service and epidemiological research involves the use of ancillary personnel in the collection of data.

The Department itself is organized into three main divisions: 1, Medicine, which subdivides into epidemiology, medical care, and general practice; 2, Social Science; 3, Statistics.

All the graduate members of the Department may be identified with one of these divisions by nature of their qualifications, as shown in Fig. 1.

The main difficulty in this system arises in the responsibilities of the head of the department. He is essentially responsible for all the various projects and all the heads of divisions and project leaders are accountable to him for the

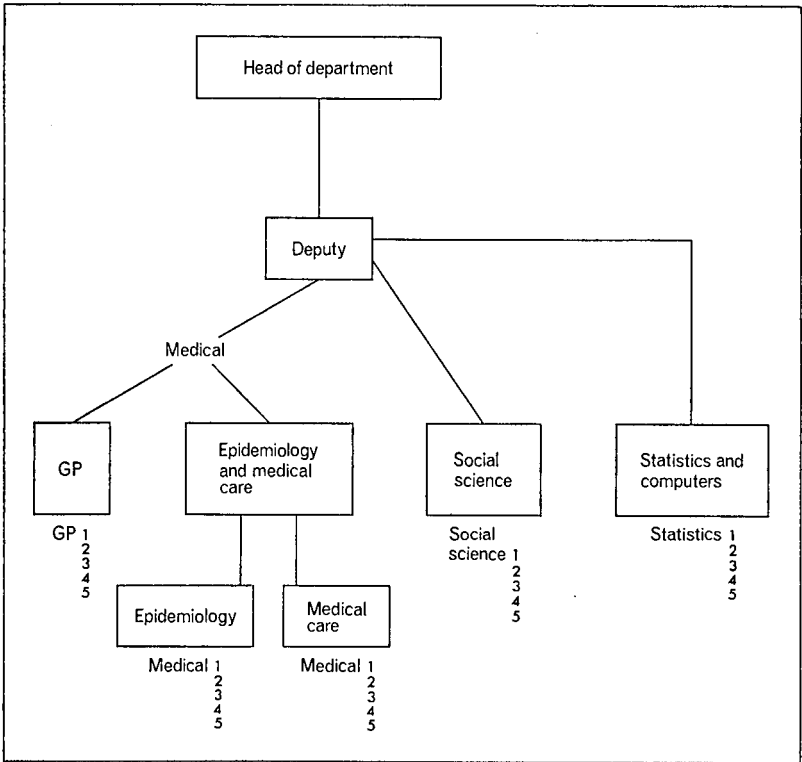


FIGURE 1. Organization of disciplines in the Department of Clinical Epidemiology and Social Medicine, St Thomas's Hospital Medical School.

work that is being done. But he is not an expert in social science and his knowledge of statistics is not perhaps as great as it ought to be. This means that the heads of the divisions exercise considerable control and responsibility independently of the head of the department.

Furthermore, the head of the department must not attempt to make any decisions on his own, as this will undermine the authority of senior individuals. The predominance of doctors in this senior group compared with only one social scientist and one statistician also creates problems and it should be emphasized that social scientists, statisticians, and doctors must have equal rights in research in a multidisciplinary unit concerned with health care and epidemiology.

In an attempt to overcome this problem in our department, each individual research project is allocated a leader responsible for the initiation, design, and execution of the project. His team will consist of individuals from all disciplines (if necessary), and the members of the team are accountable for their



activities on the project to the project leader. The project leader has authority in the way he carries out the project, and for this he usually controls a number of fieldworkers and research assistants.

The members of the project team, in addition to being accountable to their project leader, report to the head of their own discipline, who is responsible for training in his own profession and for maintaining and advancing the standards of his discipline. He also has to ensure that members of his discipline are not being misused. Thus the role is staff advisory and is essentially concerned with the effectiveness of the discipline and with the professional competence of the individuals in it.

It may be seen that an attempt is being made to control and advance research in a truly multidisciplinary way. There is, however, one further difficulty. The statistical and computer section, although central in its role within the department and its research activities, is organized more as a service unit. Members of the statistical section are accountable to the statistical head, and only report to their project leader. Nevertheless each project has as a member a senior statistician, with a number of statistical assistants accountable to him, who participates in the initiation and planning of the project.

The head of the department retains responsibility throughout for deciding what projects shall be undertaken and by whom, on the basis of his knowledge of the capabilities, interests, and workload of the members of his department.

Regular departmental meetings play an important part in the development of projects. At these, all new and current projects are submitted to criticism by specialists in the various disciplines.

## **Recruitment of personnel and administration**

The head of the department is responsible for the recruitment, selection, and discipline of graduate staff. Heads of divisions and projects are responsible for the appointment of non-graduate staff, such as fieldworkers, secretaries, and statistical assistants, within their division, although this must first be given the approval of the head. The head acts as the referee when competing claims for people, space or money arise. The over-all financial arrangements for the Unit and Department are dealt with by the Hospital Finance Department and day-to-day administration, including the submission of claims, holiday arrangements, and general liaison, is taken care of by a capable administrative assistant.

## **Conclusion**

The administration and support of a multidisciplinary research unit is bound to be complex. In the field of epidemiology and of health services research, such a multidisciplinary approach is essential and it is hoped that our unit will provide useful experience and results in these fields. The question of unit size is important. Too small a unit will not provide sufficient intellectual

stimulus within each of the disciplines. Too large a unit will create problems in communication and administration. Under the present system of organization it seems likely that this unit has reached its optimum size. The amount of work being undertaken at the moment is probably the maximum with which we can cope. If we are required to undertake more work, and thus become larger, some form of reorganization will be necessary.

Certainly the effectiveness of a research unit must be judged by its results. However, one of the greatest contributions to be made by individuals concerned with research of this kind lies not only in the production of research findings but also in education and in the transmission of ideas. The presence of a multidisciplinary research unit in an institution such as St Thomas's has a number of fringe benefits which are difficult to measure. The continual co-operation of statisticians, social scientists, and doctors within this Department and Unit has undoubtedly broadened the outlook and education of all three disciplines. The existence of the unit has an influence on the staff of the hospital and medical school and can and does play a part in policymaking and the education of people working within the institution as a whole.

Finally, I believe the involvement of members of the Research Unit in teaching at undergraduate and postgraduate level has a profound influence both on members of the Unit and on those being taught. In the present discussions on research in this country it is most important not to attempt to dissociate research, particularly applied research, from service and education.

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2. HOLLAND, W. W., GARRAD, JESSIE, BENNETT, A. E., and RHODES, P. (1966). 'A clinical approach to the teaching of social medicine', *Lancet*, i, 540.
3. — and MORRELL, D. C. (1972). 'A marriage of convenience?', *Br. J. Med. Educ.* 6 (2), 121.

PART III

List of  
current activities

LESLIE BEST

# List of current activities

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FOREWORD BY  
LESLIE BEST

This synopsis of DHSS research and development differs from that given in the 1971 edition of *Portfolio for Health* in three respects.

First, there are many more entries: 509 compared with 260 in the previous list. This is mainly because this time we have included separate descriptions of the individual projects undertaken by the research units where previously we gave only digests of their programmes as a whole, and because we have widened the scope of the list to include the NHS Experimental Computer Programme and certain other central activities previously omitted. Even now, though, the list is not fully comprehensive, since it does not include research in the social security field or the health building and engineering R & D.

Second, the entries are fuller. The names of project leaders and the more senior workers are given, along with those of the directors, for all extramural work; more detailed descriptions are given of the projects; and there are more extensive references to publications arising from the research.

Third, the entries have been arranged in a different way. In the previous issue they were set out in five sections, namely 1, research units; 2, medical; 3, social; 4, operational and management research; and 5, developments. The items in 2, 3, and 4 were further subdivided into 'programme' and 'project' supported research. Finally within each subsection and section the entries were arranged in alphabetical order of the institutions concerned.

The list thus showed proportions of different types of research ('medical', 'social science', and 'operational') and 'developments', although the accuracy, since much of the research is interdisciplinary, and the usefulness of this information is questionable. The inquirer was also able to find in it what research was being done under DHSS support by different institutional groups and what support they were receiving; and, with the aid of a subject

index, to trace projects in particular subjects. It was not so easy for him, however, to get a useful over-all view of the objectives, structure, and balance of the DHSS R & D programme as a whole. The present list will, we hope, be found to go some way towards making good the deficiency.

The list is arranged in two sections.

## Section 1

Section 1 details the establishments with which programme-based, period contracts have been arranged. The list comprises ten designated research units; forty-three other academic groups or institutions with period contracts; and a number of government establishments whose facilities are used for DHSS R & D.

The contracts with the non-governmental organizations specify the strategic field in which the research will be undertaken and prescribe a mechanism by which the respective interests of the parties can be secured. Usually they are for a fixed term, with provision for periodic review and renewal, or extension, if appropriate; but a number of them are at present at the stage of preliminary support for the development and exploitation of a research capability in areas of strategic interest.

Together the contracts in section 1 account for about two-thirds (£2½ million in 1971/2) of the total expenditure on the health and social services research, excluding the Experimental Computer Programme and capital and running costs of other development projects, and give a broad notion of the current, over-all balance of research effort. It should be noted, however, that this section does not include all the major research; where support is given for a single project, however important or costly, it appears in section 2 (the classified list) only. Nor should it be supposed that all the programmes which are included are necessarily of the first priority.

## Section 2

Section 2 is a comprehensive account of projects current at 1 April 1972, classified by subject: ie it includes both the single projects specifically commissioned, for which total cost figures are given in the descriptions, and projects carried out under the programmes described in section 1.

The classification frame is given in the table of contents (p. 239). There are twenty-three classes. The first twelve cover research related to particular client groups (the elderly, the physically handicapped, etc.) or the more general surveillance of health or social condition (population screening, etc.). The other eleven are concerned in various ways with resources, including development of techniques and technology; the provision, training, and organization of staff; information, communications, and methods of management; and with the evaluation of and response to services provided.

The material used is, however, wide-ranging (covering the whole health interest and an extensive social service field) and complex (the major interest is variously a client group, a medical or social disability, a service function, a technological development, a research method—or a combination of these); and a satisfactory synoptic classification system is not easy to devise. There have inevitably been problems of selection and a certain amount of straining; for example, research related to children appears in subsections 1-3, 6, 10, 11, 12, and 16, and the logic of some of the classification, and of the frame itself, may not be followed. We would welcome views, and criticism, on the presentation.

As to the content of the descriptions, a guidance note is prefaced to each of the sections (pp. 243 and 273). There is, however, an apparent inconsistency in the entries in section 2 to which attention should be drawn here.

In respect of those projects which are financed individually by the DHSS complete details are given in the entry, including full project cost and references to publications arising from it. For those projects carried out under programme-based support, however, the separate project costing was impracticable, and not all the publications made by the units/groups could be referred wholly to specific current projects. For clarity of presentation, therefore, no cost data or publication references are given with these project entries, but a reference is given to the unit or group entry in section 1, where the details are given for the programme as a whole.

Finally, the reader will of course be aware that there are other research supporting bodies active in most of the fields covered by this list, for example, the research councils, the universities, voluntary organizations, and, particularly in medical substances and technology, industrial concerns. It is beyond the scope of this book to give references to the works of these other activities.

Brief details of research in British universities and other institutions including, in the case of social sciences, government departments are, however, published annually in *Scientific Research in British Universities and Colleges* by the Department of Education and Science; and the research councils and voluntary organizations, of course, publish periodic reports.

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The effects of environment on the physical, social, and psychological development of the child.	

2.4. The handicapped adult	288
Studies to discover the incidence and degree of disability in adults, the effectiveness of rehabilitative measures, and the medical, technical, and other support necessary for them in their daily lives.	
2.5. The deprived adult	293
Inquiries into the clinical and social problems of homeless men, to determine the services needed.	
2.6. The mentally ill	293
Investigations into the identification and treatment of mentally disturbed persons in their homes, institutions, and general and mental hospitals, including the Special Hospitals.	
2.7. The addicted	298
Studies of drug addiction, alcoholism, and smoking; the background of known addicts and those at risk; evaluations of treatment and rehabilitation methods; and follow-up of former addicts.	
2.8. The elderly	304
Investigations into the health and welfare needs of old people in the home, hospital, and the community; the use of the services provided; estimates of present unmet demand and future planning requirements.	
2.9. The physically sick	308
Surveys of the medical and social needs of the sick; advice service on the management of terminal cancer patients in the home.	
2.10. Maintenance of physical health	310
Surveys and studies into drug monitoring and safety of medicines; the nutrition of preschool children, school children, and the elderly; the health and development of preschool children and young people; community health; industrial and environmental hazards to health; screening in general practice; effect of illness on the family; and the rehabilitation services.	
2.11. Maintenance of mental health	318
Studies into the early detection of psychiatric disorder; prediction of psychiatric illness; measurement of relationship between physical and mental impairment in the elderly; psychological welfare of young children making long stays in hospital.	
2.12. Incidence, prevention, and treatment of specific diseases and conditions	320
Screening of persons at risk for specific diseases and conditions; collecting and collating information; evaluating present preventive measures and methods of treatment; and trials and evaluations of new methods.	



2.13. Supporting services	345
Studies in the management of ambulance services; the management of and response to pathology transport systems; the need for a transport service for a GP's patients; the management of hospital stores; and the development and assessment of an area hospital catering system based on centrally prepared and frozen food.	
2.14. Allocation of resources: cost studies	351
Studies in the relationship between resources and costs based on the present usage and effectiveness of hospital and community services in order to estimate the costs and benefits of alternative services or planning for future requirements.	
2.15. Medical technology	359
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Investigations into the management of manpower and resources in social service departments and evaluations of some of the services provided.	
2.17. Professional education and staff recruitment, training, and conditions	375
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2.18. Management and organization of services	385
Studies into the various aspects of the organization and administration of GP, hospital, and health centre services, to identify and assess the management problems involved in providing alternative and improved methods of care.	
2.19. Evaluation of services and standards of care	393
Evaluation of the standards of care and the services provided in the hospital and the community, in order to measure the adequacy and the efficiency of present services and to obtain the information necessary for the improvement of these services.	
2.20. Record and information systems	397
Studies and trials of various techniques designed to assist in data collection and production, and maintenance of information systems in the hospital, GP, and community services.	

<b>2.21. NHS Experimental Computer Programme</b>	<b>404</b>
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# I

## List of research units and other groups on period contracts

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### Explanatory note

This section lists the organizations which are supported on programme-based contracts, as opposed to specifically financed single projects; and shows for each the scope and cost of the programmes.

The entries are in three groups:

1.1. Designated research units: nos 1-10.

1.2. Other academic groups or institutions subject to contract: nos 11-53.

1.3. The main government establishments whose facilities are used for DHSS R & D: nos 54-59.

The entries within each of the groups 1, 2, and 3 are listed in alphabetical order of the establishments concerned.

Each entry gives:

- (a) The name of the establishment.
  - (b) The director and senior research workers of the programme.
  - (c) Other bodies giving contributory financial support.
  - (d) A brief description of the constitution and objectives of the group.
  - (e) The financial support received from the DHSS in the year 1971/2.
  - (f) A list of current projects, cross-referenced to the more detailed project descriptions in section 2.<sup>1</sup>
  - (g) References to publications.<sup>1</sup>
- 

1. Except in those few cases where this information was not available.

**1.1. Designated research units**

*1. Birmingham, University of; Department of Clinical Chemistry, Birmingham B15 2TH*

PROFESSOR T. P. WHITEHEAD

DR P. WILDING

**The Wolfson Research Laboratories**

*Current contract: 1969-76*

*Support in 1971-2: £70,000, plus equipment £90,000*

The research laboratories were established at the Queen Elizabeth Medical Centre at Birmingham to develop and exploit automated and computer-supported methods of laboratory investigation.

Support for the building, which was commissioned in February 1972, was provided by the Wolfson Foundation; and for the equipment and running costs mainly by the DHSS.

The organization and work of the unit are described by Professor Whitehead in an article on pp. 143-9 of Part II.

See section 3, Publications, page 427

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*2. Brunel University, Institute of Organization and Social Studies, Uxbridge, Middlesex*

PROFESSOR E. JAQUES

S. A. CANG, MISS M. DIXON, G. F. L. PACKWOOD, MISS H. TOLLIDAY, DR R. W. ROWBOTTOM

**Health Services Organization Research Unit**

*Current four-year rolling contract*

*Support in 1971-2: £34,000*

The Unit's aims are to study and develop improved methods of organization and management in the health services, to combine research and training in organization and management, and to achieve widespread implementation of results. The Unit also co-operates with the Management Study Team of the DHSS in its work on the reorganization of the NHS.

A series of studies is being carried out with a regional hospital board and a teaching hospital in the organization of administration, nursing, engineering, and paramedical services, and into hierarchical and cross-professional relationships.

See the article on pp. 151-6 of Part II.

See section 3, Publications, page 428.

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*3. Brunel University, Institute of Organization and Social Studies, Uxbridge, Middlesex*

DR R. W. ROWBOTTOM

DR D. BILLIS, MISS A. M. HEY

**Social Services Organization Research Unit**

*Current four-year rolling contract*

*Support in 1971-2: £12,000*

The Unit is carrying out two closely linked kinds of activity. Firstly, it is undertaking

collaborative projects with social service departments in four local authorities which are concerned with the continuing analysis and development of organization and management procedures. Work usually proceeds by analysis of specific problems presented by client departments, for example, placement procedures for residential accommodation; intake and duty systems to cover new work arising; problems of role definition such as of senior social workers with supervisory duties or on allocation of functions between senior headquarters staff.

The analyses form the material from which more generic problems can be pursued, such as department structures; the work and management structure of area social services teams; relations between field and residential social work sectors; the role of administrative sectors in departmental management; procedures for control and co-ordination of social work; and staff representative systems.

Secondly, a series of research conferences is held at Brunel University. Membership is drawn from senior personnel of social services departments throughout England and Wales. At these conferences findings from the collaborative projects are disseminated and their validity and generality are tested with this wider audience.

See the article on pp. 151-6 of Part II.

See section 3, Publications, page 428.

#### 4. Exeter, University of; Exeter EX 2 5AE

PROFESSOR J. R. ASHFORD, DR N. G. PEARSON

DR D. C. MORGAN, R. W. CANVIN, DR J. G. FRYER, M. D. MACDONALD,  
DR R. J. PETHYBRIDGE, DR G. FERSTER, R. S. LOTT, D. P. BOLDY, J. E. BUTTERLEY,  
F. E. JONES, DR A. M. TUCKER, P. WARD

#### The Institute of Biometry and Community Medicine

*Current contract*: 1968-75

*Support in 1971-2*: £89,000; with additional support by the Nuffield Provincial Hospitals Trust

The Unit was established to develop and extend an existing programme in the fields of epidemiology and in the medical applications of statistics, computing, and operational research, in the population of Devon and Exeter and elsewhere. It consists of three divisions (epidemiology, numerical science, and operational research), though all research is integrated, and there are links with the NHS Computer Project at Exeter. The Unit also provides advisory services to local administration in many aspects of medical care.

See the article on pp. 157-74 of Part II.

See section 3, Publications, page 428.

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<i>A post-myocardial infarction chest pain study</i>	196
<i>Alternative policies for providing maternity care</i>	272
<i>Accident services in England and Wales</i>	273
<i>Construction of mathematical models of the health services</i>	274
<i>Studies of biological time series</i>	311
<i>Research programme in analytical biochemistry</i>	312
<i>Review of general practice vocational training schemes</i>	369
<i>Provision of GP facilities for a rural community</i>	398
<i>The 'Cogwheel' project</i>	399
<i>Revision of birth registration procedures in England and Wales</i>	433
<i>Investigation of file design for the Exeter Medical Computer Project</i>	434
<i>Cardiac infarction register</i>	435
<i>A health centre patient attitude survey</i>	492

5. Kent, University of, at Canterbury; Centre for Research in the Social Sciences, Canterbury, Kent

PROFESSOR M. D. WARREN

J. M. BEVAN, J. R. BUTLER, DR K. S. DAWES, MISS G. BAKER, MRS D. CUNNINGHAM, MISS G. DYCHE, R. H. LEE

### Health Services Research Unit

*Current contract: 1971-8*

*Support in 1971-2: £46,000*

The Unit was established in 1971 by the appointment of a Director and the bringing together of projects already under way in the Centre for Research in the Social Sciences and financed by the DHSS. The Unit is particularly concerned with studies in primary medical care, in rehabilitation and in the care of the chronic sick, and in factors affecting the intensity of use of health services.

See the article on pp. 187-93 of Part II.

See section 3, Publications, page 428.

### CURRENT PROJECTS

<i>Rehabilitation and care of the chronic sick: survey of needs</i>	151
<i>Transport of patients to surgeries</i>	251
<i>Health centres and group practice study</i>	401
<i>Study of the use of multiple consulting rooms in general practice</i>	402
<i>Utilization of health services</i>	494

## 6. London, University of; Institute of Psychiatry, London SE5 8AF

DR J. G. EDWARDS

A. AGATHANGELOU, MISS E. ARMSTRONG, DR H. BLUMBERG, I. CROW, MISS I. DAY, MISS E. DRONFIELD, MRS S. EGERT, DR D. HAWKS, DR H. HERSHON, MISS A. KOSVNER, MISS M. MACCAFFERTY, DR GLORIA LITMAN, MISS E. MORDECAI, P. NICHOLLS, MISS E. OPPENHEIMER, J. ORFORD, MISS S. OTTO, J. PETO, C. ROBERTS, DR D. ROBINSON, DR M. RUSSELL, MRS L. SMITH, D. TRIESMAN

**The Addiction Research Unit***Current contract: 1970-7**Support in 1971-2: £25,000, with equal contribution by Medical Research Council**Co-sponsor: Medical Research Council*

The Unit was formed in 1966 on the merger of the Alcoholism Research Group, supported by the Nuffield Foundation, with a newly formed Drug Addiction Group, built and supported by the then Ministry of Health. In 1969 a group concerned with smoking was added. The MRC provided the funds for the last and also for specific projects in all these fields. The present agreement between the MRC and the DHSS jointly provides for research into epidemiological, behavioural science, and treatment aspects of all varieties of chemical abuse.

See the article on pp. 175-81 of Part II.

See section 3, Publications, page 429.

## CURRENT PROJECTS

<i>Heroin prospective study</i>	125
<i>Retrospective study of heroin addicts known to the Home Office</i>	126
<i>The cannabis follow-up study</i>	127
<i>The prevalence of cannabis smoking in tertiary education institutions</i>	128
<i>Drug hostels research</i>	129
<i>Drug taking: prospective study of schoolchildren</i>	130
<i>Controlled trial of electric aversion therapy on cigarette smoking</i>	131
<i>Investigations into the role of nicotine in cigarette smoking</i>	132
<i>Alcoholism: family study</i>	133
<i>Alcoholism: hostels study</i>	134
<i>Drunken offender in court</i>	135
<i>The alcohol withdrawal syndrome</i>	136
<i>Alcoholism as a social fact</i>	137
<i>Intensive design studies of processes in alcoholism</i>	138

## 7. London, University of; Institute of Psychiatry, London SE5 OH and Department of Health and Social Security

DR T. G. TENNENT (until 30 June 1972)

DR C. P. TREVES BROWN, MRS S. E. PARKER

**The Special Hospitals Research Unit***Support in 1971-2: £24,000*

This Unit was set up by the DHSS in 1969 to carry out medical, behavioural, and

social scientific or biological research in the three special psychiatric hospitals at Broadmoor, Rampton, and Moss Side. The work is relevant to the description, explanation, management, or modification of antisocial behaviour associated with psychopathology.

In addition to the projects listed below, there is a study in conjunction with Professor Jenner of Sheffield University, to screen the urines of all Rampton patients for amino acids and carbohydrate abnormalities. At the same hospital, two local practitioners are studying the physical health and general physical characteristics of all the female patients. Preliminary studies into social interactions within the hospital and immunoglobulin surveys are also under way.

See the article on pp. 183-6 of Part II.

See section, 3 Publications, page 429.

#### CURRENT PROJECTS

<i>Admission survey</i>	109
<i>Criteria for admission to the Special Hospitals</i>	110
<i>Demographic studies</i>	111
<i>Chromosome studies</i>	188
<i>Sex offender studies</i>	189
<i>EEG studies</i>	190
<i>Special Hospitals case-register</i>	431

#### 8. London, University of; St Thomas's Hospital Medical School, Department of Clinical Epidemiology and Social Medicine, London SE1

##### PROFESSOR W. W. HOLLAND

DR B. BEWLEY, DR JEAN WEDDELL, DR M. ANDERSON, DR JUDITH COOK, D. ALTMAN, DR M. W. ADLER, MISS C. KING, MRS S. C. THORNE, DR HARRIET TREVELYAN, DR D. C. MORRELL, DR M. CLARKE, T. HALIL, MISS I. DAY, MRS J. J. WALLER, MRS K. DUNNELL, MISS S. BERESFORD, MRS C. MOORE, H. S. KASAP, MISS E. ECKLES, MRS Z. CORKHILL, A. V. SWAN, R. CORKHILL, MISS L. IDE

#### The Social Medicine and Health Services Research Unit

*Current contract: 1970-7*

*Support in 1971-2: £121,000*

The Social Medicine and Health Services Research Unit was established in 1968, following programme support over some years, to study the medical and social needs of defined population groups, the implications of the organization of health services on need, demand, and utilization of services and the epidemiology of disease in the UK.

See the article on pp. 213-24 of Part II.

See section 3, Publications, page 430.

#### CURRENT PROJECTS

<i>Study of the aetiology of mental subnormality</i>	72
<i>The resonaut study</i>	93



<i>Functional ability and nursing dependency in a long-stay psychiatric hospital population</i>	117
<i>Study into smoking behaviour of Kent schoolchildren</i>	164
<i>Surveillance study of the growth and nutrition of schoolchildren</i>	165
<i>South-east London general practice screening study</i>	218
<i>Controlled trial of treatment of moderate hypertension</i>	219
<i>Duodenal ulceration in north Lambeth</i>	220
<i>Influenza in north Lambeth</i>	221
<i>The Harrow children's respiratory study</i>	222
<i>Respiratory symptoms and lung function measurements in Kent schoolchildren</i>	223
<i>Total medical care given to stroke patients</i>	224
<i>Study of early discharge for inguinal hernia and varicose veins</i>	421
<i>Study of the use of acute medical beds in the Basingstoke area</i>	422
<i>Study of factors influencing demand for medical care</i>	498
<i>Utilization of services for the elderly in the catchment area of a district general hospital</i>	499

9. Newcastle upon Tyne, University of; Newcastle upon Tyne NE2 4AA

PROFESSOR D. J. NEWELL, DR J. H. WALKER

MISS M. FLINTOFF, N. J. GLASS, DR M. R. HALLY, MRS A. HOLOHAN,  
DR J. LANGHAM-HOBART, W. MORGAN, DR P. R. PHILLIPS, DR B. L. REEDY,  
I. T. RUSSELL, SISTER M. THOMAS

**The Medical Care Research Unit**

*Current contract: 1969-76*

*Support in 1971-2: £32,000*

The Unit was set up in 1969 to undertake research into the provision, organization, and effects of medical care.

See the article on pp. 195-200 of Part II.

**CURRENT PROJECTS**

<i>The Newcastle maternity survey</i>	75
<i>The North Tees study of day-case surgery for inguinal hernia and haemorrhoids</i>	234
<i>Trial of manipulation in the treatment of low back pain</i>	235
<i>Prospect House general practice-hospital relationship</i>	410
<i>General practitioner questionnaires: Phase II of the Newcastle accident survey</i>	411
<i>Spina bifida studies</i>	425
<i>Newcastle accident survey: medical and social characteristics of patients</i>	501

10. *Northwick Park Hospital, Harrow HA1 3UJ*

DR T. W. MEADE

DR W. E. MIALL, DR R. CHAKRABARTI, DR A. M. S. MASON, W. R. S. NORTH,  
MRS S. L. JUDD, MRS Y. STIRLING**The MRC/DHSS Epidemiology and Medical Care Unit***Current contract: 1971-6**Support in 1971-2: £30,000 (through MRC)**Co-sponsor: Medical Research Council*

The Unit was established in 1970 under the joint sponsorship of the MRC and DHSS to carry out studies of the aetiology of disease and in medical care.

See the article on pp. 201-5 of Part II.

See section 3, Publications, page 431.

## CURRENT PROJECTS

<i>Trial of general rehabilitation methods</i>	97
<i>Rehabilitation follow-up study</i>	171
<i>Trial of treatment methods in low back pain with sciatica</i>	207
<i>Carcinoma of the colon and rectum: Case-control study of dietary habits</i>	236
<i>Medical care and economic consequences of smoking</i>	237
<i>Randomized controlled trial of treatment of mild hypertension</i>	238
<i>Arterial disease prediction study</i>	239

**1.2. Other institutional groups under contract**11. *Birmingham, University of; Department of Social Medicine, Health Services Research Centre, Birmingham B15 2TT*

PROFESSORS T. MCKEOWN, E. G. KNOX

DR K. W. CROSS, DR J. LEIGH, MISS O. GOLDSMITH, DR L. J. OPIT,  
DR A. J. MACKENZIE, DR R. D. T. FARMER, T. MARSHALL*Current contract: Terms under discussion**Support in 1971-2: £19,000*

The Centre is being established to strengthen and extend the work previously done in the Department of Social Medicine on health services research and related epidemiological themes. Since 1 May 1972, the Centre has been located in a new building financed jointly by the Nuffield Provincial Hospitals Trust, the DHSS, and the University. The DHSS has so far provided a small core staff and support for specific projects.

See section 3, Publications, page 431.

## CURRENT PROJECTS

<i>Obstetric/anaesthetics survey</i>	61
<i>Childhood surveillance</i>	62

<i>Childhood nutritional surveillance</i>	156
<i>Breast cancer screening</i>	183
<i>Evaluation of screening in childhood</i>	184
<i>Simulation studies of screening procedures</i>	185
<i>Hospital siting</i>	271
<i>Mental health service evaluation</i>	418
<i>General practice records</i>	429

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12. *General Nursing Council for England and Wales, Research Unit, London W1A 1BA*

DR JILLIAN M. MACGUIRE

DR A. SINGH, J. SMITH, MISS I. JACKSON

*Current four-year rolling contract*

*Support in 1971-2: £20,000*

The General Nursing Council Research Unit was set up with DHSS support in 1969, for research related to nurses, in particular to evaluate experimental schemes of training for student nurses.

See section 3, Publications, page 431.

CURRENT PROJECTS

<i>Compilation and updating of list of all known nurses who are also graduates in the UK</i>	370
<i>Analyses of applications and admissions to experimental schemes of nursing education</i>	371
<i>Career pattern study of newly qualified nurses</i>	372
<i>Index project</i>	373
<i>Evaluation of experimental courses</i>	374

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13. *Heriot-Watt University, Department of Pharmacy, Edinburgh EH1 2HF*

PROFESSOR A. R. RODGERS

A. W. PATTERSON, G. L. GEDDES

*Current contract: 1970-3*

*Support in 1971-2: £13,000*

*Co-sponsor: Scottish Home and Health Department*

The team is participating in a collaborative study with the Department of Social Studies of University College, Swansea (entry no. 507). A cohort of several hundred general practice principals is being followed as they enter general practice to study the trends in the prescribing patterns of GPs, for example, in the introduction of new drugs. As part of this process the team is analysing the routinely available data on prescribing by GP principals in the NHS, and will attempt to collate it with the information obtained by the Department of Social Studies at Swansea about the general practice principals.

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14. *Institute for Social Studies in Medical Care, London E2 9CF*

DR ANN CARTWRIGHT

MRS M. WAITE, MRS S. LUCAS, R. MITTON

*Current contract: 1971-4**Support in 1971-2: £30,000*

The Institute for Social Studies in Medical Care developed from the Medical Care Research Unit of the Institute of Community Studies. It was set up as a separate institute in 1970, with the aim of studying the social aspects of health care in ways which have a bearing on social policy. A concern with the viewpoints of both those using and those providing services is fundamental to its approach. Its main fields of interest are the organization of general practice, birth control services and practices, and the care of elderly people.

See the article on pp. 207-11 of Part II.

See section 3, Publications, page 431.

## CURRENT PROJECTS

<i>Birth control services in England and Wales</i>	400
<i>Life before death: a study of needs and care in the twelve months before death</i>	419
<i>The process of getting an abortion</i>	493

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15. *Lancaster, University of; Department of Operational Research, Unit for Operational Research in the Health Services*

PROFESSOR M. G. SIMPSON, DR A. HINDLE

R. H. GREEN, MRS J. WILSON

*Current contract: 1971-3**Support in 1971-2: £9,000*

The Unit was set up by Lancaster University in October 1971 with support from the DHSS, to carry out operational research studies in the health services, with guidance by the DHSS and a consultative committee drawn from the DHSS, the Manchester Regional Hospital Board, and a local health authority.

See section 3, Publications, page 432.

## CURRENT PROJECTS

<i>The development of methods for costing pathology transport systems</i>	252
<i>An experimental investigation of GP response to pathology transport systems</i>	253
<i>The development of a simulation and gaming approach to assist planning and resource scheduling in acute hospitals</i>	275
<i>A feasibility study for an improved information system for a hospital group</i>	403
<i>The organization of community nursing services</i>	404

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16. *Leeds, University of; Procter Department of Food and Leather Science, Catering Research Unit, Leeds LS2 9JT*

PROFESSOR A. G. WARD

G. GLEW, J. F. ARMSTRONG, D. C. DORNEY, MISS M. A. HILL

*Current three-year rolling contract*

*Support in 1971-2: £17,000*

The Catering Research Unit was set up in 1966 within the Procter Department to investigate the application of the techniques of food technology to catering. Work on the use of precooked frozen food in hospital feeding was undertaken with the United Leeds Hospitals, and a trial of a catering system involving the production, freezing, storage, distribution, and reheating of food was started at the Hospital for Women, Leeds, in May 1967. The encouraging results of this trial led to the development of the system for feeding schoolchildren and the further extension of the hospital side of the work to the planning of a large trial within hospitals in the Newcastle Region. The Newcastle Hospitals Catering Project (entry no. 264) receives technical advice from the Catering Research Unit at Leeds University.

See section 3, Publications, page 432.

CURRENT PROJECTS

<i>Production flow lines for all dishes, and associated recipe development</i>	256
<i>Assessment of peripheral kitchen requirements</i>	257
<i>Development of a frozen food production unit layout</i>	258
<i>Assessment of the effects of the processing system on bacteria in the food</i>	259
<i>The measurement of heat labile nutrients in the food</i>	260
<i>The measurement of equipment performance</i>	261
<i>Assessment of control procedures</i>	262

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17. *Liverpool, University of; Department of Psychiatry, Liverpool L69 3BX*

PROFESSOR A. MUNRO

DR P. LEY, DR A. PAULINE RIDGES, DR C. BIRTLES

*Current contract: 1971-3*

*Support in 1971-2: £20,000*

Bridging finance has been provided for three years to assist Professor Munro to build up the research work of his Department; a specific programme in the field of doctor-patient communications by Dr Ley is also under support.

CURRENT PROJECTS

<i>Measures of mental health and disease</i>	115
<i>Research into methods for improving doctor-patient communications</i>	495

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18. London, University of; Bedford College, Social Research Unit, London NW1 4DT

PROFESSOR MARGOT JEFFERYS

MISS M. CLARKE, DR M. DRAGOUMIS, MRS R. HOLLINS, MRS M. HYMAN, DR A. MAST, MRS H. SACHS, A. VARLAAM, DR P. MANSFIELD (*University College Hospital Medical School*)

*Current contract: 1971-4*

*Support in 1971-2: £31,000*

The Social Research Unit, which is part of the Sociology Department at Bedford College, was formed in 1965 and has been mainly concerned with research in the field of medical care, viewed from administrative, professional, and consumer viewpoints.

See section 3, Publications, page 432.

CURRENT PROJECTS

<i>Tests of physical impairment</i>	92
<i>Kentish Town Health Centre study</i>	405
<i>Goodmayes Psycho-geriatric Unit study</i>	406
<i>Health and welfare needs of households in Camden with special problems</i>	496

19. London, University of; Guy's Hospital Medical School, Department of Community Medicine, London SE1 9RT

DR J. A. D. ANDERSON

MISS A. ALLAWI, DR E. R. DALTON, DR P. A. DRAPER, DR G. GRENHOLM, S. ISRAEL, MRS H. LEIGH, DR R. ROSSER

*Current contract: 1970-4*

*Support 1971-2: £17,000*

This group is currently carrying out research under DHSS support, in the fields of hospital communications and community health intelligence.

See section 3, Publications, page 432.

CURRENT PROJECTS

<i>An investigation of the development of 'Cogwheel' hospital administrative approaches (now being undertaken at the University of Sussex)</i>	407
<i>Community Health Teams Study</i>	408
<i>Hospital evaluation investigation: exploratory study</i>	420
<i>A study of existing NHS data in relation to the 1974 reorganization of the Service</i>	439

20. *London, University of; Guy's Hospital Medical School, Paediatric Research Unit, London SE1 9RT*

PROFESSOR P. E. POLANI

M. DAKER, J. D. SINGER, D. E. MUTTON

*Current contract: 1971-3*

*Support in 1971-2: £3,000; with additional support of £15,000 per annum for service aspects*

The Paediatric Research Unit is carrying out, with contributory support from the DHSS, a programme of studies in congenital abnormalities and provides an extensive specialized diagnostic service and a counselling service in relation to inborn metabolic disorders.

See section 3, Publications, page 432.

CURRENT PROJECTS

*Fluorescence studies in subjects with Y-chromosome anomalies* 69

*Sex chromatin and chromosome studies on amniotic fluid obtained at amniocentesis* 70

21. *London, University of; Institute of Education, Child Development Research Unit, London WC1H 0NT*

PROFESSOR J. TIZARD

DR BARBARA TIZARD, B. A. AKHURST, P. MOSS, DR C. C. KIERNAN

*Current contract: 1971-8*

*Support in 1971-2: £29,000*

*Co-sponsor: Dr Barnardo's Homes*

The Unit was set up in 1971 to consolidate and expand Professor Tizard's research into child development. Current work includes a study of the numbers of children in residential care; a study of the structure and functioning of children's homes of different sizes; a study of the application of operant training techniques to the behaviour of severely subnormal children; the development of a battery of assessment tests and a study of preschool children in residential care.

See the article on pp. 33-40 of Part II.

22. *London, University of; Institute of Psychiatry, London SE5 8AF*

PROFESSOR M. SHEPHERD

*Current rolling contract: terms under negotiation*

*Support in 1971-2: £12,000*

The DHSS has supported Professor Shepherd over a number of years in his studies of psychiatric illness in the community. A rolling contract for a further programme of work is currently under negotiation.

See the article on pp. 49-52 of Part II.  
See section 3, Publications, page 433.

## CURRENT PROJECT

*Psychiatric morbidity in general practice*

176

23. London, University of; Institute of Psychiatry, London SE5 8AF

PROFESSOR J. K. WING

MRS W. ATKINS, DR H. DAWSON, DR S. HIRSCH, J. LEACH, DR SHEILA MANN,  
MISS R. SOUSA, DR D. TIDMARSH, MRS S. WALLER, DR SUZANNE WOOD, DR J. SCHLICHT

*Current contract: 1971-6*

*Support in 1971-2: £27,000 (£9,500 through MRC)*

Professor Wing is the head of the MRC Social Psychiatry Unit and the DHSS has been contributing since 1964, through the MRC, towards the maintenance and exploration of the Camberwell Psychiatric Register. Support is also given by the DHSS through the Institute of Psychiatry for a group, under the direction of Professor Wing, concerned with the development of psychiatric diseases registers and the evaluation of certain services for destitute people and long-stay patients in hospitals.

See section 3, Publications, page 433.

## CURRENT PROJECTS

<i>Camberwell Reception Centre study</i>	107
<i>St Mungo's Community Trust study</i>	108
<i>New long-stay patients in mental hospitals</i>	116
<i>Salford Psychiatric Case-Register (computer analysis)</i>	440
<i>Maintenance and use for study of Camberwell Psychiatric Register</i>	441

24. London, University of; London School of Hygiene and Tropical Medicine, Department of Human Nutrition, London WC1E 7HT

PROFESSOR J. C. WATERLOW

DR J. M. L. STEPHEN, DR G. C. SUTHERLAND, DR D. I. THURNHAM, M. BLECKWEN,  
P. R. PAYNE, MISS E. F. WHEELER, DR S. BALASURIYA

*Current contract: 1972-7*

*Support in 1971-2: £5,000 (preliminary)*

The Human Nutrition Studies Group at the School was set up in 1971 with the aims of being responsible for the organization, supervision, and analysis of those surveys and studies which, by agreement with the DHSS, were most appropriately done by an academic department; setting up and operating a laboratory to standardize and as far as possible centralize the biochemical measurements made in nutrition surveys in Britain; evaluating methods for the assessment of nutritional status and engaging in research into new methods; and in conjunction on the one hand with other departments in the School (for example, Medical Statistics and



Epidemiology, and Social Medicine), and on the other hand with the DHSS, advising generally on matters relating to nutrition and health.

## CURRENT PROJECTS

<i>Survey of growth of preschool children</i>	162
<i>Nutritional survey of the elderly</i>	163

25. *London, University of; London School of Hygiene and Tropical Medicine, Department of Public Health, Chronic Disease Control Study Unit, London WC1E 7HT*

PROFESSOR J. N. MORRIS, DR J. M. G. WILSON (until 31 May 1972)

DR JOCELYN CHAMBERLAIN

*Current contract: under discussion*

*Support in 1971-2: £34,000*

The Chronic Disease Control Study Unit was instituted in 1970 with the object of studying problems in the control of chronic diseases, within the pattern of the NHS. It has been designed to work in close contact with the DHSS, and to that end, the first Director was appointed with a shared post between the School and the DHSS. Members of the medical staff of the Unit serve on DHSS committees, or as their secretary.

The research that has been developed is of two kinds. The first is concerned with developing instruments for chronic disease control, and the second to discover how methods of working established in epidemiological and health care research can be introduced into the NHS.

## CURRENT PROJECTS

<i>Validation of screening tests in the elderly</i>	143
<i>The identification and treatment of symptomless hypertension in general practice</i>	209
<i>The irrigation pipette study</i>	497

26. *London, University of; London School of Hygiene and Tropical Medicine, Organization of Medical Care Research Unit, London WC1E 7HT*

PROFESSOR R. F. L. LOGAN

DR J. S. A. ASHLEY, MISS P. PASKER, D. A. T. GRIFFITHS, MISS. A. GARDNER,  
MRS SHINEBOURNE, MRS D. ELBOURNE, MRS J. ROGERS

*Current five-year rolling contract: terms under discussion*

*Support in 1971-2: £40,000*

The Organization of Medical Care Research Unit was set up with DHSS support in the Department of Public Health, at the School in 1969. Its current activities include:

(i) The study at a general level of the differences between need and demand in the health services and its relationship to the deployment of resources to obtain a satisfactory outcome bearing in mind policy and economic implications.

(ii) A study of the nursing and other care provided by relatives in the community to a defined group of patients.

(iii) The identification of individual institutions with exceptional operating and mortality rates.

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27. *Manchester, University of; Department of Child Health, Manchester M13 0JH*

PROFESSOR J. A. DAVIS

DR F. N. BAMFORD

*Current contract: 1972-6*

*Support in 1972: £4,000*

The group is concerned with the organization of developmental screening and assessment programmes and of counselling services for the parents of handicapped children; and the application of paediatrics to social work problems.

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28. *Manchester, University of; Department of General Practice, Manchester M13 0FW*

PROFESSOR P. S. BYRNE

DR J. FREEMAN

*Current contract: 1971-5*

*Support in 1971-2: £13,000*

The group is carrying out, with DHSS support, a programme of studies related to the development and evaluation of training programmes for general medical practitioners.

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29. *Manchester, University of; Department of Social and Preventive Medicine, Manchester M13 0FW*

PROFESSOR E. ALWYN SMITH

DR I. M. LECK, DR D. H. VAUGHAN, DR JOYCE E. LEESON, MISS J. K. MCFARLANE, A. C. C. GIBBS, MISS N. MARSH, MRS V. F. HILLIER, MISS R. PUSHKIN, DR T. FRYERS, MISS D. E. BAKER, MISS C. R. KRATZ, DR JOAN E. MUNRO, D. MAY

*Approved support 1971-2: £31,400*

The Department was established in its present form in 1951, and has responsibility not only for undergraduate teaching to medical students but also for postgraduate training in public health (community medicine) and for the unique programme of nurse education to the degree of Bachelor of Nursing. The research interests of the department reflect the wide teaching commitment and may be categorized as follows: traditional epidemiological studies (mainly of cancer); studies of service utilization; studies of service innovations; development of nursing research; research into health-related behaviour.

(i) Evaluation of cervical cytological screening and determination of the optimum interval for screening individual women.

(ii) Use of a community psychiatric case-register to examine referral patterns in psychiatry and the effect of specific care programmes on prognosis.

(iii) Examination of referral patterns among the members of a general practice multidisciplinary team with particular reference to heavy users of GP consultation.

(iv) Examination of hostel provision for the mentally subnormal and its effect on public attitudes to subnormality and its care.

(v) Studies of nursing: the effect of educational experience on nurses' attitudes to the elderly and chronic sick; the role of the district nursing service in the management of chronic illness; studies of the implementation of the Salmon Report.

See section 3, Publications, page 433.

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30. *Manchester, University of; Hester Adrian Research Centre, Manchester M13 9PL*

DR P. MITTLER

DR J. HOGG

*Current contract: 1970-7*

*Support in 1971-2: £13,000 with similar support from DES*

*Co-sponsors: Sembal Trust, National Association for Mental Health, Department of Education and Science*

The work of this Centre is concerned with the study of learning processes in the mentally handicapped. The emphasis at present is on the study of cognitive processes, with special reference to language and communication skills, organization and memory, educational deficit in relation to personality, perceptual skills and work skills in adults. The DHSS and the DES have both given general support up to the end of July 1972, and each has agreed to provide at least £2,500 per year until 1977, for work on specified projects. At the time of writing, these specific projects were still under discussion.

See section 3, Publications, page 433.

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31. *Manchester, University of; Institute of Science and Technology, Department of Management Studies, Manchester M60 1QP*

B. MOORES

A. SISOURAS, G. GRANT, A. MOULT, C. MIKAN

*Current contract: 1971-4*

*Support in 1971-2: £2,000*

The principal investigator is working in conjunction with the Manchester Regional Hospital Board on mainly local problems in health services.

See section 3, Publications, page 433.

## CURRENT PROJECTS

<i>Investment in mental subnormality—an input/output analysis</i>	96
<i>Evaluation of pathology to GPs</i>	227
<i>The assessment of the effectiveness of mobile cardiac ambulances</i>	228
<i>Effects of differing nurse staffing levels</i>	384

32. *National Children's Bureau, London W1P 5AH*

DR M. L. KELLMER PRINGLE, DR R. DAVIE

P. J. WEDGE, H. GOLDSTEIN, MRS E. FERRI, K. FOGELMAN, A. LEISSNER, MRS S. NAIDOO, DR C. PECKHAM, MRS L. TUCKEY, MISS D. BIRCHALL, D. EVANS, T. POWLEY, R. TUCKEY

*Current contract: 1969-75**Support in 1971-2: £49,000**Co-sponsors: Department of Education and Science, Department of Employment, Social Science Research Council (for Second Sweep of National Child Development Study)*

The present field of interest under this programme covers two related areas. First, longitudinal, developmental studies of children and their families are under way with particular emphasis on those who have special needs such as the socially and physically handicapped.

Secondly, the availability, use, and functioning of services for children and young people are being investigated, such as: day-care centres for the under fives; the further education, training, and employment prospects for handicapped children; and intermediate treatment facilities.

See section 3, Publications, page 434

## CURRENT PROJECTS

<i>Pilot study of the day-care needs of preschool children</i>	74
<i>National study of the facilities for the further education, training, and employment of severely handicapped school leavers</i>	81
<i>National study of mentally handicapped children</i>	82
<i>National study of children in one-parent families</i>	89
<i>National Child Development Study (1958 cohort) Third Sweep</i>	169
<i>Study of intermediate treatment in a community setting</i>	357

33. *National Coal Board, Operational Research Executive, Harrow HA1 2EX*

R. C. TOMLINSON

D. A. V. EDMONDS, A. B. BARTON, A. G. SMITH, M. A. TALBOT, P. R. ARCHER, D. M. HAWES, P. D. MCGINITY, J. D. MAGUIRE, MRS Y. P. BANKS

*Current three-year rolling contract**Support in 1971-2: £80,000*

The team began their work for the DHSS by studying the architectural implications of the distribution of supplies within new 'Harness' hospitals. This work has been ex-

tended to a wide range of economic studies of the logistical aspects of the hospital service such as frozen food catering and hospital stores. These studies aim to establish the economies of scale in each field and eventually to evaluate the benefits of area service centres housing some or all of these logistical activities. In certain cases the possible contribution of outside manufacturers is also being examined. As a part of a major study of hospital size, being undertaken by the OR Unit of the DHSS, the costs and times of travel to hospitals are being studied.

## CURRENT PROJECTS

<i>Stock control for stores in the hospital service</i>	263
<i>A study of pharmacy costs</i>	276
<i>The evaluation of alternative methods of sterile supply</i>	277
<i>The economics of centralizing hospital stores</i>	423
<i>Hospital catering: the evaluation of the cook/freezer system</i>	424
<i>The accessibility consequences of hospital location</i>	500

34. *National Institute for Social Work Training, Research Unit, London WC1H 9SS*

D. JONES, OBE, MISS E. M. GOLDBERG

MRS J. FELDMAR, DR D. FRUIN, MISS J. E. NEILL, MISS A. MCKAY, MISS M. L. SHEPPARD, MISS A. VICKERY

*Current contract: 1970-8*

*Support in 1971-2: £33,000*

The Research Unit of the National Institute is concerned with research in the social services and social work.

See section 3, Publications, page 434.

## CURRENT PROJECTS

<i>Home treatment of the chronic schizophrenic</i>	119
<i>Study of two social service departments</i>	358
<i>Evaluation of task centred short-term casework</i>	359
<i>Social worker workload study</i>	385

35. *Newcastle upon Tyne, University of; Department of Psychological Medicine, Newcastle upon Tyne NE2 4AB*

PROFESSOR SIR MARTIN ROTH

DR D. W. K. KAY, DR K. BERGMANN, DR G. BLESSED, DR R. F. GARSIDE, DR R. D. SAVAGE, DR P. G. BRITTON, MISS E. M. FOSTER, MISS S. O. ALLISON

*Current contract: 1968-73*

*Support in 1971-2: £10,000, further programmes under discussion*

The group has carried out studies on the natural history of mental disorder in old age, examining the links with and the role of somatic disease, hereditary factors, and social isolation.

The present stage of study began with the Newcastle Community Survey of aged persons. Its first phase in 1960 consisted of a random sample of 297, subsequently extended by a further community sample of 478. Investigations into physical and social factors in old age mental disorder have been extended, the factors contributing to mortality investigated, and the role of bereavement, loneliness, social isolation, retirement, economic factors, and previous personality studied. Inquiries have also been conducted into the neuroses of the elderly.

See section 3, Publications, page 434.

#### CURRENT PROJECTS

<i>The effects of bereavement in the elderly</i>	144
<i>Elderly people receiving local authority services</i>	145
<i>Prediction of outcome in terms of survival or death</i>	170
<i>Prediction of dementia in the aged</i>	177
<i>Intelligence and neurosis</i>	178
<i>Longitudinal study of the intellectual functioning of elderly subjects</i>	179
<i>A study investigating relationship between clinical diagnosis of brain damage and measures of memory, behaviour, and intelligence</i>	180
<i>A survey of psychiatric morbidity in the elderly in acute medical ward admissions</i>	232
<i>Pilot study of early ascertainment of psychiatric morbidity in a general practice population</i>	233
<i>The development of a psycho-geriatric updating computer register</i>	443

36. Nottingham, University of; Department of Community Health, Nottingham NG7 2RO

PROFESSOR E. M. BACKETT

D. S. MILLER, A. O. HUGHES, DR A. BIGOT, MRS C. MASON, MRS M. TEW

*Current contract:* Year to year

*Support in 1971-2:* £11,500

The DHSS has provided support to Professor Backett, in the past two years, to assist him to develop a programme of research in health care services in his new Department at the University. Current researches are (i) baseline studies of the health services in the Nottingham area, made with a view to monitoring changes, particularly those arising from the development of the new teaching hospital; (ii) medical care sensitive indices, in which a feasibility study has been completed; (iii) studies in general practice relating to the effects of changes in care for old people; (iv) studies on the problems of ageing; (v) and in doctor/patient communications.

37. Nottingham, University of; Department of Psychology, Blind Mobility Research Unit, Nottingham NG7 2RD

PROFESSOR C. L. HOWARTH

DR J. D. ARMSTRONG, DR A. D. HEYES

*Current contract* : 1972-5

*Support in 1971-2* : £7,500 (through MRC)

*Co-sponsor* : Medical Research Council

The research group, founded by the late Dr J. A. Leonard in 1969, is concerned to find solutions to some of the problems experienced by blind people in moving from place to place. The scope of the work includes the detailed analysis of mobility skills, the development and evaluation of new mobility aids for the blind and the deaf/blind, and the measurement of psychological and sociological change undergone by those given training in mobility.

See section 3, Publications, page 435.

#### CURRENT PROJECTS

<i>Evaluation of mobility performance</i>	98
<i>Tactile maps for blind pedestrians</i>	99
<i>Low vision research</i>	100
<i>Mobility of the deaf/blind</i>	329
<i>Skin stimulation</i>	330

38. *Oxford Regional Hospital Board and Oxford, University of; Department of the Regius Professor of Medicine, Oxford OX2 6PS*

DR P. J. R. NICHOLS

DR G. CLARKE, MRS B. RUTTER

*Current contract* : terms under negotiation

*Support in 1971-2* : £5,000

Arrangements have been made with Dr Philip Nichols, the Oxford Regional Hospital Board, and the University of Oxford for the development by Dr Nichols of a programme of research in rehabilitation; the group is being established at Mary Marlborough Lodge.

39. *Oxford, University of; Department of the Regius Professor of Medicine, DHSS Cancer Epidemiology and Clinical Trials Unit, Oxford OX2 6PS*

PROFESSOR SIR RICHARD DOLL, DR M. C. PIKE

MISS P. COOK, DR L. J. KINLEN, P. G. SMITH, DR N. WALD, MRS D. BULL

*Current five-year rolling contract* : (terms to be formulated)

*Support in 1971-2* : £6,000

The Unit was set up in February 1972 at the suggestion of the DHSS, to conduct studies in cancer epidemiology and to assist in the detailed planning, running, and statistical analysis of clinical trials of cancer treatment. The latter is to be done in collaboration with the MRC. The present particular fields of interest of the Unit

are the epidemiology and treatment of leukaemia and Hodgkin's disease. At the time of writing, only a few of the DHSS-supported staff were in post, and the DHSS studies had not been formulated. There were, however, several projects being undertaken for the MRC.

40. *Oxford, University of; Department of the Regius Professor of Medicine, Health Services Evaluation Group: Community Hospital Programme, Oxford OX2 6PS*

PROFESSOR SIR RICHARD DOLL, DR A. E. BENNETT

C. C. KIRK, MISS K. JACK, DR M. JOHNSTON, DR M. LEE-JONES, J. H. RICKARD,  
DR R. G. A. WILLIAMS

*Current contract: 1970-5*

*Support in 1971-2: £19,000*

Community hospital is the descriptive term given to a type of decentralized hospital unit one form of which is being developed by the Oxford Regional Hospital Board. A pilot experimental unit was opened in 1970 and a completely new experimental unit will be commissioned late in 1972. Two more experimental units are planned and studies will test the efficiency and effectiveness of care provided. Randomized controlled experiments are being undertaken to allow comparisons in clinical, economic, and behavioural terms. Further studies will lead to the definition of a general model and operational policies for this type of unit.

See section 3, Publications, page 435.

CURRENT PROJECTS

<i>Randomized controlled trial of screening in general practice</i>	172
<i>Studies of family and home life as affected by illness and as influencing recovery</i>	173
<i>Studies on the epidemiology and treatment of patients with chronic disease</i>	241
<i>Randomized controlled trials of admission and discharge policies</i>	279
<i>Development of techniques of social cost-benefit analysis to alternative patterns of care</i>	280
<i>Systems for medical records in health centres and community hospitals</i>	445
<i>Preparation of a monograph on the design and use of questionnaires in medicine</i>	446
<i>Measurement of patients' anxiety and attitudes to hospital care</i>	502

41. *Oxford, University of; Department of the Regius Professor of Medicine, Unit of Clinical Epidemiology, Oxford OX2 6PS*

DR J. A. BALDWIN

MRS G. BETTLEY, MRS. W. BRENNAN, DR. A. S. FAIRBAIRN, MRS J. FEDRICK, L. E. GILL,  
M. HOLDAY, DR J. PERRY

*Current contract: 1971-5*

*Support in 1971-2: £9,000 when support from Nuffield Provincial Hospitals Trust ended*



*Co-sponsor: Nuffield Provincial Hospitals Trust*

The Unit is concerned with the development of linked records for medical information systems for epidemiological research. It was formed for the purpose of studying the methodology of record linkage by computer and to exploit the data in the information system it develops. The Unit works in close association with the Oxford Hospital Boards. Workable solutions to the problem of electronic name matching have been developed but further research is necessary to increase their efficiency. Since 1963 the main focus has been on hospital in-patient records and vital certificates and studies are in progress on a five-year linked file. In recent years increasing attention has been given to community medicine and an information system based on general practice records is at an advanced stage.

See section 3, Publications, page 435.

## CURRENT PROJECT

*Oxford Record Linkage Study*

447

42. *Reading, University of; Department of Applied Statistics, Operational Research (Health Services) Unit, Reading RG2 2AN*

PROFESSOR R. N. CURNOW

DR D. G. NEAL, M. R. BATHE, DR I. B. DUNCAN, MISS S. B. J. MACFARLANE,  
L. J. TWOMEY

*Current contract: 1970-4*

*Support in 1971-2: £17,000*

The Unit was established and financed from 1967 to 1971 by the Nuffield Provincial Hospitals Trust. Apart from the individual studies listed below, the group is also interested in information systems, problems of implementation, in-service training and in increasing the appreciation by NHS personnel of the potential of operational research.

See also entry no. 56 (i).

## CURRENT PROJECTS

<i>Needs of the elderly visiting scheme</i>	146
<i>The Berkshire County Council Ambulance Service</i>	265
<i>Study of the Reading Ambulance Service</i>	266
<i>Provision of beds for terminally ill cancer patients</i>	282
<i>Study of the Reading and Berkshire Maternity Services</i>	283
<i>Study of patients waiting for a hospital appointment</i>	284
<i>Study to estimate future bed requirements for accident cases in the Reading hospitals</i>	285
<i>Why staff leave the Reading hospitals</i>	388
<i>Study of the Orthopaedic Department at Reading</i>	412
<i>Study of the use of orthopaedic beds at Princess Margaret Hospital, Swindon</i>	413
<i>Reasons for delay in discharge from hospital</i>	414

43. *Royal College of General Practitioners, London SW7 1PU, General Practice Research Unit*

DR D. L. CROMBIE

DR R. J. F. H. PINSENT, DR R. T. FARMER, DR D. M. FLEMING

*Term of current contract:* 1968-75

*Support in 1971-2:* £31,000

The Unit's aim is to develop methods of research for use in general practice; to give advice upon these methods and to teach them; and to undertake research alone or with other bodies. Experience has been gained in the use of study practices of which the Unit has two in the Birmingham area, at Harborne and Birchfields, as workshops for research in general practice.

See section 3, Publications, page 435.

CURRENT PROJECTS

- |   |     |
|---|-----|
| (i) <i>The second National Morbidity Survey</i>               | 242 |
| (ii) <i>The development of standardized recording methods</i> | 448 |

44. *Royal College of Nursing Research Unit, London WIN 0AB*

*Director:* PROFESSOR J. TIZARD

*Project Leader:* MRS U. INMAN, H. MADDOX

*Current contract:* 1968-73

*Support in 1971-2:* £19,000

The Unit was set up in 1966 to provide a centre from which nurses could study and attempt to measure the quality of nursing care under guidance from experienced research workers. The guidance is provided by a steering committee and additional specialists in particular disciplines as necessary. Two sets of six nurse research assistants have carried out individual studies, each isolating a critical area in nursing care and establishing facts in that area. No one study alone can achieve the aim of the project to develop measures of quality of care and currently the project has entered into a second phase to draw from the completed studies and to develop further measures which can be used together to give some measure of the quality of care.

See section 3, Publications, page 435.

45. *St Christopher's Hospice, London SE26 6DZ*

DR CICELY M. S. SAUNDERS

DAME ALBERTINE WINNER, DR C. M. PARKES, DR R. G. TWYROSS, MISS M. E. SPINKS

*Current contract:* To 1975

*Support in 1971-2:* £14,500

*Co-sponsors:* School of Family Psychiatry and Community Mental Health, the Tavistock Institute of Human Relations

The interests of the Research Group at St Christopher's stem from Dr Saunders' work in the management of terminal pain and distress at St Joseph's Hospice between 1958 and 1965, from the various studies on bereavement carried out by Dr Murray Parkes, and from the aim of the hospice since its opening in 1967, to accept the family as the unit in need of its care. The experimental domiciliary service and the psychosocial studies were planned as an evaluation of this work and of the current needs in the community nearby.

See article on pp. 19-25 of Part II.

## CURRENT PROJECTS

<i>Out-patient clinic and Home Care Service at St Christopher's</i>	152
<i>Diamorphine (heroin) in the treatment of pain associated with advanced malignant disease</i>	245
<i>Evaluation of a service for bereaved families</i>	360
<i>Study of patterns of terminal care in Bromley and Lewisham</i>	503
<i>Comparison of opinions on terminal cancer care at St Christopher's Hospice and other institutions</i>	504

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46. *Sheffield, University of; Department of Community Medicine, Medical Care Research Unit, Sheffield S10 2TN*

PROFESSOR J. KNOWELDEN

DR B. T. WILLIAMS, MRS A. W. M. WARD, DR R. A. DIXON

*Current contract: 1970-3*

*Support in 1971-2: £6,000*

*Co-sponsor: Sheffield Regional Hospital Board*

The Unit was the continuation in 1970 of a similar joint activity of the DHSS, the Sheffield Regional Hospital Board, and the University of Sheffield Department of Community Medicine (then called the Department of Preventive Medicine and Public Health) which had started in 1965. The studies undertaken have general application, but are selected because they have particular relevance within the Sheffield Hospital Region.

See section 3, Publications, page 436.

## CURRENT PROJECTS

<i>The utilization of hospitals and residential homes by the elderly in Sheffield</i>	147
<i>Utilization of rehabilitation services by orthopaedic and accident services</i>	175
<i>A study of a BMA deputizing service and its effect on hospital in-patient use</i>	415
<i>Impact of the provision of a terminal care nursing home in Sheffield</i>	505

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47. *Tavistock Institute of Human Relations, Centre for Applied Social Research, London NW3*

DR E. J. MILLER

DR I. MENZIES, D. TOWELL

*Current contract: 1969-75*

*Support in 1971-2: £20,000*

The DHSS has provided, and is providing, support for projects by Dr Miller concerned with the study of institutions and services from the view of a social anthropologist, and by Dr Menzies of the welfare of young children.

See section 3, Publications, page 436.

CURRENT PROJECTS

<i>Geriatric hospital care</i>	149
<i>Psychological welfare of young children making long stays in hospital</i>	181
<i>The development of self-innovation in hospitals through the aided use of social research</i>	393
<i>Day-nurseries and child-minders</i>	—

48. *Tavistock Institute of Human Relations, Institute for Operational Research, London NW1*

Director: J. STRINGER

*Health Programme Director: G. M. LUCK*

DR M. C. J. ELTON, MRS E. GREGORY, DR J. M. H. HUNTER, J. LUCKMAN, D. W. MILLEN, M. E. NORRIS, MISS G. M. OVERTON, B. R. QUARTERMAN, A. SUTTON, H. C. WISEMAN

*Current two-year rolling contract*

*Support in 1971-2: £52,000*

The Institute for Operational Research was set up in May 1963 and is one of the five research units within the framework of the Tavistock Institute of Human Relations. The health programme forms about one-third of the Institute's activities. The DHSS supports a programme of operational research directly related to subjects under study by the DHSS OR Unit (see entry no. 56 (i)). The contract also provides for collaborative studies with hospital boards and for generalization of results for wider dissemination.

See section 3, Publications, page 436.

CURRENT PROJECTS

<i>Health and welfare of the elderly</i>	150
<i>Scheduling of patients for investigation</i>	288
<i>120-bed clinical nursing unit research project</i>	416

49. *Wales, University of; University College of Swansea, Department of Sociology and Anthropology, Swansea SA2 8PP*

PROFESSOR W. M. WILLIAMS

MRS M. STACEY, DR P. A. PARISH, B. J. BROWN, F. CLOUGH, MRS J. COMAROFF,  
D. J. HALL, MISS R. JACOBS, MRS R. M. PILL, G. V. STIMSON

*Current contract*: 1968-74

*Support in 1971-2*: £47,000

The present field of interest which is centred on medical sociology has grown up during the past seven years from the research interests of individual members of the teaching staff in the Department of Sociology and Anthropology.

See section 3, Publications, page 436.

#### CURRENT PROJECTS

<i>Psychosocial aspects of the hospitalization of child patients</i>	90
<i>Aspects of the sociology of prescribing in general practice: a longitudinal study of a cohort of GPs in England and Wales</i>	507

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50. *Wales, University of; Welsh National School of Medicine and Medical Research Council Epidemiological Research Unit (South Wales), Cardiff CF2 1YE*

PROFESSOR A. L. COCHRANE

DR P. C. ELWOOD

*Current contract*: 1968-73

*Support 1971-2*: £5,000

By arrangement with the Council and the Director, the Department has financed or contributed to a number of service related studies planned by Professor Cochrane and he has acted as adviser and guide to other projects financed through the Welsh National School of Medicine.

#### CURRENT PROJECTS (financed through the School)

<i>An evaluation trial of supplementary milk in pregnancy and infancy: Dr Elwood</i>	76
<i>The treatment and outcome of stroke</i>	95
<i>A costing study of cone biopsy hysterectomy and radiotherapy</i>	289

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51. *Wessex Regional Hospital Board, Winchester, and Southampton, University of; Medical School, the Wessex Medical Information Unit*

PROFESSOR M. R. ALDERSON

D. O'BRIEN, M. SLATTERY, K. L. GOULDING

*Current contract*: 1971-4

*Support in 1971-2*: £8,000 (initiating year) with contributory support by Wessex RHB

*Co-sponsor*: Wessex Regional Hospital Board

The Wessex Medical Information Unit, associated with the Chair of Medical Information at the University of Southampton, was established experimentally in

1970 under the joint sponsorship of the DHSS and the Wessex RHB. Its initial aim is to develop the processing of routinely collected data for exploitation for managerial purposes, medical research and teaching.

## CURRENT PROJECT

*Medical Information Unit*

450

52. *Wessex Regional Hospital Board, Winchester, and Southampton, University of; Mental Handicap and Geriatrics Research Unit*

DR A. KUSHLICK

R. BLUNDEN, P. WILLIAMS, R. WHATMORE, B. SEXTON

*Current contract: 1970-7**Support in 1971-2: £10,000 (in part through MRC)**Co-sponsor: Medical Research Council*

The interests of the Research Group arise from a request to Professor Jack Tizard from the Wessex Regional Hospital Board in 1961 for his advice on the number and type of places required to meet residential needs of the mentally handicapped in the Region. As a result a prevalence survey was undertaken, and an on-going epidemiological register established. On the basis of data generated and other data, advice was given on setting up alternative forms of residential care (experimental) which would be predicted to achieve defined client-oriented and administrative-oriented aims more simply and effectively than existing (control) services.

The group has now been expanded and will examine problems of caring for the elderly.

See the article on pp. 41-48 of Part II.

## CURRENT PROJECTS

*Epidemiological survey and on-going Register on administrative prevalence of mental handicap in the Wessex Region*

105

*Evaluation of residential care services for mentally handicapped children and adults*

106

53. *York, University of; Department of Economics and Related Studies and Institute of Social and Economic Research, York YO1 5DD*

PROFESSORS A. T. PEACOCK, J. WISEMAN

A. J. CULYER, A. K. MAYNARD, J. R. SHANNON, R. A. AKEHURST, J. CULLIS,

R. J. LAVERS, M. S. REES, MISS R. TINGLE, P. WEST, K. WRIGHT

*Current contract: 1972-5**Support in 1971-2: £9,500*

*Co-sponsors: Asbestosis Research Council, Institute of Municipal Treasurers and Accountants, Leeds RHB, Medical Research Council, Nuffield Provincial Hospitals Trust, Social Science Research Council, Health Economics Research Programme*

The Health Economics Research Programme was established in the Institute of Social and Economic Research through the generous financial aid of the Nuffield Provincial Hospitals Trust, and is currently supported by the DHSS.

## CURRENT PROJECTS

<i>Economics of hospital costs</i>	290
<i>Economics of hospital waiting-lists</i>	291
<i>Social accounting of health</i>	292
<i>Social indicators for local authority planning</i>	—

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### 1.3. Government and public authority establishments undertaking DHSS research

#### 54. *The Atomic Weapons Research Establishment*

A programme of scientific and technological research is carried out under arrangements made with AWRE. The projects are specifically commissioned by the DHSS and there is close liaison throughout their performance. The main items in the current programme are:

Research: Studies in corrosion, the isolation and identification of metabolites, an intermittent haemodialysis system, dental problems with radiation or nasal carcinomas, dental fillings and dental burrs, extraction of frugs from body fluids, holographic techniques for diagnosis, pessaries for incontinence, an experimental hip joint, and denture base materials.

Development projects: Image intensifiers, toxicity of plastics, cardiac pacemakers, and infra-red screening equipment.

See also entry no. 295.

*Cost in 1971-2*: Approximately £250,000

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#### 55. *The Biomechanical Research and Development Unit, Roehampton SW15 5PN*

This Unit is administered directly by the DHSS. It was established in 1967 and carries out clinical research in relation to leg and arm amputees, and fundamental technological and applied research and development in the structures and mechanisms of artificial limbs, including powered limbs. An article on the work of the Unit was given in the 1971 edition of *Portfolio for Health*, pp. 197-202.

*Approximate cost in 1971-2*: £46,000 (*capital*), £107,000 (*revenue*)

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#### 56. *The Department of Health and Social Security, in-house activities*

The DHSS has a corps of medical and other scientific and professional staffs who assist in the planning, management, and interpretation of the external research programme. There are, additionally, two areas of in-house research.

##### (i) The Departmental Operational Research Service.

This Unit was established in 1970, initially with the main purpose of examining two strategic problems: the allocation of resources under various policy options (Balance of Care study), and the best size to build new district general hospitals (Hospital Size study). The latter is almost entirely an in-house study, whilst aspects of the former have been sub-let to external OR firms including Scientific Controls Systems

Ltd, Novy Eddison and Partners Ltd, the National Coal Board, Arthur Andersen & Co., and the Institute for Operational Research. The strategic studies and the work of NCB on hospital logistics are described more fully in entry no. 33. The service is also responsible for, *inter alia*, studies of the ambulance service and of pathology laboratories, and for the co-ordination of local OR studies carried out at universities with financial support from the DHSS.

See also group entries nos. 42 and 48.

(ii) Departmental Social Science Research Unit.

Since 1965 work has been undertaken by a small team of professional workers within the Statistics and Research Division of the DHSS. Some of the current projects within this field of health and personal social services include studies of clients' choice of hearing aids, accommodation for hospital nursing staff, co-ordination of voluntary services within local social service departments, and the impact of the Children and Young Persons Act on the care of children in community homes.

57. *The Laboratory of the Government Chemist, London SE1*

DR H. EGAN

The Laboratory has a regular commitment to the DHSS to provide chemical, physical, and bacteriological analysis and advice on the quality of the National Dental Service approved materials, NHS hospital supplies and Medicine Act samples, and research is undertaken in association with the service. Current projects include radioactivity analysis for arsenic in persons exposed to it, monitoring hospital water supplies for toxic metals and fluoride, development of novel ionomeric cements and restoratives, stability of diamorphine solutions used to alleviate malignant disease, tar and nicotine yields of cigarettes on sale in the UK, organochlorine pesticide residues in human fat, pharmacopoeial standards, etc.

Support for the Laboratory is provided under inter-government department allied services arrangements.

CURRENT PROJECTS

<i>Determination of tar and nicotine yields of all brands of cigarettes on sale in the UK</i>	158
<i>Organochlorine pesticide residues in human fat</i>	159
<i>Radioactivation analysis for arsenic in persons environmentally exposed to it</i>	160
<i>Development of novel ionomeric cements and restoratives</i>	198
<i>Monitoring hospital water supplies for toxic metals and fluoride</i>	199
<i>Stability of diamorphine solutions used to alleviate malignant disease</i>	200
<i>Standard test procedures for dental resins, cements, and casting alloys</i>	317
<i>Arbitration methods for medicinal products</i>	318
<i>Pharmacopoeial standards for medicines</i>	319
<i>Methods for determining the efficacy of disinfectants</i>	320



58. *The Medical Research Council, London W1N 4AL*

The DHSS supports a considerable amount of research in collaboration with the MRC. This includes investigations carried on for the DHSS in the MRC's own establishments, such as advisory and control work under the Therapeutic Substances Act by the Biological Standards Division of the National Institute of Medical Research and programmes of research carried out under arrangements made jointly by the two authorities with outside organizations. The main current jointly sponsored activities are the MRC/DHSS Epidemiology and Medical Care Research Unit at Northwick Park Hospital (see entry no. 10), the Addiction Unit and work by the MRC Unit of Social Psychiatry at the Institute of Psychiatry (see entry no. 6 and group entry no. 23), the Blind Mobility Research Unit, at Nottingham (see group entry no. 37), and the studies at the University of Southampton in services for mental handicap and the elderly (see group entry no. 52).

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59. *The Public Health Laboratory Service Board, London W1N 4DA*

An account of the investigative work undertaken by the Public Health Laboratory Service was given by the Director in the 1971 edition of *Portfolio for Health*, pp. 213-19. Research is financed routinely, within the normal budget of the PHLS; but major new or unforeseen projects are funded initially by special extra-budgetary authorization of funds.

Some current major projects are: identification of bacteria by computer; the development of studies in hepatitis, farmer's lung, laminar flow ventilation, transferable blood resistance; surveillance of whooping cough vaccine.

## 2

# Classified list of projects under support

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### Explanatory note

This is a classified list of extramural research projects under DHSS support<sup>1</sup> which were current at 1 April 1972. It includes projects directly commissioned by the DHSS, which can be distinguished by the inclusion of cost figures, and those carried out within the programme contracts in section 1.

The entries within each class are arranged in alphabetical order of the establishments. Each entry includes:

- (a) The name of the establishment.
- (b) The project leader(s).
- (c) Other bodies giving contributory financial support.
- (d) The title, and a brief description of the aims and methods, of the project.

Entries of directly commissioned projects include also:

- (a) The cost of the project.<sup>2</sup>
  - (b) References to publications.<sup>2</sup>
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### 2.1. The mother and infant

60. *United Birmingham Hospitals, Department of Clinical Psychiatry*

DR M. SIM

MISS R. FROST

1. Except those in the social security and building and engineering fields: see p. 235.

2. This information for the entries relating to research under programme contracts is given for the programme as a whole in the group entries, to which cross references are made (see pp. 236 and 237).

**Psychiatric illness in pregnancy***Approved support 1971-2: £1,300*

This is a retrospective study of all case records of patients with instability associated with pregnancy, who were referred to the principal worker while working in the United Birmingham Hospitals' Department of Clinical Psychiatry, since 1951. These include puerperal psychoses, mental illness occurring during pregnancy, refused abortions, and post-abortive psychoses. A follow-up of the children of these mothers and the mothers themselves has been undertaken.

61. *Birmingham, University of; Department of Social Medicine, Health Services Research Centre*

DR L. J. OPIT

DR J. CRAWFORD

**Obstetric/anaesthetic survey**

The survey attempts to measure the workload generated by obstetrics on the anaesthetic services in the Birmingham Region and it is concerned with relating the organization and quality of the anaesthetic service to certain types of anaesthetic morbidity. An inquiry form is being completed for every specified item of anaesthetic service throughout fifty hospitals in the region for a period of six months.

See unit entry no. 11.

62. *Birmingham, University of; Department of Social Medicine, Health Services Research Centre*

PROFESSOR E. G. KNOX

DR J. LEIGH, DR E. L. M. MILLER, DR D. F. MAHON (*City of Birmingham Health Department*)**Childhood surveillance project**

The City of Birmingham in conjunction with the Department of Social Medicine has for many years maintained a semi-automated register of all births. It has been the basis of a large series of scientific studies of growth, development, congenital malformation, etc. The objective now is to extend the degree of automation and to convert this from a register with purely scientific applications to one which will assist in the management and scheduling of care and screening in childhood. The feasibility and design studies will soon be the subject of proposals to the DHSS.

See unit entry no. 11.

63. *Exeter, University of; Institute of Biometry and Community Medicine*

PROFESSOR J. R. ASHFORD

DR J. G. FRYER

**Trends in perinatal mortality in England and Wales**

This study is concerned with the monitoring of recent trends in perinatal mortality

in England and Wales, with particular reference to the effects of changes in the organization of the maternity services and the implications as regards policy for the future organization of these services.

See unit entry no. 4.

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64. *Exeter, University of; Institute of Biometry and Community Medicine*

PROFESSOR J. R. ASHFORD

DR J. G. FRYER, DR R. J. PETHYBRIDGE

**The joint distribution of gestation and birthweight**

This study involves the assessment of the observational errors associated with the recording of gestation and birthweight. The relationship between these two quantities is being investigated in the light of the idea that the total population of births may be divided into a primary and a secondary distribution. This study is based on data obtained for the south-west region from the National Birthday Trust 1958 Survey, the analysis of standard birth notifications for Plymouth, Devon, Torbay, and Exeter local authorities for 1970, and other sources concerning gestation and birthweight, including 60,000 births from Sweden.

See unit entry no. 4.

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65. *Exeter, University of; Institute of Biometry and Community Medicine*

PROFESSOR J. R. ASHFORD

DR J. G. FRYER, DR R. J. PETHYBRIDGE

**Factors affecting birthweight and perinatal mortality**

This study is based on the information provided by individual birth certificates and local authority birth notifications for all births in south-west England during 1965 and all perinatal deaths in south-west England during 1966-8, the object being to assess and compare on a quantitative basis certain biological and environmental factors related to birthweight and perinatal mortality. It is also intended to construct a mathematical model of the distributions of birthweight and perinatal mortality in selected populations.

See unit entry no. 4.

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66. *Exeter, University of; Institute of Biometry and Community Medicine*

PROFESSOR J. R. ASHFORD

M. D. MACDONALD

**Variations in birthweight distribution and perinatal mortality between different local authorities in England and Wales**

This is an investigation of differences in birthweight distribution and perinatal mortality between different local authorities in England and Wales, and their relationship to other characteristics of the local authorities based on information

furnished by annual returns of local authorities in England and Wales for 1956-69, the annual returns of the Registrar-General for 1956-69, and by various other sources of data about local authorities for 1956-69. On the basis of these results, the actual and 'expected' perinatal mortality in each local authority are being compared and particular local authorities with large discrepancies have been identified. The significance of these discrepancies in terms of the organization of the maternity services is being assessed.

See unit entry no. 4.

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67. *The Kennedy-Galton Centre, Watford WD7 9HQ*

DR C. O. CARTER

**The prenatal detection of genetically determined disorders**

*Approved support 1970-3: £4,700*

The aim of the project is to establish a reliable method for culture of cells from amniotic fluid, so that their chromosome can be examined. Prenatal diagnosis of various conditions is then possible. The cells are also subjected to chemical tests and, in some cases, to EM investigations. Studies have also been made of the enzyme content of amniotic fluid at different stages, with special reference to amylase.

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68. *Leeds, University of; Department of Paediatrics and Child Health, Leeds LS1 3ET*

PROFESSOR R. W. SMITHELLS

**Leeds Pregnancy Nutrition Study**

*Approved support 1969-72: £5,100*

*Co-sponsors: Action for the Crippled Child, Roche Products Ltd*

The study aims to relate nutrition in early pregnancy to the outcome of pregnancy. Seven-day weighed diets have been studied on 200 mothers, and are being related to biochemical values, which have been studied in almost 2,000 mothers, and to the outcome of the pregnancy. This data is supplemented by information on maternal height, smoking habits, social class, and other relevant factors. It is hoped that the study may show nutritional factors relevant to some of the major causes of perinatal mortality.

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69. *London, University of; Guy's Hospital Medical School, Paediatric Research Unit*

PROFESSOR P. E. POLANI

**Fluorescence studies in subjects with Y-chromosome anomalies**

New techniques for chromosome identification have recently been developed which are of considerable value, especially where a more precise cytological diagnosis would aid genetic counselling. Quinacrine dyes are used to produce distinct fluorescent banding patterns of the chromosome. The characteristic brilliance of the Y-chromosome and Y-chromatin fluorescence is of particular significance. In addition this technique ensures the accurate pairing of homologues, helps in the

identification of chromosomes involved in translocations, and reveals a number of bright fluorescence variants useful as cytogenetic markers. The various applications of this staining technique are currently being examined in studies of selected groups of patients.

See group entry no. 20.

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70. *London, University of; Guy's Hospital Medical School, Paediatric Research Unit*

PROFESSOR P. E. POLANI

**Sex chromatin and chromosome studies on amniotic fluid obtained at amniocentesis**

Amniocentesis is being used to enable prenatal diagnosis of chromosomally abnormal fetuses to be made when the mother is especially at risk. Amniotic fluid is required from the patient between the thirteenth and sixteenth week of pregnancy, and the cells obtained from this fluid are cultured. Nuclear sexing is carried out directly on uncultured cells by examination for Barr bodies and/or Y-chromatin fluorescence, and the results confirmed later by chromosome analysis on the cultured cells if necessary.

See group entry no. 20.

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71. *London, University of; St George's Hospital Medical School, Department of Medical Microbiology, London SW1*

PROFESSOR H. STERN

**Epidemiology and clinical patterns of cytomegalovirus infection**

*Approved support 1971-4: £26,000*

*Co-sponsor: Medical Research Council*

The project aims to determine the mechanism of spread of cytomegalovirus and its importance as a cause of disease, and to develop methods of prevention. The major part of the study is concerned with cytomegalovirus infection in pregnancy. Women are being followed clinically, virologically, and serologically through the course of pregnancy, and their infants similarly for a further year or more. In this way, information is obtained on the importance of the virus as a cause of mental retardation, and on whether the severity of the neonatal illness and the degree of brain damage are related to the gestational age of infection.

Other studies are concerned with the incidence and clinical significance of venereal and blood transfusion spread of virus, with the frequency of primary and reactivated latent infection of patients undergoing immuno-suppressive methods of therapy, and with antigenic analysis of cytomegalovirus strains and the problems of prophylactic immunization.

See section 3, Publications, page 437.

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72. *London, University of; St Thomas's Hospital Medical School, Department of Clinical Epidemiology and Social Medicine, Social Medicine and Health Services Research Unit with Kent County Council, Mental Health Department*

PROFESSOR W. W. HOLLAND

DR M. CLARKE

### **Study of the aetiology of mental subnormality**

The aim of the study is to investigate the influence of certain factors in the prenatal and natal periods in the aetiology of mental subnormality by investigating records of the Mental Health Department of Kent County Council. Subsidiary aims are to define the group of subnormal children in terms of diagnosis, developmental or intelligence quotient and physical defects and to determine the ascertained prevalence of mental subnormality in the study population, which consists of all babies born in Kent from 1967 to 1970. It is calculated that about 200 subnormal children will be notified.

See unit entry no. 8.

73. *The National Birthday Trust Fund, London SW1W 0LR*

DR ROMA CHAMBERLAIN

G. CHAMBERLAIN, B. HOWLETT, MRS S. KIMBER

### **British Births Survey, 1970**

*Approved support 1972-4: £14,100*

*Co-sponsors: The National Birthday Trust Fund, the Royal College of Obstetricians and Gynaecologists*

A study of the events occurring during pregnancy, childbirth, and the first week of life from a national sample of women, to find ways of improving perinatal mortality and the quality of life of the children. The survey was carried out on about 17,000 births which occurred in one week in April 1970.

Questionnaires were completed by the midwife in charge of the case by interviewing the mothers and from the case-records. All births in England, Wales, Scotland, and Northern Ireland were included, and the results are now being analysed.

74. *National Children's Bureau*

DR M. L. KELLMER PRINGLE

### **Pilot study of the day-care needs of preschool children**

The aim of this project is to explore and develop viable methods by which individual local authorities can estimate the extent and nature of the need for day-care provision for their preschool children. A pilot study has been mounted in a county borough. This has involved examining the nature of records routinely kept within various departments of the borough on families with preschool children. In addition information about a random sample of 250 families in the borough has been obtained

from health visitors' records. Finally these same families were seen individually by trained and briefed interviewers.

See group entry no. 32.

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*75. Newcastle upon Tyne, University of; Medical Care Research Unit with Department of Obstetrics*

PROFESSOR D. J. NEWELL, I. T. RUSSELL

DR P. R. PHILLIPS, PROFESSOR J. K. RUSSELL, S. L. BARRON

**The Newcastle maternity survey**

The Newcastle maternity survey was set up by the University Department of Obstetrics with the object of examining the causes of perinatal mortality, and the use of the maternity services in the City of Newcastle upon Tyne. From 1960 to 1969 inclusive, obstetrical and social data were collected on all births to women resident in the city. Current work and future plans include an epidemiological account of perinatal mortality, with particular reference to previous foetal loss; an investigation of the medical care aspects of place of booking and place of delivery; longitudinal studies of birthweight and maternal and foetal morbidity; and specific sub-studies of clinico-pathological cause of death, the unbooked maternity patient, and breech delivery.

See unit entry no. 9.

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*76. Wales, University of; Welsh National School of Medicine, Department of Child Health and Medical Research Council Epidemiology Unit (South Wales), Cardiff CF2 3AS*

PROFESSOR A. L. COCHRANE, DR. P. C. ELWOOD

DR D. DAVIES, MISS C. HOPKINSON, MRS D. WILLIAMS

**A randomized controlled trial of supplementary milk in mothers and infants**

The aim of the trial is to determine whether or not entitlement to a supplement of milk has a detectable effect on child growth and development. About 1,000 pregnant women are to be identified. Half of these, chosen at random, and the infants subsequently born to them, will be supplied with tokens entitling them to a free daily half-pint of milk. Measurements of the infants' linear growth, head circumference, and weight will be made at intervals, and estimates of development and dental state will be obtained.

See group entry no. 50.

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## **2.2. The handicapped child**

*77. 1 King's Avenue, Birchington, Kent*

DR JOYCE R. LUDLOW



**Study of children suffering from Down's disease in East Kent***Approved support 1970-3: £3,000*

The project aims to observe the effect of various factors, including preschool stimulus and early institutionalization, upon the mental development and social competence of mongol children.

Three groups, totalling 200 children, are being compared. These are home-reared children who have received regular counselling and guided stimulus during their first five years; home-reared children who have received no such help; and children who were institutionalized before their second birthday.

*78. Greater London Council, Department of Planning and Transportation, Social Studies Division, London SE1 7PB*

MISS B. M. SPAIN

MISS G. MARTIN

*Approved support 1967-74: £24,600**Co-sponsor: Greater London Council*

The project aims (i) to determine the incidence of neural tube defects within Greater London between 1965 and 1969 and to establish the survival rate and patterns of treatment for spina bifida children born in this period compared with treatment patterns for earlier cohorts of births, and (ii) to discover the range of mental and physical handicaps among spina bifida children born between 1967 and 1969 and to investigate the family problems and use of services.

Notifications were obtained from the borough MOsH, the Registrar-General's death and stillbirth certificates and from the diagnostic index of the treatment hospitals. A prevalence study of spina bifida children under 16 at the end of 1966 was undertaken and their medical records perused to discover patterns of treatment and range of handicaps, and to establish incidence and survival rates.

The survivors of the 1967-9 cohorts are being visited annually up to the age of 5 years. Each child is given a developmental assessment and the mother interviewed to determine what family problems have arisen, what medical services are being used and the satisfaction with these.

See section 3, Publications, page 437.

*79. London, University of; Guy's Hospital Medical School, Dental Department for Children, London SE1*

PROFESSOR W. J. TULLEY

MRS D. POOL, R. FAWCUS, MRS J. NAGEL

**The dental problems of physically and mentally handicapped children***Approved support 1968-72: £23,000**Co-sponsor: The Spastics Society*

The project aims to assess the need for dental treatment in handicapped children; determine whether there is a demand for this treatment to be met; discover whether

it is possible to carry out this dental treatment and institute preventive measures using normal methods in a mobile unit at the schools and centres; and determine the proportion of children requiring referral to hospital for full treatment under general anaesthesia. In addition to this, observations on levels of co-operation, time required for treatment, and full analysis of dental disease and treatment carried out is being prepared.

The study is being carried out on about 900 children aged 1½-17 years, and the prevalence of dental disease in 800 normal children in the same area is being used for a comparison of dental disease.

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80. *Manchester and Salford Council of Social Services, Manchester M2 5JL*

MRS S. M. WORTHINGTON

**Support Project**

*Approved support 1971-2: £2,500*

*Co-sponsors: National Elfrida Rathbone Society. Several local trusts*

The two aspects of this pilot project are descriptive evaluations of (i) voluntary support for ESN school-leavers in the transition from school to work, and (ii) friendly voluntary home visiting of inadequate families of children attending special schools.

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81. *National Children's Bureau*

DR M. L. KELLMER PRINGLE

**National study of the facilities for the further education, training, and employment of severely handicapped school-leavers**

The sample for this project consists of 1,700 children, which is fully representative of those school-leavers from special schools for the handicapped in England and Wales in 1969. Full information was obtained from schools and the Youth Employment Service for 1,400 children; and partial information was obtained for a further 200. The data include details of the children's abilities and disabilities, behaviour and adjustment, and predictions about their vocational, further education, and training needs after leaving school. A follow-up eighteen months after school-leaving gathered information about what actually happened from the young people, their parents, and, where possible, from their current employers.

See group entry no. 32.

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82. *National Children's Bureau*

DR M. L. KELLMER PRINGLE

**National study of mentally handicapped children**

Data from the National Child Development Study, which is a long-term study of one week's births in 1958, have enabled a group of mentally retarded children to be identified and studied in some detail. The aims of this project are to investigate at 7 and 11 years the children's perinatal history, their present environment,

physical status including the presence of additional handicaps, and the type of special educational treatment they are receiving. In the past, studies of mental retardation have been confined to selected groups or local samples so the study provides a unique opportunity to look at information about mentally retarded children on a national scale.

See group entry no. 32.

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83. *Newcastle upon Tyne, University of; Institute of Education, Newcastle upon Tyne NE1 7RU*

PROFESSOR B. STANLEY

A. ARNOT, MRS K. WALLIS, P. SIMPSON

**Investigation into the stimulation of language development of mentally handicapped children**

*Approved support 1968-72: £11,700*

*Co-sponsor: University of Newcastle upon Tyne*

The aim of the initial project (1967-71) was to see how far it is possible for teachers of mentally handicapped children to stimulate language development. Language scales were devised to assess the language ability of children at the beginning and end of an eighteen-month period, during which teachers of the experimental group worked with the research workers to devise methods of encouraging language development. This project showed that such a programme of language stimulation carried out by teachers had a greatly beneficial effect on language development. When asked what was the greatest help to them, however, teachers all stated that it was having knowledge of the level of language ability of each child and the greater awareness which language assessment had given them. A second project (1971-2) therefore grew from the first and work is now being carried out to look into the possibility of publishing the Language Assessment Scales for use by teachers. The initial project is being written up as a book for teachers.

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84. *Royal Devon and Exeter Hospital, Department of Paediatrics and Exeter, University of; Institute of Biometry and Community Medicine, Exeter EX1 2ED*

DR F. S. W. BRIMBLECOMBE, DR D. C. MORGAN

DR MARY VOWLES

**The incidence of congenital malformations and their call upon community resources**

*Approved support via RHB 1971-3: £16,500 with provisional additional support via Exeter University*

The incidence of congenital malformations within a defined area is being determined. An attempt is being made to discover how successful current health service procedures are in identifying malformations at an early stage. The degree of disability and the handicap caused to the children during their first five years of life is being measured together with the requirements of treatment by the medical services and

the demand made on social and educational services by the children and their families.

Birth notifications and discharge forms, additional reports to the local health department, examination of hospital records, a review of the hospital discharge register, and reports from GPs form a basis for the incidence study. Specificity and observer variability connected with some diagnostic tests are to be evaluated, while the medical and social requirements of the children and their families are being obtained by questionnaire and by examination of the records of the services involved. A study of the requirements of normal children and their families is being used as a control.

See also unit entry no. 4.

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### 2.3. The deprived child

85. *Birmingham, University of; School of Education, Centre for Child Study, Birmingham B15 2TT*

C. J. PHILLIPS

DR HARRIETT WILSON, G. W. HERBERT

**Child Development Study (Birmingham 1968-71): A study of inadequate families**

*Approved support 1970-2: £23,800*

*Co-sponsor: Bernard van Leer Foundation, The Hague*

The characteristics of fifty-six indigenous families having five or more children, including a 6-year-old and 10-year-old boy, and known to the City of Birmingham Social Service Department are being studied.

Sociological data form the basis of parent typologies to be related to a number of psychological attributes in one boy in each family. Each boy is also compared to national and local standards. Controls are chosen representing different degrees of social disadvantage.

The main sample and half the controls are given a general clinical examination. The findings are related to psychological tests and ratings. Play-groups run for the 3-5-year-old children of the main sample provide data on types of play, social interaction, and language, which are compared to data obtained from a play-group of working-class children who are not socially handicapped.

Child-rearing methods of the 4-, 6-, and 10-year-olds are ascertained by interviews with parents from the main sample, and are compared with data from other surveys of working-class populations. Differences in child-rearing methods among the main sample are related to psychological traits of the boys.

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86. *Dartington Research Unit into the Sociology of Education, Totnes TQ9 6ED*

DR R. LAMBERT

S. MILLHAM, R. BULLOCK, P. CHERRETT

**A comparative study of eighteen boys' community (approved) schools***Approved support 1971-4: £32,000**Co-sponsors: The Trustees of Dartington Hall*

The project aims to evaluate the effectiveness of various styles of residential care in achieving educational progress, improving relationships and preventing delinquency, by charting the differences of approach among eighteen boys' approved schools. Styles of boarding, aims of the schools, commitment of boys and staff and the social processes arising in the various structures are being examined and compared. Research material has also been gathered on the boys' background and their careers after release.

See section 3, Publications, page 437.

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**87. *The Hospital for Sick Children, Department of Psychological Medicine, London WC1N 3JH***

DR P. GRAHAM, DR NAOMI RICHMAN

J. STEVENSON, MRS R. MURRAY, MISS R. KEMP

**The prevalence of behaviour problems in 3-year-old children***Approved support 1971-4: £30,000*

The study aims to determine the prevalence of behaviour problems and developmental delays in a total population of 3-year-old children. The mothers of a one-in-four sample of children (from a total cohort of 4,000) are being interviewed using a standardized procedure. A further interview and more intensive psychological testing is being carried out on subgroups of this sample, to compare the social backgrounds and domestic difficulties of groups of children selected for possible behaviour disorder and language retardation. These will be compared with a randomly selected group, matched for age and sex.

See section 3, Publications, page 437.

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**88. *Leicester, University of; School of Social Work, Leicester LE1 7CA***

P. BOSS, M. SHAW

MISS J. HOMESHAW, R. PINDER

**Coloured children in care***Approved support 1971-3: £21,400*

A study of the circumstances bringing coloured children to the notice of three local authority social service departments and the subsequent progress of those children who are admitted to care.

Part I of the study focuses on the circumstances surrounding current applications or committals to care with a follow-up of the care process in selected cases. Part II is a study of a sample of children who have been in care for a given period. Samples of coloured and non-coloured children are being studied for comparison.

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89. *National Children's Bureau*

DR M. L. KELLMER PRINGLE

**National study of children in one-parent families**

The aim of this project, which began in November 1970, is to study the educational, social, psychological, and physical development of a group of children who have experienced life in a one-parent family.

The samples and material for the investigation are drawn from the National Child Development Study, a longitudinal follow-up of all children born in England, Scotland, and Wales in one week of March 1958. A preliminary report, submitted to the Finer Committee in August 1971, contained information on the incidence and certain characteristics of one-parent families. Further analyses will compare the development of the children concerned with that of children living in 'normal' two-parent homes.

The project will be completed by October 1973.

See group entry no. 32.

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90. *Wales, University of; University College of Swansea, Department of Sociology and Anthropology*

PROFESSOR W. M. WILLIAMS, MRS M. STACEY

**Psychosocial aspects of the hospitalization of child patients**

Four linked studies are in process:

(i) A psychological study of children aged 3-6 aimed to characterize different types of response to hospitalization and particularly to identify 'at risk' groups.

(ii) The experimental introduction of play leaders to paediatric wards in two hospitals to assess the acceptance of the play leader in the ward and how her presence affects the child's stay.

(iii) A study of the social relations established in the ward by long-stay, short-stay, and recurrent child admissions to an orthopaedic hospital.

(iv) A psychosocial study of the implications of scoliosis treatment for adolescent girls.

See group entry no. 49.

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91. *York, University of; Department of Social Administration and Social Work, York YO1 5DD*

PROFESSOR KATHLEEN JONES

MRS S. HARRISON

**The social consequences of long-term treatment of children**

*Approved support 1971-4: £14,000*

The study aims to identify by means of interviews, with all those concerned, the social problems that arise for children undergoing long-term treatment, and for their parents; to predict when they are most likely to occur, and to determine the implications for hospital staff, social workers, doctors, and educationalists. Eighty-eight children from six different hospitals are being studied.

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## 2.4. The handicapped adult

92. *London, University of; Bedford College, Social Research Unit*

PROFESSOR MARGOT JEFFERYS

### Tests of physical impairment

This project proposes to analyse data from the Survey of the Disabled carried out by the Office for Population Censuses and Surveys, in order to relate measures of physical impairment to measures of self-care.

See group entry no. 18.

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93. *London, University of; St Thomas's Hospital Medical School, Department of Clinical Epidemiology and Social Medicine, Social Medicine and Health Services Research Unit*

PROFESSOR W. W. HOLLAND

DR M. W. ADLER, MRS K. DUNNELL, MISS I. DAY

### The Responaut study

The study was designed to investigate the conditions and circumstances of a group of patients requiring regular mechanical respiratory support following poliomyelitis, and to discover what medical, technical, and other support is necessary for them in their daily life. By considering possible alternative forms of care for each patient it was aimed both to evaluate the optimum conditions that are reasonable and achievable in the particular circumstances of the patient, and to assess the feasibility and effects of such conditions.

See unit entry no. 8.

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94. *London, University of; University College, Department of Mechanical Engineering, Ergonomics Section, London WC1E 7JE*

DR H. G. MAULE

MISS M. KWOKA

### A comparison of two training methods for use of the Kay sonic aid

*Approved support 1971-2: £40*

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95. *Medical Research Council, Epidemiology Unit (South Wales)*

PROFESSOR A. L. COCHRANE, DR D. BAINTON

MISS B. BUTTS

### The incidence of strokes in a defined community and a study of the resulting disability

A defined community in South Wales (with a population of about 42,500) has been chosen for this study. All twenty-one GPs working in this town have agreed to

notify the team of all new cases of stroke encountered during a defined period of time. As soon as possible, a nurse visits the patient at home or in hospital, and makes further visits at four-weekly intervals for the next three months. The measure of disability being used is that devised by Professor Holland and his Department at St Thomas's Hospital, London, and the work is being carried out in parallel with the stroke study in the Frimley area (entry no. 224).

See group entry no. 50.

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96. *Manchester, University of; Institute of Science and Technology, Department of Management Studies*

B. MOORES

**Investment in mental subnormality—an input/output analysis**

Given the wide variation in resources utilized in various mental subnormality programmes, the object of this study is to discover to what extent these different provisions are reflected in the performance of the units, the performance being measured by the degree of independence and normalization of the patients or trainees. Two important elements in the transformation from resources input to performance outputs are (i) the expectation levels of the staff, and (ii) the nature of the staff-patient interaction.

See group entry no. 31.

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97. *Northwick Park Hospital, MRC/DHSS Epidemiology and Medical Care Unit*

DR T. W. MEADE

DR A. M. S. MASON, W. R. S. NORTH, DR D. S. SMITH (*Northwick Park Hospital*)

**Trial of general rehabilitation methods**

*Co-sponsor: Medical Research Council*

This is the pilot stage of a randomized controlled clinical trial to assess the relative values of different ways of rehabilitating patients with disabling illnesses. Patients are assigned randomly to one of three groups when discharged from hospital. One group receives very intensive rehabilitation (for example, physiotherapy, occupational and speech therapy), and another is treated along conventional clinical lines. The third receives a minimum of specific rehabilitative measures, but is frequently and regularly assessed by a health visitor, who arranges for specific measures when these are indicated. About 150 patients will eventually be included in the pilot trial, which, depending on its feasibility and results, may be expanded into a larger-scale inquiry.

See unit entry no. 10.

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98. *Nottingham, University of; Department of Psychology, Blind Mobility Research Unit*

DR J. D. ARMSTRONG

P.H. 2—22



**Evaluation of mobility performance**

One of the major problems underlying research into mobility of the blind has been the difficulty in specifying mobility skills. A system is being developed which will allow the evaluation of the mobility performance of blind people, with or without mobility aids.

Such a system will be useful in assessing the success of individual devices and specific training procedures. The system involves the assessment of mobility performances, recorded on video-tape, along dimensions of safety and efficiency.

See group entry no. 37.

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99. *Nottingham, University of; Department of Psychology, Blind Mobility Research Unit*

DR J. D. ARMSTRONG

G. A. JAMES

**Tactile maps for blind pedestrians**

Tactile maps for mobility purposes are produced in many parts of the UK by independent groups. This project is concerned with specifying optimum symbols and representations for use on such maps. At the same time, consideration is being given to the problems of training and practical use of both tactile and verbal maps.

See group entry no. 37.

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100. *Nottingham, University of; Department of Psychology, Blind Mobility Research Unit*

DR J. D. ARMSTRONG

D. W. CAMPBELL

**Low vision research**

The majority of blind people have some degree of vision. In many cases this residual vision is capable of being put to good use for mobility purposes. At the present time, however, no special training programmes exist to assist blind people to make the most of what little vision they have. An analysis of the special mobility problems of the low vision blind is being carried out and training programmes will be evolved and evaluated.

See group entry no. 37.

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101. *Royal College of Art, Department of Design Research, London SW7 2EV*

PROFESSOR L. B. ARCHER

K. M. AGNEW

**Evaluation of portable chemical closets for the physically handicapped**

*Approved support 1972: £8,000*

The study is being carried out in collaboration with the DHSS. It is intended to

evaluate the usefulness, actual and potential, of selected portable chemical closets for assistance in the care of the sick and disabled at home, in relation to their incapacities and circumstances.

The Royal College of Art team is carrying out a programme of ergonomic appraisals related to all aspects of delivery, preparation, use, servicing, and reissue of equipment. The work includes a programme of about forty field visits to user situations, to ensure realism and relevance in the laboratory work.

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102. *St Bartholomew's Hospital, South Ockendon Research Unit for the Subnormal, London EC1A 7BE*

PROFESSOR W. LINFORD REES

DR B. W. WATSON, C. DUNK, C. STANTON, MRS B. CASSIDY

**Research unit for the subnormal**

*Approved support 1972-4: £26,000*

*Co-sponsor: St Bartholomew's Hospital*

This unit has been established for the purpose of studying the application of modern technology to improve the quality of life of patients in a hospital for the subnormal, and to provide an opportunity for doctors, nurses, psychologists, therapists, teachers, and administrators to work with engineers and scientists in applying modern technology to this area. It is intended to modify and adapt equipment of all kinds for use by the subnormal; to conduct trials in living areas and study the use of modern materials; and to apply electronics in areas other than the specialized area of teaching aids, and improve aids and programmes to be better suited to the subnormal patient.

During the first year progress has been achieved in developing a number of devices to help with the nursing care of mentally subnormal and physically disabled patients.

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103. *Sheffield, University of; Centre for Human Genetics, Sub-Department of Medical Genetics, Sheffield S10 5DN*

DR C. E. BLANK

**Chromosome abnormality project**

*Approved support 1967-72: £8,400*

The project aims to provide information about the relationship of chromosome abnormality, in particular sex chromosome abnormality, to mental subnormality or mental illness and to antisocial behaviour.

The patients at the Special Hospitals and various prison populations are being karyotyped. Those with abnormal karyotypes and a large hospital control series, are being studied further with respect to criminal activity, medical history, social and family environment, etc. A control series of the adult general population is also being accumulated.

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**104. Wessex Regional Hospital Board**

DR A. KUSHLICK

DR ALISON ROSEN

**Evaluation of a group home for mentally handicapped adults in Slough***Approved support 1972: £1,800**Co-sponsor: Buckinghamshire County Council*

A feasibility study has been undertaken into the possibility of a long-term research project to assess the impact on mentally handicapped adults and their families of admitting such mentally handicapped adults to a group home as opposed to other forms of residential care or staying at home. A group home is defined as a residential facility *without* resident staff and with minimal support and supervision from outside sources.

See also group entry no. 52.

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**105. Wessex Regional Hospital Board, Mental Handicap and Geriatrics Research Unit**

DR A. KUSHLICK

**Epidemiological survey and ongoing register on administrative prevalence of mental handicap in the Wessex Region**

A continuous register of mental handicap has been set up in the Wessex Region with the object of being able to monitor changes in prevalence, service usage and natural history.

It is also used as a sampling frame for more detailed evaluative studies. It is now being used, with special modification, to supply data needed in connection with the sectorization of facilities recommended in the DHSS's policy document, Cmnd 4683.

The Register is maintained by a continuing supply of information from hospital staff (nursing, administrative, and medical) and local authority staff in the social service, education, and health departments. There are now computerized data on about 9,500 subjects.

See group entry no. 52.

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**106. Wessex Regional Hospital Board, Mental Handicap and Geriatrics Research Unit**

DR A. KUSHLICK

**Evaluation of residential care services for mentally handicapped children and adults**

The team is evaluating the feasibility and effectiveness of new, 25-place, locally based units which serve the needs of defined total populations of 100,000 and 200,000 in the case of children and of 50,000 in the case of adults. These units are compared with existing facilities which often have more places, and are outside the areas they serve because they take clients from total populations of up to 1,000,000 or more.

The approach to evaluation consists of attempting to measure the different degrees of 'effectiveness' of different methods of care. It should also be possible to cost different degrees of effectiveness.

The criteria of effectiveness used by the team were incorporated in regional hospital board and hospital management committee operational policy documents. Work continues on refining these measures which have been divided into two main areas which are discussed further in Part II of this volume.

See group entry no. 52.

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## 2.5. The deprived adult

107. *London, University of; Institute of Psychiatry*

PROFESSOR J. K. WING

DR D. TIDMARSH, DR SUZANNE WOOD

### **Camberwell Reception Centre study**

The objective of this study is to determine the services needed by the men using the Reception Centre. In April 1970 a 5 per cent random sample of case papers at the Reception Centre was made and standard social, clinical, and service data extracted. A sample of men attending the Centre between October 1970 and April 1971 was interviewed by a psychiatrist and a sociologist. From these it has been possible to assess the proportion of those attending who are mentally ill, physically handicapped or frail, alcoholic, or otherwise afflicted, suffer from disorders of personality, or are there solely because of acute social problems; and also how frequently they attend and how long they stay.

See group entry no. 23.

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108. *London, University of; Institute of Psychiatry*

PROFESSOR J. K. WING

DR H. DAWSON, J. LEACH, DR J. SCHLICHT, MRS S. WALLER

### **St Mungo's Community Trust study**

St Mungo's Community Trust is a voluntary organization which maintains a 'soup run' for destitute people in London. A survey is being undertaken in order to describe the clinical and social problems of the men and to evaluate the service offered to them.

See group entry no. 23.

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## 2.6. The mentally ill

109. *Department of Health and Social Security, Special Hospitals Research Unit*

DR T. G. TENNENT

### **Admission survey**

Although the Demographic Survey (entry no. 111) will provide much information

about the background of patients in the hospital, it is essentially retrospective and lacks any detail regarding psychiatric status. This study sought to obtain such information along with psychological and EEG data. All male admissions to Broadmoor Hospital between January 1970 and April 1971 have been examined using psychiatric interview schedules, psychological testing, and EEG recordings.

See unit entry no. 7.

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*110. Department of Health and Social Security, Special Hospitals Research Unit*

DR T. G. TENNENT

**Criteria for admission to the Special Hospitals**

The Special Hospitals obviously contain a highly selective population and a series of studies has been proposed with the objective of examining the processes which determine the admission of patients to one of these hospitals. The first of these studies attempts to examine the psychiatric factors involved and all patients falling within certain categories of mental disorder who are put up from prisons or hospitals for placement in the Special Hospitals are being examined.

See unit entry no. 7.

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*111. Department of Health and Social Security, Special Hospitals Research Unit*

DR T. G. TENNENT

**Demographic studies**

The main aim of this project has been to delineate the social and clinical parameters of the Special Hospital population. This will also provide some indication as to which items or areas of information might be developed further in predictive studies.

Information is being extracted from the case notes of all male and female patients admitted to the three Special Hospitals between 1961 and 1965. The Criminal Records Office, Mental Health Index, and the NHS Central Register kindly agreed to assist with the follow-up information.

See unit entry no. 7.

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*112. Kent, University of; at Canterbury, Faculty of Social Sciences, Keynes College*

D. G. MORGAN

R. M. CROMPTON

**Social factors affecting the identification, treatment, and hospital admission of the mentally ill**

*Approved support 1970-2: £2,400*

The ultimate aims are to describe lay and medical attitudes which lead to the identification of persons as being mentally ill and in need of hospital assessment and to describe the referral process leading to consultation with a hospital psychiatrist.

A pilot study has been completed and further study is being planned in collaboration with Professor M. Shepherd of the Institute of Psychiatry (entry no. 22).

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113. *Leeds, University of; Department of Psychiatry and Department of Psychology, Leeds LS2 9LT*

PROFESSORS M. HAMILTON, H. GWYNNE JONES

**Clinical applications of operant conditioning**

*Approved support 1971-4: £15,000 (prov.)*

*Co-sponsors: Medical Research Council, Mental Health Research Fund of Great Britain*

The study is investigating the relevance of operant conditioning procedures to the treatment of chronic schizophrenic patients. These procedures are implemented through a controlled 'token economy' programme, which will indicate the contribution of operant conditioning effects, apart from other effects operating in such a programme.

A pilot study with seven patients ran for eight months in 1971, and the main controlled study began that November, to last about fifteen months. The main study has matched experimental and control groups, each of six patients, both of which are on the Token Economy Unit. A third matched group of six patients act as an own-ward control, and a remaining pool of forty-two patients form a further control group.

See section 3, Publications, page 438.

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114. *Leicester, University of; School of Social Work, Leicester LE1 7LA*

PROFESSOR D. JEHU, DR H. M. N. REES

DR R. K. TURNER, DR R. T. T. MORGAN, D. C. PIKE

**The treatment of psychologically disordered children in the home environment**

*Approved support 1972-5: £34,000*

*Co-sponsor: City of Birmingham Social Services Committee*

The project aims to investigate the use of behaviour therapy with psychologically disordered children in their home environments, including residential establishments and foster homes, and more particularly to develop and evaluate ways of helping the adults caring for such children to ameliorate their emotional and behavioural problems.

The subjects will be children in the care or under the supervision of the City of Birmingham Social Services Department, but the precise composition of the samples and the detailed design of the controlled trials are yet to be determined during the first year of the project.

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**115. Liverpool, University of; Department of Psychiatry, Liverpool L69 3BX**

PROFESSOR A. MUNRO

DR A. PAULINE RIDGES, F. OWEN

**Measures of mental health and disease**

This project is concerned with the investigation of what biochemical parameters may be altered in psychiatric illness and in particular what changes occur in the metabolism of catecholamines and other biogenic amines. Methods have been devised which provide information on the quantitative importance of the various metabolic pathways and the minor qualitative differences which may be found in individuals maintained under carefully controlled and monitored conditions. This has included the development of a highly specific double isotope method to quantify the catecholamines at nanogram levels. These methods are being applied to selected groups of patients and control individuals and the data correlated with other information obtained by workers within the group.

See group entry no 17.

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**116. London, University of; Institute of Psychiatry**

PROFESSOR J. K. WING

DR SHEILA MANN, MISS W. ATKINS

**New long-stay patients in mental hospitals**

Patients who have been resident from twelve to thirty-six months in one hospital in each of the English regional hospital board areas are being interviewed in order to discover the reasons why they have had to remain resident so long, and whether alternative arrangements could be made if other services were available. Hospital doctors and nurses and local authority social workers are helping to provide information.

See group entry no. 23.

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**117. London, University of; St Thomas's Hospital Medical School, Department of Clinical Epidemiology and Social Medicine, Social Medicine and Health Services Research Unit**

PROFESSOR W. W. HOLLAND

DR M. CLARKE, MRS J. J. WALLER

**Functional ability and nursing dependency in a long-stay psychiatric hospital population**

The objective of this study is to assess the functional ability of the long-stay and aged population of a long-stay psychiatric hospital and by so doing to provide information which could be of value in selecting patients for alternative accommodation, and information which would allow nurse/patient ratios to be adjusted more appropriately within the hospital. The method involves the use of a questionnaire which is completed by the senior nursing staff involved in the day-to-day care

of the patient. Work is being undertaken using the results to develop a functional ability index.

See unit entry no. 8.

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118. *Napsbury Hospital Family Research Department and Brunel University*

DR R. D. SCOTT

P. D. CASSON, L. B. PRINCE

**Napsbury Hospital Family Research Project**

*Approved support 1968-73: £12,300*

The research team have found that about 30 per cent of first admission schizophrenics admitted from parental homes become hospital-based, and that the outcome depends on the degree of 'fit' in the patient-parent relationships. The team have developed an interpersonal perception technique for measuring this.

The aim of the project is to subject the test to a predictive trial. Fifty-five schizophrenics admitted to hospitals in North London have been tested soon after first admission (Test 1), and a prediction made as to the outcome two years later, when the family is retested (Test 2). If Test 1 predicts correctly, then family relationships are likely to be the main determinant of outcome; if Test 2, but not Test 1, is correct, then hospital influence is likely to be a more important factor.

In units attached to district general hospitals, the test results should enable identification of cases likely to have become hospital-based in conventional hospitals, and the outcome in the new setting can then be explored and compared.

See section 3, Publications, page 438.

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119. *National Institute for Social Work Training*

MISS E. M. GOLDBERG

MRS J. FELDMAR, DR D. FRUIN, MISS J. E. NEILL, MISS M. L. SHEPPARD, MISS A. VICKERY

**Home treatment of the chronic schizophrenic**

The project is examining the process and outcome of sustained social work help given to a defined sample of fifty chronic schizophrenic patients and their families. The condition of the patient, the burden on the family and their attitudes towards help are independently assessed at the beginning, the mid-point, and the end of the eighteen-month helping period.

See group entry no. 34.

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120. *North Middlesex Hospital, Department of Psychological Medicine, London N18*

DR A. G. MEZEY

**The psychiatric unit in the general hospital**

*Approved support 1964-73: £15,000*

This project aims to study the problems raised by the integration of psychiatry into the work of the district general hospital, and their relevance to the planning of



psychiatric services. Epidemiological, psychological, and clinical methods are used in the collection and evaluation of data.

The work is centred on a geographically defined area and deals with hospital treated mental illness, its incidence, distribution between the different parts of the hospital service, and its acceptance in the general hospital.

See section 3, Publications, page 438.

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121. *Runwell Hospital, Nr Wickford, Essex*

DR A. A. ROBIN

**Comparative studies of a general hospital psychiatric unit and a psychiatric hospital**

*Approved support 1965-73: £22,300*

The project aims to determine clinical and social outcome in similar patients treated in either a general hospital psychiatric unit or a psychiatric hospital, and to study the use of resources involved. The method has been to conduct standard clinical examinations and social assessments of patients treated in the two settings. Patients were then followed up to measure clinical outcome and adjustment. Their medical treatment and quantity of in-patient, day-patient, and out-patient care were assessed. An independent assessor matched patients for sex, age, and diagnosis blind to the research workers conducting the examinations. The relevant results are based on matched pairs of patients treated in each hospital setting.

See section 3, Publications, page 438.

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122. *Southampton, University of; Department of Sociology and Social Administration, Southampton SO9 5NH*

MRS S. N. WANSBROUGH

**Employment experiences of ex-psychiatric patients**

*Approved support 1971-4: £15,000*

The aim of the research is to identify the factors making for successful re-establishment of ex-psychiatric patients in the employment field; and, conversely, contraindications. The topic is being approached from the angle of both employers and employees. The former are being contacted by visit and questionnaire, and a sample of ex-patients in the Wessex area will be interviewed personally.

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## 2.7. The addicted

123. *Christie Hospital and Holt Radium Institute, Department of Social Research, Manchester M20 9BX*

DR J. WAKEFIELD

**Long-term study of cigarette smoking in medical students**

*Approved support:* under discussion

This is a long-term study of cigarette smoking in medical students, compared with students of other faculties.

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124. *Department of Health and Social Security*

DR E. R. BRANSBY

**Study of heroin-dependent patients**

*Approved support 1969-72:* £6,000

The study has two main aims. Firstly, by means of the completion of a questionnaire for each notified drug-dependent patient on first attendance at a hospital treatment centre to describe the patients in terms of a number of personal characteristics and their drug-taking history. Regular analysis of the data will show how the addicts presenting for treatment change in these respects.

The second aim is to follow up such patients in terms of their attendance at hospital, and the drugs they are prescribed, whether they die and their work record, in order to determine their longer-term history.

See section 3, Publications, page 438.

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125. *London, University of; Institute of Psychiatry, Addiction Research Unit*

DR J. G. EDWARDS

DR D. HAWKS

**Heroin prospective study**

This study has two principal objectives; to investigate the aetiology of opiate dependence and to consider the role of the special drug treatment centres in the treatment and control of opiate dependence.

A longitudinal study of a cohort of opiate users first notified in twelve months from November 1970 is being pursued over a period of four years. Areas inquired into include those circumstances precipitating coming to the clinic, the treatment each receives, and the perspective adopted by doctors with regard to each patient. In each subsequent year it is intended to trace the development of the patients' lives in personal interview with them, paying especial regard to their status *vis-à-vis* the treatment clinics.

See unit entry no. 6.

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126. *London, University of; Institute of Psychiatry, Addiction Research Unit*

DR J. G. EDWARDS

DR D. HAWKS

**Retrospective study of heroin addicts known to the Home Office**

Four hundred and fifty heroin addicts known to the Home Office in 1965 are being

followed up employing criminal, hospital, drug status, and employment records with a view to describing the natural history of heroin dependence. Those whose dependence apparently terminated in 1966 will be compared with those still known to the Home Office in 1971, and the adjustment of the total cohort compared before and after the provision of special clinics for the treatment of heroin dependence. If feasible, a sub-sample of those whose dependence has been continuous and those who are apparently drug-free will be interviewed through their GPs in order to establish their contemporary status with a view to checking the adequacy of the official sources employed.

See unit entry no. 6.

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127. *London, University of; Institute of Psychiatry, Addiction Research Unit*

DR J. G. EDWARDS

DR D. HAWKS

**The cannabis follow-up study**

This is a four-year follow-up of a number of cannabis users in London. The study aims to look at questions associated with the use of this drug, the main ones including: 'Is there a demonstrable movement from cannabis use to the use of other drugs, and especially narcotics?' 'What is the nature of legal involvement of users, both in terms of legal response to their drug use and their involvement in other illegal activities?' 'Are there any specifiable predisposing personality or social factors that are significantly correlated with cannabis use?' 'What are the dimensions of the attitudes held by users with regard to their self-image, their immediate peer group, society in general and the use of drugs?'

Three geographical areas have been selected to reflect observable cultural distinctions and class distinctions between areas. Within two of these areas, the samples are further dichotomized on the basis of apprehended legality. The third area is one where there is substantial use of the drug and where there are very few cases ever brought before the courts.

See unit entry no. 6.

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128. *London, University of; Institute of Psychiatry, Addiction Research Unit*

DR J. G. EDWARDS

DR D. HAWKS

**The prevalence of cannabis smoking in tertiary education institutions**

The intention of this study is to establish the prevalence of drug use in a number of tertiary institutions. Those institutions sampled, while not representative of the total, are sufficiently diverse to exclude local bias. The characteristics of smokers and non-smokers will be compared and an attempt made to differentiate between types of smokers. A preliminary survey has been carried out in order to test the methodology in this contentious area with a view to identifying a number of institutions in which more intensive investigations can be carried out.

See unit entry no. 6.

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129. *London, University of; Institute of Psychiatry, Addiction Research Unit*

DR J. G. EDWARDS

DR D. HAWKS, A. OGBOURNE

**Drug hostels research**

Phoenix House in London and Alpha House in Portsmouth are therapeutic communities concerned with the rehabilitation of chronic drug-takers. The present research project aims to assess the therapeutic effectiveness of the two programmes. Information is currently being collected on all new admissions to the two houses and a detailed follow-up interview for all drug-takers who complete or otherwise terminate their treatment is being developed. In addition the two principal researchers are engaged in the documentation of the development of the two projects both from the perspective of their internal operation and in terms of their relationships with their respective local communities.

See unit entry no. 6.

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130. *London, University of; Institute of Psychiatry, Addiction Research Unit*

DR J. G. EDWARDS

DR D. HAWKS, MISS A. KOSVINER

**Drug-taking: prospective study of schoolchildren**

Fourteen-year-old children from a number of schools will be studied with a view to identifying 'at risk' factors related to drug misuse and other kinds of diverging behaviour. Home background, schooling, peer group involvement, parental values, and socialization practices will be examined developmentally and in relation to the child's present adjustment. The child's self-esteem, attitudes, expectations, and copying style will be identified as intervening variables between the child's general background and eventual post-school adaptation.

See unit entry no. 6.

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131. *London, University of; Institute of Psychiatry, Addiction Research Unit*

DR J. G. EDWARDS

DR M. RUSSELL, MISS E. ARMSTRONG

**Controlled trial of electric aversion therapy on cigarette smoking**

The aim of this trial is to assess the efficacy of electric aversion as an anti-smoking measure, and to evaluate the effective elements in electric aversion therapy.

Seventy dependent cigarette smokers were randomly assigned to one of four different treatment groups or a non-treatment control group. One of the treatment groups involved 'simulated' rather than 'true' aversion therapy in order to determine whether the effect of electric aversion is due to classical conditioning or other non-specific factors. Outcome is being measured by comparing changes in cigarette consumption and shifts of attitude to relative concepts on a semantic differential

attitude scale. The results are being assessed immediately after treatment and over one year after treatment.

See unit entry no. 6.

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132. *London, University of; Institute of Psychiatry, Addiction Research Unit*

DR J. G. EDWARDS

DR M. RUSSELL, MISS E. ARMSTRONG

**Investigations into the role of nicotine in cigarette smoking**

These studies involve two approaches: an assessment of the efficacy of nicotine compared to control aerosols as an aid to cigarette withdrawal; and in collaboration with the Poisons Reference Centre at New Cross Hospital, gas chromatographic methods will be used to measure nicotine and its metabolites in blood and urine.

Attempts will be made to relate nicotine absorption and excretion patterns to different types of smoking behaviour and to identify differences in nicotine metabolism in smokers, ex-smokers, and non-smokers, and to assess to what degree these differences may be constitutional and fixed, or reversible and nicotine induced.

See unit entry no. 6.

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133. *London, University of; Institute of Psychiatry, Addiction Research Unit*

DR J. G. EDWARDS

J. ORFORD, MISS E. OPPENHEIMER, MRS S. EGERT

**Alcoholism: Family study**

The aims of this study are to compare the outcome of two types of treatment for alcoholism which are contrasted in their intensity, and to estimate the importance for the outcome of treatment of variations in the nature of the marital circumstances of those treated.

The sample consists of one hundred married males for whom a diagnosis of alcoholism has been confirmed. Fifty of these patients were selected on a random basis for maximum intensity treatment involving at the least regular contact of both husband and wife with a psychiatric and social work team, the remaining patients being assigned to the minimum intensity treatment group, treatment being confined to a single brief counselling session during which abstinence from alcohol was advised.

Outcome will primarily be determined in terms of drinking behaviour, alcoholism symptomatology, occupational adjustment, and marital satisfaction.

See unit entry no. 6.

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134. *London, University of; Institute of Psychiatry, Addiction Research Unit*

DR J. G. EDWARDS

J. ORFORD, MISS S. OTTO

**Alcoholism hostels study**

The aim of this study is to provide a more intensive description than has hitherto been available, of the operation of a small number of half-way house communities for the rehabilitation of men suffering from alcoholism. Such facilities have mushroomed during the last decade and a recent report by a Home Office Working Party on the treatment of the drunken offender has recommended an acceleration in their growth.

A pilot investigation has already been carried out over a period of nine months at one such half-way house, the data has been analysed, and reports are in preparation. Among other things, the pilot investigation established the importance of two varieties of 'in-treatment' failure: premature leaving and irregular or relapse-associated leaving.

The major part of the study is in its data collection phase, which will last between twelve and twenty-four months in all. Of major concern is the establishment of criteria for improvement during residence in a half-way house, and the explanation of individual differences in improvement during residence and of varieties of 'in-treatment' failure.

See unit entry no. 6.

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**135. *London, University of; Institute of Psychiatry, Addiction Research Unit***

DR J. G. EDWARDS

DR H. HERSHON

**The drunken offender in court**

The medical, psychiatric, and social problems of a series of drinkers charged with various drinking offences were assessed by interview, in an attempt to evaluate the appropriateness of medical, psychiatric, and social resources as adjuncts (or alternatives) to the present penal response.

See unit entry no. 6.

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**136. *London, University of; Institute of Psychiatry, Addiction Research Unit***

DR H. HERSHON

MISS I. DAY, MISS E. OPPENHEIMER

**The alcohol withdrawal syndrome**

The withdrawal syndrome is being described and defined in accordance with hypotheses of the physical dependence model. The results will have implications for operantly learned relief or avoidance drinking, which has in turn been suggested as an explanation for uncontrolled drinking.

See unit entry no. 6.

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137. *London, University of; Institute of Psychiatry, Addiction Research Unit*

DR J. G. EDWARDS

DR D. ROBINSON

#### **Alcoholism as a social fact**

It is beyond the sociologist's brief to construct universally applicable definitions of 'alcoholism' or 'the alcoholic'. He can, however, describe, attempt to explain, and indicate implications, for social behaviour and medical practice and organization, of the fact that different categories of people differ systematically in their assessment of what counts as 'alcoholism', being an 'alcoholic', 'normal drinking', 'drinking problem', etc.

The questions which the study seeks to answer are: 'what does alcoholism mean to the various categories of people involved in the referral process?'; 'in terms of what criteria do people get referred to the clinic or unit?'; and 'what counts as being, and how do people come to occupy the social position of, alcoholic?'

See unit entry no. 6.

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138. *London, University of; Institute of Psychiatry, Addiction Research Unit*

DR J. G. EDWARDS

DR G. LITMAN

#### **Intensive design studies of processes in alcoholism**

This project is concerned with intensive investigations of the covariations of alcohol consumption and/or craving with fluctuations in affective and other symptomatology over time, and in relation to such external parameters as treatment, diurnal variation, etc.

See unit entry no. 6.

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## **2.8. The elderly**

139. *Exeter, University of; Institute of Biometry and Community Medicine*

DR N. G. PEARSON, R. W. CANVIN

D. P. BOLDY, P. C. R. TAYLOR, P. R. WARD, J. E. BUTTERLY, E. JONES

#### **Health and welfare care of old people project**

The project aims to develop a model of the health, welfare, and care needs of the aged and the services available to meet them. Descriptive studies have been carried out to understand better the components of the system, how they interact, and who uses them and to evaluate what alternative or professionally preferred forms of care could be provided now and in the near future, and at what cost. A model is to be developed to describe the flow of old people within the system in order to predict the effect of various actions taken in the future.

See unit entry no. 4.

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140. *Exeter, University of; Institute of Biometry and Community Medicine*

DR N. G. PEARSON, R. W. CANVIN, DR D. C. MORGAN

DR R. C. MCLEOD, R. S. LOTT, F. E. JONES

**Survey of the needs of older residents**

A Devon coastal town, having some 35 per cent of its residents over the age of 65 years, is being surveyed in order to discover the social and medical needs of the elderly. The survey is being conducted on a 10 per cent sample of patients aged 65 and over. A questionnaire administered by interview collects information on housing, care of the home, mobility, social contacts, and presence of disability. Items of professional and voluntary care are recorded in order to describe care that has already been given, and the amount of unmet need is being estimated.

See unit entry no. 4.

141. *London, University of; Institute of Psychiatry, London SE5 8AF*

DR J. R. M. COPELAND

**US/UK diagnostic project***Approved support 1971-3: £29,000**Co-sponsor: National Institute of Mental Health, Washington DC*

This project compares the diagnosis and outcome of geriatric admissions (over the age of 65) admitted to mental hospitals serving Camberwell in London and Queen's County in New York. Its purpose is to examine the discrepancy in the US/UK national statistics for the elderly which show a preponderance among hospital admissions of organic disease in New York and affective disorders in London.

In order to compare diagnoses and outcome with the psychiatric group a similar series of patients admitted to the geriatric hospital and other medical and surgical facilities serving Camberwell has been examined. Attention has also been given to the reasons for admission and the availability of alternative accommodation. Subsidiary studies on psychological testing in the elderly, hypoploidy in senile dementia, etc., have also been undertaken.

142. *London, University of; London School of Economics and Political Science, Department of Social Science and Administration, London WC2A 2AE*

DR R. HADLEY, A. WEBB

**An evaluation of the contribution of young volunteers (organized by Task Force) to the provision of local social services for the elderly***Approved support 1970-2: £16,800*

The project aims to assess the nature of the contribution made by young volunteers in visiting and giving practical help to old people, and to isolate the principal factors affecting this contribution, by means of extensive interviews with different categories of volunteers, clients, and local authority social workers. Organizational variables are being examined by monitoring the activities of four local centres over the period of the research.



143. *London, University of; London School of Hygiene and Tropical Medicine, the Chronic Diseases Control Study Unit*

DR J. M. G. WILSON, J. O. P. CHAMBERLAIN

DR H. FAULKNER (*Caversham Centre, Camden*), DR W. HARDING (*London Borough of Camden*)

**Validation of screening tests in the elderly**

A study to validate screening tests for vision, hearing, mobility, and economic need which could be used by community nurses or health visitors in the homes of elderly people, to detect unreported disabilities has been completed. Elderly people in a group general practice were visited by a 'geriatric visitor' who completed a questionnaire and applied simple tests for hearing and vision. Subsequently definitive examination by specialists was carried out for vision, hearing, and economic need, and for mobility by an occupational therapist in the person's home.

The validity of the tests was then measured for sensitivity and specificity by matching the positive and negative screening tests against the positive and negative definitive tests by specialists. The results are being analysed and will be published. It is next intended to (a) extend this validation procedure to other tests, and (b) to study the effectiveness of early diagnosis and treatment compared with the normal 'clinical' situation without screening.

See unit entry no. 25.

144. *Newcastle upon Tyne, University of; Department of Psychological Medicine*

PROFESSOR SIR MARTIN ROTH

DR A. A. MCKECHNIE

**The effects of bereavement in the elderly**

As part of the Newcastle Community Survey of aged persons the occurrence of bereavements among various classes of relatives within two years and five years of the interview date were recorded and the relationship to the current psychiatric state was examined. Subsequent bereavements were studied at follow-up about three years later, and detailed assessments were made of the social, medical, and psychiatric effects. Features associated with good or poor adjustment after bereavement were defined. A clinical comparison was made of the psychiatric symptoms after bereavement with those occurring in disorders not associated with bereavement.

See unit entry no. 35.

145. *Newcastle upon Tyne, University of; Department of Psychological Medicine*

PROFESSOR SIR MARTIN ROTH

MISS E. M. FOSTER, DR K. BERGMANN, DR D. W. K. KAY

**Elderly people and local authority services**

As part of the Newcastle Community Survey of aged persons local authority services coming into each household were recorded by the social worker, who also

made her own assessment of the needs of the subject and his/her household, irrespective of whether or not services were actually being received. The characteristics of subjects needing, but not receiving, services were then compared with those of subjects actually receiving services, and with those neither needing nor receiving any. In this way an estimate was arrived at of the proportion of old people with unmet needs, and the kind of needs that were not being met.

See group entry no. 35.

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146. *Reading, University of; Department of Applied Statistics, Operational Research (Health Services) Unit*

PROFESSOR R. N. CURNOW

MISS S. B. J. MACFARLANE

**Needs of the elderly visiting scheme**

*Co-sponsors: Oxford Regional Hospital Board, Reading and District Hospital Management Committee, Queen Victoria Institute.*

A method proposed for identifying the needs of the elderly living in the community and of co-ordinating the supply of services to cater for these needs involved the continual visiting of people over 65 in order to keep up to date with their needs and the maintenance of central records. In conjunction with the DHSS the team has experimented with this in an area of Reading during the pilot scheme. The scheme has now been adopted for the whole of Reading.

See group entry no. 42.

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147. *Sheffield, University of; Department of Community Medicine, Medical Care Research Unit*

PROFESSOR J. KINSWELDEN, DR B. T. WILLIAMS

DR R. A. DIXON

**The utilization of hospitals and residential homes by the elderly in Sheffield**

This study uses a computer simulation program to examine the interrelationship between the demands for different types of accommodation, and aims to describe the optimum size of hospital and residential homes to satisfy different levels of demand.

Data were collected for three months in 1971 on the size, use, length of waiting-lists, and waiting-times for admission. The appropriateness of each admission and the point at which the particular resources were no longer required were recorded by each unit's staff. In addition, an estimate of unmet demand was obtained from GPs sampled weekly.

Data collection and coding are complete and the analysis is proceeding.

See group entry no. 46.

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148. *Southampton, University of, Department of Geriatric Medicine*

PROFESSOR M. R. P. HALL

**Support for establishment of a professorial unit in geriatrics**

*Approved for support 1970-6*

*Agreed support in 1972-3: £11,000*

*Co-sponsor: Wessex Regional Hospital Board*

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149. *Tavistock Institute of Human Relations, Centre for Applied Social Research*

DR E. J. MILLER

T. DARTINGTON, MRS G. V. EYNSTONE, MRS P. JONES

**Geriatric hospital care: an action research study**

The project arose out of concern over the stress on nursing staff in geriatric hospitals. The internal organization of two hospitals and their place within the wider systems of geriatric care in the community are being examined by means of interviews with nursing and other staff, observation on the wards, collection and analysis of data, and detailed follow-up of small samples of patients involving interviews with members of their family, neighbours, GPs, social workers, etc. The study has not so far moved into an action phase.

See group entry no. 47.

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150. *Tavistock Institute of Human Relations, Institute for Operational Research*

J. STRINGER, G. M. LUCK

**Health and welfare of the elderly**

The strategic problems of providing health and personal social services for the elderly are being approached through developing a simulation model of a generalized elderly population.

See group entry no. 48 and Departmental ORS entry no. 56 (i).

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## 2.9. The physically sick

151. *Kent, University of; at Canterbury, Centre for Research in the Social Sciences, Health Services Research Unit*

PROFESSOR M. D. WARREN

**Rehabilitation and care of the chronic sick: survey of needs**

The Unit is collecting data about the patients attending a regional rehabilitation unit and is closely associated with the City of Canterbury in a field study of the needs of handicapped people in the community. The Unit expects to extend these studies to include a detailed follow-through and follow-up study of patients discharged from

hospital and an examination of handicapped patients on the list of a group practice in a rural area. The objective of these studies is to estimate the need for rehabilitation and other services.

See unit entry no. 5.

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*152. St Christopher's Hospice*

DR MARY BAINES, MRS B. MCNULTY

**Out-patient clinic and home care service at St Christopher's**

The clinic offers an advice service to GPs and district nurses on the management of terminal cancer patients in the home. It aims to relieve distress, both physical and emotional, in patients and their families, by making suggestions about the use of appropriate drugs, by close supervision and support on a twenty-four-hour call basis. Patients include those who may need admission in the future and those who will be able to die at home; of these some will already have been in-patients who have been discharged.

Methods of care are by frequent domiciliary visits by nurse clinicians, with occasional medical visits for consultation, if necessary, and by out-patient clinic sessions at regular intervals.

In thirty-four months 725 patients have been cared for by this service, and evaluation of results would seem to indicate that patients are less distressed by their symptoms, relatives feel less anxious and more secure and in-patient care is more efficiently used.

See group entry no. 45.

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*153. York, University of; Department of Social Administration and Institute of Social and Economic Research, York YO1 5DD*

PROFESSOR KATHLEEN JONES

D. T. CARTER, MISS J. A. JINKS

**The social needs of the physically sick**

*Approved support 1968-73: £34,900*

This project incorporates a number of studies designed to examine certain aspects of the social needs of the physically sick and of the services provided to help meet these needs. The main foci of study are the social needs of general hospital patients and the organization of medical social work services. The major studies are:

(i) A deployment survey of hospital social workers and local authority medical social workers in England and Wales.

(ii) A study of the above-mentioned social workers carried out by postal questionnaire, concerned with individual characteristics, current organization of work, and attitudes towards possible reorganization.

(iii) An examination through records of 9,000 admissions to nine selected hospitals to determine the proportion referred for social work help, the reasons given for referral, what kind of help was given, etc.

(iv) A study of 120 patients referred for social work help in three hospitals, carried

out by means of interviews with the patients, hospital social workers, and medical and nursing staff.

(v) A study of the needs of 450 randomly selected in-patients in four hospitals who were interviewed in hospital and after discharge.

(vi) A survey undertaken in four hospitals concerned with the perception of social needs, the role of the hospital social worker and views on the organization of services, carried out by means of interviews with all levels of medical, nursing, and social work staff.

The major objectives of the project are to determine the incidence and type of social need in the selected areas and to study responses to it on the part of medical social workers and other hospital staff, and to examine the current organization of hospital social workers in the light of proposals about possible future reorganization. See section 3, Publications, page 438.

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## 2.10. Maintenance of physical health

154. *Aberdeen, University of; Department of Social Medicine and Dundee, University of; Department of Pharmacology and Therapeutics, Dundee DD1 4HN*

*Aberdeen*: PROFESSOR R. D. WEIR

*Dundee*: PROFESSOR J. CROOKS

### Monitoring of drugs for adverse reaction in hospital

*Approved support 1967-73*: £8,500

*Co-sponsors*: The Scottish Home and Health Department, World Health Organization, Nuffield Provincial Hospitals Trust, Board of Management for the Dundee General Hospitals, University of Aberdeen, University of Dundee

The development of a hospital-based system which includes patient, drug, and diagnostic data has ensured ready identification of all patients exposed to a drug or combination of drugs. The system has been used to determine the frequency of recognized toxic effects and to confirm suspicions. Adverse interactions occurring in patients receiving therapeutic combinations have also been studied and ways of using the system to investigate drug efficacy are currently being investigated. These studies have been integrated with a larger research project which is also investigating methods of detecting previously unsuspected toxic effects.

See section 3, Publications, page 439.

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155. *Birmingham, City of; Public Health Department, Birmingham B1 2BQ*

DR N. JOHNSTON

MRS S. ARMSTRONG

### Nutrition survey of schoolchildren

*Approved support 1970-2*: £19,000

The main aims of the project are to find out by means of a weighed dietary survey

and medical examination of a sample of about 1,000 schoolchildren in their fifteenth year whether there is any malnutrition (under- or over-nutrition) in the sample; to find out whether there is any socio-economic factor which can be used as a parameter of malnutrition, and to relate height, weight, skinfold measurements, etc., to nutritional intake.

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156. *Birmingham, University of; Department of Social Medicine, Health Services Research Centre*

PROFESSOR T. MCKEOWN

T. MARSHALL

#### Childhood nutritional surveillance

This is a contribution to a national study, of serial nutritional levels in children, and the approach is by analysis of birth-weights and subsequent growth-rates in early childhood.

See unit entry no. 11.

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157. *Exeter, University of; Institute of Biometry and Community Medicine*

PROFESSOR J. R. ASHFORD, DR N. G. PEARSON, DR D. C. MORGAN

#### Analysis of Exeter Community Health Study data

A series of epidemiological studies is being carried out. This includes the effect of smoking, environmental factors, and other factors on health services usage.

See unit entry no. 4.

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158. *Laboratory of the Government Chemist*

DR H. EGAN

#### Determination of the tar and nicotine yields of all brands of cigarettes on sale in the UK

The ultimate aim is the publication by the DHSS of a 'league table' of the tar and nicotine yields of all brands of cigarettes sold in the UK. Smokers are to be encouraged to reduce their tar and nicotine intakes by choosing brands that feature lower in the table than the brand they already smoke. The project was initiated by the DHSS following the Royal College of Physicians' report, *Smoking and Health Now* in 1971.

See unit entry no. 57.

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159. *Laboratory of the Government Chemist*

DR H. EGAN

#### Organochlorine pesticide residues in human fat

Work is directed to the assessment of the body load of organochlorine pesticides

over a period of years, to endeavour to determine a possible trend. Previous surveys, carried out in 1963-4, 1965-7, and 1969-71, have been published in the *British Medical Journal* as follows: 1965 (10 July), pp. 66-99; 1968 (20 July), pp. 146-9; 1972 (3 June), pp. 553-6.

See unit entry no. 57.

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160. *Laboratory of the Government Chemist*

DR H. EGAN

**Radioactivation analysis for arsenic in persons environmentally exposed to it**

One aspect of potential environmental pollution arising from smelting plants has been assessed by using radioactivation techniques to determine the arsenic content of nail clippings from workers and persons living in the neighbourhood.

See unit entry no. 57.

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161. *London, University of; Institute of Child Health, The Wolfson Centre, and The Department of Developmental Paediatrics, London WC1N 2AP*

DR K. S. HOLT, DR PAMELA ZINKIN, DR COLLEEN A. COX, M. J. F. GRIMSLEY,  
MISS R. MITCHELL

**A comparative study of the effectiveness of two methods for the early detection of delayed and aberrant development**

*Approved support 1969-75: £55,200*

*Co-sponsors: London Borough of Hounslow, North-West Metropolitan Regional Hospital Board*

The project is comparing the effectiveness of two methods (total and selective population screening) for the early detection of delayed and aberrant development in 2,000 babies born in 1970-2 in a defined area. Antenatal, perinatal, and environmental information is collected and a group of 'high-risk' babies defined. All babies are given fully recorded periodical developmental examinations, but a group of 'high-risk' and a random sample of 'low-risk' children are given additional resources in order to determine the optimum resource allocation.

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162. *London, University of; London School of Hygiene and Tropical Medicine, Department of Human Nutrition*

PROFESSOR J. C. WATERLOW

DR J. M. L. STEPHEN, DR G. C. SUTHERLAND, P. R. PAYNE, MISS E. F. WHEELER,  
DR S. BALASURIYA

**Survey of growth of preschool children**

Growth is considered to be one of the most sensitive indices of nutritional state in young children. No systematic study on any scale has ever been made in Britain of the growth of preschool children. The aims of the present study are two-fold: to

assist in the monitoring of effects, if any, of the changes in the provision of welfare foods; and to provide a baseline for further studies in the future.

The study will be partly cross-sectional, partly longitudinal, a cohort being followed from birth to 5 years, until they enter school. About 12,000 children will be examined in all, in six representative regions. The sample will be chosen to be representative of different social classes and sizes of family.

Heights and weights only will be measured, and some social information will be collected. Studies of special aspects of health may be made on sub-samples of the main group.

See unit entry no. 24.

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*163. London, University of; London School of Hygiene and Tropical Medicine, Department of Human Nutrition*

PROFESSOR J. C. WATERLOW

DR J. M. L. STEPHEN, DR D. I. THURNHAM, P. R. PAYNE, MISS E. F. WHEELER

**Nutritional survey of the elderly**

Biochemical measurements will be done in the laboratory on specimens of blood from elderly subjects followed-up from the previous survey done by the DHSS in 1967-8, and also on specimens from the first of a new series of longitudinal surveys of elderly people due to begin in 1973. Automated analysis will be used wherever possible. The aim is to correlate biochemical values with medical, dietary, and socio-economic information and to get some idea of biochemical criteria for health in elderly people and to study the changes in these with age. The sample for the new survey is being planned in collaboration with the Office of Population Censuses and Surveys, and as far as possible will attempt to cover the range of socio-economic and regional variations throughout the country.

See unit entry no. 24.

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*164. London, University of; St Thomas's Hospital Medical School, Department of Clinical Epidemiology and Social Medicine, Social Medicine and Health Services Research Unit with Kent County Council, Public Health Department*

PROFESSOR W. W. HOLLAND, DR A. E. ELLIOTT

DR B. BEWLEY, T. HALIL, MISS I. DAY

**Study into smoking behaviour of Kent schoolchildren**

The study aims to determine the prevalence rates of smoking in children who are in their final year of primary school and in their first year of secondary school; the association between respiratory symptoms and smoking, factors associated with smoking behaviour, including family, sibling, and peer group smoking behaviour, type of school, and attitudes towards smoking. Four areas of Kent were chosen for the study.

See unit entry no. 8.

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165. *London, University of; St Thomas's Hospital Medical School, Department of Clinical Epidemiology and Social Medicine, Social Medicine and Health Services Research Unit*

PROFESSOR W. W. HOLLAND

DR JUDITH COOK, D. ALTMAN, DR M. MORRIS (*up to April 1972*), MRS J. J. WALLER

#### Surveillance study of the growth and nutrition of schoolchildren

The aim of the study is to develop a system of surveillance which will allow the detection of changes in the growth, health, and nutrition of schoolchildren resulting from future changes in social and environmental conditions. Additional aims are to determine the extent and nature of poor nutrition, to identify regional, demographic, and socio-economic factors associated with children's growth and to investigate the relationship between height and weight and the consumption of school milk and school meals.

A cohort study will be made of a sample of about 20,000 children between the ages of 5 and 11 during the five years of the study, resident in twenty-eight selected areas of England and Scotland. Information will be obtained using a self-administered questionnaire completed by the child's parents and height, weight, and triceps skin-fold thickness will be measured annually.

See unit entry no. 8.

166. *Medical Research Council Unit on Environmental Factors in Mental and Physical Illness, London W1P 0AF*

DR J. W. B. DOUGLAS

M. WADSWORTH, MISS N. CHERRY, MISS E. ATKINS, M. LOWE

#### National survey of health and development

*Approved support 1971-2: £5,000*

This is a longitudinal study of 5,000 young people born in the first week of March 1946. Since then, they have been seen, visited, or examined at intervals of approximately eighteen months to two years. In 1972 an interviewing programme is being undertaken which aims to produce dependent variables against which the earlier information on health, growth, and education can be related. These dependent variables include the levels of education achieved, of skill in employment and of salary, and assessments of home circumstances and training. Also being gathered are a repeat of reading and personality tests given ten years earlier, information on the social origins and education of the survey member's spouse, a detailed assessment of attitudes to society, and information that will complete from birth to 26 years the data on hospital admissions, accidents, and physical and mental handicaps.

167. *National Blood Transfusion Service, North London Blood Transfusion Centre, HA8 9BD*

DR T. E. CLEGHORN

**The use of red cell stroma in stimulating anti-Rh antibody levels in human volunteers**

*Approved support 1970-2: £9,000*

The project aimed to produce purified preparations of Rhesus positive red cell stroma which could then be freeze-dried. These preparations were to be used for primary immunization and antibody boosting in donors of Rh(D) antibody for preparation of specific immunoglobulin. It was considered that by stockpiling in this way, red cell donors could be monitored over a period of six months or more, and the stroma only be released for use when it was reasonably certain that it did not contain serum hepatitis virus.

It is evident that even with normal biochemistry and enzymology and negative results to tests for Au(1) antigen, not all carriers of serum hepatitis can be detected.

A further complication has been the failure to date to produce preparations of stroma which are stable in their ability to neutralize standard quantities of anti-D.

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**168. National Blood Transfusion Service, Manchester M1 3BP**

DR F. STRATTON

**Investigation of red cell antigen-antibody reactions with special reference to the role of complement**

*Approved support 1971-4: £8,300*

The object of the work is to gain further information on red cell antigen-blood group antibody interactions and the role of complement in these where the antibody is complement fixing.

The investigation includes a study of haemolytic states, the detection of blood group antibodies and also a study of various reagents which are necessary to detect components absorbed on to red cells.

See section 3, Publications, page 439.

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**169. National Children's Bureau**

DR M. L. KELLMER PRINGLE

**National Child Development Study (1958 cohort) Third Sweep**

The National Child Development Study is a longitudinal investigation of all children in England, Scotland, and Wales born in the week 3-9 March 1958. The study originated from the 1958 Perinatal Mortality Survey, which included an estimated 98 per cent of all births in this week. Information was gathered on over 90 per cent of the original cohort when the children were 7 years and again at 11 years. The follow-up data included educational, psychological, social, medical, and developmental variables. A Third Sweep is being planned for the year 1973-4 during the final year of the children's compulsory schooling.

See group entry no. 32.

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*170. Newcastle upon Tyne, University of; Department of Psychological Medicine*

PROFESSOR SIR MARTIN ROTH

DR D. W. K. KAY, DR. K. BERGMANN, DR P. G. BRITTON, DR C. M. H. NUNN,  
MISS E. M. FOSTER**Prediction of outcome in terms of survival or death**

The status at follow-up of psycho-geriatric patients was related to a large number of variables recorded at first interview some three years earlier, and an attempt was made to identify those features which determined the outcome. In particular, the following question was examined: 'To what extent do social and psychiatric variables, including diagnosis, add to the prediction of death obtained using only the actuarial variables age and sex?' For a sub-sample, psychometric test results were available, and the relationship of test performance to outcome could also be examined.

See group entry no. 35.

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*171. Northwick Park Hospital, MRC/DHSS Epidemiology and Medical Care Unit*

DR S. MATTINGLY, DR T. W. MEADE

W. R. S. NORTH

**Rehabilitation follow-up study***Co-sponsors: Medical Research Council, Department of Employment*

All patients, at work prior to their illness or accident, who pass through a combined Medical and Industrial Rehabilitation Unit in two years will be followed up for a year to see how quickly they have returned to work, and to assess the various medical, personal, social, and economic factors associated with a rapid or slow return. About 1,500 patients will be studied.

See unit entry no. 10.

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*172. Oxford, University of; Department of the Regius Professor of Medicine, Health Services Evaluation Group: Community Hospital Programme*

DR A. E. BENNETT

**Randomized controlled trial of screening in general practice**

A randomized controlled experiment was set up to measure changes in workload and patterns of consultation resulting from a programme of routine health examinations performed by GPs on their patients and to validate and evaluate a short self-administered symptom questionnaire as a method of case finding. All male patients aged 50-59 in four general practices were randomly allocated into three groups. One group was fully examined, one group was examined if in answering the questionnaire they admitted to certain symptoms, one group was the control group. Details on consultations and referrals to hospital were recorded for the following eighteen months. Analysis of the data to compare the findings in the three groups and their experience is proceeding.

See unit entry no. 40.

173. *Oxford, University of; Department of the Regius Professor of Medicine, Health Services Evaluation Group: Community Hospital Programme*

DR R. G. A. WILLIAMS

**Studies of family and home life as affected by illness and as influencing recovery**

The study of the patient's home circle has two broad aims: (i) to identify influences of the home circle on the patient's recovery, and whether these interact with type of hospital; (ii) to estimate the burden on the home circle of the patient's illness, and whether this interacts with type of hospital. The range of illnesses observed will be restricted to medical diagnoses, and is expected to require concentration on the elderly population. Accordingly an attempt will be made to rank disabilities as one measure of recovery. Time budget data will be sought here as well as general interview data.

See unit entry no. 40.

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174. *St Bartholomew's Hospital, Medical Professorial Unit, London EC1A 7BE*

PROFESSOR E. F. SCOWEN

**Projects concerned with the safety of medicines**

*Approved support 1971-4: £2,500*

The DHSS is providing up to £1,000 a year from its central research funds to meet expenditure on small projects needed by the Adverse Reactions Subcommittee of the Committee on the Safety of Medicines, connected with the safety of medicines. Each project is to be approved by the Chairman of the Committee. No projects have yet been started under this arrangement.

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175. *Sheffield, University of; Department of Community Medicine, Medical Care Research Unit*

DR B. T. WILLIAMS, MRS A. W. M. WARD

DR R. A. DIXON

**Utilization of rehabilitation services by orthopaedic and accident services**

An earlier study by the Sheffield RHB demonstrated variations between centres in the referral rate to physiotherapy departments, and this study examines this rate for two major users, orthopaedic and accident and emergency services.

In four centres the proportion of out-patients referred to physiotherapy departments is being obtained over a three-month period. Information is also being obtained on the nature of the physiotherapy prescription, how this is interpreted by the therapist, and the way in which it is implemented.

See unit entry no. 46.

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**2.11. Maintenance of mental health**

176. *London, University of; Institute of Psychiatry*

PROFESSOR M. SHEPHERD

B. COOPER, B. G. HARWIN, V. HOWARD

**Psychiatric morbidity in general practice**

The study aims to produce simple and reliable presymptomatic diagnostic tests for the early detection of psychiatric disorders. It is hoped that by studying the distribution of psychiatric morbidity among groups carrying a seriously increased risk in a general practice population to learn more about the predisposing factors involved, and to determine the possibilities for preventive action.

The first stage of the research entailed evaluation and comparison under the working conditions of general practice of different screening methods devised for the purpose. The second stage is concerned with problems of treatment and management.

See group entry no. 22.

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177. *Newcastle upon Tyne, University of; Department of Psychological Medicine*

PROFESSOR SIR MARTIN ROTH

DR K. BERGMANN, DR D. W. K. KAY, DR C. M. H. NUNN, DR P. G. BRITTON,  
MISS E. M. FOSTER

**The prediction of dementia in the aged**

The status at follow-up of the elderly in the Newcastle Community Sample (see group entry no. 35) was related to a large number of variables recorded at the original interview some three years earlier, and an attempt was made to identify those features which determined the outcome. The aim was to develop methods of predicting new cases of organic brain syndrome (dementia). For this purpose, first the prediction was limited to survivors whose mental status at follow-up was determined at interview; secondly, the material was extended to include those people who had died, after as much information as possible about their mental state before death had been ascertained from relatives, hospital records, and all other sources. The results of psychometric tests were available for a subsample.

See group entry no. 35.

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178. *Newcastle upon Tyne, University of; Department of Psychological Medicine*

PROFESSOR SIR MARTIN ROTH

DR C. M. H. NUNN, DR K. BERGMANN, DR P. G. BRITTON, DR D. W. K. KAY,  
MISS E. M. FOSTER

**Intelligence and neurosis: A study of the WAIS scores of normal and neurotic subjects**

This project concerns the psychometrically tested subsample of the Newcastle Community Sample. It was found that subjects diagnosed by the psychiatrist as

suffering from a neurotic or affective disorder tended to perform poorly relative to normal subjects on the WAIS sub-tests, which were administered independently by a psychologist. The nature of this difference was then examined in detail by taking account of variables such as age, sex, social class, living alone, physical health, individual symptoms, etc.

See group entry no. 35.

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179. *Newcastle upon Tyne, University of; Department of Psychological Medicine*

PROFESSOR SIR MARTIN ROTH

MRS E. H. HALL, DR R. D. SAVAGE

**Longitudinal study of the intellectual functioning of elderly subjects**

The present stage of the investigation is concerned with the third and fourth assessments of two samples selected in 1964. Three psychometric tests are used. The relationship between cognitive change and mental illness in the elderly is being analysed statistically in further detail. The aim has been to study test performance longitudinally and to relate test-retest differences to age, mortality, and psychiatric variables.

See group entry no. 35.

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180. *Newcastle upon Tyne, University of; Department of Psychological Medicine*

PROFESSOR SIR MARTIN ROTH

M. R. WILDE, DR H. BRIERLEY

**A study investigating the relationship between clinical diagnosis of brain damage and measures of memory, behaviour, and intelligence**

Eighty psycho-geriatric patients referred for psychological assessment have been selected for this study. These patients have had psychiatric assessment, physical assessment, behaviour rating scales, memory rating scales, full-scale WAIS tests, and a proportion have received the Wechsler memory scale. A factor analytic study is being carried out to assess the relationship between clinical diagnoses and these measures of behaviour and intellectual function. Three main factors have emerged: an innate intelligence factor, a 'brain syndrome' factor, and an impairment factor related to physical ill-health. It is proposed to extend this study by analysing the EEG data in relation to these findings.

See group entry no. 35.

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181. *Tavistock Institute for Human Relations, Centre for Applied Social Research, London NW3 5BA*

MISS E. I. P. MENZIES

R. A. JONES, J. ROBERTSON, MRS E. WOLPERT

**The psychological welfare of young children making long stays in hospital***Co-sponsor: The Royal National Orthopaedic Hospital*

The study stems from concern about young children who tend to sustain emotional damage when they spend long periods in hospital. The aim is to explore what can be done within the hospital setting to prevent or mitigate such damage. The research team is exploring possibilities of modifying methods of care of children, particularly of those under 5, in order to achieve this objective.

The first year of the study has been spent largely in fact finding as a basis for experimenting with development and change. However, a number of minor modifications have been introduced into the care of children, including a number spontaneously initiated and carried out by the hospital staff themselves. In the next phase the research team and the hospital are hoping to introduce some more major changes, to evaluate the effectiveness of such changes and to publish any successful innovations.

See group entry no. 47.

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**2.12. Incidence, prevention, and treatment of specific diseases and conditions***182. Alder Hey Children's Hospital, Liverpool LI2 2AP*

DR F. P. HUDSON

DR JANET HAWCROFT

**Maintenance of Phenylketonuria Register on behalf of MRC and DHSS***Approved support 1972: £2,000**Co-sponsor: Medical Research Council*

The project is designed to accumulate information on phenylketonuric patients throughout the UK. The analysis of this data will be used for such purposes as assessment of the value of the screening programmes for the early detection of phenylketonuria and the efficacy of dietary treatment.

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*183. Birmingham, University of; Department of Social Medicine, Health Services Research Centre*

PROFESSORS T. MCKEOWN, E. G. KNOX

DR L. J. OPIT

**Breast Cancer Screening Study**

Following recommendations by the Subcommittee on Screening in Medical Care of the Standing Medical Advisory Committee of England, Wales, and Scotland, research projects are to be set up to look at (i) the operational problems which would be encountered if it were ultimately decided to introduce a service of screening for breast cancer, and (ii) some questions concerning the natural history and

treatment of the disease. Dr Opit has undertaken the field negotiations with participating centres and is attempting to negotiate complementary experimental designs and co-ordinate documentation.

See unit entry no. 11.

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184. *Birmingham, University of; Department of Social Medicine, Health Services Research Centre*

PROFESSOR E. G. KNOX

DR A. J. MACKENZIE; DR E. L. M. MILLER, DR D. F. MAHON (*City of Birmingham Health Department*)

#### **Evaluation of screening in childhood**

There are two stages in this project. The first was an evaluation of effectiveness of at-risk registers carried out by Professor Knox. This is complete and published. The second, carried out by Dr Mackenzie, consists of separate evaluations of detection methods for amino acid disorders, congenital dislocation of the hip, and deafness.

See unit entry no. 11.

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185. *Birmingham, University of; Department of Social Medicine, Health Services Research Centre*

PROFESSOR E. G. KNOX

#### **Simulation studies of screening procedures**

Screening procedures present complex policy problems and, characteristically, deficient data. For each area of uncertainty, for example (i) with respect to natural history, (ii) with respect to the effectiveness of diagnostic tests, (iii) with respect to the effectiveness of treatment, (iv) with respect to the optimum tactic of applying the test (for example at what ages), it is necessary to examine a range of factual or policy proposals. The objectives are, first, to adjust the factual proposals until the computered consequences fit the facts; and secondly, to explore a range of policy proposals to find which one is best.

A generalized programme has been written and is working, and a series of particular studies, beginning with cervical cytology, is in hand.

See unit entry no. 11.

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186. *The British Thoracic and Tuberculosis Association, Research Sub-Committee, Newcastle upon Tyne NE4 6BE*

*Research Sub-Committee Co-ordinator*: DR A. R. SOMNER; *Chairman*: DR P. STRADLING

**Tuberculosis in England and Wales in 1971 related to country of birth**

*Approved support 1971-2: £700*

The object of the survey is to determine the amount of tuberculosis occurring among immigrants in England and Wales during a sample period in 1971. This sur-



vey coincides with the Registrar-General's population census and thus will allow a more detailed analysis than was possible in a previous survey of this problem carried out in 1965.

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187. *Churchill Hospital, Oxford, Laboratory of Clinical Cytology*

DR A. I. SPRIGGS

M. M. BODDINGTON

**Cervical smear recall project**

*Approved support 1968-73: £9,700*

A study of the feasibility of a manually operated recall system for women who have had routine cervical smears. A sliding scale is being used depending on age, the youngest women having a five-yearly recall and the older women three-yearly or (in the over-50s) annual recall. This is intended to weight the effort expended in the direction of those at maximum risk to life, from carcinoma of the cervix.

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188. *Department of Health and Social Security, Special Hospitals Research Unit*

DR T. G. TENNENT

**Chromosome studies**

The Special Hospitals contain a relative excess of patients with chromosomal abnormalities. There is now considerable literature on many aspects of such individuals although, in the main, such studies have been confined to rather small groups. In this series of studies the Unit has sought to replicate and extend previous work. All patients with chromosomal anomalies who have consented to be involved in these studies have been investigated together with a control group matched in respect of sex, age, length of stay in hospital, and intelligence. The results of several of these studies have already been published.

See unit entry no. 7.

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189. *Department of Health and Social Security, Special Hospitals Research Unit*

DR T. G. TENNENT

**Sex offender studies**

More than 10 per cent of patients within the Special Hospitals have been convicted of sexual offences and often there is a persistent pattern of aberrant sexual behaviour. In conjunction with the Academic Unit of Psychiatry, Oxford, the Unit has been involved in a number of studies which have attempted to establish a method for the assessment of change in sexual patterns in this group and also to assess the effects of various supposedly anti-libidinal drugs.

See unit entry no. 7.

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190. *Department of Health and Social Security, Special Hospitals Research Unit*

DR T. G. TENNENT

**EEG studies**

There are active EEG departments within two of the three hospitals, and in collaboration with the staff of these and Dr G. Fenton of the Institute of Psychiatry, London, a number of investigations have been carried out including studies on patients with post-encephalitis Parkinsonism disorders and patients with post temporal lobe slow wave foci, as well as involvement in part of other more general studies.

See unit entry no. 7.

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191. *Edinburgh, University of; Department of Medicine and Department of Social Medicine, Edinburgh EH9 1DW*

PROFESSORS K. W. DONALD, S. L. MORRISON, DR M. F. OLIVER

DR BARBARA DUNCAN, MISS D. TAYLOR, MRS S. SHANKLAND

**Study of recent onset angina**

*Approved support 1971-4: £28,700*

*Co-sponsor: Scottish Home and Health Department*

The first aim of the study is to follow the course of patients with angina of recent onset in order to determine the incidence of sudden death, acute myocardial infarction, and the resolution of symptoms. A wide range of characteristics is being examined in an attempt to find an index to predict the outcome. The second aim is to identify patients from the same population, not included in the study, who experience acute heart attacks, in order to discover the proportion who experienced premonitory symptoms and to assess the contribution made by the group under study to the over-all incidence of acute heart attack.

The third aim is to determine the opportunity for preventive treatment and the impact this might make on the incidence of sudden death. Patients are identified through a group of GPs in Edinburgh.

See section 3, Publications, page 439.

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192. *Exeter, University of; Institute of Biometry and Community Medicine*

DR N. G. PEARSON, DR D. C. MORGAN

DR J. BENN, DR H. G. MATHER, DR K. READ

**Acute myocardial infarction: length of bed-stay**

From January 1969, the effect of varying the length of bed-stay in hospital treatment of myocardial infarction has been studied at Musgrove Park Hospital, Taunton.

See the article on pp. 71-77 of Part II and also unit entry no. 4.

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193. *Exeter, University of; Institute of Biometry and Community Medicine*

DR N. G. PEARSON, DR D. C. MORGAN

DR H. G. MATHER, DR D. B. SHAW, DR G. R. STEAD, DR M. G. THORNE, DR K. READ

**Acute myocardial infarction: home and hospital treatment**

A co-operative study at four clinical centres in the south-west of England was designed as a randomized controlled trial to compare the outcome of patients treated in hospital, initially in an intensive care unit, and at home.

See the article on pp. 71-77 of Part II and also unit entry no. 4.

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194. *Exeter, University of; Institute of Biometry and Community Medicine*

DR N. G. PEARSON, DR D. C. MORGAN

DR R. J. PETHYBRIDGE, R. S. M. LING

**Controlled clinical trials investigating calf vein thrombosis after total prosthetic replacement of the hip joint**

The aims of the trial are to determine the incidence of deep vein thrombosis in the legs of patients undergoing total replacement of the hip, and to ascertain whether some of the measures presently recommended have any prophylactic effect.

Subject to certain restrictions, patients undergoing the operation will enter one of three concurrent controlled trials, each of which is designed to test a prophylactic procedure. Patients follow a standard regime in other respects. The occurrence of thrombosis is determined on clinical grounds by the excessive concentration of  $I^{125}$  labelled fibrinogen in the calf veins following pre-operative injection. Follow-up will continue after hospital discharge.

See unit entry no. 4.

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195. *Exeter, University of; Institute of Biometry and Community Medicine*

DR N. G. PEARSON, DR D. C. MORGAN

DR J. T. SMYTH, DR R. J. PETHYBRIDGE, F. E. JONES

**Chest symptoms and farmer's lung: a community survey**

*Co-sponsors: Medical Research Council, South-Western Regional Hospital Board*

A survey was carried out in east Devon with three objectives: to determine the prevalence of chest symptoms among farmers, farm-workers, and their families; to determine the prevalence of precipitin reactions to antigens associated with farmer's lung; and to determine the relationship between chest symptoms, chest illness, and serological reactions within the survey population.

One hundred and eighty-eight persons randomly sampled from the lists of three GPs were interviewed using a questionnaire on respiratory symptoms. Blood samples were taken at the same time for serological testing. The past medical history of people with positive serological findings was examined in conjunction with the GPs concerned. A repeat survey was carried out one year later, and on this occasion included a test of lung function.

See unit entry no. 4.

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196. *Exeter, University of; Institute of Biometry and Community Medicine*

DR N. G. PEARSON, DR D. C. MORGAN

DR A. M. TUCKER, DR D. B. SHAW

#### **A post-myocardial infarction chest pain study**

The purpose of this study is to ascertain the prevalence of angina pectoris in post-myocardial infarction survivors and to determine whether there is any significant difference in the prevalence of angina pectoris and other post-infarction chest pains between those groups treated electively, or randomly, at home or in hospital.

Two hundred and fifty-two survivors of myocardial infarction were interviewed by a doctor using the same questionnaire at two months, six months, and twelve months after their infarction.

See unit entry no. 4.

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197. *King's College Hospital, Renal Unit, London SE 22*

DR V. PARSONS

#### **Screening survey to detect children with urinary tract infection in the London boroughs of Lambeth and Southwark**

*Approved support 1971-2: £11,800 (prov.)*

The project aims to detect urinary tract infection in schoolgirls, to estimate the efficiency of urinary culture in detecting significant infection and urinary tract abnormalities, and to observe the effect of treatment of persistent urinary tract infection in the progression of renal disease; and to find the simplest method for routine detection of renal disease to be used by the School Medical Service.

Each week, fifty specimens are collected from schoolgirls aged 5-16. Questionnaires are sent to parents prior to the medical sessions. The results are reported to the school authorities. Positive children are retested and if positive again are sent to their GP for referral to the appropriate hospital paediatric department.

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198. *Laboratory of the Government Chemist*

DR H. EGAN

#### **Development of novel ionomeric cements and restoratives**

This project was initiated by the DSIR Committee for Research on Dental Materials and Equipment. Fundamental studies on the chemistry of dental silicate cements led to the discovery of a series of ionomers of poly (acrylic acid) with special glasses. Development is partly supported by NRDC who are promoting commercial exploitation of the invention. Clinical trials are being undertaken by university dentistry departments, RAF dental services, and by consultants in private practice. Applications as a cavity liner, and erosion cavity and fissure sealant, seem assured. *In vitro* studies are proceeding to improve the rate of hardening after set and the translucency for use as an anterior restorative for permanent teeth. There is prospect too of use as a deciduous posterior restorative. Extra-dental applications are the subject of a separate project pursued in collaboration with a university.

See group entry no. 57.

Two patents have been registered and results of the studies have been previously published in the *British Dental Journal*, the *Journal of Dental Research*, and the *Journal of Materials Science*.

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199. *Laboratory of the Government Chemist*

DR H. EGAN

**Monitoring hospital water supplies for toxic metals and fluoride**

These include water supplies to a dental hospital experimental unit, and to hospitals with renal dialysis units.

See group entry no. 57.

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200. *Laboratory of the Government Chemist*

DR H. EGAN

**Stability of diamorphine solutions used to alleviate malignant disease**

Thin-layer chromatographic procedures have been adopted to effect semiquantitative estimates of the proportions of diamorphine (heroin), 6-monoacetylmorphine and morphine in oral solutions of diamorphine, and in extemporaneous sweetened mixtures with cocaine, administered to terminal cancer patients at St Christopher's Hospice. Variation in the relative content with time under different conditions of buffering and storage temperature have been investigated. The influence of alternative sweetening agents, and the stability of injection solutions, are the subject of current studies.

See group entry no. 57; also entry no. 245.

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201. *Liverpool, University of; Department of Dental Surgery, Liverpool L69 3BX*

PROFESSOR E. D. FARMER

DR P. LEY, DR M. COHEN, K. FLEISCH

**Day-bed project**

*Approved support 1971-3: £13,000*

The project aims to determine the value of a day-stay unit in a non-residential hospital for the treatment of patients requiring oral surgical procedures. So far as possible the patients will be submitted to standardized oral surgery and anaesthetic procedures. The clinical and psychological response of the patients to the treatment will be compared with those undergoing similar treatment in an in-patient hospital and as out-patients under local anaesthesia. Psychological response will be assessed by measures of personality, mood, and attitude. About 500 patients will be involved.

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202. *London, University of; Charing Cross Hospital Medical School, Department of Microbiology, London WC2*

PROFESSOR H. I. WINNER

DR ANNE GERKEN

### **Infection risks in an ultra-clean unit**

*Approved support 1971-3: £4,900*

The aim of the investigation is to study the infection hazards to patients undergoing treatment in an ultra-clean hospital unit, and to devise methods to minimize them.

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203. *London, University of; Guy's Hospital Medical School, Department of Medicine, London SE1 9RT*

DR H. KEEN

### **Detection and follow-up of diabetes mellitus**

*Approved support 1966-76: £78,500*

*Co-sponsors: British Diabetic Association, Bedford Public Health Department*

The work aims to discover: (i) the most effective methods of detecting abnormal blood sugar elevation in the population at large, what risks to health and life this indicates and the relationship between the degree of glucose intolerance and any enhanced risk; and (ii) the natural history of lesser degrees of glucose intolerance and the effect of carbohydrate restriction and/or oral hypoglycaemic agents upon it.

There are two groups of individuals, each about 250 strong. The first is being submitted to a double-blind, placebo-controlled trial of tolbutamide treatment, with or without dietary carbohydrate restriction. The second group is aged 40 years or more, and the test medication is phenformin (TD). In both cases, suitable non-diabetic populations form a baseline for comparison.

Preliminary results suggest that tolbutamide treatment confers some protection against cardiovascular events but that it has no marked effect upon long-term glucose tolerance. The second study is, as yet, insufficiently advanced for analysis. See section 3, Publications, page 439.

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204. *London, University of; Institute of Diseases of the Chest, Department of Clinical Epidemiology in General Practice, London SW3*

DR I. GREGG

DR MARY E. C. HORN

### **Study of the pathogenesis of asthma and chronic obstructive bronchitis**

*Approved support 1964-72: £11,200*

*Co-sponsors: Chest and Heart Association, Board of Governors of the Brompton Hospital*

This research aims to study environmental and constitutional factors bearing on the pathogenesis of asthma and chronic obstructive bronchitis. In asthma, the mechan-

isms which cause airways obstruction are studied with special reference to the better treatment of this disease in general practice. The study in adults began in 1962 and over 2,500 have been recruited to the prospective study. The study of children began in 1967 in collaboration with the Virus Department of the Brompton Hospital, with emphasis on the viral causes of acute episodes of asthma and bronchitis. One thousand eight hundred episodes of upper and lower respiratory infections occurring in children and in contacts have been investigated virologically.

See section 3, Publications, page 440.

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205. *London, University of; Institute of Ophthalmology, Department of Clinical Ophthalmology, London WC1H 9QS*

PROFESSOR BARRIE R. JONES, DR S. DAROUGAR

#### **Studies of chlamydial infection**

*Approved support 1970-2: £38,000*

Support is being given for the development of diagnostic services for the recognition of chlamydial infection of the eye and genital tract. There are several interrelated studies aimed at the improvement of the technique of irradiated McCoy cell culture; the serotyping of chlamydial isolates by means of the micro-immunofluorescence test; the evaluation of this test, which provides much more precise and sensitive indications of chlamydial infection than the earlier test; epidemiological, clinical, and therapeutic studies on chlamydial diseases in both ocular and genital aspects; the relationship between TRIC agent Ophthalmia neonatorum and associated chlamydial genital infections; a study investigating the prevalence of chlamydial infection in men presenting with non-specific urethritis, and their consorts; studies on chlamydial infection in women with non-specific genital infection and in patients presenting with Reiter's disease; and the recovery of chlamydia from the rectum in certain groups of patients and their consorts.

See section 3, Publications, page 440.

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206. *London, University of; Institute of Ophthalmology, Department of Experimental Ophthalmology, London WC1H 9QS*

PROFESSOR E. S. PERKINS

#### **The Bedford glaucoma survey**

*Approved support 1964-72: £13,700*

The study aimed to assess the incidence of glaucoma in a population sample over the age of 40, to assess methods of early diagnosis of glaucoma and to study the natural history of the disease.

The main survey was completed six years ago and now a long-term follow-up is in progress of people who initially presented with ocular tensions above 21 mmHg. The results so far suggest that less than 4 per cent are likely to develop glaucoma.

A sample seen initially with normal tensions is being re-examined; 770 people have been seen, and three have been found to have glaucoma. Eleven more have

developed tensions above 21 mmHg, but have no field defects, and are being followed up.

See section 3, Publications, page 440.

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207. *London, University of; Institute of Orthopaedics, Spinal Research Unit, with Northwick Park Hospital, MRC/DHSS Epidemiology and Medical Care Research Unit*

DR J. D. G. TROUP, DR T. W. MEADE

**Trial of treatment methods on low back pain with sciatica**

*Approved support via London University 1971-4: £10,400, plus support via MRC/DHSS Epidemiology and Medical Care Unit*

*Co-sponsors: The Chartered Society of Physiotherapy, Medical Research Council*

This is a randomized controlled clinical trial to assess the relative values of exercises, manipulation, and traction, either singly or in combination, in low back pain with sciatica. Patients are randomly assigned to one of eight groups (representing all the ways in which the three methods can be combined) and the effectiveness of treatment in each group is assessed by objective measures of functional change, symptomatic changes, and return to work. This is a pilot trial, intended as much to investigate the feasibility of a larger inquiry as to produce definitive results. At the end of the pilot stage, which will include about fifty patients, consideration will be given to expanding the study.

See also unit entry no. 10.

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208. *London, University of; Institute of Psychiatry, London SE5 8AF*

DR M. L. RUTTER

**An evaluation of a behavioural approach to the treatment of autistic children**

*Approved support 1970-3: £16,300*

The project aims to assess the effectiveness of a comprehensive behavioural and developmental approach to the treatment of autistic children. The focus is on training parents and teachers in the home or school situation. Behavioural techniques are closely integrated with counselling and case-work approaches.

An experimental group of autistic children receive intensive treatment for six months and support or guidance over a longer period. Their progress is being compared with that of a group of children receiving only advice or other forms of treatment. Emphasis is placed on careful monitoring of the children's progress, of changes in parent-child interaction, and of altering parental attitudes.

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209. *London, University of; London School of Hygiene and Tropical Medicine, Chronic Disease Control Study Unit*

DR C. H. HODES



### **The identification and treatment of symptomless arterial hypertension in general practice**

In 1971 the Subcommittee on Screening in Medical Care of the Standing Medical Advisory Committees of England and Wales and Scotland recommended that, besides further randomized trials to determine the effectiveness of treatment in mild and moderate essential hypertension, operational studies should be carried out to find out how people with high blood pressure could best be identified and treated within the framework of the NHS.

This study has been designed to compare different ways of identifying and treating hypertensive patients aged between 45 and 54 years in the setting of general practice. The problems of attendance, a good degree of control (including adherence to treatment), and the possible psychological problems associated with long-term treatment are all being studied, along with the cost. These factors will then be compared with other, less formal, methods of identification and treatment. The relative efficiency of the treatment by the different methods of approach will be compared, in relation to their costs.

See unit entry no. 25.

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210. *London, University of; London School of Hygiene and Tropical Medicine, Department of Microbiology, London WC1E 7HT*

PROFESSOR D. G. EVANS, DR A. J. ZUCKERMAN

#### **Australia antigen detection**

*Approved support 1972-3: £5,200*

This project involves the examination of samples received from the Blood Transfusion Service and hospitals throughout the country to detect the presence of Australia antigen. Support was arranged for the maintenance of service by this specialist laboratory pending the development of the necessary facilities in other laboratories. The antigen is a specific marker of infection or carriage of the serum hepatitis virus.

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211. *London, University of; London School of Hygiene and Tropical Medicine Department for Occupational Health, London WC1E 7HT*

PROFESSOR R. S. F. SCHILLING

DR J. M. HARRINGTON, DR P. J. TAYLOR

*Approved support 1971-2: £55,000*

This Department is carrying out some studies, in agreement with the DHSS, relating to occupational health of hospital staffs. The main ongoing studies are (i) (a) to obtain information on the existence and extent of occupational health schemes already developed in hospitals, and (b) to attempt an evaluation of existing and/or experimental schemes, and (ii) on the morbidity and mortality of laboratory workers.

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212 *London, University of; Royal Postgraduate Medical School, Department of Medicine, London W12 0HS*

PROFESSOR J. P. SHILLINGFORD

**The evaluation of the integration of the coronary care unit into the normal ward routine, and the pilot coronary ambulance service**

*Approved support 1970-2: £3,000*

*Co-sponsors: Medical Research Council, British Heart Foundation*

The aims of the project are to evaluate the organization of the coronary care unit in terms of operation on the minimum expense and at the highest efficiency. Towards this end the unit has been fully integrated into the normal ward routine and is attached to the main medical ward. A pilot ambulance service has been set up with the co-operation of the London Ambulance Service, in which a doctor seeing a patient at home with a coronary thrombosis may ring the ambulance service and ask for an emergency ambulance with a team of doctors.

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213. *London, University of; Royal Postgraduate Medical School, Department of Surgery, Unit of Plastic and Reconstructive Surgery, London W12 0HS*

PROFESSOR J. S. CALNAN

**Methods of diagnosis and prevention of venous thrombosis after surgery**

*Approved support 1970-2: £10,500*

The project aims to determine which patient is likely to suffer venous thrombosis of the legs after operation, and how this can be prevented; to follow those who do have a thrombosis to see the incidence of chronic disability in the legs later in life; and to estimate the cost of such to the NHS.

Two groups of patients undergoing major surgery are entered into a controlled clinical trial. All receive an intravenous dose of  $I^{125}$  fibrinogen on the day of operation and the legs are scanned for radioactivity for five days afterwards. The treated group will wear intermittent pneumatic compression leggings for two days after operation, or they will receive a therapeutic dose of an anti-thrombotic drug. In the latter case the control group will receive an identical placebo.

See section 3, Publications, page 440.

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214. *London, University of; Royal Postgraduate Medical School, Department of Virology, London W12 0HS*

PROFESSOR A. P. WATERSON

**Study of virological problems in renal dialysis and transplantation**

*Approved support 1970-2: £8,300*

The project aims to study virus infections in patients on haemodialysis and after renal transplantation. This involves both the study of increased risks to which these patients are exposed and their reactions after infection. The project has largely been confined to serum hepatitis, partly because this is the principal virological hazard involved. Topics of study are:

(i) The correlation of the nature and state of Australia antigen with the clinical course of the illness and the state of health of the patients.

(ii) A study of the incidence and distribution of serum hepatitis in the hospital, with the aim of preventing its spread by drawing up a code of practice.

(iii) Particular topics of study other than the renal dialysis situation are:

(a) The incidence of hepatitis carriers among antenatal patients and the connection between this and neonatal and juvenile hepatitis and cirrhosis.

(b) The extra-hepatic manifestations of serum hepatitis virus.

See section 3, Publications, page 441.

215. *London, University of; St Bartholomew's Hospital Medical School, Department of Medical Microbiology, London EC1*

PROFESSOR R. A. SHOOTER

DR O. M. LIDWELL

### Study of cross-infection at Greenwich Hospital

*Approved support 1969-73: £13,700*

The study aims to determine the value of different types of ward ventilation in preventing staphylococcal infection. The highly adaptable system installed at the new Greenwich District Hospital is well suited to this purpose.

Nasal carriage of staphylococci is being used as an index of staphylococcal spread. Nasal swabs are taken at weekly intervals from patients, medical, nursing, and domestic staff. Staphylococci isolated from these are typed and examined for antibiotic resistance. Also weekly the staphylococcal contamination of the air is estimated and the staphylococci isolated are examined in the same way.

The flow of air in the wards is studied using tracer gases and particles. By correlating all these results under different conditions of ventilation evidence will be obtained about the importance of ventilation systems in hospital.

216. *London, University of; St Mary's Hospital Medical School, Department of Epidemiology, London W2*

PROFESSOR G. ROSE

DR D. CHRISTIE, MRS D. IRVING, MR N. DE KLERK, MISS R. CHAPMAN,

MISS J. K. PATEMAN, MISS K. RICHARDSON, MISS J. RUTTER

### Heart disease prevention project

*Approved support 1971-7: £213,200*

The project is a randomized controlled trial in industry, using factories as allocation units, designed to estimate the effects of a programme of screening and multifactorial advice and treatment on (i) the levels of risk factors for coronary heart disease, and (ii) mortality from and incidence of coronary heart disease and stroke in the ensuing five years. There will be about 20,000 subjects, comprising males aged 40-59 from a variety of occupational groups in England and Wales, randomly allocated into intervention and control groups.

Men on the 'intervention' side of the trial are offered a limited cardio-respiratory

screening examination, as are a randomly selected 10 per cent of the 'control' population. Response has been excellent, and the screening phase of the project is two-thirds completed. Advice and treatment is delivered to those men considered most 'at risk', by occupational physicians within the context of existing services. The aims of intervention may be summarized as follows:

- (i) Cessation of smoking.
- (ii) Reduction of plasma cholesterol by dietary advice.
- (iii) Drug treatment of moderate hypertension.
- (iv) Weight reduction in obese subjects.
- (v) Increase of habitual physical activity in sedentary individuals.

The degree to which this advice is accepted is monitored by periodic re-examinations of samples of men on both sides of the trial. The success of the project will be measured in terms of reduction of morbidity and mortality from coronary heart disease and stroke in the intervention group.

See section 3, Publications, page 441.

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217. *London, University of; St Mary's Hospital Medical School, Paediatric Unit, London W2*

DR D. BARLTROP

DR C. STREHLOW, DR A. SMITH, MRS E. FINUCANE

#### **Paediatric lead metabolism**

*Approved support 1972-4: £19,000*

*Co-sponsors: International Lead Zinc Research Organization, New York, National Environmental Research Council*

The project is designed to determine the significance of lead in soil for children inhabiting a lead-contaminated district.

The absorption and excretion of lead by groups of children in test and control communities in Derbyshire are being determined and the findings correlated with analyses of soil and locally grown vegetable produce. The lead content of air and water for the two communities will be monitored throughout the study and seasonal variations determined.

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218. *London, University of; St Thomas's Hospital Medical School, Department of Clinical Epidemiology and Social Medicine, Social Medicine and Health Services Research Unit*

PROFESSOR W. W. HOLLAND

DR HARRIET TREVELYAN, A. V. SWAN

#### **South-east London screening study**

The project aims to determine the effect of multiphasic screening for chronic degenerative disease on mortality, morbidity, and health service usage, and to study the feasibility and cost of multiphasic screening in general practice.

The study population consisting of 6,600 individuals between the ages of 40 and 64 years was randomly allocated to control and screening groups. The screening

group is screened every two years. Both groups are followed for five years and indices of mortality, morbidity, and health service usage collected. At the end of this time both groups are being examined and measures of occupation and physical function are being collected.

An analysis will be made of the characteristics of those who accept and refuse the screening invitation; the yield of disease and management load occurring at initial and repeat screening; differences between the control and screening groups in patterns and cost of health service usage, sickness absence, and occupational and physical dysfunctioning; and the direct cost of screening.

See unit entry no. 8.

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219. *London, University of; St Thomas's Hospital Medical School, Department of Clinical Epidemiology and Social Medicine, Social Medicine and Health Services Research Unit*

PROFESSOR W. W. HOLLAND

DR M. W. ADLER, MRS K. DUNNELL, A. SWAN

#### **Controlled trial of treatment of moderate hypertension**

The objectives of this study are to measure the effect of anti-hypertensive treatment on subsequent mortality and morbidity of subjects with moderate hypertension; to measure the number of subjects with hypertension previously unknown to the practice, to assess the feasibility of screening and treating for hypertension from a general practice; and to measure the cost of screening for moderate hypertension in general practice and entering suitable patients into the treatment trial.

It is intended to carry out a feasibility study in a group practice. If this proves successful it is hoped that other GPs will be persuaded to take part in the main study. The study will be confined to men aged 35-64 years of age.

See unit entry no. 8.

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220. *London, University of; St Thomas's Hospital Medical School, Department of Clinical Epidemiology and Social Medicine, Social Medicine and Health Services Research Unit*

PROFESSOR W. W. HOLLAND

DR M. CLARKE, T. HALIL

#### **Duodenal ulceration in north Lambeth**

This study was designed to determine the prevalence of duodenal ulceration in males aged 25-64 in the six northern wards of Lambeth, to assess the use these men made of medical services and to investigate the importance of certain physiological, psychological, social, and personal factors in the development of the condition.

The sample of men for study was drawn in part from the St Thomas's Hospital private census, and from the 10 per cent General Register Office Census. In the first stage of the study the men were divided into those suspected of having a duodenal ulcer and negatives, based on their response to a five-item postal question-

naire. In the second stage a sample of the suspects and negatives to the first stage were interviewed in depth by a questionnaire to determine the extent of dyspeptic symptoms; and physical measurements, including venepuncture for blood group, secretor status, and pepsinogen, were undertaken.

See unit entry no. 8.

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221. *London, University of; St Thomas's Hospital Medical School, Department of Clinical Epidemiology and Social Medicine, Social Medicine and Health Services Research Unit*

PROFESSOR W. W. HOLLAND

DR M. CLARKE, T. HALIL

#### **Influenza in north Lambeth**

The aim of this study was to relate initial, pre-epidemic, titres of serum antibody against influenza (A<sub>2</sub>/Hong Kong) and changes in titre during subsequent epidemics to sickness absence due to acute respiratory disease and other items of personal information.

The study population consisted of a sample of males aged 25-64 who had been identified for the second stage of a study on duodenal ulceration (see entry no. 220). Personal information derived from the duodenal ulcer questionnaire together with additional information collected prior to the 1968-9 epidemics will be related to the initial antibody titre and the infection rates in both epidemics.

See unit entry no. 8.

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222. *London, University of; St Thomas's Hospital Medical School, Department of Clinical Epidemiology and Social Medicine, Social Medicine and Health Services Research Unit*

PROFESSOR W. W. HOLLAND

R. CORKHILL, MISS A. EDWARDS

#### **The Harrow children's respiratory study**

The study aims to determine the prevalence of respiratory illness and symptoms in newborn babies and their parents and siblings; and the influence of familial and social factors on the development of respiratory disease in young children from birth. The study population consisted of all the families living in part of Harrow who had children born between July 1963 and June 1965. Information was obtained by questionnaire from every member of the family. A one-third sample was then visited by a field worker from St Thomas's Hospital, and lung function and anthropometric measurements were taken. This sample was revisited annually for five years and similar measurements taken. Annual follow-up information was obtained from the rest of the population by postal questionnaire.

See unit entry no. 8.

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223. *London, University of; St Thomas's Hospital Medical School, Department of Clinical Epidemiology and Social Medicine, Social Medicine and Health Services Research Unit, with Kent County Council, Public Health Department*

PROFESSOR W. W. HOLLAND

T. HALIL

**Respiratory symptoms and lung function measurements in Kent school-children**

The objective of this investigation is to obtain a clearer picture of the aetiology of respiratory disease in schoolchildren. The survey is designed to assess the influence of social, environmental, and personal characteristics on the prevalence of respiratory symptoms, illness, and ventilatory function as measured by the peak expiratory flow rate.

For the purposes of this study three cohorts of schoolchildren resident and attending school in four areas of Kent were identified. The prevalence (since birth) information of respiratory symptoms and illness was obtained by means of a self-administered questionnaire completed by parents. The respiratory function measurement was made during a medical examination which also included examination of ears and throat and questions on smoking habits. These three cohorts are being followed up to school-leaving age. In the follow-up studies more detailed information of the respiratory symptoms and illnesses of the whole family unit is being collected.

See unit entry no. 8.

224. *London, University of; St Thomas's Hospital Medical School, Department of Clinical Epidemiology and Social Medicine, Social Medicine and Health Services Research Unit*

PROFESSOR W. W. HOLLAND

DR JEAN WEDDELL, DR M. ANDERSON, MRS K. DUNNELL, MISS S. BERESFORD,  
MRS J. BOCKING, MRS M. LARGE, MRS M. HOCKEY

**Total medical care given to stroke patients**

The study aims to record all those in a defined population of 222,000 in the Frimley/Farnham area who sustain a stroke within a defined period of time; to record the type of care given to the patients and the places in which this care is given; to record the patient's functional ability before the stroke and to compare this with the ability recorded at specified time intervals after the stroke; to identify met and unmet needs for medical care; and to record how these needs are being met at present by hospitals, GPs, and local authorities.

The study covers all patients in this population who suffer from a stroke of sufficient severity to need time off work and receive medical or nursing care. Also included are all patients, eligible for inclusion, who are found at post-mortem examination to have died from cerebro-vascular disease.

See unit entry no. 8.

225. *London, University of; St Thomas's Hospital Medical School, Department of Microbiology and Department of Obstetrics, London SE1*

DR I. PHILLIPS, PROFESSOR P. RHODES

DR D. W. HYATT

### **Gonorrhoea screening in antenatal patients**

*Approved support 1972: £1,500 (prov.)*

The project aims to determine the incidence of gonorrhoea in pregnant women attending an obstetric booking clinic; assess the rate of isolation of gonococci from cervical and anal swabs; and determine the antibiotic sensitivity of strains of *N* gonorrhoea isolated, in comparison with strains isolated from patients in a VD clinic.

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226. *Manchester, University of; Department of Social and Preventive Medicine, Manchester M13 035*

DR L. BARÍC

D. WILKIN

### **The determinants of behaviour related to the aetiology of coronary artery disease**

*Approved support 1969-72: £8,000*

The study aims to measure the extent to which the aetiological significance of habitual physical activity, obesity, and cigarette smoking on coronary artery disease is known, the degree to which such knowledge is accepted, and the effects of such knowledge on behaviour among members of the medical and health professions, a random sample of the population, and a group identified as being especially at risk. The team hypothesize that a number of influences have conspired to prevent medical discoveries in this field being translated into changes in behaviour.

Data were obtained from sample surveys of the general population and members of the medical profession as well as from an intervention study carried out on an experimental group and a control group.

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227. *Manchester, University of; Institute of Science and Technology, Department of Management Studies*

B. MOORES

### **Evaluation of pathology to GPs**

This is a study being run in conjunction with the Department of General Practice and is designed to assess the reasons for pathology investigations and the extent to which the results of these investigations are deemed to have influenced the diagnoses and/or pattern of treatment. Thus far, the study has been restricted to a small number of GPs and has involved the design of a tracer card which makes use of a coding system that picks up the original motivation behind the test, the interpretation placed on the test result, value, and the impact this had upon medical judgement.

See group entry no. 31.

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228. *Manchester, University of; Institute of Science and Technology, Department of Management Studies*

B. MOORES

### **The assessment of the effectiveness of mobile cardiac ambulances**

This is an ongoing analysis of the effects of introducing a mobile cardiac ambulance into the community of Salford. The aim is to determine to what extent such a vehicle influences the level of service provided by the health care system. Because time is the prime element, emphasis is on retrieving information pertaining to the times various elements occupy, for example, time from onset of symptoms to calling of first medical aid, etc. Full costing was also performed and the ongoing work is an attempt to provide a far larger sample for analysis. A simulation has also been performed of the operation of the coronary care unit in order to determine the effect of various admission rates and number of beds provided.

See group entry no. 31.

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229. *Medical Research Council, Clinical Research Centre, Division of Immunology, Harrow HA1 3UF*

DR G. L. ASHERSON

DR A. D. B. WEBSTER

### **Immune deficiency disease: natural history and the role of laboratory investigations in its management**

*Approved support 1971-3: £7,000*

*Co-sponsor: Medical Research Council*

The aim of the project is to study the classification and clinical course of patients with immune deficiency disease and to investigate the relevance of various clinical immunology tests in management. The tests are of three types: tests of humoral immunity, tests of cellular immunity, and tests of polymorph function.

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230. *Medical Research Council Social Medicine Unit and the London Hospital, Cardiac Department, London E1 2A2*

DR H. D. TUNSTALL PEDOE

### **Tower Hamlets coronary project**

*Approved support 1970-3: £11,100*

*Co-sponsor: Medical Research Council*

The project is a pilot study for a heart attack register. The protocol and record forms are shared by nineteen European centres co-ordinated through the World Health Organization Regional Office for Europe. In Tower Hamlets an attempt is being made to record the frequency and outcome of acute coronary heart attacks, fatal and non-fatal, occurring in the population aged under 65. Surviving cases are being followed up and a psychosocial study of factors affecting a successful return

to work is in progress. Registration began in April 1970 and the two years' experience gained is being used to help design an international model for a simple permanent register scheme.

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231. *Newcastle General Hospital, Department of Microbiology, NE4 6BE*

DR J. B. SELKON

**The detection and treatment of asymptomatic bacteriuria in school-children**

*Approved support 1969-75: £20,000*

*Co-sponsors: Newcastle Corporation, Department of Health and Department of Education*

This study has been undertaken to determine the prevalence of asymptomatic bacteriuria in schoolchildren as related to sex, age, and social class; the incidence of asymptomatic bacteriuria in the schoolgirl during a four-year period; the acceptability and the cost of screening schoolchildren for pyuria and bacteriuria using a mobile clinic-laboratory; and the clinical importance of asymptomatic bacteriuria in terms of the development of pyelonephritis and the efficacy of a two-year course of chemotherapy in preventing its progression to pyelonephritis if this is its natural history. The survey is being carried out in the schools of Newcastle upon Tyne.

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232. *Newcastle upon Tyne, University of; Department of Psychological Medicine*

PROFESSOR SIR MARTIN ROTH

DR E. J. EASTHAM, DR K. BERGMANN

**A survey of psychiatric morbidity in the elderly in acute medical ward admissions**

One hundred consecutive patients over the age of 65 admitted to an acute medical ward were seen. A standardized psychiatric interview, tests of memory, tests of behaviour, and a social inquiry were carried out. The psychiatric morbidity of the population has been ascertained and the material will be analysed with special reference to the significance of depressive illness and organic brain disease with regard to the medical outcome and social progress of the patients.

See unit entry no. 35.

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233. *Newcastle upon Tyne, University of; Department of Psychological Medicine*

PROFESSOR SIR MARTIN ROTH

DR C. M. H. NUNN, MISS E. M. FOSTER, DR K. BERGMANN

**Pilot study of early ascertainment of psychiatric morbidity in a general practice population**

In 1970 a general practice survey was initiated in two practices with a total of about 24,000 people of whom 12 per cent were over 65. In the initial phase of the study

the aims of early ascertainment and the type of patients who might be helped in this way were discussed with the GPs concerned and further written information was made available to provide a consistent frame of reference for referral. Subjects who were referred were randomly allocated to a treatment group and a control group. The control group was seen and assessed and any treatment necessary was left to the judgement of the referring family doctor. The treatment group were offered full assessment on a multidisciplinary basis at the Brighton Clinic. Follow-up of the patients by a research social worker has begun to assess outcome with regard to mortality, morbidity, social stress, hospital care, and further demands on the local authority social services.

See group entry no. 35.

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234. *Newcastle upon Tyne, University of; Medical Care Research Unit*

PROFESSOR D. J. NEWELL, I. T. RUSSELL

N. J. GLASS, MISS M. FLINTOFF, H. B. DEVLIN (*Consultant surgeon, North Tees HMC*)

**The North Tees study of day-case surgery for inguinal hernia and haemorrhoids**

This project, which is being carried out in collaboration with St Thomas's Hospital Medical School (entry no. 421), aims to analyse the clinical, social, and economic implications of day-case surgery for inguinal hernia and haemorrhoids by means of a randomized controlled trial.

A trial group undergoing day-case surgery is being compared with a control group receiving traditional care. Within the hospital, data is being collected at out-patient clinics, both pre-operatively and post-operatively, and during the patient's stay. In the community, clinical data is being gathered by using postal questionnaires to GPs and district nurses, and socio-economic information by means of home interviews, both before and after the operation.

See unit entry no. 9.

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235. *Newcastle upon Tyne, University of; Medical Care Research Unit*

PROFESSOR D. J. NEWELL

**Trial of manipulation in the treatment of low back pain**

*Co-sponsor: British Association of Physical Medicine and Rheumatology*

This trial compares four treatments for low back pain: manipulation, corset, physiotherapy, and analgesics.

Some 400 patients attending departments of physical medicine at ten hospitals throughout the country who satisfied certain diagnostic criteria are randomly allocated to one of the four treatments, which is given for three weeks. Patients are assessed clinically before and after treatment, and again at six weeks. Postal follow-ups are made at three months and one year.

See unit entry no. 9.

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236. *Northwick Park Hospital, MRC/DHSS Epidemiology and Medical Care Unit with Division of Surgery, Dietetics Department; and University of London, St Mary's Hospital Medical School, Department of Bacteriology*

DR T. W. MEADE

**Case control study of dietary habits in carcinoma of the colon and rectum**

*Co-sponsor: Medical Research Council*

The purpose of this study is to see whether the habitual dietary habits in those with large bowel cancer differ from those without, particularly in fat and roughage intake. Patients with carcinoma of the colon or rectum and (for each patient) two control patients with other diagnoses are interviewed for their usual dietary habits before the onset of symptoms. Stool specimens are also examined for bacterial flora and steroid content, and these results correlated with dietary habits, since these factors have been suggested as playing a part in the onset of the disease. About 35 cases and 70 control subjects have so far been studied.

See unit entry no. 10.

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237. *Northwick Park Hospital, MRC/DHSS Epidemiology and Medical Care Unit*

DR T. W. MEADE

DR A. M. S. MASON, W. R. S. NORTH, MISS J. L. SKEGG, PROFESSOR A. B. ATKINSON  
(*University of Essex, Department of Economics*)

**Medical care and economic consequences of smoking**

*Co-sponsor: Medical Research Council*

The aim of the study is to make a detailed analysis of the medical care and economic implications of smoking, with individual reference to lung cancer, ischaemic heart disease, and chronic bronchitis. Data on mortality, morbidity, the dose-response relationship between tobacco consumption and smoking-related disease, and population projections are being built into a demographic model, which will be used to investigate the medical care and economic consequences of changes in tobacco consumption.

See unit entry no. 10.

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238. *Northwick Park Hospital, MRC/DHSS Epidemiology and Medical Care Unit*

DR T. W. MEADE

DR W. E. MIALL, W. R. S. NORTH

**Randomized controlled trial of treatment of mild hypertension**

*Co-sponsor: Medical Research Council*

The trial is designed to assess the value of detecting those with mildly raised arterial blood pressure (diastolic levels of 90-109 mmHg) and treating them with drugs. It is one of several being co-ordinated by an MRC Working Party specially set up for the purpose. In order to have adequate numbers for a clinical trial it will be necessary

initially to screen several thousand people. Those with sustained pressures above 109 mmHg will be actively treated, and those within the determined range who agree to participate will be randomly assigned to active treatment or placebo groups. Mortality and morbidity from arterial and hypertensive disease in the two groups will be compared.

See unit entry no. 10.

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239. *Northwick Park Hospital, MRC/DHSS Epidemiology and Medical Care Unit*

DR T. W. MEADE

DR R. CHAKRABARTI, W. R. S. NORTH, MRS S. L. JUDD, MRS Y. STIRLING

**Arterial disease prediction study**

*Co-sponsor: Medical Research Council*

The study's two principal aims are to improve the ability to predict the onset of arterial disease, particularly ischaemic heart disease, in those hitherto clinically free of it, and the epidemiological study of thrombosis. Tests for 'increased thrombotic tendency' are being performed in a prospective study in which about 2,000 people will each be followed up for five years. These tests are for fibrinolytic and platelet activity, and clotting factor levels, and their value in prediction is being compared with known risk factors. Carbon monoxide levels are also being determined.

See unit entry no. 10.

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240. *Oxford, University of; Department of Psychiatry, Oxford OX3 7JX*

DR J. H. J. BANCROFT

**Attempted suicide in the Oxford Region**

*Approved support 1972-5: £28,600*

The study is in three parts. The first is a prospective survey of one year's 'attempted suicide' cases, both those admitted to general hospital and dealt with by GPs. This will provide (i) accurate incidence rates and a baseline for evaluating a proposed change in managing general hospital cases, (ii) detailed analysis of types of social problems involved, and (iii) the extent to which social or medical agencies had been contacted before the attempt.

The second part is a social area analysis of the Oxford Region which will relate attempted suicide behaviour to other social variables (including the 1971 census). This analysis will make use both of data from the prospective survey, and data on attempted suicide cases for 1969-70 obtained from the Oxford Record Linkage Service. This will enable a direct comparison with social mapping in Edinburgh and also a comparison between social mapping in urban and rural areas.

In the third stage, the identification of 'at-risk' groups will be attempted.

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241. *Oxford, University of; Department of the Regius Professor of Medicine, Health Services Evaluation Group: Community Hospital Programme*

DR A. E. BENNETT

**Studies of the epidemiology and treatment of patients with chronic disease**

Severe haemophilia frequently results in bleeding which requires replacement transfusion and admission to hospital. Two trials of prophylactic treatment have been completed, the first using steroids and the second an antifibrinolytic agent, tranexamic acid; one trial of treatment assessing the value of joint aspiration following haemarthrosis has been completed. Data are now being analysed to identify factors associated with the frequency of bleeding events.

See unit entry no. 40.

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*242. Royal College of General Practitioners, General Practice Research Unit*

DR D. L. CROMBIE

**The second National Morbidity Survey**

During the second National Morbidity Survey (1970-2), GPs are recording the use of their services by patients, comprising a population of some quarter of a million, in broadly the same way as that used for the first survey, 1955-6. Comparison of the results of the two surveys will enable trends in the use of GP services to be identified.

See unit entry no. 43.

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*243. Royal Devon and Exeter Hospital, Cardiac Department, Exeter EX1 1PQ*

DR D. B. SHAW

DR R. C. EVANS

**Study of the prevalence, incidence, morbidity, and mortality of heart block and bradycardia in the Devon clinical area**

*Approved support 1971-4: £11,800.*

A survey is being made of the prevalence, incidence, morbidity, and mortality of heart block and bradycardia in the population. This data is essential as a preliminary to setting up pacemaker services for the community. Patients with heart block and bradycardia are sought by direct approach to the 290 GPs in the Devon clinical area. They have been asked to notify any patients suspected of suffering from these conditions. The patients are then interviewed and an electrocardiogram taken. As far as possible patients with suspected heart block are investigated as they arise. However, an annual census is made to look for new cases and to check the condition of those already notified. In the pilot survey replies were obtained from 282 out of the 290 GPs in the area, and 183 patients were notified.

See section 3, Publications, page 441.

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*244. St Ann's General Hospital, Department of Communicable Diseases, London N15 3TH*

DR G. D. W. MCKENDRICK, DR R. EMOND

**An investigation into the incidence of cross-infection in isolation wards of different design**

*Approved support 1968-73: £18,200*

The study aims to determine the incidence of cross-infection in isolation wards of different design. In the pilot study, three wards in different hospitals were chosen: a long straight closed corridor ward, a cruciform ward with closed corridor, and a cruciform ward with open corridor. Varicella, zoster, and measles were selected as marker diseases because of their high infectivity and ease of recognition. Detailed records of index cases and susceptible contacts are kept by a research worker appointed for the purpose. This worker also visits the homes of the contacts following discharge from hospital to determine if any infection has arisen during this period.

The investigation was later enlarged to include three hospitals in south London.

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**245. *St Christopher's Hospice***

DR CICELY M. S. SAUNDERS, DR R. G. TWYXCROSS

MISS M. E. SPINKS

**Diamorphine (heroin) in the treatment of pain associated with advanced malignant disease**

Terminal cancer appears to be the one remaining field in which diamorphine is commonly used but in which detailed studies comparing it with morphine have not been attempted.

The project is organized as a clinical trial. Double-blind assessments of the two opiates will be made in suitable patients admitted to St Christopher's Hospice. The modifying effects of commonly used adjuvants such as cocaine, phenothiazines, and glucocorticosteroids will also require investigation. Biochemical techniques in order to arrive at a basic understanding of the way in which the human body handles diamorphine when administered orally are also to be developed.

See group entry no. 45.

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**246. *University of Sheffield, Department of Orthopaedics, Sheffield S10 5DL***

W. J. W. SHARRARD

DR A. P. MEHROTRA

**Investigation into wounds and state of tetanus prophylaxis in an accident population**

*Approved support 1972-3: £2,000*

This is a study of the present state of tetanus prophylaxis in patients attending an accident and emergency department to discover the proportion not immunized against tetanus. Concurrently, an investigation is being made into the type of wounds present, with particular reference to those that might develop tetanus if specific measures were not undertaken.

On the basis of the results of this investigation, it is anticipated that a trial of the use of human immunoglobulin will be undertaken to discover whether the routine

administration of this preparation would be feasible in patients not immunized against tetanus in certain circumstances.

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247. *West Middlesex Hospital, with South Middlesex Hospital, London Borough of Hounslow Health Department, London Borough of Richmond Health Department, and London Borough of Ealing Health Department*

DR J. S. STEWART

**A three-year prospective survey of infective hepatitis in a defined area**

*Approved support 1972-5: £26,000 (prov.)*

The survey aims to assess the extent of endemic clinical infective hepatitis in an open urban community in Great Britain, to correlate the different clinical types of hepatitis with associated immunological data and to investigate the epidemiological factors affecting the spread and severity of the illness in the community.

Patients in three London boroughs notified as having infective jaundice are seen as early in their illness as possible by the health visitor, who completes an epidemiological questionnaire, and by the survey doctor who examines the patient and takes blood during the acute and convalescent stages for biochemical and immunological investigations.

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248. *West Middlesex Hospital*

DR L. DORAN

**Trial of manipulation in the treatment of low back pain**

*Approved support 1969-72: £2,100*

This multi-centre trial of manipulation, planned by the British Association of Physical Medical has the objective of determining to what extent manipulation is successful in the treatment of acute and chronic low back pain. Some twelve hospitals participated; patients for the trial were divided into four treatment groups: manipulation, definitive physiotherapy, corset, or analgesic tablets. Statistical analysis and evaluation of the results is being carried out by the Medical Care Research Unit, Newcastle upon Tyne.

See also unit entry no. 9.

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## 2.13. Supporting services

249. *Hoskyns Corporate Studies Ltd*

M. H. BRETHERTON

**The organization of ambulance services in metropolitan counties**

*Approved support: Phase I 1972: £5,600; Phase II 1972: £5,300.*

The objective of the study was to identify the potential cost savings through amalgamating the ambulance services of the proposed area health authorities in each



of the four proposed metropolitan counties. Using standards, based on the best current practice the resources and costs for different levels of amalgamation were calculated.

It was found that the greatest potential saving, ranging from 5 to 30 per cent, would be achieved by merging the ambulance services of the area health authorities into one service.

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250. *York, University of; Department of Social Administration and Institute of Social and Economic Research*

PROFESSOR KATHLEEN JONES

See entry for Birmingham, University of; Social Studies Department, entry no. 351.

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251. *Kent, University of; at Canterbury, Centre for Research in the Social Sciences, Health Services Research Unit*

PROFESSOR M. D. WARREN

**Transport of patients to surgeries**

This study aims to assess the need for a transport service for GPs' patients.

See unit entry no. 5.

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252. *Lancaster, University of; Department of Operational Research, Unit for Operational Research in the Health Services*

PROFESSOR M. G. SIMPSON

DR A. HINDLE

**The development of methods for costing pathology transportation systems**

Simple techniques have been developed to obtain the costs of transport systems aimed at providing a regular service to GPs. These techniques consider the transport problems associated with complex pathology systems with central laboratories, peripheral laboratories, and GP services.

See group entry no. 15.

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253. *Lancaster, University of; Department of Operational Research, Unit for Operational Research in the Health Services*

PROFESSOR M. G. SIMPSON

DR A. HINDLE

**An experimental investigation of GP response to pathology transport systems**

An experimental study is currently being set up to determine the likely response of GPs to transport systems which would provide to them a regular specimen collection service.

See group entry no. 15.

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**254. United Leeds Hospitals**

T. MCGEE, J. D. G. CHESTER, *with advice from University of Leeds Catering Research Unit, (entry no. 16), and Maynards, Management Consultants*

**Extension, with evaluation, of frozen food catering system**

*Approved support 1971-2: £10,000 capital; £6,000 revenue*

An experimental hospital catering system based on precooked frozen foods was set up in 1968 at the Hospital for Women, Leeds, under the sponsorship of the Nuffield Provincial Hospitals Trust and the DHSS.

A large-scale experiment is now being conducted at Newcastle (entry no. 264); but as part of the over-all programme the system at Leeds is being extended to take in a further hospital and thereby to provide planning and operational information on distribution and service systems, and staff working systems.

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**255. Leeds, University of; Nuffield Centre for Health Services Studies, Leeds LC2 9PL**

K. LEE

**A study of the ambulance service**

*Approved support 1971-2: £2,000*

The research aims to study the pattern of activity of the ambulance services in two hospital regions; to identify and to examine critically variations in the scope of service provided and in their operational policies; to examine any performance indicators available; and to consider the implications of the study's findings for the management of the ambulance services.

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**256. Leeds, University of; Procter Department of Food and Leather Science, Catering Research Unit**

PROFESSOR A. G. WARD

**Frozen food: production flow lines for all dishes, and associated recipe development**

Process flow lines for all dishes have been compiled to enable the production of pre-cooked frozen food to be organized so that the products would flow smoothly from one process to another with the minimum of delay. New recipes and new processing methods applicable to cook/freeze, including therapeutic diets, are being investigated and formulated.

See group entry no. 16.

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**257. Leeds, University of; Procter Department of Food and Leather Science, Catering Research Unit**

PROFESSOR A. G. WARD

**Frozen food: assessment of peripheral kitchen requirements**

The assessment of peripheral kitchen requirements is based on the geographical

grouping of wards and the availability of suitable space for the siting of reheating ovens for the immediate service of food to adjacent wards. Research work has indicated that the food quality of most items would be acceptable within thirty minutes of reheating if kept at optimum temperature. Within this delay period hot food can be distributed effectively and speedily from a centralized point employing a tray service or plated meals service.

See group entry no. 16.

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258. *Leeds, University of; Procter Department of Food and Leather Science, Catering Research Unit*

PROFESSOR A. G. WARD

#### **Development of a frozen food production unit layout**

Cooked frozen food will be prepared centrally at a self-contained production unit, stored and delivered to points of consumption at six hospitals in the Newcastle area. The aims of development work on the production unit are to provide the basic design requirements to ensure that frozen food can be produced efficiently and safely, using up-to-date methods.

See group entry no. 16.

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259. *Leeds, University of; Procter Department of Food and Leather Science, Catering Research Unit*

PROFESSOR A. G. WARD

#### **Frozen food: assessment of the effects of the processing system on bacteria in the food**

The bacteriological hazards of using chilled food will be investigated to determine the limits of the system which can safely be tolerated.

See group entry no. 16.

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260. *Leeds, University of; Procter Department of Food and Leather Science, Catering Research Unit*

PROFESSOR A. G. WARD

#### **Frozen food: the measurement of heart labile nutrients in the food**

The measurement of vitamin C in vegetables is being used to monitor food quality and provide data for food production and food service planning. New methods of vegetable processing for cook/freeze systems will be investigated. The processing conditions will be simulated in the laboratory and the vitamin C content of the products will be estimated.

See group entry no. 16.

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261. *Leeds, University of; Procter Department of Food and Leather Science, Catering Research Unit*

PROFESSOR A. G. WARD

**Frozen food: the measurement of equipment performance**

In connection with the precooked frozen food project at Newcastle (see no. 264) a number of items of equipment have been tested in the laboratory. A selection of forced convection ovens have been tested. The thermal performance of several container systems has been examined. The plant associated with these systems has been either tested or inspected. Freezing methods have been reviewed, and tests carried out using blast and liquid nitrogen freezers. Simulation on a laboratory scale of chilling and thawing will lead to prototype equipment being built and tested.

See group entry no. 16.

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262. *Leeds, University of; Procter Department of Food and Leather Science, Catering Research Unit*

PROFESSOR A. G. WARD

**Frozen food: assessment of control procedures**

The aim of this project is to improve the quality of the food supplied and served in hospitals by providing management with better methods of control and by testing the food to ensure that high quality is being maintained. Organoleptic, nutritional, and bacteriological tests will be used for this purpose. These techniques can also be applied to purchased goods to ensure that specifications are being met.

See group entry no. 16.

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263. *National Coal Board, Operational Research Executive*

R. C. TOMLINSON

**Stock control for stores in the hospital service**

The project's aims are to design and implement a manual stock control system for use in hospital service stores. A system based on economic order quantities has now been designed. A study of the necessary size of stores is also being undertaken.

A series of implementations are now being carried out, such that shortly one store in each region will have installed the system. A set of reports to describe the system have now been issued by the DHSS.

See group entries nos 33 and 56 (i).

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264. *Newcastle Regional Hospital Board, Newcastle NE29 8DV*

*Steering Committee Chairman: S. MITCHINSON; Project Director: S. F. PASSMORE; with collaboration from University of Leeds Catering Research Unit and Maynards, Management Consultants.*

**The Newcastle Hospitals Catering Project**

*Approved support 1970-5: £721,000 (capital); £75,000 (provisional revenue)*

This is an experimental development of a large-scale hospital catering system based on frozen foods, which aims to assist the DHSS to assess the potential value and consequences of a change to freeze production catering in the health service. A central food production unit will be established to provide approximately 60,000 meals per week for six hospitals. It will explore and demonstrate production, storage, distribution, and service methods, quality controls, consumer satisfaction; and assess costs.

See also Leeds, University of; Catering Research Unit, entry no. 16.

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*265. Reading, University of; Department of Applied Statistics, Operational Research (Health Services) Unit*

PROFESSOR R. N. CURNOW

DR D. G. NEAL

**The Berkshire County Council Ambulance Service**

A simulation study to investigate the effects of re-siting ambulance stations and to evaluate an optimum fleet size and constitution.

See group entries nos 42 and 56 (i).

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*266. Reading, University of; Department of Applied Statistics, Operational Research (Health Services) Unit*

PROFESSOR R. N. CURNOW

MR L. J. TWOMEY

**Study of the Reading Ambulance Service**

A study of the Reading Ambulance Service to determine, by simulation of the system, location and size of fleet.

See group entries nos 42 and 56 (i).

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*267. Wales, University of; University College Cardiff, Department of Sociology*

PROFESSOR P. HALMOS

MISS J. F. WALKER

**An analysis of some aspects of the role of the British midwife**

*Approved support 1970-3: £16,200 (including cost of entry no. 394)*

The project aims to examine the present professional status of the British midwife, with particular reference to the nature of midwifery knowledge and expertise, and the control of midwifery practice. By observation, interviews, and questionnaires information has been obtained from obstetricians and midwives in hospital and domiciliary practice, about the work of midwives, and the ideas respondents have concerning what midwifery is, and what midwives should do.

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## 2.14. Allocation of resources: cost studies

### 268. *Arthur Andersen and Company*

D. R. KAYE

V. C. WATTS

#### **Patient care event model**

*Approved support 1971-2: £32,500*

The project is part of the DHSS strategic study into the most appropriate balance between community and hospital resources. A computer simulation was developed to model the movements of patients between hospital in-patients and out-patients, accident and emergency departments, GPs, and patients' homes. It has been used to examine the resource consequences of providing in health centres or group practice premises those services normally provided in hospital out-patient departments. In view of the interest of the initial results a further set of models has been developed and used to examine the out-patient sector in greater depth.

See also entry no. 56 (i).

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### 269. *Arthur Andersen and Company*

D. R. KAYE

J. W. MCCLENAHAN, V. C. WATTS

#### **Analysis of claims on hospital building schemes and some effects of phasing hospital buildings**

*Approved support 1971: £8,000*

The project formed part of the Hospital Size Study (one of the DHSS strategic studies) and was directed towards finding out any relationship between cost overruns or claims (as a proportion of cost) and scheme cost and the relationship between scheme (or phase cost) and the time taken to build such a phase. No relationship between cost overrun and scheme cost was established, but a relationship between size and time overrun was observed. It was shown that substantial benefits could be obtained from more rapid completion of schemes and the introduction of a programme of smaller schemes.

See also entry no. 56 (i).

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### 270. *Arthur Andersen and Company*

D. R. KAYE

V. C. WATTS, J. W. MCCLENAHAN

#### **Analysis of time and cost overruns on hospital building schemes**

*Approved support 1972-3: £15,000*

In this work an attempt will be made to discriminate between schemes having low and high time overruns, on the basis of such factors as scheme cost, scheme type,

contract period, and controlling board. The basic technique involved will be multiple regression, based on data collected for large RHB schemes (costing more than £705,000 for works, fees, and equipment) scheduled for completion since 1967. See also entry no. 56 (i).

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271. *Birmingham, University of; Department of Social Medicine, Health Services Research Centre*

PROFESSOR T. MCKEOWN

DR. K. W. CROSS, DR D. KEATING (*London School of Hygiene*)

**Hospital siting**

A series of studies relating to patient transport and to visiting by relatives in hospitals for the mentally sick and mentally sub-normal in the Birmingham conurbation, based on field studies carried out through personally administered questionnaires and subsequent computer analysis. Extension to study the problems of rural areas is planned.

See group entry no. 11.

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272. *Exeter, University of; Institute of Biometry and Community Medicine*

PROFESSOR J. R. ASHFORD

DR G. FERSTER

**Alternative policies for providing maternity care**

This study is concerned with the allocation of resources and the effectiveness of the present policies for the delivery of maternity care and to estimate the costs and benefits of alternative policies. Information concerning the availability and use of resources, the selection procedures for place of confinement and the course and outcome of the pregnancy have been collected in selected geographical areas in Devon and Exeter and the associated costs have been identified. It is planned to extend this project by making comparative costing studies in representative cross-sections of selected areas in England and Wales.

See unit entry no. 4.

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273. *Exeter, University of; Institute of Biometry and Community Medicine*

DR N. G. PEARSON, DR D. C. MORGAN

F. C. DURBIN, P. SCOTT, F. E. JONES

**Accident services in England and Wales**

A questionnaire was designed to obtain accurate information from local medical sources on the medical staff and basic facilities supplied for hospital emergency services. By relating these details to workloads it was hoped to provide informed recommendations on future staffing and organization.

Emphasis was laid on the separation of workloads into that caused by major in-

juries and the large and growing demand for minor first aid and instant medical consultation. The relationship between reception units and the supporting organization of wards, theatres, and teams of medical personnel was also studied. See unit entry no. 4.

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274. *Exeter, University of; Institute of Biometry and Community Medicine*

PROFESSOR J. R. ASHFORD

DR G. FERSTER

**Construction of mathematical models of the health services**

The object of this study is to construct mathematical models of particular parts or activities of the NHS. and by developing models of the separate subsystems and taking due account of the interaction between them, to arrive at a composite model. It is then planned to study in depth the operation of the health services in the Exeter district, using the data from the Exeter Community Health Survey and from other local sources. Further studies will be carried out of the relation between usage, effectiveness, resources, and costs by an examination of variations between different districts within the UK.

See unit entry no. 4.

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275. *Lancaster, University of; Department of Operational Research, Unit for Operational Research in the Health Services*

PROFESSOR M. G. SIMPSON

DR A. HINDLE

**The development of a simulation and gaming approach to assist planning and resource scheduling in acute hospitals**

Several suites of simulation programmes have been developed appropriate to various problems of resource planning and scheduling in acute hospitals. Developments are currently concerned with the construction of hospital 'games' so that doctors, nurses, and administrators can play with strategies of resource allocation and resource management and obtain immediate feedback of results. The games will be computer-based.

See group entry no. 15.

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276. *National Coal Board, Operational Research Executive*

R. C. TOMLINSON

**A study of pharmacy costs**

The economies of scale of pharmaceutical manufacturing activities are being estimated. The study takes into account labour, building, equipment, and transport costs and seeks to compare the costs of central manufacturing activities of different sizes with the savings that can be made by their removal from group pharmacies.



The costs that are to be estimated will also facilitate a comparison of in-service and industrial costs.

See group entries nos 33 and 56 (i).

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277. *National Coal Board, Operational Research Executive*

R. C. TOMLINSON

**The evaluation of alternative methods of sterile supply**

The study's aims are to compare alternative organizational policies of sterile supply for hospitals, wards, and theatres. The study will evaluate the costs of Central, Hospital, and Theatre Sterile Supply Units and soft-pack factories and reveal the potential economies of scale that may exist.

The costs that will remain if the health service adopts a heavy dependence on industrial supplies will also be examined so that a true comparison with industrial prices may be undertaken.

See group entries nos. 33 and 56 (i).

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278. *Novy, Eddison and Partners*

PROFESSOR R. EDDISON

A. T. WILLIAMS

**Mode model**

*Approved support 1971-3: £35,000*

As part of a major DHSS study of the balance between different modes of delivering care, the mode model is concerned with behavioural factors involved in making a change. The cost of changing behaviour is as much a part of the cost of change as is the capital cost of new buildings or equipment. The study is directed at the development of procedures for obtaining information and constructing a comprehensive list of alternative ways of delivering care; the 'social analysis' of people and organizations involved in providing, operating, and using new or redeployed resources, including the measurement of behavioural reactions to change; and the development of procedures for determining the cost and time involved in various rates of change from one mode of operation to another.

See also entry no. 56 (i).

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279. *Oxford, University of; Department of the Regius Professor of Medicine, Health Services Evaluation Group: Community Hospital Programme*

DR A. E. BENNETT

**Randomized controlled trials of admission and discharge policies**

To compare the effectiveness of the community hospital with alternative methods of care, randomized controlled trials are planned and in progress. Patients suitable for care in either the community hospital or district general hospital and for whom no

special considerations exist are randomly allocated. Data on the process and outcome of care will be used to compare the groups: efficiency in economic terms will be determined. Studies will examine a policy of early post-operative transfer, policies for the admission of acutely ill medical patients, and a policy for the continuing surveillance and care of the elderly patient.

See unit entry no. 40.

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280. *Oxford, University of; Department of the Regius Professor of Medicine, Health Services Evaluation Group: Community Hospital Programme*

DR A. E. BENNETT

J. H. RICKARD

**Development of techniques for applying social cost-benefit analysis to alternative patterns of care**

The concept of social cost-benefit analysis is being applied to the analysis of the provision of health services. This entails an enumeration of resources and social costs with the identification and evaluation of benefits for alternative patterns of care, in particular those brought about by the introduction of community hospitals. The existing deployment of resources is being examined by the construction of an input-output matrix of health resources in a defined geographical area and population. To assess 'output' an attempt will be made to construct an aggregative index of health care efficiency which reflects the relative value society places on different possible outputs.

See unit entry no. 40.

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281. *Peat, Marwick, Mitchell and Company*

D. J. BISHOP

**Pathology laboratory simulation study**

*Approved support 1971-2: £18,600*

The aim of the simulation is to be able to represent any particular pathology laboratory so that it can be used as a planning and management tool to investigate the effects of changes in laboratory equipment, work scheduling, or manning, for example, increased automation or more high-grade staff. It is hoped that the model will also be used to show where bottlenecks are likely to arise when workloads increase.

See also entry no. 56 (i).

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282. *Reading, University of; Department of Applied Statistics, Operational Research (Health Services) Unit*

PROFESSOR R. N. CURNOW

MISS S. B. J. MACFARLANE

**Provision of beds for terminally ill cancer patients**

Estimates were made of the number of hospital beds required for these patients in the Reading area, taking into account the possibility of the development of community hospitals.

See group entry no. 42.

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**283. Reading, University of; Department of Applied Statistics, Operational Research (Health Services) Unit**

PROFESSOR R. N. CURNOW

DR D. G. NEAL

**Study of the Reading and Berkshire Maternity Services**

Descriptive study of maternity services in Reading and Berkshire based on detailed data of over 6,600 deliveries, June 1969–June 1970.

See group entry no. 42.

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**284. Reading, University of; Department of Applied Statistics, Operational Research (Health Services) Unit**

PROFESSOR R. N. CURNOW

M. R. BATHE

**Study of patients waiting for a hospital appointment**

Study of patients of the Reading Hospitals who are on a waiting list for admission or who are waiting to attend for their first appointment at a hospital out-patient clinic. A 1 in 5 sample of all such patients is to be visited by a health visitor and an assessment made of the effect on the patient and on the community health services of the patient waiting for a hospital appointment.

See group entry no. 42.

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**285. Reading, University of; Department of Applied Statistics, Operational Research (Health Services) Unit**

PROFESSOR R. N. CURNOW

M. R. BATHE

**Study to estimate future bed requirements for accident cases in the Reading hospitals**

Information was collected on accident cases admitted to the Reading hospitals between 1 January 1969 and 30 April 1970. Further data on accident in-patients in the Reading hospitals during the years 1966–9 was obtained from the Oxford Record Linkage Study. A simulation study was carried out to determine the future bed requirements of accident in-patients in an acute care ward.

See group entry no. 42.

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286. *Scientific Control Systems Ltd*

DR S. H. STOREY

**Balance of care models**

*Approved support 1971-3: £78,500*

The aim of the project is to devise models to assist with planning the best allocation of DHSS resources at a strategic level. The current model being investigated is a single time period, linear programming allocation model. It makes use of the existence of groups of patients for which acceptable alternative treatments are available, where each alternative consumes different resources and allocates patients to the alternative which minimizes the total cost, whilst still satisfying the restrictions imposed by the availability of resources, and by medical considerations. The current model now includes alternatives involving the elderly, surgical patients, general practice, and maternity.

See also entry no. 56 (i).

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287. *South-East Metropolitan Regional Hospital Board and Kent, University of; Mathematical Institute*

PROFESSOR D. J. BARTHOLOMEW

M. L. MARSHALL

**A study of the manpower planning requirements of the South-East Metropolitan Regional Hospital Board**

*Approved support 1971-2: £1,900*

The aim of the study is to design and set up a computer-based personnel records system for the total labour force of the Region (about 40,000).

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288. *Tavistock Institute for Human Relations, Institute for Operational Research*

J. STRINGER

DR J. M. H. HUNTER

**Scheduling of patients for investigation**

This is a study of the problems involved in scheduling patients requiring investigations through the new out-patient department, clinical measurement centre, radio-diagnostic department, and the ambulant care unit to be included in the re-development of Hammersmith Hospital. Simulation and analytic models will be used to produce decision rules for patient scheduling, to estimate capacity and performance for each unit, to look at possible effects elsewhere in the hospital, and to advise whether the use of a computer to control the scheduling operations would be desirable.

See group entry no. 48.

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289. *Wales, University of; University College, Cardiff, Department of Economics (Accountancy)*

PROFESSOR C. C. MAGEE

MRS P. CONNIES-LAING

#### **Costing of cone biopsy, hysterectomy, and radiotherapy**

The purpose of the research project is to ascertain the cost of the Cardiff cervical cytology screening service, including the cost of screening all females, and to provide financial data on the medical costs of the treatment consequential on the finding of suspicious or positive results from the original smear.

See group entry no. 50.

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290. *York, University of; Department of Economics and Related Studies and Institute of Social and Economic Research*

J. R. SHANNON

P. WEST

#### **Economics of hospital costs**

The object of this project is to derive criteria for allocating teaching hospital budgets, using econometric methods of hospital cost estimation.

See group entry no. 53.

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291. *York, University of; Department of Economics and Related Studies and Institute of Social and Economic Research*

A. J. CULYER

J. CULLIS

#### **Economics of hospital waiting-lists**

This project aims to find methods of reducing hospital waiting-lists, and deciding criteria for placing patients on lists in the first place. Also to be studied is the interpretation of lists and the impact of private practice on lists and waiting-times.

The method will involve the use of modern welfare economics to provide the theoretical underpinning and the use both of surveys and econometric estimation of the parameters of the models employed.

See group entry no. 53.

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292. *York, University of; Department of Economics and Related Studies and Institute of Social and Economic Research*

PROFESSOR A. T. PEACOCK

#### **Social accounting of health**

This project will trace out the flow of funds, both public and private, in British

medical care and provide consistent international comparisons of medical care expenditure using the methods of social accounting.

See group entry no. 53.

293. *University of York, Institute of Social and Economic Research*

PROFESSOR A. WILLIAMS

K. G. WRIGHT

**Output measurement for public services**

*Approved support 1972-4: £10,000*

*Co-sponsors: The Institute of Municipal Treasurers and Accountants*

The project aims to collect together, classify, and appraise critically the measures of output or effectiveness at present used in public services, and try to devise new or improved measures.

Work has started in the field of personal health and social services and is initially concentrated on the problems of assessing success in the care of the elderly.

## 2.15. Medical technology

294. *Atomic Energy Research Establishment, Harwell*

Development of a nuclear-powered battery for cardiac pacemakers. The long-life battery will obviate the need for frequent surgery in replacing conventional batteries. Animal trials have started and further development continues.

*Approved support 1970-3: £135,000*

Semi-conductor radiation detection probes. Used for gamma and beta measurements *in-vivo*. Two forms of probe have been developed:

(a) Planar detectors for use in superficial tissue and very small probes for use behind the eye.

(b) Cylindrical detectors for use in body cavities, for example, during radium treatment of cervical cancer. Associated equipment such as amplifiers has also been developed.

*Approved support 1969-72: £21,000*

Super-fine focus X-ray tube. Development of a tube in which the X-ray beam comes from a micro-sized target. This allows the image of a particular part of the anatomy to be greatly enlarged without loss of definition. The tube is linked to an image intensifier and is being evaluated primarily for orthopaedic work at Oswestry Orthopaedic Hospital.

*Approved Support 1969-72: £14,400*

295. *Atomic Weapons Research Establishment, Aldermaston*

AWRE is carrying out a programme of research, financed by the DHSS on the following topics:

Corrosion studies and metallurgical and mechanical investigations of surgical implants.

The identification of metabolites in the blood of uraemic patients, and related studies; advanced techniques of isolation and identification are employed.

Investigation of a closed loop cycle as an alternative to the present flow to waste system for intermittent dialysis. This involves the recirculation of a small volume of dialysing fluid after it has been passed through a sorbent column to remove metabolites.

Study into the ways of resolving dental problems associated with radiation of nasal carcinomas.

Studies in conjunction with the Eastman Dental Hospital on the degradation of dental fillings *in situ*; and on the cutting action of dental burrs.

Development of methods and automated equipment for the extraction of drugs from body fluids in cases of suspected addiction, for use at the Poisons Reference Centre.

Design and construction of experimental equipment for investigating the application of holographic techniques to diagnostic procedures (radiology, ultrasonics).

Design of pessaries for treating incontinence.

Design and construction of an experimental hip joint movement simulator for investigations in connection with research on artificial hip joints (in conjunction with the Institute of Orthopaedics, Stanmore).

Reinforcement of denture base materials; radio-opaque denture materials; improved anterior dental fillings.

See also group entry no. 54.

Exploratory developments in hand, include the following:

A drill for the clearance of obstructed arteries.

Method of assessing the level of performance of image intensifiers.

Collaborative work on the laboratory assessment of the toxicity of plastics.

Design of cardiac pacemakers; encapsulation processes; voltage converter for use with isotope-powered batteries.

Development of high-speed high-performance infra-red scanning equipment.

296. *Bath Institute of Medical Engineering*

*Approved support 1972-3: £4,500*

Development of cryosurgical equipment for use in gynaecological operations, treatment of haemorrhoids, superficial tumours, and general surgery.

297. *Birmingham, University of; Wolfson Research Laboratories*

PROFESSOR T. P. WHITEHEAD

Automation of laboratory processes.

See unit entry no. 1.

298. *Bristol Royal Infirmary, Department of Medical Physics, Bristol BS2 8HW*

DR F. G. M. ROSS, DR H. F. FREUNDLICH

*Approved support 1972-3: £6,000*

The investigation of the application of ultrasonics to various diagnostic procedures including the study of the liver, gall bladder, and heart movements and associated problems such as data presentation and transducer design.

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299. *Cardiff Maternity Hospital*

PROFESSOR A. C. TURNBULL

*Approved support 1969-72: £4,000*

Infusion of oxytocin in labour. A new infusion pump has been developed and is available commercially. Further work has led to a fully automated system in which the rate of oxytocin infusion is regulated by the strength and frequency of uterine contractions. The automated system is being evaluated.

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300. *Charing Cross Hospital, London WC2*

G. WILLIAMS

*Hammersmith Hospital, London*

PROFESSOR R. SHACKMAN

*Approved support 1968-73: £28,000*

Determination of the optimum conditions for preserving donor kidneys in readiness for transplantation (see also entry no. 324).

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301. *Department of Health and Social Security (Scientific and Technical Branch) and Industry*

*Approved support 1971-3: £8,000*

Blood pressure transducer. The aim is to develop a miniature intravascular blood pressure sensor which can be mounted on the tip of a catheter for measurements in the arterial system and later, possibly, also in the venous system. Prototypes will be evaluated shortly.

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302. *Department of Health and Social Security; Services Electronics Research Laboratory; and Industry*

*Approved support 1968-72: £600,000*

Neutron radiation therapy. A joint programme has led to the development of equipment for neutron therapy of tumours. The first installation commenced in November 1971 at the Christie Hospital, Manchester, and the second in January 1972 at the Belvedere Hospital, Glasgow. Clinical trials will start shortly.

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303. *Department of Health and Social Security (Scientific and Technical Branch)*

*Approved support 1969-73: £7,000*

Patient lifting devices. A programme of work concerned with performance trials and the establishment of specification requirements.

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304. *Department of Health and Social Security (Scientific and Technical Branch) and Industry*

*Approved support 1967-73: £75,000*

Invalid road transport. A three-wheeled road vehicle of much improved design has been developed and is now in production. It has fully automatic transmission and a quieter, more powerful engine. Post-development work has continued to improve certain features of the vehicle. One aspect of this is the work being undertaken to reduce the level of noise inside the vehicle.

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305. *Department of Health and Social Security (Scientific and Technical Branch) and Industry*

*Approved support 1968-73: £6,700*

Pedestrian-controlled wheelchair. A battery-powered wheelchair has been developed for situations where the patient is incapable of controlling it and the attendant is unable to push an unpowered model. Good results were obtained from user trials and the wheelchair is being manufactured as a standard item. Work has continued on providing additional features on this wheelchair.

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306. *Department of Health and Social Security (Scientific and Technical Branch) and Industry*

*Approved support 1970-3: £3,500*

Electric wheelchairs. A powered wheel system is being developed which will enable various types of hand-propelled wheelchairs to be readily converted to battery electric propulsion.

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307. *Department of Health and Social Security (Scientific and Technical Branch) and Industry*

*Approved support 1969-73: £30,000*

Wheelchairs. Development work has continued on the new types of folding light-weight wheelchairs some of which are now ready for production.

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308. *Department of Health and Social Security (Scientific and Technical Branch) and Industry*

*Approved support 1969-73: £6,000*

Wheelchair test gear. A test gear is being developed to provide a means for carrying out simulated testing of wheelchairs under varying dynamic conditions.

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309. *Essex, University of; Department of Electrical Engineering Science; University College Hospital, Medical Physics Department*

PROFESSOR G. G. B. CHAPLIN, J. S. CLIFTON

*Approved support 1969-73: £28,500*

Development of a simplified data manipulation, display, storage, and retrieval system specially designed for use with patient monitoring and related systems though with potential applications in other fields. Hospital trials will start shortly.

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310. *Exeter, University of; Department of Chemical Engineering*

PROFESSOR M. LACEY

*Approved support 1970-3: £12,000*

Haemodialysis. A study of the flow of liquids in haemodialysis equipment with the purpose of eliminating design features which cause difficulty with sterilization and/or mixing of water and concentrate solution.

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311. *Exeter, University of; Institute of Biometry and Community Medicine*

PROFESSOR J. R. ASHFORD

DR J. G. FRYER

**Studies of biological time series**

The project aims to develop a methodology for the analysis and interpretation of biological time series data, with particular reference to the analysis and interpretation of ECG and EEG data.

See unit entry no. 4.

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312. *Exeter, University of; Institute of Biometry and Community Medicine*

PROFESSOR J. R. ASHFORD

M. D. MACDONALD

**Research programme in analytical biochemistry**

The study aims to set up a data accumulation and quality control system for the results obtained from the Technicon data logger installed at the NHS Area Laboratory at Exeter, and to study the distribution of blood parameters in selected populations.

See unit entry no. 4.

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313. *The Hammersmith and St Mark's Hospital: Royal Postgraduate Medical School*

DR H. L. GLASS

*Approved support 1970-2: £25,000*

Development of a dual detector semiconductor medical scanner. The feasibility of

a solid state scanner has been demonstrated. The next stage is aimed at a double-head system with an improved detector.

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314. *Institute of Cancer Research and the Royal Marsden Hospital, Surrey*

DR C. R. HILL, DR V. R. MCCREADY

*Approved support 1971-3: £14,500*

Development of new ultrasonic scanning techniques employing a constant depth scan pattern and improved display.

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315. *King's College Hospital, London SE5, Department of Medical Physics*

DR S. B. OSBORN, P. J. FISH

*Approved support 1972-3: £6,500*

Development of an ultrasonic device for the detection and display of flow in blood vessels, particularly the detection of deep vein thrombosis.

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316. *King's College Hospital, London; East Birmingham Hospital*

DR O. H. B. GYDE

*Approved support 1971-2: £4,000*

The effects of blood pumps on blood components. The project is to define the effects of blood pumps on blood components in order to lessen any physiological trauma due to blood damage caused by pumps.

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317. *Laboratory of the Government Chemist*

DR H. EGAN

A. D. WILSON, R. F. BATCHELOR, J. M. PADDON

(a) Standard test procedures for dental resins and cements

(b) Standard test procedures for dental casting alloys

(a) In recent years filled resin systems have come into prominence as alternatives to dental silicate cements for the restoration of anterior teeth. Certain defects reduce the durability in the mouth of the new resins. From laboratory studies tests are being developed to evaluate these defects and relate the test results to clinical observations. The relationship of chemical erosion to mechanical properties is also being examined.

(b) Investigations seek to isolate the various factors that affect the measured elongation values of cobalt-chromium and nickel-chromium dental casting alloys.

Progress has normally been published through BSI and ISO committees and the International Association for Dental Research.

See group entry no. 57.

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318. *Laboratory of the Government Chemist*

DR H. EGAN

G. E. PHILLIPS, M. J. DE F. MAUNDER, MRS G. V. ALLISTON

**Arbitration methods for medicinal products**

*Ad-hoc* investigations are undertaken to explore problems arising in statutory arbitration analyses of medicinal products referred to the Laboratory following dispute in proceedings pursuant to the Food and Drugs Act 1955, Medicines Act 1968, and the NHS Drug Testing Scheme.

See group entry no. 57.

319. *Laboratory of the Government Chemist*

DR H. EGAN

G. F. PHILLIPS, E. W. HAMMOND, D. SCUFFAM

**Pharmacopoeial standards for medicines**

Numerous short-term investigations are undertaken to evaluate standard methods proposed for monographs in the *European Pharmacopoeia*, *British Pharmacopoeia*, *British Pharmaceutical Codex*, and the *British Veterinary Codex*. Alternative proposals may be raised.

Results are normally channelled through the relevant pharmacopoeial authority.

See group entry no. 57.

320. *Laboratory of the Government Chemist*

DR H. EGAN

G. F. PHILLIPS, A. F. LOTT, E. PARKINSON

**Methods for determination of efficacy of disinfectants**

The Laboratory is collaborating with the DHSS and the Public Health Laboratory Service to devise sufficiently reliable evaluation methods for hospital disinfectants. Similar investigations have been undertaken in connection with the Diseases of Animals Act and, currently, for the Milk and Dairies Regulations.

See group entry no. 57.

321. *The London Hospital, London E1*

DR R. SEAR, P. DEAN

*Approved support 1971-2: £3,000*

Development of a data-processing system for improving the display of data from rectilinear isotope scanners.

322. London, University of; Guy's Hospital Medical School, London SE1

D. R. SCRUTTON

*Approved support 1970-3: £9,300*

Surgical appliances. Continuing work on improved lower limb bracing for children.

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323. London, University of; Imperial College of Science and Technology, Department of Mechanical Engineering

PROFESSOR S. A. V. SWANSON, DR M. A. R. FREEMAN

*Approved support 1969-75: £61,000*

Research on the mechanical properties of articular cartilage and lubrication and wear in synovial joints, soft tissue, particularly aortic walls and cusps, and load transmission through the lumbar spine.

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324. London, University of; Royal Postgraduate Medical School, Department of Surgery

PROFESSOR R. SHACKMAN

**Kidney preservation**

*Approved support 1971-3: £7,200 (see also entry no. 300)*

*Co-sponsor: Ab Gambro, Lund, Sweden; Gillian Buxton Research Fund*

A kidney suitable for transplantation procured at one end of the country may have to be sent to the other end of the country for transplanting into the most suitable recipient. When a kidney has to be preserved for more than twelve hours, simple methods of irrigation and cooling lose their value, and sophisticated methods requiring continuous perfusion are required. These sophisticated methods require special staff and equipment, and this project aims to discover why simple methods fail, the limiting factors in clinical practice, and the limitations of any known method. The current project is experimenting with dogs' kidneys.

The results so far show that simple methods of irrigation and cooling can be effective, but that when prolonged preservation is required, a continuous perfusion system is necessary to reduce the failure rate to a realistic level. The most effective equipment, fluid, and conditions for perfusion still require investigation.

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325. Microbiological Research Establishment, Porton

*Approved support 1968 (continuing): £615,000*

L-asparaginase. Production of experimental quantities of L-asparaginase for clinical work on the treatment of leukaemia. Some research is also being conducted into other anti-tumour enzymes.

*Approved support 1971-5: £220,000*

Influenza vaccine. Research to produce a highly purified stable vaccine and a suitable adjuvant.

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326. *Middlesex Hospital, London W1N 8AA, and Industry*

DR K. E. BRITTON, DR N. J. BROWN

*Approved support 1968-72: £42,000*

Renography equipment. This development has resulted in a mobile couch incorporating all the apparatus of a three-channel renography system with blood background subtraction facility. It does not need the services of a physicist for operation. Production models are being evaluated.

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327. *National Blood Transfusion Service, Manchester and Lancaster*

DR F. STRATTON, DR H. H. GUNSON

P. K. PHILLIPS

**Immunization of Rh negative male volunteers with small doses of Rh positive cells**

*Approved support 1968-73: £22,300*

The aim of this investigation is to determine the best method for the production of the Rhesus antibody anti-D in Rhesus negative male volunteers with a view to providing high titre anti-D serum for the preparation of immunoglobulin used in the prevention of Rhesus haemolytic disease of the new born. Immunization schedules have been carried out using various preparations of Rhesus positive red cells and the resultant anti-D has been investigated with regard to its specificity, immunoglobulin nature, using ultracentrifugal analysis, column chromatography, gel filtration, and specific antiglobulin reagents. Investigation has also been carried out with regard to the quantitative aspects of the antibody produced both during the primary and secondary immune responses. The quantification of anti-D has been assessed by titration methods and also by the use of the Auto-Analyser, and assessment of the latter method has developed into an important aspect of the study.

At the present time, more than 50 Rh negative males have been immunized and it is hoped that from this study the knowledge in homologous immune response processes will be increased and that an effective means of producing high titre anti-D serum will be effected.

See section 3, Publications, page 441.

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328. *National Blood Transfusion Service, North-East Metropolitan Regional Blood Transfusion Centre*

DR W. J. JENKINS

*Approved support 1970-3: £20,000*

The long-term storage of blood for transfusion. Investigation of techniques and equipment for the freeze preservation of red blood cells at a very low temperature. The project envisages the use of a system of packs and containers for the various procedures from collection of the blood right through to its 'reconstitution' for use together with sterile connecting device to enable single packs to be joined together aseptically and safely.

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329. *Nottingham, University of; Department of Psychology, Blind Mobility Research Unit*

DR J. D. ARMSTRONG, DR A. D. HEYES

D. J. GAZELY

### **Mobility of the deaf/blind**

This project is in two parts. In the first part, development of a stereophonic hearing aid system is under way. This device is intended to be used by the hard-of-hearing/blind who presently depend on the monaural Medresco hearing aid. The latter aid is unable to allow the accurate localization of sound sources around the blind person and, in consequence, cannot provide essential orientation information for mobility purposes.

The second part is concerned with the totally deaf/blind. Existing electronic mobility aids usually have auditory displays which obviously cannot be used by the deaf/blind. A simple skin stimulator system is being tested as a means of providing the user with information on the location and range of objects in the environment.

See group entry no. 37.

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330. *Nottingham, University of; Department of Psychology, Blind Mobility Research Unit*

PROFESSOR C. I. HOWARTH, DR J. D. ARMSTRONG, DR A. D. HEYES

### **Skin stimulation**

This work is related to the experimental programme being carried out at the Smith-Kettlewell Institute of Visual Sciences in San Francisco. The skin represents a possible surface through which optical information might be transmitted after suitable encoding. Experiments on the limitations of the skin for this purpose are being conducted.

See group entry no. 37.

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331. *Nunnery Fields Hospital, Canterbury*

DR A. A. BARTON

*Approved support 1972-3: £2,000*

Thermography. Investigation of pressure sores and management of long-stay patients.

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332. *Orpington Hospital, Kent*

DR K. J. RANDALL

*Cambridge University, Department of Pathology*

DR J. H. TUCKER

*Approved Support 1970-2: £7,700*

Automation of cervical screening. Development of techniques for automatically

preparing cervical specimens in a form suitable for presentation to the equipment mentioned in project no. 340.

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333. *Queen Victoria Hospital, East Grinstead*

J. WATSON

*Approved support 1972-3: £1,000*

Lasers in surgery. Investigations into the use of lasers in excising burns tissue.

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334. *Reading, University of; Department of Applied Physical Sciences*

PROFESSOR H. H. HOPKINS

*Approved support 1971-4: £37,500*

Development and improvement of optical equipment for clinical use. The work includes the improvement of optical systems in conventional endoscopes, examination of ophthalmic methods and equipment and the application of modern optical techniques to medical work.

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335. *Royal National Orthopaedic Hospital, London*

DR J. T. SCALES

*Approved support 1969-72: £35,000*

Hip-joint prostheses. Research into the wear and corrosion characteristics of various types of hip-joint prostheses.

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336. *Royal National Orthopaedic Hospital, London*

DR J. T. SCALES

*Approved support 1968-72: £4,500*

Hip-joint prosthesis. Development and long-term clinical assessment of a total hip-joint replacement prosthesis.

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337. *Royal Salop Infirmary, Shrewsbury*

G. K. ROSE

*Approved support 1969-73: £10,000*

Surgical appliances. Continuing work on the development of improved splinting for spina bifida.

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338. *Royal Victoria Infirmary, Newcastle*

PROFESSOR D. N. S. KERR



*Approved support 1969-73: £8,500*

Haemodialysis. Laboratory and clinical assessment of dialysers with the aim of improving the performance of future equipment.

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339. *St Martin's Hospital, Bath*

K. LLOYD WILLIAMS, DR B. PHILIPS

*Approved support 1969-72: £23,000*

Thermography. Two current aspects of an extensive programme are the application of thermography to (i) diagnose and localize incompetent perforating leg veins, and (ii) diagnose carotid stenosis by examining temperature patterns in the supra-orbital areas.

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340. *St Mary Abbots Hospital, London*

DR O. A. N. HUSAIN

*Approved support 1969-73: £16,000*

Automation of cervical screening. A prototype equipment is being evaluated as a possible means of automatically scanning and classifying cervical smears as 'clear' or 'suspicious'. In the latter case, the particular specimen is investigated by a cytologist.

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341. *St Mary's Hospital, London*

PROFESSOR R. E. O. WILLIAMS

*Approved support 1968-75: £39,000*

The mechanization of laboratory microbiological procedures. One prototype equipment has been developed and negotiations for production are proceeding.

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342. *Salford University*

J. T. HENSHAW

*Approved support 1969-74: £25,000*

Surgical appliances. Continuing work on the development of lower limb bracing with improved cosmesis.

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343. *Shoe and Allied Trades Research Association*

*Approved support 1969-73: £12,000*

Continuing work on the development of footwear for the arthritic foot.

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344. *Strathclyde University, Radiation Laboratory*

DR A. WARD

*Approved support 1971-3: £2,000*

Research on recognition strategy in relation to automated differential white blood cell counting.

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345. *University College Hospital, London*

J. S. CLIFTON

*Essex University, Department of Electrical Engineering Science*

PROFESSOR G. B. B. CHAPLIN

*Approved support 1970-3: £25,000*

Blood gas analysis/mass spectrometry. Work at Essex University is aimed at development of an easily operated mass spectrometer for use in a clinical environment to provide on-line analysis of blood gases. The development of suitable catheter probes for use with this system is being undertaken at University College Hospital.

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346. *Various hospitals and investigators*

*Approved support 1970-2: £1,200*

Incontinence control. Urinary incontinence can be sometimes controlled by the application of electrical stimuli. Trials are being undertaken to examine the practicability and effectiveness of a method in which the electrical pulses are applied via small contacts mounted on a pessary.

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347. *Various hospitals*

*Approved support 1968-73: £30,000*

General purpose hospital beds and cots. Evaluation of the various types of movable beds and cots and the development of new designs.

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348. *Various hospitals*

*Approved support 1968-72: £2,200*

Immersion beds. Trials have been undertaken at a number of hospitals on the use of the Winchester immersion bed for the treatment of bed sores.

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349. *Walton Hospital, Liverpool*

DR S. LIPTON

*Approved support 1969-72: £3,500*

Percutaneous cordotomy. Development of techniques and devices for selective

destruction of nerve fibres involving extremely precise, micro-manipulation of the electrodes from a lesion generator. The method is used to relieve intractable pain in terminal cases.

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350. *Westminster Hospital, London*

C. DREW

*Approved support 1969-73: £7,000*

Blood pump. Support for development of pulsatile flow blood pump for long-term pumping.

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## 2.16. Social science techniques

351. *Birmingham, University of; Social Studies Department, and York, University of; Department of Social Administration and Institute of Social and Economic Research*

*At Birmingham: PROFESSOR F. LAFITTE, MISS J. HARDY*

*At York: PROFESSOR KATHLEEN JONES*

J. LEWIS, MRS J. G. ROSON (*left September 1970*), M. GLADWIN (*left September 1970*), D. EMERSON (*left October 1971*)

### **Child Care Research Project**

*Approved support: at Birmingham 1967-72: £34,700; at York 1967-72: £30,800*

A comparative study of decision-making about referrals in two local authority children's departments. The aim is to explore the main features of the decision-making process in child care and its effects on the kinds of service received by clients.

In each department a sample of referrals, collected over one year, have been followed up for six months by repeated interviews with all members of the department involved in the referrals. Distinct 'styles' of working have been identified and these have been related to the organization of teams of child care officers. The implications of this in the operation of the new social service departments will be considered.

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352. *Brunel University*

R. W. ROWBOTTOM

### **Organization and management in social service departments**

See unit entry no. 3.

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353. *London, University of; Institute of Psychiatry*

DR R. H. CAWLEY

MRS E. O. SILVERMAN

**Methodological study on the use of social work manpower in relation to mental health services**

*Approved support 1972-4: £12,800*

The aim of the project is to provide a set of methods for investigating the work of social service departments concerned with the mental health field. The intention is to devise and evaluate a number of indices descriptive of five main classes of variables: available manpower, physical amenities, nature and extent of work undertaken, organization and management of resources, and pattern of collaboration with similar services.

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**354. London, University of; University College, Department of Anthropology**

PROFESSOR MARY DOUGLAS

M. NICOD

**Food as a system of communication**

*Approved support 1972-3: £3,000*

The aim is to establish a method of understanding the process by which the need for bodily nutrition is harnessed to the demands of the social system. Taking the family unit as a gastronomic community, an attempt will be made to identify the boundaries of intimacy and distance expressed by food sharing and food exchanging in four families.

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**355. Manchester, University of; Centre for Youth Studies and Research**

DR C. SMITH (*up to December 1970*), MRS H. M. SMITH

**Study of deviancy among adolescent girls**

*Approved support 1970-2: £11,600*

The project aims to study one aspect of deviancy, 'at risk' behaviour, among a small group of adolescent girls, and to examine the results of a two-year programme of detached youth work designed to alter this behaviour. 'At risk' behaviour was defined by isolating fourteen factors considered relevant, and the highest scorers were selected to form the experimental group. A small comparison group was obtained for research study. Changes of behaviour and attitudes of both groups of girls are recorded in three-monthly assessment interviews with the workers concerned, and 'at risk' scores obtained at each assessment.

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**356. Manchester, University of; Department of Social Administration**

DR G. ROSE

**Central Lancashire family and community project**

*Approved support 1966-72: £13,700*

*Co-sponsors: Calouste Gulbenkian Foundation, County Borough of Blackburn, Lancashire County Council*

This is an action research project which has appointed a number of school social

workers to various schools in the Blackburn area and is in the process of evaluating the results.

It has been necessary to produce and validate instruments for use in the evaluation.

See section 3, Publications, page 441.

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*357. National Children's Bureau*

DR M. L. KELLMER PRINGLE

**Study of intermediate treatment in a community setting**

This is an action-research project which aims to introduce into the statutory services preventive community-based approaches to provision for youth. The study, which will also contribute to the development of intermediate treatment provision, is being carried out in the setting of detached family advice centres in high-need areas. Seven social service departments in England and Wales are co-operating in the study.

See group entry no. 32.

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*358. National Institute for Social Work Training*

MISS E. M. GOLDBERG

DR D. FRUIN, MISS J. E. NEILL, MISS A. MACKAY

**Study of two social service departments**

This is a series of action studies in two social service departments concerned with a systematic study of a sample of consumers of personal social services; a study of the attitudes of social work staff in one social service department to the recent changes and their expectations of the reorganization; the development of standard record and information systems; and the determination of principles on which scarce social work resources should be deployed, by identifying those situations in which para-professionals can be employed, those in which general social workers can give help, and those in which specialist social work skills are required.

See group entry no. 34.

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*359. National Institute for Social Work Training*

MISS E. M. GOLDBERG

MISS J. E. NEILL, MISS A. VICKERY

**Evaluation of task-centred short-term casework**

This project aims to test the effectiveness of a model of task-centred short-term casework (developed at the School of Social Service Administration, Chicago University) with several teams of social workers in different social service departments.

See group entry no. 34.

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360. *St Christopher's Hospice*

DR CICELY M. S. SAUNDERS, DR C. M. PARKES

**Evaluation of a service for bereaved families**

*Co-sponsors: School of Family Psychiatry and Community Mental Health, the Tavistock Institute of Human Relations*

The project aims to identify relatives of cancer patients at special risk of maladjustment following bereavement; to develop a preventive intervention service to reduce the incidence of such maladjustment, and to evaluate the efficacy of that service.

Ward staff identify family members at risk of maladjustment, home visits and other forms of support are offered by selected Hospice staff to groups selected at random from among the high-scoring group and a research interviewer visits the family to assess the outcome and attitude to the service eighteen months after bereavement. Non-visited families are also followed up for control purposes. The numbers involved are about 200.

See group entry no. 45.

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361. *Southampton, University of; Department of Sociology and Social Administration*

PROFESSOR J. GREVE

B. GLASTONBURY

**Study of social service departments**

*Approved support 1972-4: £22,400*

The project is aimed at providing continuous evaluative material of use to social service departments about the general public's knowledge, use, and attitudes towards the personal services, and at formulating basic guide-lines as to the ways senior administration in the local authority can implement major national policy changes.

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362. *York, University of; Department of Social Administration and Institute of Social and Economic Research*

**Child Care Research Project**

See unit entry no. 351.

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## **2.17. Professional education and staff recruitment, training, and conditions**

363. *The Bethlem Royal and Maudsley Hospital*

DR I. M. MARKS

**The training of nurses to give psychological treatment***Approved support 1971-5: £8,000 (capital), £60,000 (revenue)*

The project aims to relieve the shortage of personnel able to give newer forms of psychological treatment by training psychiatric nurses to become therapists working with in-patients and out-patients, and also in a domiciliary setting.

The first eighteen months of the project will be spent in training the therapists to carry out the treatments and understand the principles involved. The final eighteen months will be occupied in studying their efficacy compared to other professional groups, and defining their future role in the psychiatric team and the nursing profession. A cost-effectiveness study is planned.

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**364. Birmingham, City of; Polytechnic, Department of Economics and Social Science**

DR K. A. HACK

**A study of predictors of success in social work***Approved support 1971-2: £600*

The project is designed to facilitate the task of those who interview applicants for social work courses.

A variety of cognitive and non-cognitive tests was administered to two intakes of social work students (81 in all), who also completed a comprehensive questionnaire. Scores on these variables are being related to course performance on theoretical and practical criteria, and to subsequent performance in the field.

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**365. Birmingham, University of; Health Services Management Centre**

DR D. WILLIAMS

**Management training in hospitals***Approved support 1971-4: £25,500 (prov.)*

The project aims to identify the management training needs of selected hospital roles and to design and test alternative approaches to hospital management training and development.

Performance criteria are defined for the most significant accountabilities of each role and appropriate training action is planned aimed at achieving specific changes in current performance, and long-term changes that prepare individuals to occupy new and more demanding roles. Research findings are tested in Centre senior management training programmes and elsewhere.

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**366. Brunel University, Department of Education**

PROFESSOR W. D. FURNEAUX

MISS V. H. DARLING

**Investigation into the ward-based Final Practical State Examination***Approved support 1971-2: £4,600*

*Co-sponsor:* The General Nursing Council for England and Wales.

The aim of the study is to determine to what extent there is a varying standard of

marking between practical examiners of the same and different training schools; and to analyse the criteria used for marking in the practical tests.

Two groups of students in two different training schools have been assessed by two pairs of examiners, one pair from each training school. From the assessment results an analysis of variance will be undertaken. A postal survey from a stratified sample of fifty nurse training schools will provide information related to the conduct of the practical tests including the criteria/mark sheets used.

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367. *Brunel University, Institute of Organization and Social Studies, Health Services Organization Research Unit*

PROFESSOR E. JAQUES

**Organization and management in health services**

See unit entry no. 2 and Part II, pp. 151-6.

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368. *Edinburgh, University of; Department of Nursing Studies*

PROFESSOR MARGARET SCOTT WRIGHT

N. BRUCE

**Model nursing team with a group general medical practice**

*Approved support 1967-73: £24,300; plus local costs £7,200*

The aim of this research is to discover the training needs of the health visitors and district nurses attached as a team to a group practice and the working conditions necessary for them to reach their full potential. A pilot study was undertaken in 1968. The current work consists of studies of nursing teams in two health centres in Scotland and one in England, combined with a wider survey which will look specifically at perceptions of professional role activities.

See section 3, Publications, page 442.

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369. *Exeter, University of; Institute of Biometry and Community Medicine*

DR N. G. PEARSON, DR D. C. MORGAN

DR K. BOLDEN, F. E. JONES

**Review of general practice vocational training schemes**

A review is being made of vocational training schemes for general practice, through questionnaires sent to organizers and past and present trainees, to discover the range of subjects taken, the demand for places, the reasons for failure to complete the course, the success of the course in terms of needs met and posts eventually obtained, and possible differences between university-based courses and other courses.

See unit entry no. 4.

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**370. General Nursing Council for England and Wales, Research Unit**

DR JILLIAN M. MACGUIRE

DR A. SINGH

**Compilation and up-dating of list of all known nurses who are also graduates in the UK**

To provide information on the pool of graduate nurses to which the experimental graduate and undergraduate programmes are contributing.

See group entry no. 12.

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**371. General Nursing Council for England and Wales, Research Unit**

DR JILLIAN M. MACGUIRE

**Analyses of applications and admissions to experimental schemes of nursing education**

To look at the demand for places on experimental courses and the amount of multiple application for places.

See group entry no. 12.

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**372. General Nursing Council for England and Wales, Research Unit**

DR JILLIAN M. MACGUIRE

J. SMITH

**Career pattern study of newly qualified nurses**

To investigate the career plans of student nurses just prior to qualification, and the extent to which such plans are modified by post-registration experience.

See group entry no. 12.

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**373. General Nursing Council for England and Wales, Research Unit**

DR JILLIAN M. MACGUIRE

**Index project**

To provide routine information on the characteristics of student and pupil nurses admitted to the index.

See group entry no. 12.

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**374. General Nursing Council for England and Wales, Research Unit**

DR JILLIAN M. MACGUIRE

DR A. SINGH

**Evaluation of experimental courses**

The aim of the project is to examine to what extent the development of the nurse

is a product of the type of training programme she undergoes and to what extent she brings with her a distinct pattern of attitudes, values, and traits which can be directed but not radically altered by the different types of nurse training programmes. See group entry no. 12.

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375. *Hull, University of; Department of Social Administration*

R. G. S. BROWN

R. W. H. STONES

**Survey of male entrants to nursing**

*Approved support 1967-73: £16,000*

The research aims to identify the characteristics of male entrants to nurse training and to study the channels through which they may have come into nursing, the expectations with which they start training, their reactions to the training arrangements they experience and their ultimate success in nursing.

The survey is based on a sample of 542 men who started student or pupil nurse training at one of 57 training schools in 1968. The group comprised over one-sixth of all men starting training in England and Wales in that year.

See section 3, Publications, page 442.

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376. *Ipswich and East Suffolk Hospital, Postgraduate Medical Centre Committee*

DR I. TAIT, DR J. MILLS

**The Ipswich vocational training scheme for GPs**

*Approved support 1969-73: £7,000*

The Ipswich scheme offers a vocational training for general practice based on a district general hospital. It is planned to evaluate the educational methods used in the scheme and to make some general recommendations for the design of post-graduate training for general practice based on district general hospitals.

The scheme is the subject of a larger comparative study on methods of vocational training conducted by the University of Manchester, Department of General Practice (entry no. 28).

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377. *London, Central, The Polytechnic of; School of Management Studies*

MRS DEBORAH JONES

**Evaluation of the General Management Development Course for senior health service managers**

*Approved support 1972-3: £11,000*

The pilot project aims to develop methods of evaluation for assessing the six-week General Management Development Course for senior hospital managers. These include preliminary specification of the principal management training needs of individual senior officers; a pilot study of the relation of teaching objectives to

training needs already identified in the pilot; development of a validation model for assessing the effectiveness of the learning experience; and a feasibility study of means for measuring management tasks in a work situation.

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378. *London, University of; Goldsmiths' College, Department of Sociology*

R. A. PINKER

### **The role of the nurse**

*Approved support 1972-5: £1,500 (includes cost of entry no. 380)*

The project aims to review the literature related to the development of a theoretical framework for nursing with particular reference to work done in the social sciences and to attempt a synthesis of theory in relation to nursing which may be of value when considering the educational requirements of students in the profession.

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379. *London, University of; Goldsmiths' College, Department of Sociology*

R. A. PINKER

### **Towards an understanding of nursing**

*Approved support 1971-4: £10,900*

The study is exploratory, and attempts to define institutional nursing, and account for its particular form in the field of general nursing. The final objective of the study is to establish (i) who defines nursing, (ii) if the definition given is socially or institutionally determined, and (iii) the extent to which (i) and (ii) create an educational environment for participants.

The study is being conducted in two selected hospital environments. In addition, three high technology nursing areas are being studied in an extended hospital sample. The methods employed include observation, interviews, semantic scale ratings, formal record abstracts, diary keeping, and questionnaires.

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380. *London, University of; Goldsmiths' College, Department of Sociology*

R. A. PINKER

### **An evaluation of integrated courses of nurse education**

*Approved support 1972-5: £1,500 (includes cost of unit entry no. 378).*

The project aims to evaluate the integrated courses, particularly with reference to the integration of health visiting with general nurse education, and to discover whether there are any significant differences in the students who train this way.

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381. *London, University of; Institute of Education*

THE LATE PROFESSOR WINIFRED VENESS (to 1971)

MISS EVE BENDALL

**Learning for application and learning for recall**

*Approved support 1971-5: £8,200*

This project seeks to explore the difference noted by Belbin in the 1950s between those who use material learned and those who recall it, in the context of student nurses, by devising instruments to measure performance and objective tests for recall of the same material; giving conceptualization and IQ test batteries; obtaining data on order and timing of theory and practice; correlating observed performance and test recall scores and seeking any consistent pattern of variables.

See section 3, Publications, page 442.

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**382. London, University of; Institute of Education, University Teaching Methods Unit**

DR RUTH M. BEARD

**Evaluation of a course for teachers of general practice**

*Approved support 1972-4: £9,400*

*Co-sponsors: British Postgraduate Medical Federation, Royal College of General Practitioners*

The research aims to develop methods of evaluating the course and to assess changes in attitudes and teaching behaviour. Objectives will be set up for the course with a view to assessing their realization. Course members and staff will develop a scheme of objectives for trainees which will be reproduced, first for criticism and later for use in practices.

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**383. London, University of; the London Hospital Medical College, Department of Conservative Dentistry, London E1 2AD**

PROFESSORS G. L. SLACK, H. ALLRED

DR M. HOBDELL

**Research and training dental care unit clinics**

*Approved support 1970-6: £243,000 (prov.)*

The project has two aims: to train dentists in the use of dental auxiliaries, and find how these may best be used in the service; and to set up and objectively assess an experimental dental care unit. For the training dental care unit clinic six operatories suitable for patient care by operators and dental surgery assistants have been designed and built, with the aim of providing instruction in the widest range of ancillary duties; for the research dental care unit, an eight-chair clinic of maximum flexibility of operating, patient education and radiographic facilities has been constructed.

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**384. Manchester, University of; Institute of Science and Technology, Department of Management Studies**

B. MOORES

**Effects of differing nurse staffing levels**

The aims of the study are to examine the impact of differing nurse staffing levels upon (i) the extent to which the nursing service is managed effectively and (ii) the amount of care provided for patients. The study is being pursued in six hospitals representative of the range of nurse staffing figures and the methodology includes a deployment study of how nurses are in fact allocated between units in the hospital and how their duties are scheduled for the best match of needs and availabilities. How nurses spend their time will be examined using observational methods and the care received by patients is being monitored both by observation and a recording system. See group entry no. 31.

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**385. National Institute for Social Work Training**

MISS E. M. GOLDBERG

DR D. FRUIN, DR V. CARNER, MRS R. WALKER

**Social worker workload study**

This is a study of the range and magnitude of the workloads of social workers in a national sample of local authority health and welfare departments in England, Wales, and Northern Ireland, by ascertaining the time spent on different types of activities and cases during a sample period.

See group entry no. 34.

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**386. Newcastle upon Tyne, University of; Department of Family and Community Medicine**

DR J. H. WALKER

**Vocational training for general practice: an experimental scheme***Approved support 1969-75: £6,800*

The project aims to determine the feasibility of establishing regional vocational training schemes for general practice and to study, in collaboration with the Department of General Practice in the University of Manchester (entry no. 28), the effect which these programmes have upon the knowledge, skills, and attitudes of new entrants to general practice.

In August 1972 there were a total of 42 trainees in post in the Newcastle Region. See section 3, Publications page 442.

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**387. The Queen's Institute of District Nursing**

MISS L. HOCKEY

J. LEACH

**The State Enrolled Nurse (SEN) in the Community Nursing Services***Approved support 1970-2: £23,300*

The study aims to obtain information about the recruitment, training, work, and

employment of the SEN in all branches of the community nursing service. It is based on the hypotheses that there is reluctance to employ SENs in the community nursing services because there is uncertainty about the legitimate sphere of activity of SENs and their level of ability, and there is no difficulty in recruiting State Registered Nurses (SRNs and RGNs). The study areas represent a stratified random sample of 47 local health authorities. Information was obtained by means of personal interviews from SENs working in all branches of the community nursing services; a random sample of registered nurses working in the district nursing services; a sample of health visitors; and nursing officers responsible for community nursing policy in the study areas. Further information was obtained by means of postal questionnaires from a random sample of GPs in, and the medical officers of health of, the study areas. A detailed record of one week's work was provided by all nursing respondents in the district nursing service.

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388. *Reading, University of; Department of Applied Statistics, Operational Research (Health Services) Unit*

PROFESSOR R. N. CURNOW

DR D. G. NEAL

#### **Why staff leave the Reading hospitals**

Analysis of replies to a questionnaire given to all staff leaving the Royal Berkshire and Battle Hospitals in the twelve-month period March 1968–February 1969.

See group entry no. 42.

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389. *St George's Hospital and London, University of; Imperial College of Science and Technology*

THE LATE PROFESSOR JOAN WOODWARD (*to 1971*), PROFESSOR E. JACQUES (*of Brunel University, from 1971*)

MRS R. POMERANZ

#### **An experiment in nursing education**

*Approved support 1965–72: £20,200*

The brief was to evaluate an experiment in nurse training, to attempt to measure its effects on the people and the institution directly involved; to estimate, where proper and possible, the likely results of introducing similar changes on a wider scale and in less selected institutions. The study was conducted by repeated interviews during training and after qualification of student nurses on a two-year shortened training course at a London teaching hospital. Comparisons were made with students, matched for age and education following a conventional training programme and with students following a shortened course in another London teaching hospital. Additionally ward sisters' comparisons of the performance of new staff nurses trained conventionally and on the shortened programme were obtained. A ten-year study sought to ascertain the characteristics of the hospital's student population over ten years.

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390. *Salford, University of; Department of Sociology, Government and Administration*

DR R. S. FERGUSON

MRS P. HOBBS

**A study of the factors affecting the amount of group teaching undertaken by health visitors**

*Approved support 1971-2: £300*

A descriptive study of the amount of group teaching undertaken by health visitors completed in 1971. Certain characteristics were found to occur more commonly in local authorities which undertook most group teaching.

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391. *Surrey, University of; Department of Biological Sciences*

PROFESSOR P. R. DAVIS

MISS S. R. LELEAN

**The interpretation of specified instructions by different grades of nursing staff and by doctors working on medical wards**

*Approved support 1971-3: £6,700*

The project aims to discover whether the amount of activity implied by certain instructions for nursing care differs between grades of nursing staff and between nurses and doctors, and to identify some of the factors which may influence the interpretation of instructions.

A checklist of nursing care items arranged as a scale of patient activity will be administered to different grades of nurses and to doctors for selected nursing care instructions. The data will be analysed to show the effect of the grade of staff, medical ward experience, and the patient's diagnosis on the interpretation of the instructions. The study is being carried out in a number of general hospitals which are training schools for the register of nurses.

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392. *Sussex, University of; Centre for Social Research*

DR P. J. M. MCEWAN

DR C. R. BAGLEY

**The recruitment and extended role of the psychiatric nurse**

*Approved support 1972: £1,800*

This is an investigation of the extent to which potential recruits to psychiatric nursing (high school students planning careers) are motivated by different profiles of psychiatric nursing and, in particular, by the possibility of extension of the nurses' role into the community and the inclusion of social science subjects in the curriculum of nurse training.

An analysis is also being undertaken of the choices made by potential recruits in terms of personality, intelligence, and values.

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393. *Tavistock Institute of Human Relations, Centre for Applied Social Research*

DR E. J. MILLER

D. TOWELL

**The development of self-innovation in hospitals through the aided use of social research**

*Approved support 1971-4: £6,100*

This project attempts to develop the capacities of hospital staff in examining problems of hospital organization and practice, and to make informed innovations in pursuit of the goal of improved patient care. A social science adviser is available to selected hospitals to help staff members identify and carry out research on important problems and to work through the implications of such research for improving hospital organization and practice.

The first phase of the work is being undertaken at a progressive psychiatric hospital.

See group entry no. 47.

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394. *Wales, University of; University College Cardiff, Department of Sociology*

PROFESSOR P. HALMOS

MISS J. M. HUNT

**Role conflict among student nurses**

*Approved support 1969-72: £16,200 (including cost of entry no 267)*

The project is concerned with the problem of the lack of congruence in the definition of the role of the student nurse and aims to obtain definitions of the role of the student nurse from members of groups within the hospital and to determine the amount of congruence and/or conflict between these definitions.

Role definitions have been obtained from consultants, tutors, nursing administrators, and qualified ward staff, as well as from the student nurses themselves. These definitions have been analysed and then compared with each other and with the observed behaviour of student nurses and the level of congruency/conflict determined statistically.

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## 2.18. Management and organization of services

395. *Birmingham, University of; Department of Engineering Production*

PROFESSOR K. B. HALEY

**Operational research in general practice and tactical problems in hospitals**

*Approved support 1969-73: £12,000*

*Co-sponsors: Royal College of General Practitioners, Birmingham Regional Hospital Board, United Birmingham Hospitals Board of Governors*

Since 1962 many investigations of an operational research nature have been carried



out by this Department in hospitals and general practice. The great majority of these have been of a short-term nature involving a specific problem, which requires a planning or organizational decision. The Department has also been associated as OR advisers to the Birmingham Regional Hospital Board. The main interests are in models to assist general practice and the solution of interactive problems in specific hospitals. Current work for the DHSS covers package programmes for general practice and multivariate analysis and the measurement of work for ancillary staff.

396. *Bradford, University of; Management Centre, Organizational Analysis Research Unit*

PROFESSOR D. HICKSON

G. BEALS, M. WHEELER

**Social structure and working relationships among professionals, with special reference to health centres**

*Approved support 1971-6: £41,000 (prov.)*

The project is intended to examine elements of professionals' orientations to their occupation and work settings, and to determine social factors influencing the degree to which such orientations are shared. It will study how professionals define their own and related roles. It is anticipated that such processes can be traced in work structures in the course of change, such as the movement of general medical group practices into new health centres. In particular, the development and early operation of at least one large health centre in the north of England will be followed closely.

397. *Brunel University, Institute of Organization and Social Studies, Health Services Organization Research Unit.*

PROFESSOR E. JAQUES

**Organization of administration, nursing, engineering, and paramedical services**

See unit entry no. 2.

398. *Exeter, University of; Institute of Biometry and Community Medicine*

R. W. CANVIN, DR D. C. MORGAN

DR D. J. BRUCE, F. E. JONES

**Provision of GP facilities for a rural community**

*Co-sponsor: Nuffield Provincial Hospitals Trust*

A study has been mounted, in collaboration with a general practice, to consider alternative methods of providing primary medical care to patients living in a rural area. As a result of a feasibility study a mobile surgery was introduced with specifications that allowed the standard of care to equal that provided at the main surgery. There are some 3,000 patients living in the rural part of the practice who will benefit from the introduction of the mobile surgery, and their use of the service is now

being analysed together with the work pattern of the doctors and the cost of providing this type of care.

See unit entry no. 4.

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399. *Exeter, University of; Institute of Biometry and Community Medicine*

DR N. G. PEARSON, R. W. CANVIN

**The 'Cogwheel' project**

Working in close collaboration with the Medical Services Committee of the Exe Vale Psychiatric Hospital, detailed proposals for the role of the Medical Services Committee have been made, accepted, and largely implemented. An operational research activity is now being developed to assist consultants and others to fulfil the bigger management role that the 'Cogwheel' Report aimed at.

In developing plans for the future mental health service, a model will be developed to show how the numbers of various categories of patients will change with time and what the effect will be of introducing new patterns of care. Methods of evaluating the service will be established.

See unit entry no. 4.

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400. *Institute for Social Studies in Medical Care*

DR ANN CARTWRIGHT

**Birth control services in England and Wales**

This is a study of the practices and attitudes of GPs, health visitors, district nurses, midwives, consultants, and family planning clinics in fifty-two areas.

See group entry no. 14.

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401. *Kent, University of; at Canterbury; Centre for Research in the Social Sciences, Health Services Research Unit*

PROFESSOR M. D. WARREN

**Health centres and group practice study**

This project is concerned with the observation of the work of a small number of practices, and the questioning of their patients and staff before and after the practices have moved into health centres.

See unit entry no. 5.

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402. *Kent, University of; at Canterbury; Centre for Research in the Social Sciences, Health Services Research Unit*

PROFESSOR M. D. WARREN

**Study of the use of multiple consulting rooms in general practice**

Following the introduction of a new arrangement of the clinical area of the surgery

premises and an extension in the role of nurses in the practice, the study will assess changes in the nature and magnitude of the workload of the practice team and in the views of the patients.

See unit entry no. 5.

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403. *Lancaster, University of; Department of Operational Research, Unit for Operational Research in the Health Services*

PROFESSOR M. G. SIMPSON

DR A. HINDLE

**A feasibility study for an improved information system for a hospital group**

The aim of this study is to describe the current information systems for the admission, care, transfer, and discharge of in-patients in the 'acute' hospitals of a group to determine the feasibility of making improvements using operational research methods. The feasibility study may lead to a 'design' project for the improved management information system.

See unit entry no. 15.

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404. *Lancaster, University of; Department of Operational Research, Unit for Operational Research in the Health Services*

PROFESSOR M. G. SIMPSON, DR A. HINDLE

DR G. GREGORY

**The organization of community nursing services**

A study is being conducted for a rural county aimed at providing a reorganized community nursing service based on the concept of 'attachment' to GPs together with low transportation costs. A methodology for deriving transportation costs is being developed and an approach to the determination of nursing levels being constructed.

See group entry no. 15.

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405. *London, University of; Bedford College, Social Research Unit in collaboration with University College Hospital Medical School, Medical Unit*

PROFESSOR MARGOT JEFFERYS

**Kentish Town health centre study**

A study of two general practice groups and a local authority family health clinic which will join forces in a new health centre in 1973, and of two control practices and a family health clinic in an adjacent area. The study, which is obtaining data from all those employed and from a sample of patients, is mainly concerned to develop valid measures of the output of professional work and relate them to clinical and organizational objectives set by participants as well as to consumer preferences.

See group entry no. 18.

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406. *London, University of; Bedford College, Social Research Unit*

PROFESSOR MARGOT JEFFERYS

**Goodmayes Psycho-geriatric Unit study**

This is a study of the organization and staffing problems of a psycho-geriatric unit at Goodmayes Hospital

See group entry no. 18.

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407. *London, University of; Guy's Hospital Medical School, Department of Community Medicine, London SE1*

DR J. A. D. ANDERSON

MRS H. E. LEIGH

**'Cogwheel' structures**

Exploratory studies in the function of the medical centre structure within a large multi-speciality hospital.

This study, which is at a feasibility stage, is concerned with the identification and definition of the tasks of the various medical committees, and the study of some aspects of the role of the medical staff in the organization of the hospital services.

See group entry no. 19.

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408. *London, University of; Guy's Hospital Medical School, Department of Community Medicine, London SE1*

DR J. A. D. ANDERSON

**Community health teams study**

Increasingly attachment schemes bring together health personnel from different disciplines in primary care teams all working with the same patients. This study is an examination of such 'multi-attached' practices, in three phases: (i) census to determine the number, location, and manpower characteristics of these practices in selected geographic regions of the country; (ii) a questionnaire sample survey to identify care facilities, working arrangements and time commitments of the practices; (iii) interviews with sub-sample of the above practices to explore in greater detail the similarities and differences among the practices with respect to their working relationships.

See group entry no. 19.

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409. *London, University of; Imperial College of Science and Technology, Industrial Sociology Unit*

MRS C. M. DAVIES

**Hospital organization research project**

*Approved support 1970-3: £13,300*

*Co-sponsor: Social Science Research Council*

The aim of the project is to apply a 'task analysis' approach to a study of the func-

tioning of hospitals. It seeks to identify the ways in which work is co-ordinated and controlled, in a highly professionalized organization such as the hospital.

One phase has focused largely on medical tasks and the varying roles of consultants in managerial control in two general hospitals. A later stage will be to sample hospitals to determine variations in the involvement of medical staff in managerial activities. The implications of patterns of involvement will be explored and optimal control structures examined.

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410. *Newcastle upon Tyne, University of; Medical Care Research Unit*

DR J. H. WALKER

**Prospect House general practice and hospital relationship study**

This project studied all hospital contacts from a group practice of 17,500 patients for a period of one year, in an attempt to assess the current quality of the relationship between the GP and the hospital. It evaluated many aspects of the referral routine, identified some areas where improvement in communication is possible, and has led to a successful experiment in practice-based specialist consulting.

The study also explored the relationship between general practice and the accident and emergency services, and has led to a sociological investigation of casualty department attenders.

See unit entry no. 9.

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411. *Newcastle upon Tyne, University of; Medical Care Research Unit*

PROFESSOR D. J. NEWELL, MRS A. HOLOHAN

**GP questionnaire: Phase II Newcastle Accident Survey**

The aims of this study are to investigate the personal characteristics and practice organization of GPs working in the catchment area of the accident and emergency departments of the hospitals included in the Newcastle Accident Survey (entry no. 501). A short structured questionnaire was forwarded to every GP, and data was collected on personal characteristics of GPs; practice organization and auxiliary help; attitudes to working in accident and emergency departments; and the factors leading to the increasing numbers of patients who attend accident and emergency departments.

See unit entry no. 9.

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412. *Reading, University of; Department of Applied Statistics, Operational Research (Health Services) Unit*

PROFESSOR R. N. CURNOW

M. R. BATHE

**Study of the Orthopaedic Department at Reading**

To investigate the use of traumatic and orthopaedic beds, sizes of various waiting-lists, and what is required to reduce these in terms of manpower and/or facilities.

See group entry no. 42.

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413. *Reading, University of; Department of Applied Statistics, Operational Research (Health Services) Unit*

PROFESSOR R. N. CURNOW

M. R. BATHE

**Study of the use of orthopaedic beds at Princess Margaret Hospital, Swindon**

Descriptive study of the Department of Traumatic and Orthopaedic Surgery at the Princess Margaret Hospital, Swindon. Data covering the year 1972 is being collected from the hospital on an 'on-going' basis and further information is to be obtained from the Oxford Record Linkage Study.

See group entry no. 42.

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414. *Reading, University of; Department of Applied Statistics, Operational Research (Health Services) Unit*

L. J. TWOMEY

**Reasons for delay in discharge from hospital**

A study of reasons why patients are kept in hospital after they are medically fit for discharge. Information is being obtained by questionnaire completed by medical and nursing staff initially for the specialties of geriatrics, general surgery, and orthopaedics.

See group entry no. 42.

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415. *Sheffield, University of; Department of Community Medicine, Medical Care Research Unit*

PROFESSOR J. KNOWELDEN, DR B. T. WILLIAMS

DR R. A. DIXON

**A study of a BMA deputizing service and its effect on hospital in-patient use**

The functioning of the BMA deputizing service in Sheffield has been examined by analysing a 1 in 4 sample of the calls in 1970. These data provide information on the extent of use of the service and how this is influenced by factors such as the type of practice and the age of the doctor, and also on the type of patient referred and the outcome of the referral.

The impact of deputizing services on hospital resources is being measured by comparing referrals for admission by the deputizing service with emergency admissions by doctors not employed by the deputizing service, using Hospital Activity Analysis records to show the types of patient referred and their use of hospital resources.

See group entry no. 46.

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**416. Tavistock Institute of Human Relations, Institute for Operational Research**

J. LUCKMAN

**A 120-bed clinical nursing unit research project**

The project is concerned with the study of problems associated with the management of the large nursing units which are the main feature of the new district general hospitals being built in the Wessex Region. The project has developed from earlier work.

Part of the research is concerned with the problems of managing the large nursing units and these are being studied with the help of gaming, simulation, and trials at Southampton General Hospital. Four traditional surgical wards, each with thirty beds or so, have been managed as a single unit since the end of 1970.

A second part of the project has been concerned with the design and implementation of the information system needed to run large nursing units. An information room for the surgical unit has been set up and policies for admission and discharge of patients, which make best use of the available resources, have been formulated.

The third part of the project lies in the evaluation of the performance of the new units. Despite the complexity of health service systems, an attempt is being made to measure what improvements have resulted from the trial in the surgical unit and to determine, through further gaming and simulation, and eventually practical experience from 1973 onwards, what improvements can be attributed to some of the specific innovations that are incorporated in the new units.

The progress of the project to date has been written up in the form of annual reports.

See group entries nos 48 and 56 (i).

**417. Wessex Regional Hospital Board****Problems associated with the management of large ward units**

*Approved support 1970-4: £30,000*

As part of the DHSS's policy to investigate the desirability of installing large ward management units the Wessex Regional Hospital Board has converted four existing 30-bed surgical wards to a 120-bed ward management unit. (See no. 416.) The 120-bed management unit established at Southampton District General Hospital for the purpose of this experiment has also introduced the nursing system of Progressive Patient Care (PPC) and has pooled the beds which were previously allocated to individual consultants.

The study so far has established that 120 beds can be managed as one unit with pooled beds but it has not so far separately evaluated the effects of the system of Progressive Patient Care nor of the effect of pooling. Since mid-1970 the OR service has been involved with the outside group in building a model to help predict the effect which these changes might have if introduced in other locations. In particular it is concerned to measure the effect of the larger unit, together with PPC and pooling in purpose-built 120-bed wards both at Southampton and Basingstoke District General Hospitals where these changes are to be introduced in orthopaedic and medical wards.

## **2.19. Evaluation of services and standards of care**

418. *Birmingham, University of; Department of Social Medicine, Health Services Research Centre*

PROFESSORS T. MCKEOWN, E. G. KNOX

T. MARSHALL

### **Mental Health Service evaluation**

This is a joint study between the Birmingham Health Services Research Centre and the Department of Psychological Medicine in the University of Birmingham (Professor W. Trethowan and Dr C. Hassell). It arises out of a proposal by the DHSS that a new pattern of mental health care at Worcester should be independently evaluated. The project is in the design and feasibility study stage.

See unit entry no. 11.

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419. *Institute for Social Studies in Medical Care*

DR ANN CARTWRIGHT

### **Life before death: a study of needs and care in the twelve months before death**

This study was based on interviews with the relatives and friends of a random sample of adults who died, and on data from GPs and district nurses. It describes peoples' symptoms, disabilities, and needs in the year before they died and their different sources of help and care.

See group entry no. 14.

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420. *London, University of; Guy's Hospital Medical School, Department of Community Medicine, London SE1*

DR J. A. D. ANDERSON

### **Hospital evaluation study**

This study is exploring the possibility of recording disability and distress of a group of patients on numerical scales as two separate though not necessarily unrelated variables. Assessments are made at a series of points in the hospital experience of the patient (admission, discharge, first out-patients follow-up, etc.). Recorded changes in the indices for all patients admitted to the hospital over a period will be used to form assessment of the achievement of the hospital and comparison made between one period and another.

See group entry no. 19.

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421. *London, University of; St Thomas's Hospital Medical School, Department of Clinical Epidemiology and Social Medicine, Social Medicine and Health Services Research Unit*

PROFESSOR W. W. HOLLAND

DR M. W. ADLER, MRS J. J. WALLER, MISS I. DAY, MISS C. KING, MRS S. C. THORNE, H. S. KASAP, MISS E. ECKLES, MRS D. PARLETT, MRS S. WISKER, MRS K. DAVIES

#### **Study of early discharge for inguinal hernia and varicose veins**

A randomized controlled trial is now being carried out on all patients aged 18-65 years registered with practitioners in the catchment area of a new district general hospital and admitted to Farnham Hospital or one of the five cottage hospitals in the area for non-recurrent inguinal hernia and varicose veins. The aim of the study is to assess the outcome among those discharged forty-eight hours after surgery with those discharged after the conventional length of time (six to seven days), the criteria for evaluation being clinical outcome, GPs' expectations and attitudes, patients' attitudes, the economic and social effects on the patient and his household, the effects on the domiciliary nursing and home help services in the area, and hospital costs.

See unit entry no. 8.

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422. *London, University of; St Thomas's Hospital Medical School, Department of Clinical Epidemiology and Social Medicine, Social Medicine and Health Services Research Unit*

PROFESSOR W. W. HOLLAND

DR JUDITH COOK, DR HARRIET TREVELYAN, MRS Z. CORKHILL

#### **Study of the use of acute medical beds in the Basingstoke area**

The study aims to gain information on the physical and social effects on the patient of different types of responsibility and place of care; to include information on the utilization of acute medical beds in Basingstoke by different practitioners; the characteristics of cases admitted to GP and consultant beds; and the number of cases which would be suitable and available for inclusion in further studies on care of acute medical cases.

The study included all the patients admitted to the Basingstoke GP and consultant acute medical beds over a four-month period. Information was collected on demographic data, perceived needs at time of admission, use of services, outcome in terms of death, and place to which discharged.

See unit entry no. 8.

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423. *National Coal Board, Operational Research Executive*

R. C. TOMLINSON

#### **The economics of centralizing hospital stores**

The objectives of this project are to evaluate and compare alternative stores organizations in the hospital service. A research study has been undertaken to calculate the costs of stores varying in size between stores in single hospitals to central stores

for a whole area or region. Particular regions have been studied and recommendations have been made on their stores organization. In all of these studies central stores organizations have proved to be the most economic.

Reports describing the study and its recommendations have recently been issued by the DHSS.

See group entries nos. 33 and 56 (i).

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424. *National Coal Board, Operational Research Executive*

R. C. TOMLINSON

**Hospital catering: the evaluation of the cook/freeze system**

A comparison of cook/freeze and conventional catering methods in the hospital service is being undertaken. A general model is being prepared which will enable the costs of cook/freeze catering to be estimated for different hospital situations and compared with the costs of conventional catering. A separate study of meat purchasing and preparation is also under way. Its aim is to evaluate the total costs to the hospital service of different methods of meat purchase.

See group entries nos. 33 and 56 (i).

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425. *Newcastle upon Tyne, University of; Medical Care Research Unit*

DR J. H. WALKER

**Spina bifida studies**

The findings of an initial study of the family impact of spina bifida were reported in 1971. This highlighted the gross inadequacies of emotional and social support provided for parents during the early days and months after the birth of the handicapped child, and recommended the appointment of social workers to each clinical team dealing with the problem. The current study is of an older group of children, many now teenage, who represent a much larger population now surviving because of early active surgical treatment. The physical, social, and emotional problems they and their families face must be accurately identified if services are to be provided to meet them.

See unit entry no. 9.

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426. *Newport and Monmouthshire College of Technology, Department of Management and Business Studies*

G. W. DAVIES

DR O. N. OSUJI

**Evaluation of first-line management training for nurses in hospital**

*Approved support 1971-3: £3,000*

The project aims to establish the degree of congruence between the management techniques taught and the perceived needs of nurses in their working environment;

and to isolate and examine relevant factors within the nurses' environment that hinder or facilitate use of the acquired management techniques.

In trying to isolate these factors, effort will be concentrated on three main areas:

(i) Nurses' personal factors, including their general attitude towards management.

(ii) Hospital environmental factors.

(iii) College factors, including such issues as course organization, presentation, and treatment of materials, and duration.

The study is being carried out in a representative sample of hospitals in south-eastern Wales.

427. *Oxford Regional Hospital Board, Operational Research Unit*

DR A. BARR

MISS B. M. MULLIGAN

**Total patient care**

*Approved support 1968-72: £8,900 (prov.)*

*Co-sponsors: Oxford Regional Hospital Board, United Oxford Hospitals*

The study aims to construct profiles of patient care for selected diagnoses; to examine the influence of medical prescriptions on patient care; and to develop a method for measuring patient demands on professional staff. From data on ward organization, obtained from staff and patients, a topology of the wards has been constructed. The next stage will be to select a number of wards on the basis of the established characteristics and construct profiles of patient care. It is hoped to show how different organizational patterns of the ward affect patient care, and ultimately identify those elements which contribute to a high standard of practice.

428. *Royal College of Nursing*

MRS U. INMAN

**The study of nursing care**

The project arose out of the nurse deployment studies, sponsored and undertaken by the DHSS. Earlier studies attempted to develop instruments to be used in assessing different aspects of nursing care.

Individual studies under way at present include an examination of nurse-patient interaction and role perception; a study of pre-operative anxiety and its effects on pain perception, and a study on the maintenance of nutritional status and care of the unconscious patient.

The present task is to combine several of these individual indicators in order to develop a series of measuring scales to be used in assessing the effectiveness of nursing care in general hospital wards.

See group entry no. 44.

## 2.20. Record and information systems

429. *Birmingham, University of; Department of Social Medicine, Health Services Research Centre*

PROFESSOR E. G. KNOX

DR R. F. FARMER, DR K. W. CROSS

### General practice records

This project involves the adaptation of an existing hospital computer record-keeping system to a general practice in collaboration with the Birmingham Executive Council. It has two objectives: (i) to support *ad hoc* research projects and (ii) to provide a tool for managing the practice particularly through scheduling preventive and follow-up procedures, and is a continuation of work undertaken under the auspices of the Royal College of General Practitioners (see entry no. 43).

See unit entry no. 11.

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430. *Birmingham, University of; Medical School and United Birmingham Hospitals*

PROFESSORS O. WADE, J. M. BISHOP, M. R. W. BROWN, MR A. E. MARSTON

### Drug-handling system

*Approved support 1969-73: £24,600*

The objectives of this study are to design a safe and efficient method of handling drugs in hospitals. Such a system combined with clear accurate documentation could not only greatly improve the standard of patient care, but would form a background in which drug efficacy or adverse reaction studies could be performed with a minimum deviation from the normal hospital procedure.

The project is integrated with the development of a hospitals data-processing system.

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431. *Department of Health and Social Security, Special Hospitals Research Unit*

DR T. G. TENNENT

### Special Hospitals case-register

The Special Hospitals case-register is in the process of being developed and in the first two exploratory years a number of feasibility studies are being carried out. These have included a study using the Wessex Subnormality Questionnaire and a Record Reliability Study. A number of other studies are proposed.

See unit entry no. 7.

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432. *European Dialysis and Transplant Association*

DR M. CARMODY

*Approved support 1969-72: £5,200*

**Data acquisition preparation and production for intermittent dialysis and renal transplantation patients**

Data is sent to the Association from 483 European centres for patients with terminal renal failure treated by intermittent dialysis or renal transplantation. There is an annual follow-up of each surviving patient, and the data is cumulative.

Statistics are published annually in the *Proceedings* of the Association.

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**433. Exeter, University of; Institute of Biometry and Community Medicine**

PROFESSOR J. R. ASHFORD

**Revision of birth registration procedures within England and Wales**

This concerns the design, implementation, analysis, and assessment of pilot trials for new birth registration procedures in different localities, involving the co-ordination of a 'medical birth certificate' with the conventional 'civil birth certificate'. It is also planned to devise new procedures for analysing the data collected in this way.

See unit entry no. 4.

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**434. Exeter, University of; Institute of Biometry and Community Medicine**

PROFESSOR J. R. ASHFORD

R. S. LOTT

**Investigation of file design for the Exeter Medical Computer Project**

The object of this study is to examine the problems of file design for a large real-time medical computing system with particular reference to patient identification, file structure, internal data handling, and transmission and security.

See unit entry no. 4.

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**435. Exeter, University of; Institute of Biometry and Community Medicine**

DR N. G. PEARSON, DR D. C. MORGAN

DR D. B. SHAW, F. E. JONES, MRS P. HEAVER

**Cardiac infarction register**

In order to facilitate investigations of ischaemic heart disease, a register of cases of cardiac infarction is being maintained. The register is based on the 300,000 people living within the area of the Exeter and Mid-Devon Hospital Management Committee. Notifications are obtained from twenty-three hospitals within the area, GPs, death certifications, and from monitoring results of relevant laboratory investigations. Information is also provided from hospitals outside the area to whom cases may be sent.

See unit entry no. 4.

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436. *General Practice, Wantage*

DR I. S. L. LOUDON, DR J. K. HAWKEY, DR G. P. GREENHALGH, DR G. T. BUNGAY

**The Wantage medical records project***Approved support 1969-72: £1,500*

The project aimed to design a new records system for general practice as an alternative to the existing medical record envelope. The resulting folder was tested in forty general practices over a period of six months, thirty-seven of whom were in favour of this new records system.

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437. *Isle of Wight Hospitals, Department of Obstetrics and Gynaecology*

W. R. EDWARDS

**Isle of Wight Obstetric Index***Approved support 1971-3: £3,000*

The project aims to examine the techniques of accurate data collection in obstetrics for a whole community, including both domiciliary and hospital care, to examine the place of the midwife in recording this data, and to establish the uses to which this data may be applied, particularly in the evaluation of changes in obstetric management and the application of new techniques of obstetric care and treatment.

The Community Obstetric Index is designed to be used nationally and to provide a means of assessing the requirements and performance of the community obstetric team and to provide a route for notification of birth and HAA requirements.

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438. *Keele, University of; Statistical Research Unit in Sociology*

R. E. A. MAPES

MRS B. J. M. WILSON, M. J. CLARKE

**Mental health statistics project***Approved support 1969-73: £15,300*

The project aims to examine the variations in basic patient statistics such as discharge rates, and turnover rates between psychiatric hospitals in England and Wales. An attempt is made to identify factors which are causally associated with these variations. Quantitative indices have been devised for each of four main variables and sophisticated statistical techniques are used in the analysis. It is intended that the project should develop with a more detailed analysis in certain specific fields, for example hospital accessibility in relation to catchment populations and the comparison of psychiatric units in general hospitals with psychiatric hospitals.

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439. *London, University of; Guy's Hospital Medical School, Department of Community Medicine, London SE1*

DR J. A. D. ANDERSON

**A study of existing NHS data in relation to 1974 reorganization of the service**

The aim of the study is to compile an inventory of sources of health, health services, and related data. The inventory will be restricted to routinely collected, national statistics and will not include *ad hoc* or local data. A classification of identified data will be developed to facilitate presentation and use of the inventory. For each set of data presented, information on their use, flow and frequency of collection will be given.

See group entry no. 19.

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**440. London, University of; Institute of Psychiatry**

PROFESSOR J. K. WING

MISS R. SOUSA

**Salford psychiatric case-register (computer analysis)**

The aim of this project is to collect information in a form identical to that of the Camberwell Register (entry no. 441) so that comparable statistical studies may be made.

See group entry no. 23.

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**441. London, University of; Institute of Psychiatry, Medical Research Council, Social Psychiatry Unit**

PROFESSOR J. K. WING

DR LORNA WING, MRS A. HAILEY

**Maintenance of Camberwell Psychiatric Register and use for studying community psychiatric problems**

*Co-sponsor: Medical Research Council*

The Register is used to monitor changes in services in the area, as a sampling-frame for more intensive studies carried out by members of the Unit.

See group entry no. 23.

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**442. London, University of; St Thomas's Hospital Medical School, Department of Obstetrics and Gynaecology**

PROFESSOR P. RHODES

**Automatic data-processing of obstetric records by computer techniques**

*Approved support 1970-2: £18,500*

*Co-sponsor: St Thomas's Hospital Endowment Fund*

The aim is to evaluate the use of a computerized obstetric record, within the hospital group, for use by GPs and local health authorities.

Data is collected antenatally, at confinement and during the puerperium of all deliveries within St Thomas's group by means of an obstetric booklet which com-

bines medical case-record with computer coding. Obstetric summaries for hospital and GPs' use and a file of all the deliveries is provided. This file is used to generate statistics for an annual hospital report and to answer questions posed by the obstetric and administrative staff.

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443. *Newcastle upon Tyne, University of; Department of Psychological Medicine*

PROFESSOR SIR MARTIN ROTH

DR K. BERGMANN, MISS E. M. FOSTER

**The development of a psycho-geriatric updating computer register**

This project aims to develop the computer and data-handling facilities required for a psycho-geriatric research programme and to include into this the longitudinal investigation of the natural history of early organic brain syndromes and affective disorders in relation to physical disease. Among the more detailed aims of the study are to provide a psycho-geriatric age, sex, and diagnostic register, to record the major findings, physical, psychological, and social, and to record details of major changes in the life history of the patient. In addition a register will be accumulated of all patients who have had brain histology, and where available, post-mortem data on this.

See group entry no. 35.

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444. *North-East Metropolitan RHB, Management Services Division with Essex, University of; Department of Mathematics, and The Hospital Computer Centre for London*

S. E. HARRISON, PROFESSOR G. BARNARD

DR I. DUNCAN, MISS P. RAWLINS, J. BROCKIS

**Development of HAA sub-information systems for 'Cogwheel' medical divisions**

*Approved support 1971-4: £6,000*

The project aims to develop a sub-information system to meet the established needs of the specialties which form 'Cogwheel' divisions.

Hospital Activity Analysis will supply the nucleus of information, which will extend to staffing, finance, and other managerial fields. The linking of these sub-systems would be the ultimate aim. Initially, the balance between operating sessions and resources in terms of beds and ward nursing staff, as well as the different requirements of minor (short-stay) and major surgery are being examined.

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445. *Oxford, University of; Department of the Regius Professor of Medicine, Health Services Evaluation Group: Community Hospital Programme*

DR A. E. BENNETT, M. LEE-JONES

**Systems for medical records in health centres and community hospitals**

A new record system, based on A4 size, has been devised for the first experimental



community hospital. The objective is to provide an integrated record for both patient care in the community and research. Trials with problem-oriented case-records and medical audit are planned.

See unit entry no. 40.

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446. *Oxford, University of; Department of the Regius Professor of Medicine, Health Services Evaluation Group: Community Hospital Programme*

DR A. E. BENNETT, MISS K. JACK

**Preparation of a monograph on the design and use of questionnaires in medicine**

The use of questionnaires in clinical practice is extending rapidly. No suitable reference work exists. A handbook is being prepared which will include a comprehensive bibliography.

See unit entry no. 40.

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447. *Oxford, University of; Department of the Regius Professor of Medicine, Unit of Clinical Epidemiology*

DR J. A. BALDWIN

**Oxford Record Linkage Study**

*Co-sponsor: Oxford Regional Hospital Board*

The study, which commenced in 1962 on a grant from the Nuffield Foundation, is concerned with the formation of cumulative personal medical records based on birth, hospitalization, and death records from a defined population at risk of about 800,000 in the Oxford Region, by electronic record linkage. A linked file covering the period 1963-7 has been generated and will shortly be extended to 1970. Since 1969 methods of data collection, preparation, and processing have been redeveloped in order to incorporate the Hospital Activity Analysis function with unlinked data and extend coverage to the whole Oxford Regional Hospital Board area (population 1.9 million). Optical character recognition and punched paper tape techniques have been used to enable economic input of plain language for automatic encoding with the aim of improving data reliability and shortening turnaround.

See group entry no. 41.

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448. *Royal College of General Practitioners, General Practice Research Unit*

DR D. L. CROMBIE

**The development of standardized recording methods**

The project aims to develop standardized recording methods to enable GPs to obtain and compare information about the volume and mix of their daily work, and of techniques for maintaining up-to-date medical records for the clinical work of general practice and its management.

See entry no. 43.

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449. *Wales, University of; Welsh National School of Medicine, Department of Social and Occupational Medicine, General Practice Unit*

R. H. DAVIS

### **A study of the value of a computerized community records system**

*Approved support 1969-73: £2,100*

A new records system has been designed for use in the community to combine in a single record the data collected by the doctor, the health visitor, and the district nurse, and to allow experiments in data collection and recording so that selected information may be stored in a computer file for subsequent analysis and retrieval.

The records system is being evaluated in a new university teaching practice, working from a new health centre serving about 10,000 people.

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450. *Wessex Regional Hospital Board and Southampton, University of; Faculty of Medicine*

PROFESSOR M. R. ALDERSON

### **Medical Information Unit**

*Co-sponsor: Wessex Regional Hospital Board*

The aim of the Unit is to process the routinely available data in the NHS and make this available for administrative and management purposes, medical studies, and teaching. Projects in which the Unit is currently involved are concerned with the accuracy of Hospital Activity Analysis (HAA) material; examination of the detailed use of HAA material, particularly for management purposes; the examination of sickness absence of men who have had spells in hospital, to determine whether this could be used as an alternative source of outcome in the study of medical care; the examination of the need for collection of additional data, with particular reference to the information needs of a unified health service; and the preparation of a regional computing policy, with particular reference to the capture, transmission, and use of management information.

See group entry no. 51.

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451. *Wessex Regional Hospital Board, Regional Library and Information Service*

R. B. TABOR

### **The use of library and information services relating to professional knowledge in the health sciences**

*Approved support 1972-4: £15,900*

*Co-sponsors: King Edward's Hospital Fund for London, Department of Education and Science, The Office of Scientific and Technical Information, University of Southampton*

The project aims firstly to define the categories of users of information in the field of the health sciences, to establish purposes for which the information is required, and to determine the levels of information needed; and secondly to distinguish the various sources of information available in the field of the health sciences and to investigate existing patterns of communication of professional knowledge among

health science professionals. The scope of this study is extremely wide and the intention is to define the total problem and to form a base for further selective investigation and for setting up special library and information services.

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## 2.21. NHS Experimental Computer Programme

452. *Addenbrooke's Hospital, Department of Anaesthetics and Physics, Cambridge*

DR J. V. FARMAN, D. A. JUETT

### Patient monitoring

*Approved support 1971-3: £77,500 (capital); £20,000 (revenue)*

The aim of this project is to develop a monitoring system which can provide any currently acceptable level and type of monitoring at a reasonable cost per patient. It will obviate the need for a series of expensive special purpose bedside units because the individual modules will be no dearer than existing discrete units.

By using computing techniques and a carefully designed system of interfacing it should be possible to achieve fully automatic operation in the majority of measurements. The project will evaluate currently available monitoring techniques with the object of deciding the most economical. It will end with a specification for a dedicated computerized monitoring system.

See also entry for the Middlesex Hospital, no. 466.

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453. *Bristol Royal Infirmary, Department of Pathology, Bristol BS2 8HW*

DR G. K. MCGOWAN

### Pathology-biochemistry

*Approved support: The project is funded locally but the DHSS is to support the salary of a programmer for twelve months.*

The aim of the project is to use a computer in the chemical pathology section to process data from individual auto-analyser channels. It is hoped at an early stage to extend the system to process the numerical results of the tests in the haematology section.

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454. *United Cambridge Hospitals*

P. HAMMERSLEY

### The United Cambridge Hospitals Major Experimental Computer Project

*Approved support 1968-73: £130,000 (capital); £109,200 (revenue)*

The main aims of the project are to improve patient care by ensuring that information concerning the needs of patients for staff and equipment is available at the right time and in the right place; to improve hospital performance by defining the need for resources and, where appropriate, allocating those resources; and to reduce staff costs by eliminating routine and duplicated work.

A computer system is being designed for work mainly in the areas of in-patient and out-patient servicing systems. Other applications being designed are nurse allocation and nurse dependency and transport scheduling. Hospital staff will use interactive visual display terminals for input and retrieval of information and optical mark documents will be used to record nurse dependency data.

This project is co-ordinated with those at Charing Cross Hospital, St Thomas's Hospital, and University College Hospital and is involved with them in the development of common applications.

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#### 455. *Charing Cross Hospital*

M. D. VICKERS

##### **Charing Cross Hospital Experimental Computer Project**

*Approved support 1968-73: £16,000 (capital); £124,100 (revenue)*

The main aim of the project is to provide a computer-based information system to meet the increasing information and communication requirements of the New Charing Cross Hospital. Such a system will lead to improved patient care, increased clinical and administrative efficiency, and better facilities for research.

The hospital areas which have been identified as having the greatest need for computer assistance are the requesting and reporting of pathology tests and drug prescriptions. The eventual computer systems will make use of mark readable documents which can be marked by clinical staff and read directly into the system. Other systems are being designed for in-patient administration and clinical recording.

This project is co-ordinated with those at St Thomas's Hospital, University College Hospital, and United Cambridge Hospitals and is involved with them in the development of common applications.

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#### 456. *Essex, University of; Department of Mathematics*

DR K. BOWDEN (*University of Essex*), DR M. ABRAMS (*Guy's Hospital Medical School*)

##### **Guy's/Essex Computer Project**

*Approved support 1968-73: £250,000*

The prime objective of the project is the creation of a computer-based integrated health record and the provision of improved information handling facilities for the use of workers in health centres concerned with the primary medical care of patients.

Two group medical practices working at different health centres are co-operating in the project. Computer terminals at each health centre using the GPO data transmission service will provide on-line access to patient records held on a computer located at the University of Essex. General practitioners in their surgeries and during patient consultations will be able to retrieve the patient's record and amend it or enter new information as necessary. The entries will usually be made by choosing items from checklists. These have to be designed to enable the history taking to be as complete as possible but users will be able to enter some narrative in free form if they wish to do so.

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**457. Hospital for Sick Children, Department of Chemical Pathology, London WC1**

DR B. E. CLAYTON

**Pathology***Approved support 1970-1: £1,500*

The project aims to use a Graphical Peak Analyser experimentally in a pathology laboratory to evaluate the use of GPA in a pathology laboratory environment. The trace reader is used for converting auto-analyser peak heights into concentration units. Data is produced which enables the results of the tests undertaken to be produced.

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**458. King's College Hospital**

PROFESSOR J. ANDERSON

**King's College Hospital Computer Project***Approved support 1968-72: £596,000 (capital); £398,100 (revenue)*

The objective of the pilot project on two wards was to test the practicability of using a computer to acquire, store, and retrieve any on-going hospital clinical record.

The objective of extending the terminal network throughout the hospital is to establish a requesting/reporting/communication system offering a service to the rest of the hospital; and to provide a less restrictive environment in which to test the pilot project.

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**459. King's College Hospital, Department of Chemical Pathology, London SE5**

PROFESSOR C. H. GRAY

**Biochemistry-pathology***Approved support 1970: £25,300 (capital); £5,600 (revenue)*

The system is based on a Digico Micro 16 attached to a trace reader. The system allows for data calculation, data-processing, and process control of pathology tests carried out. Data is input into the system by on-line teletype. Laboratory work-sheets are produced for use in the Chemical Pathology Laboratory. The computer also accepts data from analyser charts. By use of the trace reader peaks are identified on the trace reader by electric impulses which are created by an electric pen device.

Test result reports are printed out on a teletype printer. The system also has the facility for the output of results at satellite locations at Dulwich and St Giles by means of data lines to these two hospitals.

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**460. Leeds Regional Hospital Board**

R. STEELE

**Leeds Regional Hospital Board Hospital Systems Computer Project**

*Approved support 1971-3: £121,000 (capital); £28,900 (revenue)*

In essence the proposal is for the creation of an on-line batch-processing system with a central computer sited at the RHB, and communication terminals at St James's Hospital and in the Radiotherapy Department at Cookridge Hospital. The Board envisage extension of the systems in both hospitals and eventually to other hospitals in the region.

The system will be used to assist with the day-to-day control of appointments for out-patients, admissions and discharges for in-patients, and to produce up-to-date statistics and management information. Anticipated benefits include increased administrative efficiency, improved use of resources and better interdepartmental information flow. At Cookridge the applications relate to radium dosage calculations and external beam therapy.

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**461. The United Liverpool Hospitals**

R. SOWERBUTTS

**The United Liverpool Hospitals Computer Project**

*Approved support 1968-73: £83,100*

The project is one of the experimental projects funded by the DHSS to explore the use of computers in the NHS. The project is concerned with providing information on the allocation and use of the hospital resources in the service of the patient, with particular reference to the new Medical Teaching Centre.

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**462. Local Authorities Management Services and Computer Committee (LAMSAC)**

S. R. BARNES

**The Local Health Authorities Health Systems Design Project**

*Approved support 1969-73: £5,700*

*Co-sponsors: LAMSAC, National Computing Centre*

The aim of the project is the rationalization of existing local health authority applications and the development of new applications.

Rationalization is being achieved by assisting local health authorities wishing to introduce particular applications to adopt (transplant) existing systems, which have similar features and use compatible equipment, designed and operated by other local health authorities.

The development of new applications is being undertaken by the Derbyshire County Council which is developing systems for the medical surveillance of pre-school children and the elderly and the West Sussex County Council which is developing systems for dental work for preschool children, for the periodic medical inspection of schoolchildren and for the organization of the family planning service.

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**463. The London Hospital**

W. A. ABBOTT

**The London Hospital Computer Project**

*Approved support 1968-73: £608,000 (capital); £380,100 (revenue)*

It is intended to develop a communication system for the hospital using visual display units, expanding and building upon the experience already gained on the hospital's batch-processing installation in the field of patient administration. Initial applications will be concerned with scheduling the resources of the hospital more effectively to increase throughput and improve patient care. A mixture of real-time and batch-processing will be employed dependent upon the requirements of the application.

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464. *London, University of; Department of Chemical Pathology, Royal Postgraduate Medical School*

PROFESSOR I. D. P. WOOTTON

**Pathology-biochemistry**

*Approved support 1973: £75,000 (provisional)*

A small computer will be used in Biochemistry to capture and analyse the output from laboratory equipment for quality control and cumulative reporting of results. Work sheets are produced from test request cards. Samples are loaded into the automatic analyser, colorimeters and photometers are connected on line to the computer which detects and checks peaks, checks standards, corrects for drift, and interpolates results against stored standards. Evaluated results are then stored and printed in the form of laboratory reports.

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465. *United Manchester Hospitals*

DR R. M. STIRLAND

**The United Manchester Hospitals Computer Project**

*Approved support 1968-73: £1,000 (capital); £87,800 (revenue)*

The aims of the project are to develop medical computing applications to facilitate better patient management through better resource allocation and control in the hospital environment.

Several applications, including five-day ward scheduling in a programmed investigation unit, are being studied. Initially each application will be developed as a separate module using batch-processing methods, but their design will enable them to be developed as required for real-time, integrated systems.

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466. *The Middlesex Hospital, Department of Physics, London W1P 6D, and Addenbrooke's Hospital*

D. G. JAMESON, DR J. L. HAYBITTLE

**Radiotherapy Treatment Planning Project**

*Approved support 1972-3: £20,000 (capital); £6,900 (revenue)*

The objective of this project is to demonstrate that low-cost remote graphic terminal

can be used economically with time-sharing techniques. These terminals would be capable of alpha-numeric and vector presentation. The development task is to evaluate the remote terminal and bring together the software in the two fields to produce a working system.

The project is aimed at getting interactive graphic display in external beam therapy initially in 2D and later 3D; reconstruction in implants in 3D, and presentation of dose distribution around implants in 2D and 3D.

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#### 467. Newcastle Regional Hospital Board

W. BARRON

##### **Expansion of computer services: 7020 Data Terminal Link at Sunderland**

*Approved support 1971-3: £24,000 (capital); £23,200 (revenue)*

The primary object of this experiment is to assess the value of establishing and maintaining direct linkage between a hospital group and a central computer. The applications envisaged represent activities currently undertaken at group level, and will have the effect either of overcoming delays in access to the computer, or extending the scope of work currently undertaken by reducing the necessity for extensive clerical work. They include statistical work of the Records Department, waiting-list management, scheduling of out-patient clinics, financial applications and the data preparation aspects of several projects. Local initiative is regarded by the RHB as one of the more important objectives of the experiment.

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#### 468. The North Staffordshire Hospital Management Computer Committee

M. C. SMITH

##### **North Staffordshire Hospital Management Committee, Experimental Computer Project**

*Approved support 1968-73: £678,000 (capital); £326,100 (revenue)*

*Co-sponsor: Birmingham Regional Hospital Board*

The intention is to develop a computer-based communication system for the North Staffordshire Group of Hospitals centred on Stoke on Trent. It is the only project associated exclusively with a district general hospital situation. Initially the services will be provided for the North Staffordshire Hospital Centre which contains the central Out-Patients' Department. The applications involved will be concerned with scheduling more effectively hospital resources and removing unwanted delays in patient management, together with the provision of control information for medical, nursing, and administrative management. The processing mode will be real-time and batch; the choice made will be determined by the turn-round requirements and costs.

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#### 469. Northwick Park Hospital, Harrow HA1 3UJ

DR G. SLAVIN, DR E. C. COLES



**Pathology: Data-handling in morbid anatomy histology and cytology**

*Approved support 1972-3: £3,100 (capital); £3,800 (revenue)*

The project aims to encode data as a by-product of the typed pathology report; the coded data will be used to formulate standard files which can be easily searched by computer and will enable rapid retrieval of pathological material and reports for study.

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**470. Oxford Regional Hospital Board**

G. GUEST

**Oxford Medical Computer Centre**

*Approved support 1969-73: £66,600*

There are three basic ideas which this project seeks to explore:

(i) That much information handling in a hospital can be centralized in a patient administration centre where most of the administrative data concerning patients can be captured using a small number of terminal devices.

(ii) That the connection of several such centres to a main computer centre enables the basis for an area information service for hospitals to be established.

(iii) That it is possible to build a network of computing equipment which initially would perform the basic tasks required in a relatively unsophisticated manner but which would be capable of expansion both in terms of facilities provided and number of sites.

Priority is being given to community-oriented sections of the over-all hospital system, the first specialized areas to be taken on being the geriatric and maternity services. The third area to be covered is that of admissions and discharges.

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**471. Poole General Hospital, Department of Pathology, Poole, Dorset BH15 2JB**

DR J. H. JOHNSTONE

**Pathology-biochemistry**

*Approved support 1973/4: £75,000 (prov.)*

A system will be implemented for biochemistry, to study the development and effects of automated laboratory procedures and the transmission of data from and to outlying hospitals and to see whether there is evidence that request patterns are altered by automated methods and whether, as a result, laboratory organization treatment or bed stay are affected.

Data will be derived initially on-line from Technicon Auto-Analysers Marks I and II.

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**472. Queen Elizabeth Hospital, Department of Biochemistry, Birmingham**

PROFESSOR T. P. WHITEHEAD

**Pathology-biochemistry**

*Approved support 1969-73: £32,700 (capital); £55,700 (revenue)*

The aim of the project is to use a small computer for the capture and analysis of

signals from laboratory equipment with quality control as an experiment in laboratory automation.

The system will enable a series of reports to be produced on a line printer. Priority reports, ward reports, and patient reports will be produced.

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473. *The Queen Elizabeth Hospital, Medical Centre Computer Services Unit, Birmingham*

P. M. HILLS

**United Birmingham Hospitals Experimental Computer Project**

*Approved support 1968-73: £577,000 (capital); £299,700 (revenue)*

The early aims of the project are to develop the existing computer-based patient administration and laboratory reporting systems at the hospital together with experiments in systems for drug administration, nursing records, laboratory test requesting, and patient history and physical examination recording. This will be done using visual display units and employing a variety of processing modes dependent on the requirements of individual applications. The computer, a Univac 418 III was installed and accepted in March 1972.

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474. *Royal Free Hospital, Department of Clinical Neuro-physiology*

DR B. MACGILLIVARY

**EEG—Automatic diagnosis**

*Approved support 1971-3: £35,500 (capital); £10,000 (revenue)*

The aim of the project is to use a dedicated computer to provide automatic diagnosis of the EEG in the clinical environment at minimum cost. The proposed system will be on-line to the computer and run in a real-time mode. The patient under observation will be connected to an EEG machine and AD convertor which has twenty analogue outputs. This data will also be processed by user-constructed analogue filter devices which will facilitate data reduction. Data will mostly be stored on magnetic tape. Patient data which is useful for archival material will be stored on separate magnetic tape. The results of the processing of the archival material will be the constitution of a reference library on disc which can be used on line in the processing of new records. It is hoped that the data accumulated by on-line operations will enable a medical diagnosis of the state of the brain to be undertaken. Output from the computer will be by means of teleprinter which will report in hard copy form.

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475. *Royal Marsden Hospital, Department of Nuclear Medicine, Sutton*

DR V. R. MCCREADY

**Gamma camera/tumour diagnosis by ultrasound scanners**

*Approved support 1971-3: £21,000 (capital); £5,300 (revenue)*

The aim of the project is to use a small computer for processing data which has

been derived from an ultrasound scanner, a gamma camera, and two rectilinear scanners.

The gamma camera will be connected on-line to the computer; the camera creates three pulses, *X* and *Y* pulses which are processed to form a binary number which is used for core identification; the *Z* pulse is used for data sorting. Thus the computer is used as an analyser making data immediately available for further processing. By the use of the computer linked to the gamma camera the following five applications will be undertaken.

- (i) Improvement of image quality.
- (ii) Estimation of statistical significance.
- (iii) Short-term dynamic studies.
- (iv) Measurements using two or more nuclides simultaneously.
- (v) Three-dimensional studies.

476. *Royal Marsden Hospital, Physics Department, London SW3, and Institute of Cancer Research, Department of Physics, Sutton*

DR R. E. BENTLEY

#### **Radiotherapy treatment planning**

*Approved support 1968-73: £20,000*

The aim of the project was to carry out external beam radiation treatment planning with direct user interaction. The system is an extension of the programmed console concept and incorporates its successful features. To achieve these aims, a small computer was used for the summation of isodose curves in external beam radiotherapy treatment planning.

477. *St Bartholomew's Hospital, Department of Medical Electronics, London EC1*

DR B. W. WATSON

#### **Patient monitoring**

*Approved support 1970 Phase I: £48,300*

The main emphasis of the programme is on the handling of information from transducers measuring physiological parameters and the development of apparatus connecting the transducer to the computer. The main function of the system is the automation of the cardiac laboratory and other monitoring procedures. In the Isotope Department a system has been designed for storing an isotope scan on to punched tape and it was hoped to use the computer to improve the delineation of tumours.

The aim of the project is to use the system for the collection for later analysis of patient data from normal measuring equipment and via transducers now being developed in the laboratory and eventually, to apply the experience gained in off-line working to limited on-line patient monitoring in a small cardiac intensive care unit, and the operating theatre.

478. *St Peter's Hospital and Royal College of Surgeons of England, London WC2A 3PN*

PROFESSOR J. P. PAYNE, DR D. W. HILL

**Patient monitoring**

*Approved support 1970-3: £9,000 (capital); £2,200 (revenue)*

The aim of the project is to link patients in the operating theatre of St Peter's Hospital with the computer in the research department of anaesthetics at the Royal College of Surgeons. Input to the computer system will be by a visual display unit with silent keyboard facilities. On-line facilities exist for incoming ECG and blood pressure patterns. Off-line calculations are also available for data-collecting programs. The computer out-puts the updated numerical values which have been calculated. The off-line teleprinter is used in conjunction with the computer tape punch to produce at intervals a print-out of the data presented in visual form. This print-out forms part of the patient's medical record.

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479. *St Stephen's Hospital, Group Pathological Laboratory, London SW10*

DR M. G. RINSLER

**Biochemistry-pathology**

*Approved support 1969-73: £28,100*

This project involves the trial of a small computer to test the consequences of introducing automation into a busy group laboratory and to assess the effectiveness of the service provided. The main aspects of such a trial will be a study of the effects on patients and on the service provided for clinicians of automating a laboratory service, plus the effect of automation on the organization of the laboratory. The project will also provide an opportunity for studying the effect of an automated laboratory on the service provided for other hospitals and other pathology laboratories.

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480. *St Thomas's Hospital*

V. S. ROBERTSON

**St Thomas's Hospital Experimental Computer Project**

*Approved support 1969-73: £5,000 (capital); £156,500 (revenue)*

The project's objective is to produce an integrated data-collection and data-processing system surrounding the patient's medical record in order to improve patient care, increase clinical and administrative efficiency, and improve research facilities. The computer system aims to improve communications both between and within the various hospital departments by providing authorized users with access to a centralized store of patient-oriented data.

Data will be input to the system via a number of interactive, on-line terminals situated at strategic points throughout the hospital. The main document produced by the system is known as the episode progress report. It will contain data generated during the current episode and a summary of previous episodes giving the main diagnosis and/or operations together with dates of admission and discharge.

The project is co-ordinating with three other experimental projects (Charing Cross, UCH, United Cambridge) in attempting to design common applications and exploring the problems that would be raised.

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481. *Sheffield Royal Infirmary, Department of Clinical Pathology*

PROFESSOR A. JORDAN

**Pathology-biochemistry**

*Approved support 1969-73: £26,200*

The aim of the project is to use a small computer for capture and analysis of signals from laboratory equipment with quality control as an experiment in laboratory automation. The aim of the trial is to study the ways by which a pathology laboratory computer can be used to increase the efficiency of the pathology service in a large city and subsequently to illustrate the regional consequences of an automated pathology service. The trial will have four main stages.

(i) The pathology laboratory computer linked to fifteen auto-analyser channels in the Royal Infirmary.

(ii) Linkage to the pathology computer of terminals using the GPO Datel 200 data transmission at other hospitals in Sheffield.

(iii) Linkage of the pathology computer to the RHB's general purpose computer as backing store.

(iv) Study of the wider implications both in the city of Sheffield and regionally of the use of computing equipment in the pathology service.

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482. *Southampton General Hospital, Wessex Regional Department of Nuclear Medicine*

B. A. GODDARD

**Gamma camera**

*Approved support 1972-3: £9,500*

The equipment will provide the ability to execute some data analysis and in addition will act as an off-line link to local computers, until a dedicated departmental small computer can be obtained. The provision of a magnetic tape unit will allow all the images from any procedure to be stored and analysed at the conclusion of a patient investigation. It is likely to have the following advantages:

(i) There will be no loss of information as for example can occur with defective Polaroid film.

(ii) Time/activity curves can be obtained for different regions of the lung, thus allowing a quantitative measurement of washout of Xeron which can be compared in the same patient from time to time or following therapy.

(iii) When the ventilation image is compared with that of perfusion, ventilation perfusion ratios can be obtained for different regions of the lung.

Equipment installed January 1972.

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483. *Southend General Hospital*

NEVILLE MOSS

**Southend Experimental Computer Project**

*Approved support 1971-3: £50,000 (capital); £5,600 (revenue)*

The long-term aims of the project are to develop a hospital in-patient information system to

(i) Predict bed availability for waiting-list cases and optimize bed occupancy within the constraints of staffing, theatre sessions, X-ray, and other resources available.

(ii) Make adequate provision to match demands for emergency admissions to available beds.

(iii) Provide waiting-lists of patients for consultants to order admissions.

(iv) Record admissions, up-to-date bed state position, schedule of in-patient bed movements, and eventual discharge.

(v) Provide management statistics for the hospital authorities and the DHSS.

The input, extraction, and presentation of data will be handled by the batch production of documents with a limited real-time capability for access to information where it is needed, for example, the accident centre. Entry to the computer will be via terminals located in various admission areas.

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**484. South Warwick Hospital, Group Pathology Laboratory**

DR M. K. ALEXANDER

**Pathology-biochemistry**

*Approved support 1969-73: £27,600*

The aim of the project is to use a small computer for capture and analysis of signals from laboratory equipment with quality control, as an experiment in laboratory automation. In the system it is possible to produce work-sheets for the laboratory technicians if the analysing process is interrupted. The work-sheets are produced by the test requests and all relevant information on the patient being fed into the computer and processed. Samples are loaded into the automatic analyser. Calorimeters and photometers are connected on-line to the computer which detects and checks peaks, checks standards, corrects for drift, and interpolates results against stored standards. Evaluated results are then stored and printed in the form of laboratory reports.

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**485. South-West Metropolitan Regional Hospital Board**

DR H. C. PRICE, MRS J. MACDONALD-ROSS

**Hammersmith and Kensington Community Health Information Project**

*Approved support 1968-73: £43,700*

*Co-sponsors: South-West Metropolitan Regional Hospital Board, the London Borough of Hammersmith*

The aims of the study are to examine means by which co-operation and communication between the various branches of the NHS could be improved with the use of a computer communication network, identifying and building on points of similarity between the three branches. Areas being examined are:

- (i) Hospital out-patient clinics.
- (ii) Medical social work.
- (iii) Local authority social work.
- (iv) Local authority antenatal clinics.
- (v) Health centres.
- (vi) Group practices.

#### 486. *South-Western Regional Hospital Board*

DR N. PEARSON, PROFESSOR J. ASHFORD

J. SPARROW

#### **Exeter Community Health Services Computer Project**

*Approved support 1968-73: £746,000 (capital); £279,100 (revenue)*

The objective of this project is to establish a community-based medical information system to serve the three branches of the health service in Exeter and the surrounding area of Devon county which would enable all medical, nursing, and administrative staff responsible at any time for the care of the patient to have convenient access to a computer system and patient's records. The basis of the system is an integrated patient record in which information recorded by GPs and attached local health authority staffs working in health centres will be collated with hospital information. The existence of reliable and accessible data about the usage of the health service will provide an opportunity to study both the practical problems involved in providing integrated patient care and the extent to which computer-based systems will facilitate unification of the health service. It will also provide enhanced facilities for epidemiological studies.

Initially GPs and LHA staff working in two health centres will have access to the computer system. Together these health centres provide primary medical care for 35,000 patients. If the experiment proves successful and cost effective the system could be expanded to serve a population of over 200,000 persons. In the hospitals the project will be concerned initially with in-patient and out-patient activities for all patients at the Princess Elizabeth Orthopaedic Hospital, a small hospital of 110 beds. It is intended that systems developed and proved here will be introduced at the time of commissioning in mid 1973 to the new Royal Devon and Exeter Hospital, Wonford, which in the first phase of its development will have 432 beds.

#### 487. *University College Hospital*

H. C. TERRY

#### **University College Hospital experimental computer project**

*Approved support 1968-73: £5,200 (capital); £87,300 (revenue)*

The project aims to improve the quality of the medical record by providing an up-to-date printed summary of each patient's progress; to improve communications within the hospital; and to provide statistics for management and research.

An essential feature is the patient data card on which will be recorded, in chronological order, clinic attendances, administrative information, brief clinical data, and reports of investigations.

The computer system will maintain the current bed state and waiting-list and information about out-patients' appointments will be used to produce clinic lists and identification sheets for new patients.

The project is co-ordinating with three other experimental projects (St Thomas's, United Cambridge, and Charing Cross) in attempting to design common applications and exploring the problems that would be raised.

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488. *University College Hospital, Department of Clinical Pathology*

PROFESSOR F. V. FLYNN

**Pathology-biochemistry and haematology**

*Approved support 1972-3: £120,000 (prov.)*

A system will be developed for biochemistry and haematology. Data will be derived initially on-line from Technicon Auto-Analysers Marks I and II. Capacity will however exist in the systems for linking on-line to Technican SMA equipment for chemical pathology and perhaps haematology, the Coulter Counter Model S, the LKB reaction rate enzyme analyser and a variety of equipment with output in the form of digital values. Manual input of results of tests both directly and contained in punched media will also be possible. Automation of clerical procedures will also be attempted. The major items are the identification of patients and specimens, the preparation of work-sheets, monitoring of equipment, and the output of cumulative reports at intervals during the day.

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489. *University College Hospital, Department of Medical Physics, London WC1E 6AU*

J. CLIFTON

**Gamma camera**

*Approved support 1971-3: £65,300 (capital); £29,660 (revenue)*

The system is mainly concerned with the development of a modular real-time, multi-task computer system for nuclear medicine and the investigation and development of a video disc display driving system which potentially offers a means of providing display terminals for medical computing. These are cheaper than existing systems.

Using the multiple task CAMAC interface a system will be developed to include simultaneous data acquisition from a range of equipment with real-time processing and display of results; image enhancement technique for static studies for both gamma camera and scanners; renography; blood flow; and total blood isotope investigations.

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490. *University College Hospital, Department of Medical Physics*

J. CLIFTON



**Data-processing for a gamma camera: CAMAC development***Approved support 1972: £13,700**Co-sponsor: Atomic Energy Research Establishment, Harwell*

The main aims of the project are to develop a system using a PDP 11/45 for the collection of radio therapy information from a gamma camera through a Harwell 7000 series CAMAC interface, in a manner suitable for general application in the NHS.

The development will be in three phases: starting with a minimum useful system of information flow, then improving the performance and capability of this system to meet the requirements of a stand alone system, and finally to extend to a multi-user, multi-task system by working with other instruments used in the Nuclear Medical Department.

491. *Westminster Children's Hospital, Department of Clinical Measurement, London SW1*

DR P. CLIFFE

**Patient monitoring and allied activities***Approved support 1968-73: £90,000*

To investigate through development and research a comprehensive patient monitoring system for an intensive care unit at the Westminster, a number of projects are being undertaken:

- (i) The use of an interactive graphic system for the editing and validation of physiological signals.
- (ii) Analysis of central aortic pressure.
- (iii) High-frequency electrocardiograms.
- (iv) On-line analysis of R-R intervals in the normal and abnormal electrocardiogram.
- (v) On-line automation of clinical spirometry.
- (vi) Deletion and measurement of electrocardiogram.
- (vii) Continuous logging and display of certain monitored patient variables operatively and post-operatively.
- (viii) Measurement of respiratory and cardiovascular changes.
- (ix) Reporting of cardiac catheterization (inter-hospital).
- (x) On-line filtering of data in real-time.
- (xi) Automated reporting of chemical pathology laboratory results.
- (xii) Multiple choice questions.
- (xiii) Surveys and miscellaneous statistical analysis.
- (xiv) Analysis of bed-occupancy.

**2.22. Public response and attitudes to services**

492. *Exeter, University of; Institute of Biometry and Community Medicine*

DR N. G. PEARSON, DR D. C. MORGAN

DR A. M. TUCKER, M. D. MACDONALD, F. E. JONES, DR J. LYONS, S. M. EDWARDSON

### **A health centre patient attitude survey**

A survey has been conducted to study the attitude of a 1 in 10 sample of patients whose primary medical care is delivered from a health centre by a medical team headed by six GPs.

It is proposed that later in 1972 the survey will be extended to involve other health centres of differing size, geographical location, and population structure with a view to obtaining attitudes from a wider cross-section of the community.

See unit entry no. 4.

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### *493. Institute for Social Studies in Medical Care*

DR ANN CARTWRIGHT

#### **The process of getting an abortion**

This is a survey of a random sample of women having an abortion. It is concerned with the process that women go through, any delays involved, the women's views on the care they received, and their use of birth control.

See group entry no. 14.

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### *494. Kent, University of; at Canterbury, Centre for Research in the Social Sciences, Health Services Research Unit*

PROFESSOR M. D. WARREN

#### **Utilization of health services**

Studies in the differential use of health services are focusing initially on the consumption of hospital resources by married and non-married patients as a way of assessing long-term social dependency upon the hospital. Later studies are planned to investigate the progress of these highly dependent patients through the medical care system, including research into the functional relationship between area health authorities and local authority social service departments.

See unit entry no. 5.

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### *495. Liverpool, University of; Department of Psychiatry*

DR P. LEY

#### **Research into methods for improving doctor-patient communication**

The project aims to find methods of increasing the effectiveness of doctor-patient communication in two main areas: in giving information and in giving advice and instructions.

Research into ways of increasing patients' memory for medical information and their understanding thereof is being undertaken with patients in hospital and general practice. When this has been done, the effects of increased comprehension and memory on patient satisfaction with communications and patients' compliance with medical advice, will be assessed.

Experiments will also be conducted to see the effects of applying findings from research in social psychology in the medical field.

See group entry no. 17.

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496. *London, University of; Bedford College, Social Research Unit*

PROFESSOR MARGOT JEFFERYS

**Health and welfare needs of households in Camden with special problems**

*Co-sponsor: London Borough of Camden*

This study looked at the incidence of certain forms of social and health needs in the London Borough of Camden, and the utilization by those affected of relevant social services.

See group entry no. 18.

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497. *London, University of; London School of Hygiene and Tropical Medicine, Chronic Disease Control Study Unit*

**The irrigation pipette study**

The study has been collaborative, and those taking part were:

DR JANET CARRUTHERS (*Chronic Disease Control Study Unit*); DR JOCELYN CHAMBERLAIN, DR T. W. MEADE (*for the first part of the study*), MISS PAULINE SEDGWICK, DR J. M. G. WILSON (*London School of Hygiene and Tropical Medicine*); DR T. MC. L. GALLOWAY, DR D. G. H. PATEY, J. SAUNDERS (*West Sussex County Council*); DR O. A. N. HUSAIN (*St Stephen's Hospital, Chelsea, Department of Pathology*); DR PETER MCEWAN, D. RICHARDS (*Unit for Social Studies, University of Sussex*)

The aim is to determine whether the offer of a cervical cytology test that can be carried out by women in their own homes will lead to a better response, particularly amongst women at the most risk of cancer of the cervix; compared with conventional cytology carried out either in a GP's surgery or in a clinic.

Approximately 20,000 women over the age of 18 living in the Urban District and Rural District of Horsham were invited to take part in the study.

The population was randomized by area of residence, so that division between town and country residence was approximately even. One random half of the women was invited to carry out a test on themselves, using a plastic irrigation pipette, the other half being invited to attend either their own doctor or a local authority clinic.

The response in the two groups was then compared for a number of demographic factors, including age, age at marriage, parity, use of contraceptives, and social class.

In order to compare the responders with the non-responders a parallel study on a sample of the total population was carried out by the Unit for Social Studies of the University of Sussex (see entry no. 506). The results are currently being analysed.

See unit entry no. 25.

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498. *London, University of; St Thomas's Hospital Medical School, Department of Clinical Epidemiology and Social Medicine, Social Medicine and Health Services Research Unit*

PROFESSOR W. W. HOLLAND

DR D. C. MORRELL, MISS I. DAY, MISS S. BERESFORD

#### Study of factors influencing demand for medical care

The object of the study is to elucidate the factors which influence the decision of an individual to seek primary medical care. A random sample of women aged 20-40 years, registered with a group practice, will be asked to complete questionnaires concerned with their physical health, their socio-economic status, and their psychological status. For a period of one year the demands made by these patients will be recorded in the practice. At the end of the year the data will be analysed to identify high and low users of primary medical care and a sample of each will be invited to complete a health diary designed to record their perception of illness and the action taken in response to perceived ill health.

See unit entry no. 8.

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499. *London, University of; St Thomas's Hospital Medical School, Department of Clinical Epidemiology and Social Medicine, Social Medicine and Health Services Research Unit*

PROFESSOR W. W. HOLLAND

MRS S. C. THORNE

#### Utilization of services for the elderly in the catchment area of a district general hospital

The aims of the study are to describe the characteristics of persons aged 65 and over living in the catchment area of a district general hospital who were referred to statutory and voluntary agencies over a period of six months in 1970, and to describe the characteristics of their referrees. Data on all referrals was collected by health, social service, and housing departments using a standardized *pro forma*. The data was checked for completeness by St Thomas's.

Data on individuals will be linked so that a referral network can be described.

See unit entry no. 8.

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500. *National Coal Board, Operational Research Executive*

R. C. TOMLINSON

#### The accessibility consequences of hospital location

The study of the accessibility consequences of hospital location is being carried out for the OR Unit of the DHSS as a part of their hospital size project. The study will evaluate the travel times and costs of hospital users (patients, their companions, and visitors) for different patterns of hospital provision.

A computerized model has been developed which generates demand for hospital facilities by ward and parish and allocates to a pattern of hospital provision that is

specified. The trips generated are then allocated to travel modes and costs and times of travel built up. The output gives both totals and distributions of travel costs and times. Extensive data has been assembled for the study.

See group entries nos. 33 and 56 (i).

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501. *Newcastle upon Tyne, University of; Medical Care Research Unit*

PROFESSOR D. J. NEWELL, W. MORGAN

MRS A. HOLOHAN, I. T. RUSSELL

**Newcastle Accident Survey: medical and social characteristics of patients**

The aims of the study are to investigate the factors which influence the patient when he has to make a decision as to the most appropriate type of medical care to seek in the event of an accident or emergency. A random sample of patients was drawn from the accident and emergency departments of three large hospitals serving the Tyne-side conurbation. Data about the accident or emergency itself; major social variables, such as occupation and family size; and the patient's attitude to medical care as measured by a series of hypothetical questions were obtained through patient interviews.

Data has also been collected of the medical care received by the patient at the hospital. The data have now been analysed and a report is being prepared.

See unit entry no. 9.

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502. *Oxford, University of; Department of the Regius Professor of Medicine, Health Services Evaluation Group: Community Hospital Programme*

DR A. E. BENNETT, DR MARIE JOHNSTON

**Measurement of patients' anxiety and attitudes to hospital care**

In a randomized controlled study of progressive nursing care, aspects of patients' reactions to their care are being studied. To assess emotional disturbance patients will be tested prior to hospitalization and from admission daily until discharge using as measures a self-report form of anxiety, the STAI (the State-Trait-Anxiety-Inventory; Spielberger *et al.*, 1970) and a very simple technique for enumerating active palmar sweat glands, devised by Sutarman and Thomson (1952). This latter measure has been fairly well validated as an indication of emotional stress but a necessary further validation study is being undertaken, comparing the results obtained with the enumeration technique with skin conductance data. A study of the STAI is also being done to compare its performance on repeated administration with that of other tests available.

See unit entry no. 40.

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503. *St Christopher's Hospice*

DR CICELY M. S. SAUNDERS, DR C. M. PARKES

**Study of patterns of terminal care in Bromley and Lewisham**

*Co-sponsors: School of Family Psychiatry and Community Mental Health, The Tavistock Institute of Human Relations*

This is a pilot survey aimed at categorizing patterns of terminal care and enabling some initial assessment of the distress or satisfaction with which each is associated in the mind of the surviving spouse. Spouses of patients who died of cancer in the boroughs of Bromley and Lewisham are interviewed 9-12 months after bereavement to ascertain (i) the pattern of care provided for their spouse during the terminal period of illness, (ii) their perception of the experience of the spouse under each phase of this care, and (iii) their own experience during each phase of this care. About 200 people are being interviewed for this study.

See group entry no. 45.

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**504. *St Christopher's Hospice***

DR CICELY M. S. SAUNDERS, DR C. M. PARKES

**Comparison of opinions on terminal cancer care at St Christopher's Hospice and other institutions**

*Co-sponsors: School of Family Psychiatry and Community Mental Health, The Tavistock Institute of Human Relations*

The project aims to evaluate aspects of the service provided at St Christopher's Hospice through the eyes of spouses of patients dying of cancer. This is a further investigation of two subsamples from the study of patterns of terminal care in Bromley and Lewisham (see entry no. 503). Respondants whose spouse died at St Christopher's Hospice are being reinterviewed to discover their view of the various aspects of care provided at that institution. They are being compared with a comparison group of spouses of cancer patients who died in other institutions. The groups are matched for age, sex, socio-economic status, amount of physical distress prior to terminal period, pattern of care, and duration of terminal period. There are about forty people in each group.

See group entry no. 45.

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**505. *Sheffield, University of; Department of Community Medicine, Medical Care Research Unit***

PROFESSOR J. KNOWELDEN, MRS A. W. M. WARD

**Impact of the provision of a terminal care nursing home in Sheffield**

The study attempts to assess how far the social and medical needs of patients dying of malignant disease nursed at home and away from home have been altered by the opening of St Luke's Nursing Home (25 mainly terminal beds) in October 1971. Information concerning the needs of all Sheffield patients dying from cancer of the pharynx, lung, breasts, stomach, colon, and rectum in the period May-August 1971 were obtained from hospital records, GPs, and hospital nursing sisters. About three to four months after the death, the chief carers of these patients were interviewed and asked about the difficulties they had experienced and the help that they had

obtained. A repetition of this data collection a year later, when St Luke's had been in operation for over six months, started in May 1972.

See group entry no. 46.

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506. *Sussex, University of; Centre for Social Research*

DR P. J. M. MCEWAN, N. D. RICHARDS

**Acceptability of comparative methods for cytological screening**

*Approved support 1969-72: £23,000*

This project is being conducted in collaboration with a clinical investigation under the direction of Dr J. M. G. Wilson and Dr N. Husain (see entry no. 497).

The principle aims are to conduct interview surveys to identify some of the sociological and psychological characteristics which distinguish women who accept cervical cytology from those who do not and to determine whether the characteristics of the women who accept the postal irrigation pipette method differ from those who accept the standard smear method.

A total of approximately 2,000 women have been interviewed. The report of the project will become available in late 1972.

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507. *Wales, University of; University College of Swansea, Department of Sociology and Anthropology*

PROFESSOR W. M. WILLIAMS

**Aspects of the sociology of prescribing in general practice: a longitudinal study of a cohort of GPs in England and Wales**

Several linked projects are being undertaken in the sociology of prescribing and general practice. These centre on a longitudinal study of a cohort of GPs and include social aspects of prescribing; epidemiology of psychotropic drug use; drug innovation and adoption; patient attitudes and influences upon prescribing and on attitudinal studies of GPs.

See group entry no. 49.

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508. *Wales, University of; Welsh National School of Medicine, Department of Child Health*

DR K. M. LAURENCE, DR E. H. HARE, PROFESSOR K. RAWNSLEY

**Investigation into the social and psychological effects on families of the birth of a child with spina bifida**

*Approved support 1968-73: £15,000*

The aim of this investigation is to determine the effect of a child with this serious malformation on the parents and siblings; to see how adequate the medical and social services are to cope with the problems; and to see how the surviving children cope and fit into the schools in which they are placed. The investigation began in 1964 with a total of 146 children mostly with spina bifida or encephalocele but 3

with hydrocephalus but without spina bifida, and 20 with anencephaly. Parents were visited within days of the birth of the infant and subsequently at six-monthly intervals. The schoolteachers of the 60 surviving children are being interviewed and the index patients and siblings are being investigated by the psychologist for attainment and emotional stability. The spina bifida group is being compared with control families matched for residence and family size at time of birth and social class of parents, who are being investigated in like manner.

See section 3, Publications, page 442.

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## **2.23. Decentralization of research administration**

### *509. Oxford Regional Hospital Board*

DR JOAN FAULKNER

#### **Decentralization of research administration**

*Approved support 1972-5: £27,000 (prov.)*

The present project, which is being undertaken in the Oxford region, includes a review of work at present supported by central DHSS research funds and the extent of existing collaboration between the DHSS, the MRC, and other bodies providing funds for research. It is also proposed to study the methods of assessment and control at present used for research supported by central DHSS funds and to examine the advantages and disadvantages of delegating some or all of these functions to the new regional authorities in 1974. In addition, assistance is being provided on an experimental basis with some of the activities being supported by the DHSS in the Oxford Region.



# 3

## Publications

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The publications shown in this section refer to Part III only and are listed and numbered in accordance with the list of research units and the classified list of projects in sections 1 and 2 of Part III. They are publications arising from work supported wholly or partly by the DHSS, but excluding those which are listed in the 1971 edition of *Portfolio for Health*.

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