

JOHN FRY TRUST FELLOWSHIP
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**Diagnosis
in
General Practice**
Art or Science?

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NUFFIELD PROVINCIAL HOSPITALS TRUST

THE JOHN FRY TRUST FELLOWSHIP

When he retired in 1991, after 45 years as a general practitioner, Dr John Fry established a Trust the main aim of which was to further the development of primary health care.

Through this Trust a Fellowship was established to be awarded annually to a distinguished individual from any discipline. Each holder of the Fellowship would be invited to prepare a monograph which it was hoped would contribute significantly to the progress of primary care. The monograph would be introduced by a public lecture to be delivered at a recognised teaching centre in the United Kingdom.

The inaugural John Fry Lecture was delivered at the Royal College of Physicians on Tuesday 25th May 1993.

PROFESSOR D. C. MORRELL

David Morrell graduated from St. Mary's Hospital Medical School, London and then completed a short-service commission in the Royal Air Force before entering general practice in Hertfordshire in 1957. At that time, general practice was in a state of crisis with many doctors emigrating to Commonwealth countries. The rôle of the general practitioner, and the knowledge and skills needed, were poorly defined and from an early stage in his career he began to collect simple data in his consulting room to address this problem. The results were reflected in his first book, *The Art of General Practice*, published in 1966; this has since gone to three further editions and has been translated into Dutch, Swedish and Arabic.

In 1963 he left his practice to join the Department of General Practice in Edinburgh where the first Chair of General Practice in the world was created three years later. In 1967 he moved to St. Thomas' Hospital Medical School, London, and there developed the first Department of General Practice in London University; he was appointed Wolfson Professor in 1974. A unique partnership between epidemiology and general practice was developed as his department quickly acquired a reputation for its research carried out in close co-operation with the Department of Epidemiology, led by Professor Walter Holland.

However, David Morrell's commitment to clinical care remained paramount. From a typical 'shop front surgery' in London he developed a group practice in purpose-built premises staffed by academic general practitioners. His research focused on the interpretation of symptoms presented in primary care and this was reflected in a comprehensive clinical textbook *Practice*, jointly edited with Cormack and Marinker, published in loose-leaf form in 1979 and

continuously updated; the same editors followed this with *Teaching General Practice*. In 1988 he edited *Epidemiology in General Practice* which was also based on his extensive research.

Professor Morrell was responsible for starting the first Vocational Training Scheme in General Practice based on a London teaching hospital and, later, in partnership with Professor Higgins at Guy's Hospital, London, they established the first MSc Course in General Practice in London University.

During his distinguished career, Professor Morrell has held a variety of appointments. He was the first chairman of the Academic Advisory Board in General Practice in the University of London. He was actively concerned with the development of the Association of University Departments of General Practice and has twice been elected Chairman of that association. He was sub-Dean at St. Thomas' Hospital Medical School and Chairman of the Education Committee of the United Medical and Dental Schools of Guy's and St. Thomas' Hospitals. He has served on the Council of the Royal College of General Practitioners and is currently Chairman of the Scientific Foundation Board. He has also served on the Medical Sub-committee of the University Grants Committee.

In 1982 he was appointed OBE in recognition of his services to general practice and, in the same year, he received a Papal Knighthood for his contribution to the care of the sick and disabled and to family life. For his work with the Pharmaceutical Society he was awarded Membership of the Society and for his contribution to epidemiology he was elected a Fellow of the Faculty of Public Health Medicine. He has travelled widely as a visiting Professor in Australia, Israel and the United States of America. He has been elected President of the British Medical Association for the year 1994-5.

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Introduction

1

Introduction

This monograph is concerned with the evolution of the concept of diagnosis over a period of 40 years. It focuses on diagnosis in general practice, the field in which I have worked for most of that time. I entered medical school in 1947, one year before the National Health Service was introduced, qualified in 1952 and entered general practice in 1957. At that time diagnosis was defined in the Concise Oxford Dictionary as 'the identification of disease by means of patients' symptoms, etc'; a similar definition was to be found in most reputable dictionaries at the time and has not changed since.

The emerging physician in 1952

Newly-qualified doctors in 1952 were expected to respond to patients presenting with symptoms of illness by interpreting those symptoms in terms of the underlying disease. It was expected that they would frame their diagnosis in both pathological and aetiological terms, for example, a patient presenting with a cough might be described as suffering from acute or chronic bronchitis, or lobar, or broncho-pneumonia due to a particular bacterial infection. Such a diagnosis would be achieved by a standard clinical method comprising interrogation and physical examination of the patient, including palpation, percussion and auscultation of the body, followed by relevant radiological, bacteriological and haematological tests. Until a diagnosis had been reached, it was generally regarded as inappropriate if not unethical to institute treatment.

Evolution in diagnosis (the first 2,000 years)

It is interesting to consider how this situation had evolved. Hippocrates, widely regarded as the father of medicine, had, of course, used a rather different approach. He lived five centuries before Christ and was probably exposed to a variety of speculative philosophies and quack remedies as regards disease. However, he seems to have applied himself to the accumulation of knowledge of disease, and of man in disease, by accurately recording what his senses revealed to him. He was concerned with describing in detail the physical factors of disease and linking these to prognosis and his aphorisms clearly indicate the outcome of his observations and accumulated experience, as illustrated by just a few examples¹:

'In every disease it is a good sign when the patient's intellect is sound and he enjoys his food—the opposite is a bad sign'

'Those who are constitutionally very fat are more apt to die quickly than those who are thin'

'Old men endure fasting more easily, than men of middle age, youths very badly, and worst of all children, especially those of a liveliness greater than ordinary'

A key lesson from Hippocrates is the importance of observing and recording facts, of studying the whole event and all attendant circumstances, and of viewing the phenomena of disease as natural. Many books in the Hippocratic Corpus are devoted to the effects of season, climate and water supply on the aetiology and outcome of illness. It is surprising how much of the Hippocratic method appears relevant today and yet over a period of nearly 2,000 years how little was incorporated in medical practice.

In the 17th and 18th centuries, the Hippocratic method surfaced once more and observation and description began to dominate medicine, exemplified by the work of Sydenham and Heberden. Sydenham, sometimes described as the 'English Hippocrates', was critical of the theories which were used at the time to explain illness and for which there was very little hard evidence. He observed and recorded illness at the bedside. He distinguished a number of infectious diseases such as measles, scarlet fever and smallpox, and tested his diagnostic categories by following up the clinical course of these diseases. Sydenham was thus able to describe the natural history of disease and to provide a scientific basis for prognosis.

This was followed by the advances in anatomy, physiology and pathology which made it possible to relate clinical syndromes to pathological entities, as exemplified by the classic work of Bright, Addison and others, which combined a careful study of disease in life with equally careful examination of the body after death. In the 19th Century, developments in bacteriology and biochemistry further focused diagnosis on the pathological process leading to disease. By the end of the 19th Century, the clinical method which was developed in most medical schools during the first half of this century was firmly in place.

The medical record was divided into the presenting complaint, the history of the present condition, a systems enquiry, physical examination and investigations, all designed to achieve a diagnosis in pathological terms; it largely ignored the psychological and social aspects of illness. The excitement engendered in those studying medicine at that time must have been enormous; the scientific basis for medicine was being laid down and the possibilities and powers of the physician in the future must have appeared to be limitless.

Despite the emphasis on the science of medicine in the 19th Century, concern was expressed about medical education at the beginning of the 20th Century. In 1910, Flexner produced a report for the Carnegie Foundation on medical education in the United States and Canada² and later extended his studies to Europe. He argued in favour of greater study of the scientific basis of medicine as opposed to the empiricism on which it was based at that time. His critics have subsequently over-emphasised his insistence on a scientific basis for medical education at the expense of a compassionate approach to the sick. This was not fully justified. Flexner indeed identified the bimodal nature of medical education concerned both with the scientific and compassionate approach but unfortunately he never succeeded in marrying the two.

In 1936 John Ryle, an outstanding physician at Guy's Hospital and subsequently Professor of Social Medicine at Oxford, was also drawing attention to this problem. He wrote in his masterpiece, *The Natural History of Disease*³,

'A student is imbued with the importance of experiment and of laboratory methods, but is then asked to contemplate the bewildering problems of man in disease. In the wards he is encouraged to think too biochemically or too radiologically, for many of the cases there are problematical and admitted for special investigation, and he does not see enough disease in its simpler forms and early stages in its natural environments. It is well nigh impossible for him to win through to that point of vantage from which medicine can be regarded as the general 'biology of man in disease'. He is often rather concerned with the seed than the soil which is actually his more immediate concern. How is he to acquire the 'general view', how shall he learn to become more of a naturalist and less of a receptacle for laboratory law or the tenets and teachings of individual professors?'

I have referred to the writings of two men, Flexner and Ryle, who were serious thinkers about medical education in the first half of this century. They both faced up to the problem of marrying the scientific basis of medicine with the actual delivery of medical care to communities but neither was able to offer a solution. This was the dilemma I faced when I and many of my contemporaries entered general practice in the 1950's.

I believe that a solution to this problem has evolved in general practice over the last four decades. It was solved by a return to the Hippocratic method of observation and careful recording which has revealed that the biomedical model which formed the basis of medical education three or four decades ago, is only occasionally appropriate in the study of illness in the setting of primary care. This conclusion was, however, reached after many years and the contribution of a variety of disciplines and it is this story which is the basis of my monograph.

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2

**Diagnostic Labelling of
Illness**

2

Diagnostic Labelling of Illness

The introduction of the National Health Service in 1948 made general practitioner care available to the entire population of the United Kingdom, free at the time of demand. This soon stretched resources to the limit, morale in general practice plummeted and emigration became rife. A major problem was that the rôle of general practitioners in this new situation had not been defined and their working methods were inappropriate. As is common in the face of adversity, a small group of doctors was provoked to react to the situation positively and to attempt to analyse the problems. Despite resistance from within the profession, they established the College of General Practitioners, in which individuals working in a variety of settings provided each other with mutual support.

Early studies in general practice, consisting very much of paper and pencil research, began to map out general practice largely in terms of workload and morbidity. Not surprisingly, one of the first in the field was John Fry, who in 1957, published a paper entitled *Five Years in General Practice (a study of simple epidemiology)*¹. Other names which come to mind were Davies, who published *A Year in General Practice* in 1958², and Scott and colleagues in Edinburgh who published *Just What the Doctor Ordered (an analysis of treatment in general practice)* in 1960³. In 1958 Logan and Cushion⁴ carried out the first national morbidity study.

In these, and the many other early studies carried out in general practice, it was difficult to compare results between the various reports because the researchers used different methods of recording the data and different definitions of, for example, 'a consultation' or 'the denominator' used to calculate rates at which events occurred. In describing morbidity a variety of coding systems were used. The national study used the *International Classification of Diseases Index*. Scott used a modification of this classification and Davies and Fry invented their own classifications. In a paper by Lees and Cooper⁵ the importance of definitions in developing and comparing research in general practice was pointed out. The College of General Practitioners, mainly through the work of Crombie and Pinsent in Birmingham, tackled this problem and in 1963 produced a glossary of definitions for use in workload studies in general practice and subsequently modified the *International Classification of Diseases Index* to meet the needs of general practitioners⁶. This modification shortened the Index and also facilitated coding morbidity at a symptomatic level.

It is perhaps timely at this stage to consider the purposes of recording morbidity in general practice or any other type of practice. Morbid is defined as 'indicative of disease or disease in organs' and early studies of morbidity in general practice reflected attempts by doctors to interpret the illnesses presented to them in terms of diseases. Diagnosis reflected the use of the biomedical diagnostic model in interpreting the morbidity occurring in general practice, and as a student, I and my contemporaries had learned that this was the starting point for determining rational management of disease or making a prognosis. On a community basis, I believed it to be of value as the starting point of epidemiological examination of disease in order to throw light on its aetiology, natural history and outcome.

Epidemiological perceptions in labelling disease

As a result of epidemiological research in the 1960s the validity of diagnostic labels was questioned. Donald Reid⁷ studying the geographical distribution of chronic bronchitis between the United States and the United Kingdom demonstrated that American physicians attributed deaths from chronic respiratory disease to 'bronchiolitis' or 'emphysema' in situations where British physicians used the term 'chronic bronchitis'. He concluded that in following up clues suggested by crude geographic comparisons of vital statistics, a much greater degree of precision in terminology was required than that used in everyday practice at that time. This led to the development of standardised questionnaires, which were designed to define more precisely the problems under investigation, of which the Medical Research Council's chronic bronchitis questionnaire is an example⁸. This questionnaire, validated in general practice through the research committee of the College of General Practitioners and funded by the Nuffield Trust, represents one of the first occasions when general practitioners and epidemiologists combined their resources to study the natural history of disease.

At about the same time other epidemiologists were demonstrating the wide variation in the observation by doctors of physical signs in respiratory disease⁹ and in reporting abnormal heart sounds and murmurs¹⁰ and even in recording blood pressure¹¹. Kessel¹² (1960) reported the enormous variation between general practitioners in labelling psychiatric disorders. In a retrospective review of patients' records, he commented that most classifications of disease are based on pathological criteria, but general practitioners are often forced to work on a symptomatic basis. In studying this sample of patients, he noted:

'great reliance was placed on the general practitioner's opinion, as this usually incorporated a knowledge of the patient extending over many years, together with experience of the family and awareness of social and economic difficulties'.

This introduced the concept of illness behaviour as opposed to pathology in the development of a diagnosis.

General practice perspectives and morbidity recording

It had been expected that records of morbidity encountered in general practice would clarify both the rôle of the general practitioner and, in due course, the training required for this branch of medical practice. Those of us involved in studies of the content of general practice felt constrained to record a diagnosis in terms of the biomedical model for each consultation and felt guilty both when we did not have the time to elicit the information required to frame such a diagnosis and when we found that this model was simply inappropriate for much of the work we were doing.

For a number of reasons it became clear that this diagnostic model was irrelevant to much that occurred in primary care in the United Kingdom. In a system of care which is free to the whole community, patients will present symptoms of illness at a very early stage in the natural history of disease, and as most of these illnesses will be self-limiting it is unnecessary to establish a diagnosis framed in pathological terms. A few patients will present with serious or even life threatening disease and the doctor's diagnostic role must be concerned with identifying these from the mass of relatively innocent illness presented. In the case of chronic disease, the diagnosis will usually be made over a

period of time and will often be well established when the general practitioner is seeing the patient in providing continuing care.

The concept that the content of health care will vary with the level of care being provided for a population was first illustrated by Fry in what subsequently became known as the Fry Triangles which are reproduced in *Figure 1*. The levels are, self care; primary professional care or general practice; and general specialist care and super specialist care. Fry¹³ pointed out that each level of care has its own:

Rôles and functions

Content of morbidity and problems

Skills, tools, methods and technologies

Training, teaching and learning needs

Research, audit, checks on resources, quality and outcomes

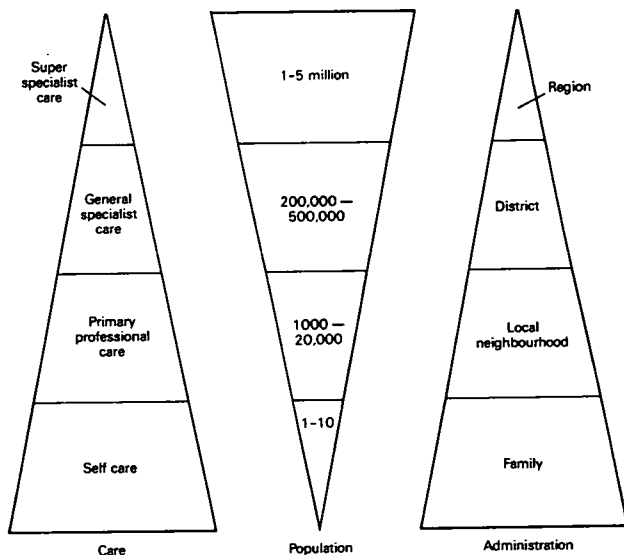


Figure 1

The Fry Triangles

Levels of care, population and administration

New symptoms of illness

Recognition of these facts led some of us, concerned with research in general practice in the 1960s, to turn our attention from the morbidity to the new problems presented to the general practitioner. We became concerned with interpreting new symptoms of illness presented at primary-care level and with the knowledge and skills needed to respond to these. This was the focus of much of my research in the late 1960s, which I like to think contributed to a better understanding of the diagnostic process in general practice and helped to clarify the knowledge and skills which needed to be inculcated in doctors preparing to work in this field.

My early studies were confined to a practice in Lambeth in London, which did not differ significantly in age, sex and social-class distribution from the population of England and Wales. The work was carried out by three general practitioners who were trained to apply strict definitions in terms of the data they recorded. They were constrained to record every consultation as being concerned with either a new symptom of illness initiated by the patient, a symptom which had been the subject of consultation in the preceding year or a doctor-initiated consultation concerned with follow-up of established disease. In the course of this study it became apparent that only about 25 per cent of consultations in general practice were concerned with interpreting new symptoms of illness, 25 per cent of consultations were concerned with symptoms which had been presented previously during the year and 50 per cent of consultations were concerned with the follow-up of acute illness or the continuing care of chronic disease. An important part of this study focused on the diagnosis recorded in response to new symptoms of illness. It very quickly became apparent that the biomedical model of

diagnosis simply did not have any meaning in the diagnostic response to new symptoms presenting in primary care. To take just two examples, 'chest pain' and 'acute abdominal pain' it is apparent that in primary care it is simply not possible to interpret these symptoms in terms of specific pathologies, nor did it seem that the diagnostic probabilities derived from hospital studies of disease had any relevance to the diagnostic probabilities in terms of symptoms presenting in primary care¹⁴ (Tables 1 & 2).

Table 1

DIAGNOSIS RECORDED IN RESPONSE TO
THE SYMPTOM 'ABDOMINAL PAIN'

<i>Diagnosis</i>	<i>Number of consultations</i>
Colic	36
Sprains and strains	22
Peptic ulcer	15
Disorders of gastric function	15
Other disease of intestines and peritoneum	15
Other disease of stomach and duodenum	13
Psychiatric disorders	14
Appendicitis	8
Pyelonephritis and cystitis	8
Tonsillitis	3
Malignant neoplasms	2
Others	46
TOTAL	197

It could, of course, be argued that the lack of precision in diagnosis in primary care was related to the lack of time devoted to physical examination and investigation. In anticipation of this challenge, we asked the doctors to record at each consultation, the confidence with which they expressed their diagnosis. This could vary from a simple

Table 2

DIAGNOSIS RECORDED IN RESPONSE TO
THE SYMPTOM 'PAIN IN THE CHEST'

<i>Diagnosis</i>	<i>Number of consultations</i>
Fibrositis and muscular rheumatism	26
Sprains and strains	19
Psychiatric disorders	14
Pleurisy	13
Acute bronchitis	12
Diseases of the buccal cavity and oesophagus	11
Contusions and superficial abrasions	9
Laryngitis and tracheitis	7
Pneumonia	7
Coronary thrombosis	5
Others	45
TOTAL	168

repetition of the presenting symptom recorded to a confident pathological diagnosis which the doctor would be prepared to defend against his colleagues. *Table 3* illustrates that there was little relationship between the doctors' confidence in diagnosis and the examination and investigations which were carried out in terms of twelve common symptoms of illness (*Table 3*).

The apparent failure of the biomedical model of diagnosis revealed by this and many other studies could possibly be explained in two ways. It could be that the model was developed from hospital experience, i.e. secondary care, and simply did not reflect the situation in primary care, or it could be that the model ignored important factors in the care-seeking behaviour of individual patients. Both of these options were examined in general practice research.

Table 3 COMMON SYMPTOMS ANALYSED BY THE DOCTORS' DIAGNOSTIC CERTAINTY AND PHYSICAL EXAMINATION CARRIED OUT EXPRESSED AS PERCENTAGE OF TOTAL NUMBER

<i>Symptom</i>	<i>Number of consultations</i>	<i>Diagnostic certainty</i>			<i>Physical examination</i>		
		<i>Symptomatic or provisional</i>	<i>Presumptive</i>	<i>History only</i>	<i>One system of the body examined</i>	<i>Two or more systems examined</i>	
Pain in throat	287	11	89	5	92	3	
Spots and sores	182	19	81	2	97	1	
Pain in ear	108	23	77	1	98	1	
Cough	527	24	76	16	73	10	
Pain in chest	168	51	49	1	66	33	
Pain in head	159	67	33	10	57	33	
Disturbance of gastric function	197	74	26	5	60	35	
Disturbance of bowel function	187	88	12	43	50	7	

The biomedical model and general practice

A number of studies were carried out into the interpretation of common symptoms of illness in terms of diagnostic probabilities. John Fry described the common presentation of children under the age of 5 years with symptoms of upper respiratory illness. Symptoms for which he introduced the term 'the catarrhal child'¹⁵. I was later able to demonstrate that the symptoms of acute gastrointestinal illness in children occurred in exactly the same age groups as those described by Fry for the incidence of symptoms of respiratory illness; both these situations presumably reflected a common aetiology¹⁶. Such descriptive epidemiology did not attempt to explain symptoms in terms of a biomedical model, nor to submit patients presenting these symptoms to an exhaustive examination or investigations; it simply described a syndrome which carried with it a good prognosis requiring minimal medical intervention.

Subsequently, many studies of common symptoms presenting in general practice have been carried out in order to identify the probability that such symptoms herald serious or less serious disease and to describe an appropriate response from general practitioners.

Frank¹⁷ carried out a detailed study of patients presenting in general practice with anterior chest pain over a period of five years which showed that less than 20 per cent were found to have a cardiac cause for their pain and in nearly 50 per cent it was considered to be of musculoskeletal origin. This may be compared with a hospital sample of patients presenting with chest pain¹⁸, where the symptom of anterior chest pain was attributed to heart disease in over 50 per cent of cases.

At the time I qualified, it was considered that recurrent urinary tract infection occurring most commonly in women would lead to chronic pyelonephritis and renal failure. Many studies of this syndrome were conducted in general practice¹⁹ and revealed the relatively benign natural history of this condition.

Headache is a relatively common symptom presenting in general practice. The Headache Study Group²⁰ led by Martin Bass in London, Ontario, Canada followed 265 patients presenting with headache in primary care for one year. Only 27 per cent received a diagnosis based on demonstrable physical characteristics such as sinusitis or classical migraine. In a similar study in which a standardised history and physical examination was carried out in all patients presenting in general practice with headache²¹, only duration of symptoms and limitation of straight leg raising were shown to have any prognostic significance amongst a large number of observations carried out and a precise pathological diagnosis was rarely forthcoming.

These are just a few examples of the studies of common symptoms in general practice which demonstrate a poor correlation between the presenting symptom and the expected biomedical explanation. Many others can be quoted such as, Weisan et al.²² of abdominal pain, Tuckman et al.²³ of diarrhoea, Ridsdale²⁴ of tiredness.

Such studies have demonstrated that the biomedical diagnostic model cannot be easily applied in responding to common symptoms of illness in general practice. Many of the studies have followed up patients over variable periods of time and have demonstrated the difficulty of forming an accurate prognosis even when a detailed history and physical examination has been carried out.

Even when a diagnosis in terms of a disease can be reached in general practice, Fry²⁵ has demonstrated the

outcome of that disease, such as peptic ulcer or asthma, if studied in a cohort of patients in primary care over a long period of time, differs markedly from the classic descriptions included in textbooks written by specialists. Despite the oft reported claim that general practice in the United Kingdom offers unique opportunities to study the natural history of illness over time, Fry's work in this field is almost unique. Similar work by Gregg²⁶ of asthma and Watkins²⁷ of acute respiratory illness has followed cohorts of patients over more limited time periods. There is indeed a need for more work of this type but it does demand meticulous follow-up of patients which can be difficult with increasingly mobile populations.

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3

**Factors Influencing
Demand for Primary
Medical Care**

3

Factors Influencing Demand for Primary Medical Care

The failure of the classic diagnostic model in identifying disease in response to symptoms of illness led researchers in general practice in the 1960s to question whether it was appropriate. This model assumed that the presenting symptoms and supporting physical signs were crucial to making a diagnosis. If, however, there were reasons unrelated to the symptoms experienced which influenced patients to seek care, it could be that investigation of these factors would be more important in identifying the problems presented by the patients. Dunnell and Cartwright¹, in their study of symptoms experienced by a random sample of the population, had inferred that the vast majority of common symptoms of illness were managed without consultation with a doctor. Two key questions emerged. Did the propensity to consult in response to symptoms of illness vary with different symptoms and what other factors influenced the decision to consult a doctor?

In responding to these questions, I invited a random sample of women aged 20–44 years in my practice to record in a health diary all the symptoms of illness which they experienced over a period of one month. Women were recruited to the study at the rate of 26 each month, and, throughout the year, their consultations in the general practice were recorded. At the mid-point in their period of diary recording the women were asked to complete a questionnaire, designed to measure anxiety and depression,

and at the end of the diary period to respond to an interview designed to measure their social and community support.

The results of the study revealed that the vast majority of symptoms recorded in health diaries were treated by self medication (*Table 4*). The probability that a symptom would lead to a consultation with a doctor varied widely with the symptom experienced (*Table 5*).

Table 4 ACTION TAKEN IN RESPONSE TO TEN COMMON SYMPTOMS

<i>First recorded Symptom</i>	<i>Number Reported</i>	<i>Symptom Days</i>	
		<i>Per cent Normal Activities Restricted</i>	<i>Per cent Some Form of Self-medication</i>
Headache	349	15%	70%
Undue tiredness	198	26%	38%
Backache	142	27%	38%
'Cold' runny nose	126	24%	61%
Nerves, depression irritability	98	21%	61%
Vomiting and indigestion	95	7%	40%
Sore throat	90	19%	59%
Abdominal pain	87	21%	53%
Cough	74	27%	78%
Toothache	55	7%	82%
TOTAL SYMPTOM DAYS	1,314	18%	57%

Scores recorded on anxiety and depression ratings influenced both the number of symptoms recorded in health diaries and independently the propensity to consult a doctor. Social factors such as duration of residence in the practice and satisfaction with housing and community support also influenced consultation rates. On the basis of

Table 5

PROBABILITY OF CONSULTING IN RESPONSE TO SYMPTOMS RECEIVED AND RECORDED IN HEALTH DIARIES

<i>Symptom Episodes Recorded in Health Diaries</i>	<i>Probability of Consulting General Practitioner</i>
Headache	0.005
Backache	0.009
Emotional disturbance	0.012
Abdominal pain	0.026
Sore throat	0.030
Cough	0.032
ALL SYMPTOMS	0.027

this study I constructed a conceptual framework to describe the factors influencing demand for general practitioner care (Figure 2).

This study led me into a whole new literature concerning primary medical care. In my research, I had developed a

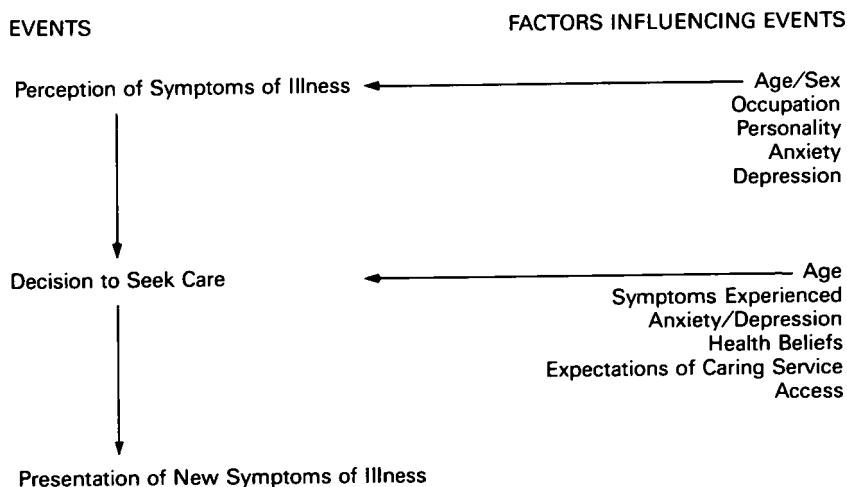


Figure 2

Factors influencing the decision to seek medical care.

project team including a psychologist and a sociologist and it became clear to me that in understanding why patients consult doctors, a multidisciplinary approach was necessary.

This study led me to reconsider the concept of the 'iceberg' of disease which visualised a community of individuals experiencing a wide variety of disturbances of ill health with just the 'tip' of the iceberg being those who took their problems to a doctor. This was first demonstrated by Pearse and Crocker² working in a pioneer health centre in South London in 1943 who found that 91 per cent of their population had some 'defects' in health, but that only half of the subjects had sought medical care for the problem. They commented that there appeared to be no relationship between the nature and severity of the illness and whether or not a person had sought medical care. Subsequent workers used a variety of methods to confirm this finding, some related consultation data to episodes of illness reported³, some related symptoms recorded in response to questionnaires on reported visits to doctors⁴ and others used health diaries⁵. Different methods produced different results. In three health diary studies used in this country the percentage of symptoms recorded in diaries and taken to the doctor varied from 2.6 to 5.4 per cent. However, whichever study is preferred, it is clear that most symptoms of illness are managed without recourse to a doctor. The question of interest is why do some symptoms experienced by some individuals lead to a consultation while others do not?

We had demonstrated that certain symptoms were more likely to lead to a consultation than others. Hannay and Maddox, working in Glasgow, devised a method of relating severity of pain and disability to the probability that symptoms would lead to a consultation with a doctor. They concluded that factors other than pain, disability or perceived severity of a symptom were important in determining whether or not a patient seeks medical care⁶.

What then are the factors which influence patients in seeking medical care? The response of individuals to symptoms of illness was summarised in the term 'illness behaviour' described in some detail in 1968 by Mechanic whose book *Medical Sociology*⁷ had an important impact on thinking in general practice in the next decade. He pointed out that medical sociology was in its infancy and typified by a proliferation of hypotheses and impressions in contrast to the accumulation of relevant and established facts. At the same time, general practice was in its infancy and studying human behaviour in a diagnostic setting. Mechanic introduced general practitioners to the concept of 'norms' and deviant behaviour. He described the work of Parsons and Zborowzski in investigating cultural responses to pain and illness and introduced the concepts of illness as a cultural response and as a coping mechanism.

Subsequently, a variety of models of illness behaviour were described. The health belief model of Becker⁸ appeared particularly relevant to general practitioners. This described patients' behaviour in terms of their perceived vulnerability to illness, their perceived severity of illness, their perceived barriers to obtaining medical care and their perceived benefits of medical care. Leavitt⁹, in a well designed study, demonstrated that the only aspects of this model which predicted the use of medical services were the perceived vulnerability to illness and the perceived benefits from preventive health care.

Deciding what to do about a symptom—whether to ignore it, worry about it, take a home remedy or see a doctor depends in large measure on what one believes is the cause of the symptom. Robbins and Kirmayer explored what is described as 'attribution theory'¹⁰, the hypothesis that individuals tend to explain symptoms experienced in terms of physical illness, psychological illness or situational factors. The attributional characteristics of individuals

appears to be influenced by their past experience of illness. This study demonstrated that the behaviour of patients in response to symptoms of illness could be predicted by their attributional style. Psychological attributional style was predictive of the number of psychosocial problems presented to family physicians. Somatic attributional style was predictive of the number of somatic complaints and the number of somatic complaints of physical origin. Normalizing style, in which the patient tends to explain symptoms on the basis of current life events, was predictive of few complaints of psychosocial symptoms. The attributional model, like the health belief model, may help to explain why and when some symptoms are presented to the doctor.

By the late 1970s medical sociology and general practice were beginning to interact. To return to my study, we demonstrated the effect of objective measures of anxiety on the propensity to consult. In a retrospective study, Howie and Bigg¹¹ found that mothers who were high users of psychotropic drugs were more likely to consult with respiratory illness in their children and more likely to receive antibiotics. In a study in Iowa, Widmore and Cadoret (1979)¹² demonstrated that depressed patients had a six-fold increase in the presentation of painful complaints and a three-fold increase in the presentation of vague somatic complaints in the seven-month period prior to the diagnosis of depression, compared to a control group. Furthermore, the children of depressed patients made significantly more visits to the doctor in the two years around the time depression was diagnosed.

Social events may also be important in the development and presentation of symptoms of illness. Brown and Harris (1978)¹³ described the complex ways in which adverse social circumstances may effect people poorly equipped to deal

with normal life stresses and lead to subsequent psychological disturbance, in particular, depression.

The effects of social class on consulting behaviour are very difficult to interpret because allowance must be made for differences in morbidity and mortality in different social classes. Data from the Second National Morbidity Study¹⁴ suggest that there is a trend showing increasing consultation rates from social class I to social class V. Further examination of these data by Blaxter¹⁵ indicates that the excess consultation rates in the lower social classes appear to be accounted for by those conditions from which they are known to have a higher morbidity and mortality. The quality of housing and mobility in housing was demonstrated in our study and confirmed by other studies such as Marsh and McNay¹⁶ and Bain¹⁷ to influence consultation rates.

The issues which have been explored at this stage in this thesis indicate that only a small proportion of symptoms experienced by patients are reported to doctors. Associations have been described between the demand for medical care, which results from these symptoms, and physical, social and psychological factors in the population of patients experiencing them. The general practitioner in his consulting room has to be aware that those patients who consult are only a minority of those with similar symptoms in the community. At each consultation the doctor must, therefore, ask himself 'why has this patient consulted at this time?'. The answer will as often lie in the patient's psychological and social background as in the particular pathology present in the patient.

Long before all this research took place Michael Balint published a book entitled '*The Doctor, His Patient and The Illness*'¹⁸. This was based on a series of seminars at the Tavistock Clinic in which Balint explored, with general practitioners, not only the psychological factors which were

important in the patients presenting in general practice, but also the doctor's response to the patient's problems and the importance of the doctor's own personality and prejudices in evaluating requests for medical care. Balint had a profound effect on the profession at that time and encouraged general practitioners to explore the psychodynamics of the doctor/patient encounter and the effect of this on the management of illness and he was very influential in moving general practitioners to recognise the importance of psychological factors in primary care.

For a number of years in the 1960s and early 1970s there was a rift between general practitioners and social scientists. Social scientists were claiming, on the basis of theoretical, experiential and some experimental work, that doctors had no understanding of illness behaviour¹⁹. At the same time, general practitioners in this country had recognised that the biomedical model of diagnosis did not work in general practice and on the basis of their day-to-day work and research, were seeking to develop a more realistic diagnostic model. The marriage of the disciplines was vital to advances in this field and is perhaps epitomised in the work of Armstrong²⁰ and Helmann²¹ and by the multidisciplinary teams of researchers which emerged in the 1980's.

The impact of this research on general practice was made explicit in the classic *The Future General Practitioner* published by the BMA for the Royal College of General Practitioners²². In this publication, the chapter entitled *The Consultation in General Practice—a theoretical approach* written by Marshall Marinker, brought together philosophy, science and art. It quotes Medewar²³ 'imaginative conjecture and criticism in that order underlay the physician's diagnosis of his patients' ailments'. and Goethe 'one sees what one knows'. Marinker draws attention to the fact that diagnosis must be framed in physical, social and psychological terms

and points out some of the important variables which must enter the equation when identifying patients' problems. These include the inherited constitution of the patient, the family power status, class and culture, the patient's view of his illness, the patient's image of himself and the patient's image of the doctor, all of which must be considered equally with the probability of disease. It introduces the concept of a contract between patient and doctor in terms of a diagnosis and reflects the work of Michael Balint and others as measured by the significance of repeat prescribing in general practice²⁴. This publication heralded the demise of the biomedical model in diagnosis in general practice.

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4
A New
Diagnostic Model

4

A New Diagnostic Model

From the early 1970s the term 'diagnosis' tended to be replaced by the term 'problem solving'. It is difficult to identify how this originated, but the work of Weed¹ who described the problem-orientated medical record may have played an important part. As introduced, the problem-orientated medical record reinforced many aspects of the hospital model of diagnosis but an adaptation of it by general practitioners began to free them from the constraint of describing every problem in disease-orientated terms. This concept appears in *The Future General Practitioner* and was developed particularly by McWhinney² and by Wright and McAdam³ in their book *Clinical Thinking and Practice*. Their work, however, went further and began to discuss the scientific method by which general practitioners reach a diagnosis; be this in terms of a disease or a problem. They rejected the diagnostic method taught to young doctors based on a complete history, examination and systems review on the basis that it is neither what doctors do nor an effective way to reach a diagnosis.

This conclusion was supported by the research of Hampton et al. who studied the diagnostic process in medical out-patient departments⁴. They compared the relative contribution of the doctor's referral letter, history taking, physical examination and laboratory investigations to the diagnosis and management of patients. In a study of 80 new out-patients, they observed that in 60 patients a diagnosis which agreed with the final diagnosis, made several

weeks later, was made after reading the general practitioner's referral letter and taking a history; the physical examination was useful in seven patients and laboratory investigations in a further seven patients.

In place of the biomedical diagnostic model, Wright and McAdam developed a concept that diagnosis in general practice was based on a 'hypothetico-deductive method'. This suggested a respectable and scientific approach to the task and was widely accepted as the new wisdom in general practice. In response to a new symptom of illness, the doctor developed a hypothesis as to the cause of the symptom and then tested the hypothesis by relevant history taking, examination and, if necessary, investigations. If the hypothesis did not stand up, the doctor rejected it and started again. It was argued that the hypothesis may be developed at a very early stage in the consultation and could sometimes be based on the doctor's previous knowledge of the patient. The ability to develop a hypothesis in this way led to a diagnostic method in general practice which was economical in terms of time and resources.

McWhinney described this as the 'patient-centred clinical method'⁵. In this method, the physician attaches equal importance to understanding the meaning the illness has for the patient to following the traditional medical agenda. This involves understanding the patient's expectations, feelings and fears.

James McCormack writing in a paper entitled *Diagnosis: the need for demystification*⁶ sought to modify this approach. Referring to the hypothetico-deductive method of diagnosis in general practice, he commented

'the reality is much more pedestrian and a deal less Popperian. Most diagnosis of physical disease is achieved on the basis of pattern recognition, supported by perfunctory confirmation; diagnosis by imagination and refutable hypotheses does not exist or is extremely rare'.

This conclusion was challenged by Barrow and Feltvitch who, in an article reviewing both the psychological and medical educational literature on diagnostic methods, concluded that the hypothetico-deductive method is used almost universally in medical practice⁷. They argued that what looks like pattern recognition, especially to non-clinical investigators or doctors unaware of their own thinking, will invariably reveal hypothetico-deductive inquiry. They pointed out that the mind is capable of processing data at very fast speeds and of problem solving at an unconscious level.

In the face of these arguments it is tempting to try to tease out the knowledge and skills which are used by a doctor in solving the sort of problems presented in the average consulting session in general practice. I was presented with an opportunity to carry out this exercise when asked to address a gathering of medical scientists and challenged to describe the role of basic science in general practice.

I started by quoting James McCormack and Petr Skrabanek from their book *Follies and Fallacies in Medicine*⁸. They stated:

'Science is an activity not an encyclopedic body of knowledge. It has been suggested that the scientific method of thought is unnatural. It is certainly unusual; it has to be learned and cultivated. One of the failings of medical education is that although in the early years there is a great emphasis on the acquisition of scientifically based knowledge, relatively few students acquire the method of scientific thought'.

I then said that I would try to analyse the scientific thinking which went into the conduct of a single surgery session in general practice which had taken place on the

previous day. This particular consulting session lasted one and a half hours and a new patient was seen on average at the rate of one every eight minutes. I presented a slide summarising the age and sex of the patients consulting, the symptoms they presented and the problems which were recorded (*Table 6*). I had time only to select four cases from the surgery to describe to the basic medical scientists the reasoning which I suspected had taken place in reaching a diagnosis.

Table 6 PATIENTS SEEN IN A TYPICAL SINGLE SURGERY SESSION IN GENERAL PRACTICE

<i>Patient</i>	<i>Presenting Symptoms</i>	<i>Problem</i>
Male aged 47	Rash, pain	Herpes Zoster
Male aged 14	Cough and breathless	Acute bronchitis
Female aged 37	Frequency of micturition diarrhoea and tension	Depression
Male aged 63	Cough, yellow sputum	Bronchitis
Female aged 42	Rash, dizziness	Rash
Female aged 55	Cough, chest pain, palpitations	Anxiety, Depression
Female aged 59	Swollen ankles	Drug side effects
Male aged 38	Spots	Folliculitis
Male aged 49	Headache, insomnia	Depression
Female aged 64	Cough and sputum	Chronic bronchitis
Female aged 6	Sore throat	Tonsillitis

The first patient was a male, aged 47, who had been unwell for two days and had experienced pain in his chest. On the morning he presented, he noticed on rising a rash around his chest. I made the diagnosis of herpes zoster before he had removed his clothes and this was confirmed immediately on inspection. If the diagnostic activity reached my cerebrum it was a very transient visit and the hypothesis I made before he removed his clothes could hardly be granted such an elaborate title. This I believe is what most general practitioners refer to as 'pattern recognition'.

It can perhaps be illustrated rather more dramatically from an example which occurred in one of my surgeries some years back when a trainee in the practice asked me to see a child with a cough and abnormal signs in the chest. The previous day the trainee had diagnosed bronchitis and prescribed Amoxycillin. When the mother consulted on this occasion, she was complaining that the child had developed a rash. By use of her brain and powers of deduction, the trainee reasoned that the child was probably allergic to Amoxycillin, hence the rash. The trainee asked me to see the child which was miserable with an irritable cough, marked conjunctivitis and a polymorphic rash. I took one look at the child and said, 'it's got measles'. The trainee said it wasn't fair.

Not much science had been demonstrated in this consulting session so far. To return to the surgery, the next example was a 14 year old boy brought in by his father. The boy complained of coughing and difficulty in breathing; he had no past history of similar illness. I interpreted my thought processes at this stage in the consultation. Ninety-five per cent of 14 year olds presenting in general practice with a cough are suffering from an upper respiratory infection. If, however, as in this case, the patient complained of cough and difficulty in breathing, the probability of lower respiratory infection increased enormously. On the basis of probability, which is dependent on research in general practice, I therefore suspected that the boy had a lower respiratory infection. This was my best guess which some people might elevate to the term of 'hypothesis'. I could have been more specific in my hypothesis by saying that he could have had acute infective bronchitis, or asthma, or pneumonia, or a spontaneous pneumothorax.

I needed more information, so I collected it. The boy felt unwell, had a fever and was off his food. He had no past or

family history of asthma and played in his school football team without respiratory problems but on examination of his chest there were widespread respiratory wheezes. I made a diagnosis of acute infective bronchitis and treated him with Amoxycillin and Salbutamol. Why did I use Amoxycillin? Most chest infections at this age are due to the pneumococcus but some are due to haemophilus influenzae so I opted for a broad spectrum antibiotic and chose Amoxycillin rather than Ampicillin because it is reputed to cause less gastrointestinal disturbance.

The whole thought process I have described lasted about five minutes. Was this science? The diagnosis was based on probability, dependent on research in general practice. The hypothesis was tested by collecting further information and the management determined on the basis of probability of success depending on knowledge of the common causes of respiratory infection; no attempt was made to seek further microbiological information or the evidence of an X-ray examination. Had I suspected asthma, I would have been driven back to more basic pathophysiology and to recognise that in an acute asthmatic attack there is not only bronchial constriction but also mucus plugging caused by inflammation and steroids may be required. The boy was seen a week later and was completely better.

The next patient I described was a 55 year-old female with cough, chest pain and palpitations who suffered from myxoedema, well controlled with Thyroxin. Having known her for many years, it was obvious to me that she was unusually tense at this consultation. She was a nurse tutor at a teaching hospital and having recited her symptoms, she told me that the new teaching programme for nurses called 'Project 2000' was a complete disaster. She said, 'all they care about is getting degrees, they are not concerned with the patients'. Her chest pain did not fit into the pattern of

cardiac pain although her anger at the nursing hierarchy might at any moment have led to a seizure. She told me that she was planning a walking holiday with her husband in two weeks' time. I examined her cardiovascular system which was normal and in true patriarchal fashion, reassured her that a walking holiday in the hills would do her the world of good. She returned symptom free three weeks later.

Where is the science in this? To what extent is the ability to listen, understand and communicate a science? It is to do with collecting and interpreting, both verbal and non-verbal information which leads to inductive reasoning and then to a hypothesis. The hypothesis may be tested, not just by examining the cardiovascular system, but by studying the patient's response to empathy and reassurance. We tend to think of science purely in quantitative terms. If in this case I could have demonstrated that my empathy and explanation had led to a reduction in some anxiolytic substance in my patient's blood, then I would indeed have been accorded an accolade by the scientists. I had no such quantitative evidence but she seemed better, said she felt better and went on her walking holiday, and returned symptom free. An alternative strategy would have been to order an ECG, a chest X-ray and blood tests or even to have referred her to a cardiologist. This would have convinced her that I suspected heart disease and if enough tests had been carried out by the cardiologist on the basis of probability, at least one would have been outside the range of normally distributed variables. That sounds like good science to me, but I am not sure it is good medicine.

The last patient I described was a 59 year-old lady receiving treatment for hypertension in the form of Nifedipine 30 mg twice daily. She was complaining of pain in her legs, but in fact her problem was ankle oedema

which was making her legs tender. My first hypothesis was that she was developing cardiac failure because I knew that people with hypertension quite often get cardiac failure. If pressed, I might even have been able to explain why. I looked for other signs of heart failure in this patient but there were none. Having drawn a blank, I dredged up my knowledge of pharmacology. This told me that Nifedipine causes dilatation of the pre-capillary vessels, thus leading to an increasing capillary filtration which may lead to oedema. I was aware that nobody in the audience believed that and had to admit that this valuable piece of knowledge was not stored in my personal computer, but was available very conveniently in the *British National Formulary* on my desk where it stated that dependent oedema is a side effect of Nifedipine therapy, so I reduced her dose.

Having exposed my thought processes in identifying the problems of four patients, I then invited the audience to decide whether or not I had been guilty of scientific thinking. In subsequent small group discussions, there was some difference of opinion as to whether or not I could be convicted of this crime. What this exercise of looking at just four cases in one morning surgery did for me was to convince me that there is no one correct diagnostic method to apply in solving the problems of patients presenting in primary care. In solving different problems in different patients, the doctor needs to be able to integrate information derived from a variety of sources and stored in the memory in different ways and to link this to a variety of clinical skills.

So how do doctors achieve this? Richard Asher, in a contribution to the Middlesex Hospital Journal in 1966⁹ explains:

'It sounds unreasonable to ask a child of 6 to count more than 200 changes of pressure within half a second by transmitting them through a system of levers to a vibrating spiral of fluid and observing the electrical impulses these vibrations excite in a given conductor.

It seems even more unreasonable to ask that child, without using pencil and paper, to calculate the number of pressure changes per unit time, then to multiply that figure by two and express its answer by adjusting two vibrating strands at the end of a wind tunnel so that the frequency of their oscillations is equal to the product of their calculations.

But human intercranial computers are so efficient that children can manage such feats long before they are 6; they pick up tunes and having high voices, usually sing them an octave above the original pitch, that is doubling the frequency. It is all done without instructions by the use of the built in cerebral computer provided; this contains the cumulative data of the innumerable and sometimes rather trying experiments carried out with the vocal apparatus during most of the waking hours since birth.

It is hard to appreciate the performance of the human intercranial computer because most of its functionings never reach the consciousness of its owners and it stores data in a very different code from that used in conscious thinking where synthetic symbols such as words and numbers play a large part. Moreover it provides answers without giving any hint of the calculations behind them.'

In recent years a number of researchers have begun to study how general practitioners collect, store and use information in their diagnostic activities.

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5
Diagnosis in General
Practice

5

Diagnosis in General Practice

In the early 1970s, De Dombal et al^{1,2} produced a series of articles describing ways in which the computer could be programmed to assist in the diagnosis of acute abdominal pain. They compared the human and computer-aided diagnosis of 552 patients presenting with abdominal pain in the Leeds General Infirmary by controlled trial. They demonstrated a diagnostic accuracy of 92.5 per cent for computer-aided diagnosis compared with 81.2 per cent for human diagnosis. Using this method, no cases diagnosed as suffering from non-specific abdominal pain by the computer subsequently developed serious pathology. Through this and subsequent work, they have demonstrated the importance of computer-assisted diagnosis which has subsequently been developed in a variety of expert systems designed to solve clinical problems.

In 1988 Calbert Phillips edited a book entitled *Logic in Medicine*. With trepidation I opened the book and was intrigued by the chapter by Fergus McCartney³ who introduced me to Bayes' Theorem. Bayes was an 18th Century English clergyman who indulged in the hobby of mathematics. Using Bayes' Theorem, the clinician applies a value to the probability that a given symptom or sign may indicate a particular disease process. As the patient is examined, a series of probabilities are accumulated as the symptoms and signs are assembled with the end result that a diagnosis is made and expressed quantitatively in terms of its certainty. McCartney gave an example of a child with

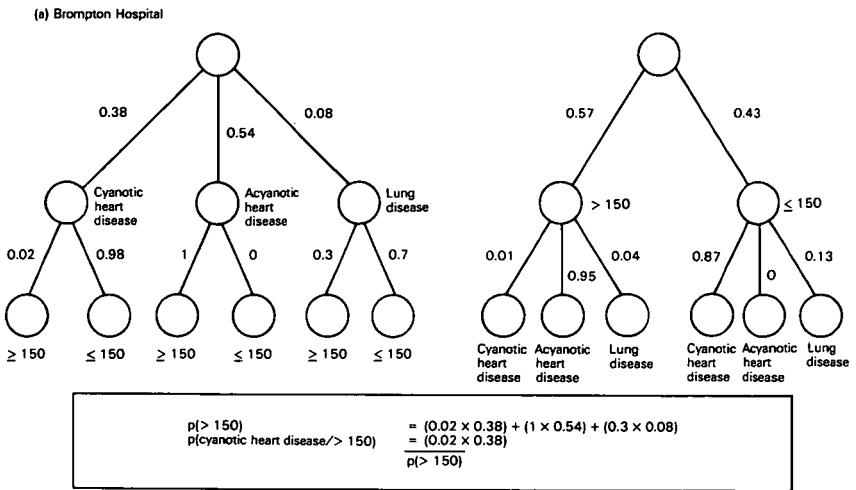


Figure 3 (a) Probability trees corresponding to results of hyperoxic test at specialist referral centre for paediatric cardiology. Equations show calculation of posterior probabilities for inversion of the probability tree.

congenital heart disease and, on the basis of a series of observations, produced a series of probabilities. The mathematics are illustrated in *Figure 3*.

Concluding this chapter he stated that no explanation of human diagnostic logic so far conceived has been entirely satisfactory, though the study of alternative models is extremely instructive. Similarly, no method of diagnosis helped by computers has been shown consistently to be superior to all others. Asher would doubtless have murmured *sottō vōce*, 'except the human computer'. In this context it is important to stress that the general practitioner is concerned in every consultation with probabilities of disease in response to illness. He applies this knowledge in the setting of primary care in which it may be more difficult to give probabilities numerical values but to quote John Fry 'common conditions commonly occur—rare conditions rarely happen'.

(b) Neonatal intensive care unit

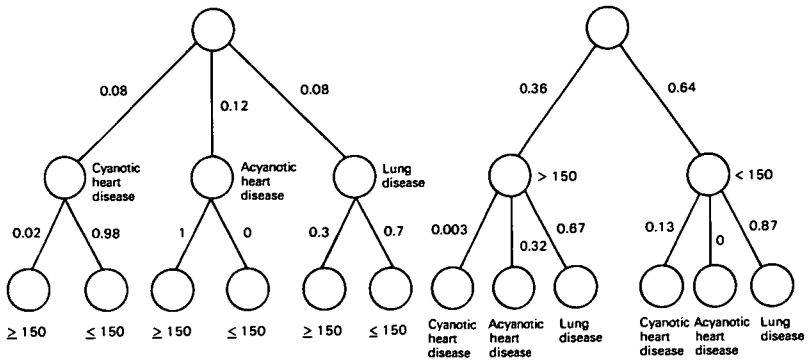


Figure 3 (b) Probability trees corresponding to results of hyperoxic test at neonatal intensive care unit.

Reproduced by kind permission from *Logic in Medicine Ed. Calbert Phillips (1988) BMA, London.*

It is interesting that McCartney expresses his gratitude to the cardiologist, David Mendell, who taught him. David Mendell, in his book *Proper Doctoring*⁴ discusses diagnosis as follows:

‘When a client complained to Whistler that he had charged a high price for a portrait which had been completed in half an hour, the painter replied that the portrait was a product of a lifetime experience. Diagnosis is like that too. You bring to bear on it yourself and your knowledge and your attitudes. Diagnosis thus starts long before you see a patient.’

David Mendell is here making a very important statement about the diagnostic process in general practice. There are two elements to this statement relevant to general practitioners which can be tested by experiment and which begin to throw some light on how they function.

If a general practitioner is presented with the name of one of his patients who has been registered with him for a period of years, and is asked to describe what he knows about the patient, he will probably provide minimal information. If he is then given the patient's address, he is likely to be able to expand his knowledge, recalling the patient in familiar surroundings. If he is then placed face-to-face with the patient, prompted, perhaps, by just a glance at the patient's records he will probably speak eloquently about the patient, his past medical history, with anecdotes about his medical care and his family. It appears that a series of prompts are necessary to open up new areas of information stored in the doctor's brain.

A similar situation appears to exist in response to symptoms of illness. The symptom of cough leads to a minimal response, add to this weight loss, a heavy smoking history, night cough in a child, disturbed sleep by coughing in an elderly hypertensive patient and a series of different responses ensue. Each item of information opens up new areas of enquiry. In the psychosocial field it works the same way, tiredness or depression, a single parent, an isolated elderly patient, unemployment, recent bereavement and so on; every new piece of information appears to obtain a response in a very logical way.

In recent years Grant and Marsden^{5, 6} have applied themselves to this problem and produced interesting results. They have studied the ways in which medical students, young doctors and consultants use knowledge in the diagnostic process. They have demonstrated that a broad base of core knowledge is stored in the brains of medical students and young doctors, but with specialisation, knowledge is stored and used more selectively. I cannot claim to fully understand the details of their research, but it does seem to me that they have demonstrated experimentally

what many general practitioners have suspected intuitively for many years, i.e. that doctors, be they specialists or generalists, store information selectively in relation to the task they have to undertake. In the case of general practitioners this will include information about the problems which they commonly encounter and about the characteristics of their registered patients and the social and psychological environment in which they work and live. It also appears that doctors develop strategies, often unconsciously, for accessing the information in relevant situations.

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6

The Future

6

The Future

In this monograph I have tried to identify the ways in which research in general practice over a period of 40 years has led to a major change in the concept of diagnosis. The disease-orientated or biomedical model has been replaced by a more holistic problem-orientated and patient-centred model. I have tried to trace how this change occurred and how further research identified the sort of knowledge needed to reach a diagnosis in general practice and how this knowledge is acquired, stored and utilised in the day-to-day care provided by general practitioners. I have demonstrated that this depends on properly integrated knowledge of the basic medical sciences and on well developed communication skills, clinical skills and an understanding of human behaviour and community epidemiology. I have suggested that these cannot be used effectively unless doctors have accumulated, over a period of time, knowledge about their individual patients and the environment in which they live, and have developed a personal relationship with them. I have intimated that general practitioners are concerned with people who are ill and that much of the satisfaction from this particular career derives from their interest in these people, in health and disease.

But will this pattern of primary care continue? There is a close relationship between the accessibility of the general practitioner and continuity of care. There is a public demand for the general practitioner to be accessible at all times, and, in the past, some doctors were prepared to accede to such demands, but it is now widely accepted that

such accessibility is not conducive to good medical care. The doctor needs time to relax, to undertake postgraduate education and to play a wider part in the life of the community in which he lives and of his own family. Some compromise is necessary.

McWhinney has suggested that the concept of continuing responsibility for individual patients is possible without constant accessibility¹. In this context, it is important to ascertain what benefits accrue to patients from a system of care which encourages continuity and the development of an on-going doctor-patient relationship. In 1960, long before the clinical method described in this monograph was researched, Fox, having visited Russia and the United States to study their methods of primary care, declared, 'in these islands with hospital specialists almost everywhere available, the general practitioner is dead, but the personal doctor is needed more than ever'². He went on to warn that personal doctoring must be practised by individuals, not by groups and that it could be threatened by deputing too much work to other people. Twenty years later, the *Lancet*³ once more extolled the value of personal doctoring, pointing out that it can be maintained, even in a group practice by judicious use of appointment systems^{4,5}. It may also be maintained in practices delegating a great deal of work to paramedical professionals as demonstrated by Marsh & Kaim-Caudle⁶.

The fact that continuity of care or personal doctoring can be preserved in properly organised group practices, even when some care is delegated to other professionals, does not prove that it is beneficial to the patient. Continuity of care is in fact very difficult to measure. It may be related to the number of times patients consult the doctor with whom they are registered or, in a group practice, the doctor who the patient has elected to see and regards as 'my doctor'. Continuity may be very good in the management of chronic

disease, but may break down in the management of emergencies, as demonstrated by Freeman and Richards⁷. Roland et al⁸ demonstrated that continuity of care is regarded as important to both patients and doctors and that practices can be organised to attain this.

Cartwright and Anderson⁹ in their study of doctors and patients, demonstrated that 30 per cent of patients had had the same doctor for over 15 years and 33 per cent for over 5 years. The mean duration of registration with their 'own doctor' was 7.8 years for those aged under 45 years, and 10.6 years for those over that age. In this study, continuity of care seemed to be reflected in the way patients feel and behave towards their doctors, rather than in the patient's assessment of doctors' behaviour or qualities.

Hjortdahl and Laerum^{10, 11} demonstrated a relationship between continuity of care and doctors' knowledge of, and sense of responsibility for, their patients and was also associated with patient satisfaction. Ettlinger and Freeman¹² demonstrated a positive correlation between continuity of care and compliance with medication for acute infections. There is some objective evidence that continuity of care facilitates diagnosis and management of the patient's problems, and abundant anecdotal evidence from general practitioners who describe the difficulty they experience in managing the patients of partners who are on leave. Those doctors who have changed their practice describe the problems they encounter on entering a new practice and consulting with a new population of patients; problems which often persist for a period of 2-3 years.

The general practitioner has been defined as a doctor who provides primary, personal and continuing care for a defined population of patients. The diagnostic model which I have described in this monograph, which has been developed and tested and which underpins much of the current vocational

training in general practice, is dependent on this concept. The increasing mobility of populations and doctors, the expectations of doctors entering general practice to have more time available for themselves, for their families and for educational activities, and the emphasis on delegation of care to paramedical professionals threatens this ideal. In addition, the new contract for general practitioners introduced in 1990 appears to embrace a philosophy of care concerned with measuring tasks done, recorded and remunerated rather than with problems identified and managed. This philosophy does little to reinforce the importance of personal doctoring and continuity of care. McWhinney¹³ comments on the situation which exists in Canada

'the industrialisation of medicine to which we ourselves have contributed has limited our freedom. We often have to work to rules we did not make, under conditions we did not choose. Nevertheless it is still open to any physician to swim against the tide even though his or her personal fulfilment may be gained at the expense of a lower income and some personal inconvenience'.

It is relevant to ask whether in this country doctors trained on the basis of the research which I have described, and committed to personal and continuing care, will cease to exist? If they do, what will replace them?

We could develop the physicians described by Fox in Russia where patients have direct access to specialist services in poly-clinics. These were at one time popular in Sweden, but, in the past year, I have had three visits to my Department by Swedish doctors and administrators who are trying to re-invent general practice. We could develop on the lines popular in the United States where patients consult a variety of different specialists as primary

physicians; a system of care which has proved highly expensive and which has been countered by the development of health maintenance organisations with a variable commitment to personal doctoring.

A new term, recently entering the vocabulary of the Royal College of General Practitioners, is 'primary care centres'. Primary care centres will provide a variety of primary care resources, but their relationship to personal and continuing care has not been explained. To such facilities may be added health shops but the knowledge, skills and attitudes to be inculcated in the proprietors of such shops have not been defined, and one suspects that the profit motive will feature fairly high on their agenda. It is easy to discuss these possibilities in a light-hearted fashion but the difference between a health shop and a general practice in a market economy might prove illusory.

In looking to the future, it is difficult to divorce political and ideological considerations from professional development in general practice. In keeping with the general tenor of this monograph, I propose to examine ways in which research can help to guide general practice into the 21st Century. Looking back it is easy to see the impact of simple research on the 1966 *Charter for General Practice* and to record the enormous changes which this produced in both the status and quality of general practice. The influence of research on the 1990 Contract is much less evident and indeed it introduced many changes which were contrary to research findings¹⁴. The introduction of this contract coincided with a period of extreme political arrogance, and it is already evident that a more rational approach to developments in medical care now exists and it is important for current research to contribute to these developments.

Diagnosis and its meaning and interpretation have been questioned in this monograph. Labelling the problems

presented by patients to general practitioners is important if it contributes to the management of those problems. The label may include a diagnosis in terms of a disease such as acute appendicitis or perforated peptic ulcer which is an immediate prompt to action. In general practice, the diagnosis of disease such as multiple sclerosis or carcinoma of the lung may, however, add little to the management decisions which are concerned with the patient's fear, disability, pain or urinary incontinence. There is a great need for studies in general practice which describe the natural history of illness and disease and identify features which predict the development of patients' problems and the prognosis. General practice is theoretically ideally suited to carry out such studies and follow-up cohorts of patients over a period of years; disappointingly such studies are relatively rare.

There is a great emphasis on the measurement of the outcome of care and medicine has been infected by the Thatcherite doctrine that everything should have an end product. However, in a civilized society the justification for caring may be caring itself. Some years ago, Watkins¹⁵, working in my department, demonstrated how difficult it is to relate the process of care delivered to patients with such chronic illnesses as diabetes and congestive cardiac failure to improvements in outcome. He showed that many of these patients are elderly, suffer multiple pathology and an improvement of one aspect of their care may not influence their physical performance, particularly as this is likely to deteriorate with the passage of time. This was a very important study because it demonstrated that outcome studies in relation to the medical care delivered must look at measures other than physical functioning and clinical improvement. A large component of general practice is caring for the chronically sick, disabled and dying and a

major challenge to researchers is to measure the benefits of good care to these groups of patients. What are the perceptions of the patients or their carers?

This type of research leads naturally to studies of the special skills which are available in doctors and paramedical professionals and the way in which they are applied in delivering care. There has been some research into the tasks undertaken by district nurses, for example,¹⁶ but these tasks do not necessarily reflect the knowledge and skills of these professionals or indeed the service they provide to their patients. While it is easy to measure the number of baths given to patients' or injections or dressings applied, it is much less easy to measure the nurse's caring function in terms of support for the dying or their carers.

There is a need for research which focuses on the needs of patients and then relates this to professional skills available. This will become particularly important in the context of the new Community Care Act. What skills are required in assessing the medical and social needs of the elderly and chronic sick? Does this need the knowledge and skills of a social worker, a district nurse or a doctor? It is possible that nurses could play an increasingly important role in the management of care for the elderly and the chronic sick. This will happen only if their caring skills, their ability to listen, communicate, advise and empathise with patients is fully understood and the tasks which they carry out in the home are understood to be a necessary prerequisite for them to perform their caring rôle. Serious qualitative research needs to be conducted if the results of simplistic research into the tasks of nurses is not to lead to them being relegated to the rôles of managers, while the tasks they perform are delegated to unskilled workers. The parallel between general practitioners and nurses is not difficult to see. General Practitioners respond to a wide

variety of demands for care which are often inappropriate and do not need their special skills, but, through such repeated contacts with their patients, they develop a knowledge of these patients which helps them, over time, to use their diagnostic skills. Nurses, through the mundane tasks they perform, gain access to their patients' hearts and minds which helps them to provide their caring role. There is a need for good research which can demonstrate and evaluate this paradox.

In identifying the optimal use of professional skills and the most cost-effective outcomes of care, there is a need for research into the field of prevention and health education. The limitations and the possible dangers of population screening have been demonstrated^{17, 18, 19, 20}. The potential benefits of opportunistic screening have been argued^{21, 22}. The cost and benefits of different approaches to preventive care and health education need to be carefully researched if the general practitioner is not to take on a responsibility for health which would more appropriately be taken on by society as a whole.

Information technology is impacting on every aspect of the National Health Service. In general practice it was at first, and is still, mainly involved in the maintenance of age/sex registers, some morbidity recording, repeat prescribing and recording, and in some cases, initiating immunizations and cervical cytology. Why do doctors wish to develop information technology in their practices? There are many reasons. New computer technology facilitates the identification of at risk groups. It simplifies some routine tasks such as repeat prescribing and identifying rates of compliance with preventive procedures. When linked with hospital computer systems, it will speed up communications with laboratories and X-ray departments. Linked with expert systems, it may facilitate the use of protocols for the

management of particular diseases or provide information on drug interactions and contra-indications.

Will the presence of a computer terminal on the doctor's desk threaten the doctor/patient relationship? Will the need to access the patient's records on the computer distract the doctor from the patient's profile presented before him? Will protocols for the management of disease replace management plans based on the identification of patients' problems? Will interactive computers in due course identify patients' problems and produce a print-out for the general practitioner, indicating on the basis of probabilities the appropriate management programme? All these questions need to be examined by research and not just research which examines the process of care, but qualitative research which determines whether or not this is the pattern of care which patients perceive as acceptable and fulfilling their needs.

In relating research in general practice to the future development of medical care, it is important to clarify the rôle of data collection in general practice in advancing epidemiological knowledge compared with the day-to-day service function. In the last few years, medical managers and medical planners have fantasised about all that data captured by general practitioners' computers and about how this could contribute to a measure of medical need in populations and to medical planning. Crombie et al²³ have demonstrated how idiosyncratic are the diagnoses recorded by general practitioners. In national studies with large numbers of general practitioners involved, these differences may be ironed out to provide a nationwide profile of morbidity but at an individual or local level, such data collection has serious limitations. The problem has been to some extent overcome in the Netherlands²⁴ where sentinel practices record information on limited and carefully defined problems; just two or three problems may be

identified each year. Data collection is carefully supervised and within the limits of the definitions used the results may be of value in planning care. Such routine observation is expensive if it is to be accurate but it offers FHSA's a way of looking at particular problems in their communities.

Not too different from the Dutch approach is the use of Prescribing Analysis and Cost (PACT) data in reviewing the care provided in general practice. The numbers of prescriptions written for the routine care of diabetics, hypertensives, asthmatics and patients with peptic ulceration may reflect the prevalence of these disorders in a community. Differences in data recorded in different practices may indicate differences in diagnostic behaviour or in case finding or in prescribing policy. The use of these data in studying medical need and medical care have so far been poorly explored, and they offer opportunities to study such problems in the future.

A major issue which will determine the type of general practitioner who will function in the National Health Service in the next decade is concerned with political ideology and with professionalism. There is an understandable desire to bring medicine into the market place, but when those with the greatest need, i.e. the old, the mentally ill and the socially and economically deprived, have the weakest purchasing power, this becomes scarcely tenable. One can add to this the paradox that in primary care the most important issues to patients, caring, empathy and relief of symptoms, are the most difficult to measure. A situation is, therefore, occurring where a massive bureaucracy has developed in which general practitioners must account for all their measurable activities, such as screening, computerisation, minor operations, health clinics, etc., but in which their primary rôle in the diagnosis and management of illness is largely ignored. General

practitioners are judged by their prescribing and hospital referral rates without any measurement of their patients' needs and accountability is replacing professional integrity. In the light of their performance over the last 20 years, some may say that this is what the profession deserves. For those of us who have tried, over the same period of time, through education and idealism to improve the quality of primary care, is this a sign of defeat?

What sort of doctors will be needed in general practice at the turn of the century, bearing in mind the likely changes in secondary care, advances in medical technology, market-place medicine and greater emphasis on prevention, health education and community care? In answering this question, I can only express what I hope rather than what I believe or indeed fear.

I hope that at the turn of the century the whole population of this country will still have direct access to general practitioners, who will be generalists and who by appropriate training in the basic medical sciences, clinical and communication skills, human behaviour and community epidemiology reinforced by continuing relationships with patients over significant periods of time, will be able to identify patients' problems and set in train appropriate management strategies. These general practitioners should have ready access to computers, to provide up-to-date information on their patients' problems and needs, on prescribing and drug therapy and on the availability of secondary care services. I hope that most of these doctors will be working from purpose-built surgery premises with practice nurses who will have special responsibilities for nursing care, the continuing care of some chronic diseases and some aspects of prevention and that patients will have direct access to the nurses where the patients deem that this is an appropriate source of medical care. I hope that these

doctors will be highly professional and trust that they will be ensured a sufficient income to enable them to put the needs of their patients before the needs of their pockets and that they will not be forced into a situation where these needs compete.

Well before the turn of the century I suspect that district nursing and health visiting will come under the management of the Family Health Service Authority which will almost certainly lead to a major review of the rôle of health visitors, district nurses and practice nurses. Current changes in nursing training with much more emphasis on training in the community, and the apparent takeover of health education and prevention by practice nurses from health visitors, will come up for review. Maybe someone will define prevention and health education and will demonstrate whether it is concerned with posters, handouts and special clinics or with the sensitivity of nurses, health visitors and doctors to the needs of their patients. The relative functions of district and practice nurses in providing continuing care in chronic disease and terminal care may lead to major changes in rôle definition or a fusion of their activities. Impacting on all this will be the new Community Care Act. There will be a need to define the rôle of social services in relation to health services in the provision of care, particularly for the aged, the mentally ill and the chronic sick.

In the face of all these changes, will we still need doctors who store knowledge in their brains selected for its relevance to the primary care setting, who are trained in communication skills and clinical skills needed to interpret new symptoms of illness, who relate over a period of time to patients and develop a useful doctor/patient relationship and who can integrate the secondary services available and guide patients through the increasingly complex world of high technology medicine?

In ending this monograph, I quote from the writings of James Spence, who in 1960 published a book entitled *The Purpose and Practice of Medicine*²⁵. This has been an inspiration to me throughout my medical career. James Spence wrote:

'The essential unit of medical practice is the occasion when in the intimacy of the consulting room, or the sick room, a person who is ill or believes himself to be ill, seeks the advice of a doctor whom he trusts. This is a consultation and all else in medicine derives from it.'

This quotation is very familiar to many. The second part of the paragraph is perhaps less familiar for he continues:

'The purpose of the consultation is not the diagnosis or the technical treatment of disease, it is the explanation and advice with the diagnosis acting as a means to these ends.'

Having spent a professional lifetime trying to tease out the knowledge and skills needed to fulfil this rôle, I would be sorry to see the general practitioner as I have described him replaced by a medical manager. The benefits which general practitioners bring to society are difficult to measure except perhaps in terms of the gratitude expressed by their patients.

If we want the doctors I have described, we must do all that we can to train them appropriately, to nurture them and to encourage them and we must stop trying to turn them into managers of health shops, health educators for the community or specialoids. In the next decade we will need computers to store information, manage registers and promote communications. We will need to develop teamwork with practice nurses, district nurses and health visitors or whatever else they may come to be called and we will need practice managers to organise medical care. We will need to integrate health education into our consultations, but the

medicalisation of society should be left to professional health educators if this is what society wishes.

General practitioners need medical care teams, not only to extend their rôle in primary care, but also to protect them from inappropriate demands for care so that they can undertake the primary diagnostic rôle, described in this monograph. The big question is, can we put a price on these general practitioners and is it worth paying? If not, I suspect that they will disappear in the materialistic mire of market medicine.

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