Rehabilitation of the Elderly Invalid at Home

AN EXPERIMENT IN RESTORATION OF ACTIVITY AFTER ILLNESS AMONGST OLD PEOPLE IN THEIR HOMES IN BELFAST

BY

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Belfast City Hospital

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I

Introduction

PROGRESS in the medical care of old people in the past ten years probably owes as much to better understanding of the kind of nursing and treatment needed to restore activity after illness in old age as to advances in medical science. When old people are confined to bed, muscular weakness, stiff joints, and loss of the desire 'to be up and doing' develop very quickly. The elderly sick need more time and more constant encouragement than younger invalids before they can be induced to make the effort to become independent again after illness. So often was this overlooked in the past that many old people, denied the prolonged supervised convalescence they needed, filled the chronic wards of municipal and Poor Law Hospitals or imposed unnecessarily heavy nursing or domestic burdens on the homes of their relatives.

The surprising recuperative powers of elderly invalids under a common-sense régime of graduated exercise, combined with appropriate nursing and medical treatment, have been shown in hospital geriatric units. Development of these departments has been encouraged by the 'new look' taken at chronic wards during and since the war, and by economic factors inherent in the National Health Service. The numbers of helpless elderly invalids to be cared for by the community must be reduced to a minimum and this is the main purpose of the new geriatric services. However, the problems of hospital care for the aged may have had more than their fair share of attention since the war, for the problems of home care are as great or greater.

Less than 5 per cent. of our old people are looked after in all forms of institutions in the United Kingdom from mental hospitals to almshouses. The rest fend for themselves, or are looked after, in private dwellings and they must include very large numbers of infirm or helpless invalids. It is sometimes suggested that if unrestricted access were available to hospital beds for old people they would quickly be filled and the national economy be ruined by the vast 'caretaker' system thus created. This belief is discounted by

the fact that once effective geriatric hospital care and other services for the aged are established in a given area, the number of hospital beds needed to back them is usually fewer than was thought necessary under the Poor Law. Moreover, old people are notoriously difficult to persuade to leave their homes and enter hospital even when it is urgently necessary for them to do so. Most people, when they are ill, prefer to be nursed at home. The reasons for this were well expressed recently by Dr. John Hunt:[1]

> In a hospital, the sister, the nurses and doctors, may all be kindness itself and of the utmost efficiency; but who is to know about the patient's likes and dislikes, his fads and his fancies about his personal hygiene, his bed, the cooking of his food, his drink, his smoking, his books, his wireless favourites and his other entertainment, his friends and the times they can visit him and the thousand and one things that have taken his nearest and dearest perhaps a lifetime to understand and appreciate?

It is well known that old people, torn from these familiar things to go into hospital, are sometimes so upset by the move that more is lost by the consequent mental disturbance than can be gained by the benefits of hospital care.

Since the National Health and Welfare Services came into force local authorities, helped by voluntary societies, have organized home-care services for the elderly sick in many areas with varying success. The help given by these nursing and domestic aids has added greatly to the comfort of the elderly invalid at home, and has given much-needed relief to relatives or neighbours responsible for the care of old people. There is, however, one aspect of hospital care for the elderly sick which home care usually lacks. This is the rehabilitation practised in the geriatric unit—the reassurance and encouragement, the physiotherapy and the exercises which, in the early weeks of convalescence, may make the difference between active independence or life as a bedfast invalid. The hospital has two assets which the home cannot provide—ready access to special departments for investigations or operations that may be needed, and the economical use of equipment that cannot easily be transported to the home, for example the apparatus of a physiotherapy department. Patients must come to hospital to benefit from the first of these advantages, but the second is less important in treatment than the personal attention and encouragement of a physiotherapist with special knowledge of the difficulties to be overcome

by an old person after illness, and with a genuine interest in helping the patient to make the best of a disability.

The advantages of such treatment in the home, particularly to the elderly, have been recognized in England by various voluntary organizations such as the Mobile Physiotherapy Service. There is no equivalent service in Northern Ireland, but home treatment of this sort is clearly needed for two groups of the elderly sick. The first is the older patient with a good home, anxious to remain there for reasons such as those given by Dr. Hunt, whose recovery may be prolonged and possibly incomplete without remedial treatment such as a hospital offers. In the second group are the old people who do very well in hospital but fail to realize how much they have come to depend on the personal service given in a hospital ward and, on returning home, soon become depressed by their shortcomings, lose initiative, and retire to bed. In an area where home-care services are indifferent these people form a high proportion of the readmissions to hospital geriatric wards, and of the helpless invalids in the community. The cost of preventive remedial treatment at home may be heavy, but if applied selectively and with concentrated effort for a limited period in cases where it is likely to succeed, it can hardly cost the community more than the continuous domestic and nursing attention given, sometimes for years, to bedfast invalids who have been denied the chance of maximum recovery.

These ideas were in mind when, in July 1953, a grant of £5,000 was offered by the Nuffield Provincial Hospitals Trust to further work on the problems of ageing in the geriatric unit of the Belfast City Hospital. Administrative responsibility for the fund rested with the Northern Ireland Advisory Committee of the Trust, and it is a pleasure to acknowledge here their continued interest in the plan put forward to take advantage of this generous offer, and the time and thought they gave to its final development. At first a home-care scheme for old people living alone was contemplated, especially for those in the second group mentioned earlier—the elderly patients who relapse after discharge from hospital. This proposal proved, on inquiry, to be too ambitious and an alternative research project was put forward a year later. This scheme concerned elderly invalids whom their family doctors thought might respond to treatment brought from the hospital to the home. It was hoped that some would thereby regain

activity and independence; others might avoid relapse and a bed-ridden existence after acute illness; while in still others the need for permanent hospital nursing care might be postponed or avoided.

The scheme was intended to provide such treatment from the geriatric unit in the homes of a selected group of patients within the boundaries of Belfast for a trial period of a year. It was to be a full-time research project for a doctor with experience of geriatrics and, if successful, it was hoped that it would indicate a means of closer integration of the services provided by the Northern Ireland Hospitals Authority, the local Health and Welfare Authorities, voluntary organizations, and the general practitioners, and might point the way to a saving of hospital beds in geriatric units and, perhaps, in general hospitals too.

The Northern Ireland Advisory Committee of the Nuffield Provincial Hospitals Trust accepted this suggestion, and assurance of co-operation and help were given by the Northern Ireland Hospitals Authority, the Local Authority, and the General Health Services Board. A provisional programme was then commended by the Northern Ireland Advisory Committee to the parent Trust in London and was approved. The Committee then set up a small sub-committee to consider the plan in more detail. One of us (F. M. McQ.), who had held a Senior House Officer post in the geriatric unit of the Belfast City Hospital for two years, was appointed, as the doctor under the scheme, to begin work in October 1955.

II

The Home-treatment Scheme

1. *Medical supervision.* The doctor was required to visit the patients referred for treatment, to assess their probable response, to select in consultation with their family doctors a suitable sample for treatment, and to review those under treatment from time to time as long as was necessary. It was arranged that the scheme should be directed from the geriatric unit of the Belfast City Hospital which was to provide the physiotherapist. The unit is well known to general practitioners in the area who are accustomed to refer elderly patients for consultation or admission. The appointment of a doctor with considerable experience of the work of this department had many advantages, not the least of them being an appreciation of the necessity to assess the potential capacity of an elderly invalid by mental and physical attributes and not by chronological age. It was agreed that ultimate responsibility for each patient should rest with the family doctor and that he should be kept fully informed throughout treatment.

2. *Physiotherapy.* The selected patients were to be visited twice or three times each week for treatment. It was desirable to employ a physiotherapist with experience of geriatric patients and approval was given by the Northern Ireland Hospitals Authority and the South Belfast Hospital Management Committee to release a physiotherapist part-time for this work on a system of repayment to cover the extra help needed in the hospital department.

It was arranged at first that a ward orderly should accompany the physiotherapist to help with patients and carry the heavier equipment, but it was soon evident that there was little need for this, as arrangements could usually be made with relatives or neighbours to give assistance when necessary.

Transport had to be provided for the physiotherapist and her appliances and a Morris 8 station-wagon proved most suitable, being economical to run, and being convenient for carrying the physiotherapy equipment. This included a portable short-wave apparatus, a faradic generator, and an infra-red lamp. Wax was

carried, preheated, in a large vacuum container. A clamp was designed to support lengths of Dexion angle-iron on an ordinary bed-head or chair for the springs and slings needed for exercises. The physiotherapist was also given a testing device to ensure that the electrical circuits in the patient's home were earthed and properly connected, and a specially made 'universal' adaptor to attach equipment to any standard flat or round-pinned power point (Appendix D).

It has been well said[2] that medical rehabilitation is not concerned with the minutiae and technicalities of apparatus used in physical medicine, but 'is the process whereby a man is made mentally, physically, socially, vocationally, and economically equivalent to his state before he became sick or injured'. Both doctor and physiotherapist undertaking this work were aware of this concept of rehabilitation as it applies to old people, and realized the need to consider the patient's mental outlook, environment, and domestic problems as well as the physical disability. The patient had to be taught self-aided exercises to maintain improvement after a course of treatment stopped, and the relatives needed advice so that they could appreciate how much continued improvement might depend on their help and encouragement. Failure to achieve this meant failure of treatment. It was often noticed as time passed that though some patients showed little physical improvement during treatment, there was a great improvement in the morale of the household as the advice they were given helped them to become better adjusted to their difficulties.

In a recent paper[3] on a London trial of home care for sick children, reference is made to its educational value and it is noted that the mothers 'come to realise that the treatment of illness, even by the most modern methods, is all in the day's work and not a mysterious rite practised only by initiates in hospital surroundings'. The comment is equally true of the relatives of many old people in this series who were accepted for home treatment.

3. *Records*. A file-card (Appendix C) was printed to record the criteria for assessment of patients and certain other data for analysis at the end of the trial period. This was the only record of the patients considered unsuitable for treatment, and gave the reason for rejection. More detailed medical records were kept for patients in the selected sample, including progress notes made by the doctor and the physiotherapist.

4. *Limitations of the scheme.* At the outset much thought was given to the amount of help we could offer in the homes of those accepted for treatment. It was clear that the sample of suitable patients would probably be small, restricted as it had to be to those with good homes where proper domestic care was assured, and to those with disabilities likely to respond to treatment who did not wish to go to hospital. The Committee considered the suggestion that nursing care, as well as physiotherapy, should be brought from hospital to the homes, and decided that this was unnecessary. Experienced senior staff could not easily be spared from their duties in hospital, and it seemed undesirable to oust the very efficient District Nurses already available in the area, or to prejudice the employment of private nurses. The scheme was to supplement and not supplant existing services. It was agreed that treatment should be confined to the physiotherapy and exercises necessary to restore activity and any other medical treatment which might be suggested in consultation with the family doctor.

Time was expected to be a major limiting factor in treatment. The physiotherapist estimated from experience in private practice, and from her knowledge of the talkativeness and slow reactions of patients in the geriatric wards, that it would be difficult to visit and treat more than five patients in a half-day. This allowed half an hour with each patient plus the travelling time around the City, and estimates of the number of patients to be adopted during the year were based on this assumption.

During the planning stage some anxiety was expressed lest the scheme should benefit only the wealthier members of the community who might well afford to pay for private treatment. This seemed unlikely, for it is known from the survey of old people in Northern Ireland[4] that there are many of them in the poorer quarters of our towns and cities living in well-kept kitchen houses, whose continued existence there, rather than in hospital, might depend entirely on the kind of treatment the scheme offered; conversely, there are others, able to afford private treatment in their residences, deteriorating into helpless invalids because money cannot buy the kind of service they need.

Reference is made later to these fears of preferential treatment for one section of the community and it is shown that the patients selected for treatment did in fact come from every social class and predominantly from the homes of working people.

5. *Obtaining the sample.* The scheme was necessarily so limited in its application to a specially selected group of elderly patients that no attempt was made to obtain a random sample, although, had it been possible to widen the net, statistical analysis with a control group might have been more rewarding. Instead it was decided that every general practitioner in the Belfast area should be invited to co-operate and to refer elderly patients whom they thought suitable for home treatment as defined in a letter setting out briefly the purpose of the scheme. The letter and a form (Appendixes A and B) was sent out to 280 doctors in Belfast in July 1955 with a stamped addressed envelope for the reply. The Medical Advisor to the General Health Services Board kindly arranged for these letters to be posted through the Board's addressograph system. After the holidays a reminder was sent by the same route to doctors who had not replied.

It was intended that doctors who referred patients should be consulted by telephone or by appointment and be invited to accompany the doctor on the assessment visit. If this could not be arranged the assessment would be discussed with the family doctor by appointment after the visit.

6. *Response from the general practitioners.* The response to the letters was very poor, and though this was at first thought to be due to the holidays the reaction to the reminder in September was little better. Only 58 replies, representing 130 patients, came in. It seemed that the difficulty of defining clear criteria for 'suitable' patients in writing was partly responsible, because many doctors who did reply expressed appreciation of the value of the scheme and reluctance to misuse it for patients they considered beyond remedial treatment. Having no patients at that time whom they thought perfect candidates for rehabilitation according to the letter, they deferred a reply until the paragon should appear. Too much was asked, perhaps, of busy and harassed doctors who had not time to select patients who would conform with the loose definition of 'suitability' in the letter and, in retrospect, it would seem wiser to have asked simply for a list of their elderly patients who were under treatment and causing them concern. Indeed, such a list was returned by some doctors and at least had the merit of enabling suggestions to be made to lighten the load in several hard-pressed households. The interviews with the family doctor sometimes before, and always after, the assessment visit, helped to overcome

these difficulties. The purpose and limitations of the scheme could be discussed, and patients subsequently referred were almost always the sort of invalids for whom the scheme was designed. However, by the end of the year only 95 doctors in the area had taken advantage of it, referring a total of 272 patients. This poor response is the more difficult to understand because so many doctors, when sounded about the scheme, reacted with great enthusiasm and felt sure that they had 'any number' of suitable candidates on their lists. However, when criteria of 'suitability' were applied these optimistic estimates dropped sharply and the maximum number of eligible cases referred by any one doctor during the year was four. Could one but find them, there must be many elderly patients in Belfast who could benefit greatly from this service and be prevented from imposing needlessly heavy restrictions on their homes, or from prematurely becoming hospital long-stay cases. Probably the response to this project was no worse, if no better, than that obtained by so many other inquiries thrust upon the general practitioner in recent years.

III

The Sample

1. *Home visits.* Most of the family doctors who referred patients for investigation chose not to go out on the assessment visit, but informed the patient or the relatives of its purpose and when it would be made. As a result the visitor was invariably welcomed and only two patients in the entire series refused to be examined and declined treatment. One, a bedfast invalid crippled by rheumatoid arthritis, could not tolerate the thought of the pain that movement might bring and said she was happier in bed, and the other, a patient with a fractured hip, considered her very restricted activity to be the best she could achieve, treatment or no treatment. Some doctors did attend the assessment session either because of interest in the 'geriatric approach' or to help with a difficult patient. Their co-operation on these occasions was very greatly appreciated, especially in a few suspicious households, and in some where it might otherwise have been most difficult to obtain a clear picture of special problems without the family doctor to inspire confidence and draw out the complete story. The visits seemed to be appreciated even by those who had to be told that no treatment would follow. Evidently they were impressed by the fact that an interest was being taken in them and that someone was at least trying to do something about their problems.

These preliminary visits usually lasted about twenty minutes, long enough in most cases to arrive at a conclusion about the possibilities of treatment after a brief clinical examination and a discussion of social and domestic difficulties with the relatives or the family doctor. Patients who were considered suitable for treatment, and some whose probable response seemed doubtful, were visited a second time by arrangement for a more detailed examination.

Several patients were referred from hospital wards for after-care under the scheme, as knowledge of it spread. Experience with these cases suggests that the patient should be examined, and an almoner's report on home conditions be considered, by the doctor

responsible for the home treatment, before the patient is discharged from hospital. Otherwise, as has sometimes happened, the patient or the relatives are given an assurance of after-care and treatment from the hospital which cannot be fulfilled when the home is visited.

2. *Criteria of assessment and selection of patients for treatment.* Four factors observed at the first visit decided whether the patient was to be considered suitable for treatment at home. These were the mental capacity and the physical state of the patient, the home conditions and the available help. They were noted in detail on the file-card record for subsequent analysis.

(*a*) *Mental capacity.* There were three attributes under this heading considered most likely to influence the patient's response to treatment and therefore to determine the possibility of re-habilitation—a state of mental confusion (and incontinence due to it), the ability to co-operate in treatment, and the desire to get better. Considerable latitude had to be allowed in assessing the relative importance of these factors because they are so closely interrelated and biased so much by environment and by the patient's individual 'make-up'. An old person, whose intellect is impaired by an illness, may seem quite confused or retarded and yet have enough insight to be very anxious to improve and to co-operate well with those helping him. Another who seems alert and very bright mentally may have such a difficult nature or be so 'carnaptious', as they say in these parts, that no one can work with him. For these reasons confused patients were only rejected outright if there was a history of progressive and irreversible cerebral degeneration and senile mental change over a long period. Transient mental confusion so often accompanies physical illness in old age that treatment was always tried in such cases and, as was expected, it often improved the mental state as morale, and the interest taken in the patient, increased in the household.

(*b*) *Physical state.* The major physical handicaps to recovery sought at the assessment visit were obesity, advanced debility, muscular wasting, contractures of the leg muscles and pressure sores, especially those on the heels. The assessment of physical state also included a record of the patient's ability to attend to normal daily needs such as washing, dressing, hair-brushing, shaving, and personal hygiene, and of the range of activity; whether the patient was bedfast, confined to sitting up or, if able to walk,

whether able to negotiate stairs, restricted to the home, or able to go out, do some shopping, and travel on public transport. These details were recorded for comparison before and after treatment.

(*c*) *Home conditions*. It was obvious that housing would play some part in deciding whether a patient could be treated at home or not. Overcrowding, inadequate water supplies and sanitation, lack of electric power for the physiotherapy appliances needed for arthritic patients, or poor living conditions, might entail admission to hospital rather than treatment at home. The room occupied by the patient was recorded according to the floor it was on. It is surprising how often the relatives of a bedridden invalid fail to appreciate the importance of nursing the patient on the ground floor if at all possible (p. 22). The homes were classified as 'good', 'fair', or 'bad', and it was also observed whether the patients lived in their own homes, with relatives, or in lodgings.

(*d*) *Help*. Information was sought under this heading to determine the amount of personal service needed by the elderly invalids at home and whether reliable help was available or not. The importance of this to an old person struggling to regain independence is self-evident though the extent of the need might vary according to the patient's disability. For example, a hemiplegic patient would need relatively skilled nursing care and continuous domestic care in the early stages of illness, whereas a patient partially disabled by arthritis and incapable of climbing stairs or going out of doors might manage very well at home, and respond well to treatment, though living alone and relying only on the daily help of a willing and interested neighbour.

During the year, 272 elderly patients were referred by their family doctors for assessment. Of these, 85 (31 per cent.) were selected as suitable for treatment and finished their course within the year, 147 (54 per cent.) were considered unsuitable, 27 (10 per cent.) were 'lost from the series', and 13 were still under treatment when this study of the results began (Table I).

Ten per cent. may seem to be a surprisingly high proportion of the patients to have been 'lost', but it is explained by the interval of eight or ten weeks between the time that the first letters were sent to the family doctors in July and the start made on the home visits after the doctor's appointment in October. Four patients had died before they were visited, 14 had been admitted to hospital for one reason or another, and 9 had left the district. The 13 patients

'still under treatment' have not been included in the considerations which follow because their response to treatment was not known at the end of the year of the trial.

TABLE I. *The Sample of Old People referred for Home Treatment*

Assessment	*Number*	%
Accepted	85	31·3
Rejected	147	54·0
Under treatment . . .	13	4·8
Lost from survey . .	27	9·9
Total	272	100·0

In assessing certain characteristics of the sample, and the results of treatment, statistical analysis was often made difficult because of the small numbers of patients in the series, but where reference is made to tests of significance the conventional level of $P < 0{\cdot}05$ has been used throughout the report.

3. *Patients unsuitable for treatment.* The object of the scheme being to provide effective rehabilitation at home, with an eye both to efficiency and economy, it was seldom difficult to decide, on the information available after visits, which patients were suitable, and which unsuitable for treatment, though the decision was often made with regret. It seemed hard not to attempt treatment for some patients disabled for years with rheumatoid arthritis, for example, because even if nothing had been done to restore activity the comfort and interest brought by the physiotherapist's visits would have meant a great deal in their lives. It was agreed, however, that the limited scope of this trial scheme must be concentrated on patients with the best prospects of regaining active independence, and of maintaining it after treatment stopped. The scheme could not be applied to those who were assured of a reasonable recovery without it, or who were permanently disabled invalids with no prospect of improved physical capacity.

Of the 147 patients considered unsuitable for treatment, 125 were referred by general practitioners in the first six months of the trial scheme (representing 75 per cent. of the patients referred at that time). In the following six months this proportion was approximately halved as only 22 of the 65 patients referred (33·8 per cent.) were rejected. The improvement was undoubtedly

influenced by a better understanding of the scheme promoted by the interviews with the family doctors, who were always willing to give time to discussion, especially after the assessment visit. Only once was the request for an appointment to discuss a patient turned down.

TABLE II. *Age and Sex of 'Accepted' and 'Rejected' Patients*

	Age group in years													
	< 60		60–		65–		70–		75–		80+		*Total*	
	Males													
	No.	%	*No.*	%	*No.*	%	*No.*	%	*No.*	%	*No.*	%	*No.*	%
Accepted	4	17·4	4	17·4	3	13·0	2	8·7	6	26·1	4	17·4	23	100
Rejected	5	13·5	1	2·7	9	24·3	12	32·4	5	13·5	5	13·5	37	100
Total	9	15·0	5	8·3	12	20·0	14	23·3	11	18·3	9	15·0	60	100
	Females													
Accepted	3	4·8	8	12·9	12	19·4	20	32·3	9	14·5	10	16·1	62	100
Rejected	11	10·0	10	9·1	15	13·6	22	20·0	20	18·2	32	29·1	110	100
Total	14	8·1	18	10·5	27	15·7	42	24·4	29	16·9	42	24·4	172	100
	Persons													
Accepted	7	8·2	12	14·1	15	17·6	22	25·9	15	17·6	14	16·5	85	100
Rejected	16	10·9	11	7·5	24	16·3	34	23·1	25	17·0	37	25·2	147	100
Total	23	9·9	23	9·9	39	16·8	56	24·1	40	17·2	51	22·0	232	100

4. *Age and sex of the sample.* The 'rejected' patients are classified according to age and sex in Table II with the 'accepted' patients for comparison. The table shows a high proportion of patients in the older age groups not only, as might as expected, in the 'rejected' group, but also amongst those who were accepted. There is no significant difference in the mean ages of male patients or of female patients between the two groups in this table and it is gratifying to know that the selection of patients for treatment was not, apparently, biased by age for either sex.

More women than men were referred for treatment probably because there are more women than men in the population, and because in illness women seem to have a greater hold on life than men. Table III shows that approximately one-quarter of those accepted for treatment were men and three-quarters women, and that the same proportions hold good for those rejected as un-

suitable, so that sex does not appear to have influenced selection either, there being no significant difference between the two groups.

TABLE III. *Comparison of Sex of Accepted and Rejected Groups*

	Sex					
	Males		*Females*		*Total*	
	No.	%	*No.*	%	*No.*	%
Accepted . .	23	27·1	62	72·9	85	100
Rejected . .	37	25·2	110	74·8	147	100
Total . .	60	25·9	172	74·1	232	100

5. *Social class.* At each visit the social class of the patient was ascertained according to the standards of social status and occupational skill laid down by the Registrar General for England and

TABLE IV. *Accepted and Rejected Patients classified according to Social Class*

	Social class											
	I		II		III		IV		V		*Total*	
	Males											
	No.	%	*No.*	%	*No.*	%	*No.*	%	*No.*	%	*No.*	%
Accepted .	2	8·7	5	21·7	6	26·1	9	39·1	1	4·3	23	100
Rejected .	1	2·7	1	2·7	9	24·3	17	45·9	9	24·3	37	100
Total .	3	5·0	6	10·0	15	25·0	26	43·3	10	16·7	60	100
	Females											
Accepted .	1	1·6	10	16·1	19	30·6	30	48·4	2	3·2	62	100
Rejected .	1	0·9	12	10·9	20	18·2	55	50·0	22	20·0	110	100
Total .	2	1·2	22	12·8	39	22·7	85	49·4	24	14·0	172	100
	Persons											
Accepted .	3	3·5	15	17·6	25	30·0	39	45·9	3	3·5	85	100
Rejected .	2	1·4	13	8·8	29	19·7	72	49·0	31	21·1	147	100
Total .	5	2·2	28	12·1	54	23·3	111	47·8	34	14·7	232	100

Wales (1938).[5] The five social classes defined in the report are: I, the 'professional occupations'; III, 'skilled workers'; and V, 'unskilled workers'; with II and IV as 'intermediate categories'.

In Table IV the accepted and rejected groups are shown according to social class. The comparison of these groups is interesting because of the doubt, mentioned earlier, that treatment under the scheme might be available only to those patients whose work and living conditions placed them in the 'professional' social class. The table does indeed show that a higher proportion of persons accepted than rejected for treatment came from classes I, II, and III, and, of course, the reverse was true for classes IV and V. This, however, is to be expected because the process of selection favoured old people with 'good' homes (not by a general standard of 'goodness', but by one applicable to the neighbourhood they lived in) and with adequate domestic help, regardless of their social standing. Such homes and such help are less often found amongst casual labourers than among skilled workers or people in the professions, and a more significant point brought out by the table is the fact that of those selected for treatment less than 4 per cent. were in Class I and almost one-half (45·9 per cent.) were in the intermediate class IV between skilled and unskilled workers. In other words position in society bore little relation to the choice of patients and those living in the poorer quarters of the city were as eligible for treatment as those elsewhere provided that the home was well kept, that the necessary help was available, and that their condition justified the trial. (The relative unimportance of housing and domestic help as deciding factors in the assessment is shown in Table V in the next section, where it can be seen that 'housing' was never recorded as the predominant handicap and lack of help only in five instances.)

6. *Predominant handicaps and reasons for rejection.* The predominant handicap in the rejected patients was mental in 11·6 per cent. and physical in 85·0 per cent. In one instance it was recorded, quite justifiably, as 'wife'. This, however, was included in the 3·4 per cent. where lack of help was the main problem. Although housing difficulties were encountered, they were always outweighed by other factors (Table V).

Twenty-seven (18·4 per cent.) of all patients unsuitable for treatment were so badly disabled that there was no hope of any improvement in the range of activity.

A widow 84 years of age, bedfast for four years following several cerebral thromboses, was aphasic, had a spastic right hemiplegia, and was confused and incontinent. She had a full-time nurse attendant.

TABLE V. *Reason for Rejection and Predominant Handicap*

Reason for rejection		Predominant handicap				
		Mental	Physical	Help	Total No.	Total %
Long-stay bedfast		4	23	..	27	18·4
Full capacity		7	74	3	84	57·1
Social problem		..	6	2	8	5·4
Mental case		4	1	..	5	3·4
Hospital admission		..	17	..	17	11·6
Geriatric out-patient		2	4	..	6	4·1
Total	*No.*	17	125	5	147	
	%	11·6	85·0	3·4	100	

Mrs. X aged 84, had been bedfast for three years owing to osteoarthritis of both knees with 90° flexion contractures and was very content to remain there. She lived in a poor home with two sons who worked intermittently.

A spinster, aged 74, was found living alone in an upper room of her house where she had been bedfast for three years crippled by rheumatoid arthritis. She was in a dreadful state of dirt and squalor, dependent on a distant relative living near by for food and any attention she was being given. She refused to accept a bed in hospital as a long-stay patient.

In all but four of these patients the predominant handicap recorded was physical, the remainder showing a severe degree of mental disturbance as well.

The most common cause for rejection was that the patients were at 'full capacity' and unlikely to derive any great physical benefit from treatment. This applied to eighty-four patients (57·1 per cent. of the rejected group).

An aged grandmother of 94 lived with a married daughter and her family. She was overweight and breathless on exertion but was up and about every day. When visited a grandchild had to fetch her from a neighbour's house farther along the street.

Mrs. Y, aged 61, had had flexion contractures of both knees for twenty years due to rheumatoid arthritis. She was able to get about the house with one crutch and to visit her sister living near by.

Mr. Z, aged 78, could walk the three miles to the city centre unaided but was liable to go for his walk in the middle of the night in pyjamas and a bowler hat.

An elderly clergyman had had a left cerebral thrombosis 5–6 months

before he was visited, but had recovered so well that he was able to do everything for himself including walking up and down stairs unaided, in spite of some residual weakness of arm and leg.

Eight patients (5·4 per cent.) were in difficulty because of social rather than medical problems though, as always, these two are inseparable in old age.

A 78-year-old man and his elderly wife were living in a derelict, dirty little house. Both of them were filthy, looked underfed, and said that they had been 'poorly since the blitz'. The old man could do the shopping for the household with difficulty, and brew a cup of tea, but was unfit to do much else.

A feeble old spinster, 88 years old, lived in a squalid little house with an aged cousin, equally decrepit, who had three sons all at work. Both women were debilitated, only able to walk holding on to the furniture (an activity known locally as 'walking by the hoults'), and were extremely dirty.

An 87-year-old widow lived in a poor home with a step-son who was working and available only at night, or on occasional evenings, to keep her company. She had fractured a leg eighteen months previously and returned home after a year in hospital unable to walk, somewhat confused and incontinent. She could do no more than sit up in a chair all day with occasional attention from her neighbours. She had refused readmission to hospital.

These case histories illustrate problems which demand the full resources of a comprehensive home-care service—home help, nursing care, laundry service, dietary supplements, voluntary visitors, diversional activities, and material aid of one sort and another. Remedial exercises and physiotherapy would have contributed little, and were certainly of less importance, than those other needs, and the family doctors were advised to enlist the help of the Local Authority Health and Welfare services.

Five patients were so mentally confused with advanced cerebral degeneration that no useful purpose would have been served by an attempt to rehabilitate them.

There were seventeen patients (11·6 per cent.) who were found on investigation to have medical or surgical conditions necessitating admission to hospital for treatment, as shown by the following examples:

A woman aged 87, had a history of a slight stroke some months before being referred for treatment at home. She had again become drowsy and unresponsive and was thought to have had a further cerebral thrombosis.

On examination she was found to have ketosis and a heavy glycosuria and went into hospital to be treated for incipient diabetic coma.

A 66-year-old man gave a history of increasing lethargy, weight loss, anorexia, and bowel symptoms. He had an abdominal tumour necessitating admission to hospital for investigation.

Mr. A, aged 65, had been in bed for two weeks owing to a painful foot. The explanation for this proved on investigation to be ischaemic gangrene which needed surgery rather than palliative treatment.

Most of the hospital admissions arose from a misunderstanding of the purpose of the scheme on the part of the general practitioners, or because some urgent need for admission arose before the patient could be visited.

Six patients were referred to the geriatric out-patient department for treatment because, although they would have derived benefit from appropriate exercises and physiotherapy at home, they were active enough to make the journey to hospital, and it was thought that the outing would help morale in some patients who otherwise would have been confined indoors, alone, all day:

A 68-year-old business man had a stroke two years before he was referred. He had made a good physical recovery but was self-conscious about his gait and would not go out. As a result of sitting indoors all day he had become far too fat, and was depressed and introspective. His arm was spastic with a painful shoulder, and the bi-weekly visits to hospital for treatment for this encouraged him to get out and about more, aroused his interest, and improved the use of his arm.

A breadserver aged 56 was making a good recovery from a slight stroke which occurred five weeks before the visit. He needed treatment for residual pain and stiffness in the hemiplegic shoulder but was able to attend for this as an out-patient and enjoyed the company of other patients.

IV

Methods and Results of Home Treatment

1. *General medical care.* The pattern of medical supervision and rehabilitation planned for the patients accepted for treatment proved practicable and was continued without change over the next twelve months. After assessment, a return visit was arranged as soon as possible for more detailed examination, and to consider the special worries of the relatives. The programme proposed for the patient was then discussed with the family doctor and with the physiotherapist before treatment was started.

Apart from the need to obtain full clinical data concerning the patient's disability, the second visit to the home was an opportunity to suggest to the relatives ways in which they might help towards the patient's recovery, and lighten their own load of responsibility. The selection of patients being biased in favour of patients with adequate help, it is to be expected that most of the 'suitable' patients would be cared for by close relatives. In Tables VI and VII, 84·7 per cent. of the group are shown to have been living in their own homes (looked after by their spouse or their children, or by another near relative) and 12·9 per cent. were being nursed in the home of a relative. The people in these households were invariably most co-operative and anxious to do their best for the patients, although the odds were often against them with patients reluctant to get out of bed or at times actively resentful of interference. Too much loose talk is heard these days about families who do not want their elderly relatives, and about 'lack of a sense of filial responsibility'. Much of it is founded on reports which concern the relatively small proportion of our old people who end their days under some form of institutional care, overlooking the vast numbers of them who are given devoted care by their relatives in their homes, unheard of and unseen except by their families and their friends. Old people in illness have an unfortunate tendency to take advantage of their relatives, who may have to give in to them for

TABLE VI. *Help Available in the Homes of Patients accepted for Treatment*

Help	*No.*	%
Spouse	30	35·3
Children	19	22·4
Other relatives	23	27·1
Health services	2	2·4
Welfare services	1	1·2
Paid help	3	3·5
Private nurse	2	2·4
Lodger	2	2·4
Neighbours	1	1·2
Nobody	2	2·4
Total	85	100·0

TABLE VII. *Living Conditions of Accepted Patients*

Living conditions	*No.*	%
Own home	72	84·7
With relative	11	12·9
Lodgings	1	1·2
Other	1	1·2
Total	85	100·0

the sake of peace in the home. There were some instances of this difficult attitude in the patients under treatment and the relatives appreciated the moral support given by the doctor and physiotherapist who could convince the patient that he was not being ruthlessly maltreated when induced to get up. (Many relatives visiting elderly dependants in the geriatric unit are surprised by their complacent acceptance of efforts to restore activity which would bring forth storms of protest at home, and this is a strong reason at times for admission to hospital.)

Suggestions could often be made to reduce unnecessary hazards in the home, many of them obvious to a stranger, but too familiar to be recognized as dangerous by the owner. Fire-guards for open fires or for electric radiators were sometimes needed; a stern battle had often to be fought to replace ill-fitting bedroom slippers with comfortable walking shoes. There must be a close link between the rigid attachment to carpet slippers and the high incidence of painful

feet in old people, and chiropody was recommended on occasion to overcome the reluctance to wear proper shoes. In about one-third of the homes the patient was accommodated on the ground floor when visited, a great saving of labour to those responsible for nursing and domestic care, and with many advantages to the patient. The care of the other two-thirds of the patients occupying rooms on the first or second floors of their homes (Table VIII) entailed much unnecessary and time-consuming work for those who looked after them, but it was only with great difficulty in many instances that the relatives could be persuaded to bring their

TABLE VIII. *Floor Occupied by Accepted Patients*

Floor	*No.*	%
Ground . .	27	31·8
First . . .	57	67·1
Second . .	1	1·2
Total . .	85	100·0

patients to a ground-floor room, even where it was easily available. The reluctance to give up the only attractive sitting-room in the home for this purpose is easily understood, but in several homes where the suggested change was adopted the relatives later remarked that they had not realized how much the extra effort of frequent journeys up and down stairs formerly weighed upon them, and that they felt much better as a result of the move. The problem of toilet facilities was overcome with a bedside commode, another asset which relatives sometimes overlook. The patients themselves usually commented on the benefits of a move downstairs. In their first- or second-floor bedrooms they saw fewer of the visitors coming to the house, could never get out of doors, and felt 'out of the way of things' in the house. On the ground floor they appreciated watching people pass by in the streets, they could be taken outside in good weather, and odd jobs such as shelling peas or peeling potatoes could readily be passed over to them so that, as one said, she felt 'so much more a part of the home'. The need for advice on equipment necessary for nursing care seldom arose, as the family doctor or district nurse had usually provided them. The rubber bed-pans now supplied by the district-nursing service are a great comfort to elderly patients who cannot tolerate the old-fashioned type, but there is a risk that the rubber model

may be used as a permanent fixture, much as an air-ring is used, with disastrous results. Patients were encouraged to use a bedside commode as soon as it could be managed.

TABLE IX. *Physical Condition of Accepted Patients*

Physical state	*No.*	%
Obese . . .	13	15·3
Normal . . .	61	71·7
Debilitated . .	7	8·2
Wasted . . .	2	2·4
Ill . . .	2	2·4
Total . . .	85	100·0

A fault common to many households was failure to recognize dehydration in elderly patients deprived of an adequate intake of fluid, and, in some, the mental confusion arising from this was being suppressed by sedatives which hindered rather than helped recovery. Constipation aggravating incontinence was also relatively common, and obesity was a considerable handicap in 15·3 per cent. of the patients (Table IX). Conversely 13 per cent. of them were in very poor physical condition owing to wasting and illness, sometimes aggravated by malnutrition and dehydration. Such problems were discussed with the family doctor and arrangements made for visits by the district nurse (especially to give enemata where necessary), to supply diet sheets, or to provide other appropriate treatment. Some patients were brought to hospital for special appliances such as plastic splints for contractures or light calipers and springs for hemiplegic legs.

2. *Physiotherapy*. It was decided that six visits from the physiotherapist or six 'treatments' should constitute a 'course', and with some patients such as those with respiratory diseases or arthritis a single course over a period of three weeks was enough to produce the desired result. Others, however, especially the hemiplegics, needed more intensive treatment, even daily attention, and treatment extended to seven or eight 'courses' was sometimes necessary to obtain maximum improvement.

The doctor and the physiotherapist usually visited the patients together when treatment started, and again at the finish of each course to assess progress and decide whether or not to continue further visits.

As physical capacity improved in some patients they were referred to the geriatric out-patient department where occupational therapy could be added to the physiotherapy, and this was most helpful to those who were alone at home during the day. Treatment tends to take second place in the minds of such people to the twice-weekly 'tea and gossip' sessions accompanying the occupational therapy.

The physiotherapy appliances were satisfactory on the whole, but their use was much more restricted than had been expected because of the unsatisfactory electrical circuits in many of the homes visited. Of the 85 treated patients, 42 needed some form of heat or faradic therapy. In the homes of twenty-four of these patients, the power circuit had only two-pin unearthed points, three had no electric supply, and one was on D.C. mains. In one of the remaining households which did possess three-pin power-points, the circuit was not earthed. The lack of a properly earthed circuit debarred the use of the portable short-wave apparatus, but as time passed the physiotherapist concluded that, although this heavy appliance was valuable in some cases, it had a very limited field of use. It weighed 60 lb. and needed two people to lift it, too much time was needed to assemble it for frequent use on a round of visits, and simpler substitutes to provide heat worked reasonably well. Moreover, treatment under the scheme concentrated more on teaching the patients and relatives to adapt themselves, within the limits imposed by the disability, to everyday life in the home, and elaborate therapeutic frills were eliminated as far as possible. The Dexion frames and 'universal clamp' (Appendix D) were a simple and useful means of providing spring-aided exercises which the patient could continue between treatment sessions, and although the clamp had to be attached to the many and varied bed-heads found in different homes, no problem proved to be insurmountable.

The physiotherapist's round, like the doctor's, called for tact and diplomacy to withstand the endless hospitality offered (sometimes in a none-too-clean cup) or to deal with the situation when confronted by a large iron bedstead containing, on one side, a frail, debilitated little man, and on the other the patient, a massive healthy-looking woman, with a bodyguard of two venomous Pekinese dogs.

3. *Response to treatment.* The results of treatment were assessed by comparison of physical state before and after treatment (including

any improvement in the patient's mental outlook) and of the capacity to perform the everyday tasks fulfilling personal needs which mean so much to the individual and are such a burden to those responsible for the care of a helpless invalid. With different types of illness to consider, and different factors influencing the recovery of individual patients, no single yardstick of comparison was applicable to the whole series of treated cases, and they had to be assessed individually. The estimates are standardized to the extent that they were made by one person thoroughly familiar with the care and rehabilitation of the elderly sick.

Of the 85 patients considered suitable for treatment, 37 had a hemiplegia, 28 had rheumatoid or osteo-arthritis, and 20 had 'other' diseases, 9 with respiratory disorders (chronic bronchitis, asthma, &c.), 5 with fractured hips, 3 with other neurological complaints, and 3 with debility and senile weakness.

Twenty-seven of these patients (31·7 per cent. of those 'accepted') were considered to be 'greatly improved' after treatment.

An outstanding success in the series was a retired shipyard worker aged 76 with a previous history of coronary thrombosis in 1943. He had a left cerebral thrombosis ten days before he was visited, and was bedfast, confused, and incontinent, and spasticity was appearing in the paralysed limbs. The right shoulder was stiff and painful, and within a few days of the start of treatment a further stroke deprived him of speech and added to his mental confusion. Treatment, resumed a week later, was continued daily for three weeks; he was then sitting up, mentally brighter, free from incontinence, and fit to move to a ground-floor room to ease the strain on his elderly wife. The 54 treatments given while he continued to improve covered about 15 weeks; he regained a normal, cheerful mental state, overcame dysphasia enough to speak quite clearly, and was walking unaided. Pain was lessened in the shoulder and arm, and despite residual spasticity and weakness, he was making successful efforts to write again.

A widow aged 76 lived in a neat little house with a most attentive daughter who was unemployed. After the death of her husband the patient had a 'nervous breakdown', made a half-hearted attempt to commit suicide, and took to her bed for over 18 months, to be attended 'hand and foot' by her daughter. Latterly she had been able to sit out of bed but could only get about, reluctantly and with great difficulty, holding on to the furniture. She was depressed and complained of weakness and pain in her back and had marked exertional dyspnoea owing to obesity. She was very unsteady, apprehensive, and lacked confidence when attempting to walk. After three months on a strict reducing diet,

two courses of short-wave diathermy, and walking exercises, she became independent in the house, and could cook and do her share of the household chores. She was less dyspnoeic, had less pain in her back, and was extremely cheerful and most grateful for her new lease of life.

A 71-year-old retired linen manufacturer lived in a very good house with his wife who, despite two episodes of coronary thrombosis, was still active. They had a maid. In August 1955 the patient had a stroke and was treated for a month in hospital. When discharged home in the middle of September he had a private nurse until mid-November. He was first visited in October. At that time he was able to sit up in a chair by the fire for about 5–6 hours but was unable to walk at all without help. He had to be helped to the commode, shaved and dressed. He had a weak, flaccid left arm with oedema of his hand. His left leg was also weak though all movements were present in both limbs. His general condition was good and he was mentally alert but very depressed. Following twelve treatments including faradism, walking, and spring exercises to the arm and leg, he was walking with a stick unaided in the house and garden. He could dress and shave himself, attend to his personal needs, and get up and down stairs without help. His mental state was much brighter and more cheerful and his improvement has been maintained so far.

Thirty cases (35·3 per cent. of those 'accepted') were regarded as 'improved'.

A spinster aged 52 was living with two sisters in a flat above their confectionery shop. The patient had had recent orthopaedic treatment for a 'frozen' shoulder but needed follow-up physiotherapy and could not attend hospital as an out-patient owing to heart disease. A course of treatment and instruction in appropriate exercises at home successfully maintained a full range of movement in the painful shoulder

A 69-year-old widow lived in a spotlessly clean little house with her son. He was at work all day, but a married daughter living near by did much of the housekeeping for her mother, who had a history of severe 'rheumatics' for five or six years. She had become extremely despondent, unable to do much in the house and rarely able to get out. There was marked limitation of movement with pain and tenderness in the muscles of her neck and back, and to a lesser extent in her shoulders. Pain and stiffness were much reduced after twelve treatments, her neck had regained almost full movement, and she was able to do much more in the house, to go out from time to time, and was much more cheerful.

A retired watchmaker lived with an elderly, very active wife, in a comfortable home. He was 75 years old. A married son and daughter living in Belfast were very helpful. In September 1955 he had a stroke resulting in aphasia and a paralysed right side. When first visited early

in November he was able to sit up 3–4 hours daily but was completely helpless and unable to feed himself. His paralysed arm was developing a spastic flexion contracture and his leg showed minimal return of voluntary power. With eighteen weeks' treatment (including faradism, walking, and spring exercises and fitting of a light leg-iron and toe-spring), he became able to walk and to get up and down stairs, though still needing support and some assistance from his wife. However, the burden of care she had to shoulder was greatly lightened by the improved morale of the household and the fact that her husband could do so much more for himself.

There were twenty-eight patients (33·0 per cent. of those 'accepted') who, for one reason or another, failed to respond satisfactorily to treatment. These were the patients who showed no change worth recording (17), who had to be admitted to hospital (10), or who died at home (1). They are classified in this way, by age and sex, in Table X, but for convenience in later tables are grouped together under the heading 'not improved'. The following are two examples of patients who showed no change as a result of treatment.

A widow aged 79 years was being cared for by her nephew and his wife and child in a rather poor house. The patient had nursed her husband for four years before his death and since then had complained of backache which had been investigated and treated twice in hospital. She was given a course of physiotherapy without improvement but refused to wear the corset fitted during previous treatment.

Mr. X aged 81 was a retired farmer. He lived in a very good home with a housekeeper and had a day and night nurse attendant. A married daughter, a doctor, lived near by. Mr. X had been out and about although he had early parkinsonism, chronic bronchitis, and spastic paralysis with contracture of his left arm until July 1955 when he fell, sustaining an impacted fracture of his left hip. After a period of rest in bed he was beginning to walk when he fell again, disimpacted the hip, and fixation with a Smith-Petersen pin was necessary this time. When first visited it was eleven weeks since his operation. Fixation was satisfactory and he was able to sit up for a few hours each day in a chair. He made no progress after twelve treatment sessions and remained frail, apprehensive, and unsteady. He was easily tired by effort because of a chronic chest complaint, and being very heavily built he quickly exhausted his helpers when trying to exercise and walk. It was considered that partial restoration of independence (the best that could be hoped for) would only result in further falls and add to the relatives' anxieties and nursing problems.

Of the ten patients admitted to hospital two required investigation not possible for them at home; two deteriorated under home treatment and it was thought that the continuous daily routine in a hospital geriatric ward might succeed where less constant attention had failed; six were admitted because a further acute illness supervened.

A married woman, 77 years of age, lived with her husband in a colony of bungalows specially designed for old people. She had had low back pain for five years and physiotherapy had relieved it considerably eighteen months before the visit, but a recurrence three weeks previously confined her to bed. She was anaemic and looked ill. The short-wave diathermy which was previously effective did not relieve her discomfort, and investigation in hospital confirmed the suspected diagnosis of an abdominal growth.

A 66-year-old man was being nursed most attentively in a very good home by his wife. He had had a stroke in March 1955 and his left side was completely paralysed, restricting his activity to sitting up for a few hours daily in a chair. Mentally he was very bright though emotionally unstable and he tried very hard to co-operate in treatment, but as there was no improvement at the end of the course he was admitted to hospital for more intensive rehabilitation. This also failed, but the interest taken in his disability did help him and his wife, and enabled them to overcome some of their domestic difficulties and nursing problems.

Mrs. Y was a widow aged 74, an invalid for six months following a stroke, and was well looked after in a good home by her son and daughter-in-law. Although residual paralysis was not severe and she was mentally alert, she had lost initiative and had become bedfast for some weeks prior to the visit. The physiotherapist attended her only once, because another stroke supervened followed by rapid deterioration and necessitated admission to hospital where she died a few days later.

Mrs. Z, also aged 74, and her husband were cared for by a very attentive niece with the help of the district nurse. The patient had been in bed for four weeks following a stroke, and for two weeks after the visit promised to do well with treatment at home, until she had to be admitted to hospital partly because of thrombophlebitis of the hemiplegic leg, and mainly because her elderly husband was exhausted owing to her restlessness at night.

4. *Age and sex of 'accepted' patients.* The age and sex distributions of these eighty-five patients are shown in Table X, where it appears that age had little influence on the degree of improvement.

TABLE X. *Age Distribution of Accepted Patients*

Result of treatment	*Age group in years*							
	< 60	60–	65–	70–	75–	80+	*Total*	%
	Males							
Greatly improved	..	..	1	1	3	1	6	26·1
Improved	3	2	..	..	1	..	6	26·1
No change	..	1	2	..	2	3	8	34·8
Admitted to hospital	1	1	..	1	..	..	3	13·0
Died	..	..	..	..	..	..	..	..
Total	4	4	3	2	6	4	23	100
	Females							
Greatly improved	1	3	6	6	3	2	21	33·9
Improved	2	4	4	8	3	3	24	38·7
No change	..	1	1	3	1	3	9	14·5
Admitted to hospital	..	..	1	3	2	1	7	11·3
Died	..	..	..	..	..	1	1	1·6
Total	3	8	12	20	9	10	62	100
	Persons							
Greatly improved	1	3	7	7	6	3	27	31·7
Improved	5	6	4	8	4	3	30	35·3
No change	..	2	3	3	3	6	17	20·0
Admitted to hospital	1	1	1	4	2	1	10	11·7
Died	..	..	..	..	..	1	1	1·3
Total	7	12	15	22	15	14	85	100

The mean ages of the men and women in the different categories (omitting the patient who died) were:

	Men	*Women*
Greatly improved	74·3	70·5
Improved	60·3	70·4
No change	75·4	75·4
Admitted to hospital	62·3	74·4

Analysis of variance shows that there is no significant difference between the mean ages of the four groups in women ($F = 1{\cdot}47$, $N_1 = 3$, $N_2 = 58$, $P > 0{\cdot}20$), but the difference in men is significant ($F = 4{\cdot}83$, $N_1 = 3$, $N_2 = 19$, $0{\cdot}05 > P > 0{\cdot}01$). This age difference in the male patients complicates comparison between groups of patients categorized according to the degree of improvement in later tables, and our numbers are too small to make proper allowance for the age factor. However, it appears that 67 per cent.

of the patients accepted for treatment were considered afterwards to have responded favourably. It should be remembered that this refers primarily to the improvement achieved in physical capacity and independence and does not take into account the very considerable improvement in morale obtained in many of the households of the remaining 33 per cent. regarded as not improved. The response to treatment seems to have been very much better in the women than in the men, both 'greatly improved' and 'improved', but again this may have been influenced by the small numbers of male patients with their higher proportions in the older age groups.

TABLE XI. *Capacity of Accepted Patients to Co-operate*

	Result of treatment							
	Greatly improved		*Improved*		*Not improved*		*Total*	
	No.	%	*No.*	%	*No.*	%	*No.*	%
Most co-operative	2 } 22	7·4 } 81·5	3 } 22	10·0 } 73·3	1 } 15	3·6 } 53·6	6 } 59	7·1 } 69·4
Co-operative	20	74·1	19	63·3	14	50·0	53	62·4
Willing but unable	2 } 5	7·4 } 18·5	4 } 8	13·3 } 26·7	4 } 13	14·3 } 46·4	10 } 26	11·8 } 30·6
Un-co-operative	..	..	3	10·0	2	7·1	5	5·9
Retarded	2	7·4	1	3·3	2	7·1	5	5·9
Not known	1	3·7	..		5	17·9	6	7·1
Total	27	100	30	100	28	100	85	100

$\chi^2 = 5{\cdot}379$, D.F. = 2, $0{\cdot}10 > P > 0{\cdot}05$.

5. *Co-operation and attitude towards disability*. The ability to co-operate was expected to play a considerable part in the response to treatment. These traits were estimated and noted on the record card at the time of the initial medical examination and were not influenced, therefore, by the assessment of 'result' after treatment. Table XI shows that 'most co-operative' and 'co-operative' patients comprised 81·5 per cent. of those who were 'greatly improved' after treatment, 73·3 per cent. of those who were 'improved', and only 53·6 per cent. of those 'not improved'. Similarly, it was thought that the patients' attitude towards a disability would influence recovery, and in Table XII it appears that 85·2 per cent. of 'greatly improved' patients and 66·7 per cent. of those 'improved' were 'hopeful' compared with 42·9 per cent. of the 'not improved' patients.

6. *Attainments before and after treatment.* An attempt was made to assess the improvement gained by treatment in the performance of simple routine tasks—the ability to negotiate stairs, to eat meals without help, to dress, to brush hair, and to shave.

TABLE XII. *Mental Attitude of Accepted Patients*

	Result of treatment							
	Greatly improved		*Improved*		*Not improved*		*Total*	
	No.	%	*No.*	%	*No.*	%	*No.*	%
Hopeful	23	85·2	20	66·7	12	42·9	55	64·7
Sceptical	..	..	1	3·3	3	10·7	4	4·7
Depressed	2	7·4	7	23·3	4	14·3	13	15·3
	4	14·8	10	33·5	16	57·1	30	35·3
Apathetic	..	..	2	6·7	5	17·9	7	8·2
Not known	2	7·4	..	..	4	14·3	6	7·1
Total	27	100	30	100	28	100	85	100

$\chi^2 = 10{\cdot}8616$, D.F. = 2, $0{\cdot}01 > P > 0{\cdot}001$.

Fifty-six of the 85 patients were unable to climb stairs before treatment, and 10 of them regained their capacity to do so with treatment. Ten patients (not all of them amongst those just mentioned) out of 51 who were unable to dress themselves could do so after treatment. There were 20 patients who could not feed themselves before treatment, but only 7 of these could eat a meal without help afterwards. Eight of the 32 patients who could not do their own hairdressing were able to manage it after treatment, and this faculty was especially important to the women. Old men commonly delegate shaving to someone else and 13 of the 23 men in the series could not, or did not, shave themselves, only two of them responding to encouragement to do so after treatment.

A similar estimate of the range of activity before and after treatment showed that the number of completely bedfast patients was reduced from 20 to 12, and of those who had been 'chairfast' from 24 to 15. The number of patients capable of restricted activity indoors was raised from 34 to 40, and, whereas only 7 patients were fit for limited outdoor exercise before treatment, 18 were able to go out afterwards.

7. *Amount of individual treatment needed.* Some patients needed more frequent attention than others, and the amount of treatment given to each person was therefore reckoned by the number of

physiotherapy visits (six representing a course) and not by the time taken to give a course. In Table XIII the three major groups of disabilities (hemiplegia, arthritis, and 'others') are shown according to the result of treatment, and in Table XIV according to the number of treatment visits. Approximately one-third of the series of accepted patients were greatly improved (31·8 per cent.), one-third

TABLE XIII. *Disabilities of Accepted Patients According to Result of Treatment*

	Greatly improved		*Improved*		*Not improved*		*Total*	
	No.	%	*No.*	%	*No.*	%	*No.*	%
Hemiplegia .	14	37·8	7	19·0	16	43·2	37	100
Arthritis . .	8	28·6	13	46·4	7	25·0	28	100
Others . .	5	25·0	10	50·0	5	25·0	20	100
Total . .	27	31·7	30	35·3	28	33·0	85	100

$\chi^2 = 7{\cdot}94$, $N = 4$, $0{\cdot}10 > P > 0{\cdot}05$.

improved (35·3 per cent.), and one-third not improved (32·9 per cent.). Hemiplegic patients seem to have responded either very well or else very badly to treatment at home, as they hold the highest proportions in the 'greatly improved' and 'not improved' categories (37·8 per cent. and 43·2 per cent. respectively). Patients with arthritis and other disabilities produced smaller proportions of outstanding successes but their overall response to treatment was better than that of the hemiplegic patients, 75 per cent. of them having attained some degree of improvement. However, these differences, though suggestive, are not significant.

The physiotherapy visits usually continued until it was thought that nothing was to be gained by further treatment (having restored reasonable independence, relieved some painful disability, or failed to obtain any response to repeated efforts). In most hemiplegic patients this entailed more frequent attention over longer periods than in other conditions (Table XIV). Those who responded with great improvement averaged 20·8 treatments, and those who were improved, 21·4 treatments. If 'greatly improved' and 'improved' groups are combined, eight of the hemiplegics (38·0 per cent. of those showing some degree of improvement) needed more than three courses of treatment compared with only 14·3 per cent.

TABLE XIV. *Number of Treatments needed for each Disability according to Result of Treatment*

Number of treatments	Result of treatment																							
	Greatly improved						*Improved*						*Not improved*						*Total*					
	Hemi-plegics		*Arthritis*		*Others*		*Hemi-plegics*		*Arthritis*		*Others*		*Hemi-plegics*		*Arthritis*		*Others*		*Hemi-plegics*		*Arthritis*		*Others*	
	No.	%	*No.*	%	*No.*	%	*No.*	%	*No.*	%	*No.*	%	*No.*	%	*No.*	%	*No.*	%	*No.*	%	*No.*	%	*No.*	%
1–6 . . .	4	28·6	..	..	1	20·0	..	..	4	30·8	6	60·0	11	68·8	5	71·4	3	60·0	15	40·5	9	32·1	10	50·0
7–12 . . .	3	21·4	3	37·5	2	40·0	1	14·3	3	23·1	4	40·0	4	25·0	1	14·3	2	40·0	8	21·6	7	25·0	8	40·0
13–18 . . .	2	14·3	4	50·0	1	20·0	3	42·9	4	30·8	..	..	..	..	..	..	..	..	5	13·5	8	28·6	1	5·0
19+ . . .	5	35·7	1	12·5	1	20·0	3	42·9	2	15·4	..	..	1	6·3	1	14·3	..	...	9	24·3	4	14·3	1	5·0
Total . .	14	100	8	100	5	100	7	100	13	100	10	100	16	100	7	100	5	100	37	100	28	100	20	100
Mean . . .	20·8		14·1		10·6		21·4		13·2		7·1		7·0		8·4		7·4		15·0		12·3		8·1	

of patients with arthritis and 6·6 per cent. of 'others'. The decision to stop treatment at the end of the first course seems to have been reached fairly uniformly in all three sets of disabilities, but in the 'not improved' group, it is probable that treatment was stopped early when it became obvious that nothing was being gained by it, so that a fair comparison with the other groups in this respect is not really possible.

8. *Comparison between hospital and home treatment; time required and cost.* In 1953 a study[6] of 174 hemiplegic patients admitted to the geriatric wards of the Belfast City Hospital showed that 74 (42·5 per cent.) of them responded to treatment and regained some degree of independence. The average time they needed for this was 72 days. These hospital patients were not 'selected' in the same sense as those accepted for treatment at home under the present scheme and may, therefore, not be strictly comparable as regards the proportion who responded with improvement (56·8 per cent. at home; 42·5 per cent. in hospital). It is more instructive to compare the amount of treatment given to obtain the desired result. In hospital this needed, on average, 10 weeks of continuous supervision. At home, results which compared very favourably were obtained with an average of 21 treatments. The first few of these were given daily in the early stages of recovery, and then twice or three times each week, so that the average time taken to give them would be, if anything, less than the 10 weeks needed in hospital. In the 12-month period covered by this report, 1,100 'treatments' were given at a cost of £867 8*s.* 0*d.* (including physiotherapist's salary, vehicle running expenses and depreciation, insurance and supplies, but not including the doctor's salary). This represents 15*s.* 9*d.* for each treatment, or £16. 10*s.* 9*d.* for the rehabilitation of an 'average' hemiplegic, a sum of money which would barely support a patient in a modern hospital for a fortnight. We have not lost sight of the fact that when most of these patients were referred for home treatment their doctors did not intend them to be admitted to hospital either because they did not wish to leave their homes, or because hospital care was not thought necessary at that time. However, there were some patients for whom home treatment was suggested as an alternative to admission, and others whose precarious home circumstances would probably have made permanent hospital care inevitable later on because of complications arising from many months in bed.

V

Discussion

THIS trial scheme was founded on the belief that there are elderly invalids being nursed at home for one reason or another who can only hope for partial recovery, and who risk becoming hospital long-stay patients, unless treated as they would be in a hospital geriatric ward. The plan to provide such rehabilitation in the homes of old people was proposed with some mental reservations because, although we knew of the need for it from some hundreds of domiciliary visits made in recent years, we doubted whether the results obtained at home could compare favourably with those in a geriatric department, in which a régime of treatment adapted to the slower response of old age, and constant encouragement, often succeed where a general hospital ward fails. It seemed unlikely that intermittent visits to the homes could arouse the same concentration on recovery, though it was intended that physiotherapy should take second place to instruction in self-aided methods of maintaining activity.

For these reasons the effective rehabilitation of two-thirds of the small series of patients accepted for treatment at home is most encouraging. Many of the patients had been confined to bed for a considerable time, and our belief that treatment forestalled the admission of several long-stay patients to hospital was confirmed by their family doctors. The scheme has been unexpectedly successful in the rehabilitation of the hemiplegic patients, both for those treated from the time of the onset of the stroke and for others incapacitated for some weeks or months. One patient described earlier in the report had been 10 weeks in bed when treatment started, was confused, incontinent, and helpless, had a further stroke, and yet regained full independence apart from the use of his arm after 15 weeks. An 85-year-old woman nursed devotedly by her daughter was confused, dehydrated, and bedfast 8 weeks after a stroke. The dehydration was corrected and after 8 weeks she was able to go out for short walks with her daughter, and was

quite clear mentally. A faded little lady straight from the pages of Quality Street lived with an equally genteel niece who did the housekeeping and helped the invalid out of bed to sit in a chair for an hour or so. The patient could neither stand nor walk because of a stroke 8 months previously, yet 22 treatments enabled her to get about the house unaided and help with the household chores. It would seem that where home conditions are suitable and the patient able to respond, the hemiplegic patient can be treated as effectively at home as in hospital, and for about one-quarter of the cost.

The first six months of the trial period were very active and interesting from the standpoint of the medical visits. Assessment outstripped treatment at first, a waiting list developed, and in February a second physiotherapist had to be employed part-time so that treatment could be given in the afternoons, as well as the mornings, throughout the week. The home-treatment scheme added welcome variety to the work of the geriatric physiotherapy department, but would have been too tiring as a whole-time occupation. The waiting list vanished in a few weeks, but both physiotherapists were kept busy until the autumn when, in September and October, the numbers of patients referred for treatment began to fall off to six or seven each week. This was thought at first to be a temporary decline, but there was no improvement by November, and it then seemed obvious that, though the general practitioners interested in the scheme would continue to refer a few patients each week, and the need for the physiotherapy service still existed, the work could be covered by the former system of morning visits by one part-time physiotherapist. The full-time medical appointment could not be justified by so few assessment visits and if, as is hoped, the scheme is to be continued and allowed to fulfil the excellent purpose it serves, this responsibility could be taken over, with some extra help, from the geriatric unit.

The value of the scheme to their patients was mentioned by several of the family doctors. The idea appealed very much to them and, though they understood its limitations, they felt that it filled a gap in the services they could call upon to help old people in their homes and that it would save hospital beds. Some of these doctors, whose patients had failed to gain much physical improvement from treatment, mentioned the benefit derived from the new interest aroused by the visits, and from the improved morale where advice had helped to overcome difficulties in the management of the patient.

These intangible benefits could not be taken into account in the assessment of improvement, but they may have had even more influence on the household than the results of physical treatment. Some doctors were asked if they could explain the indifference shown to the scheme by the majority of their colleagues in the area, despite the appreciative support given by the minority who had used it. They could only suggest that the numbers of suitable patients in the average practice is small, and that selection needed time and concentration. It seems, therefore, that the scope for this kind of service in the home is limited, and that the number of patients referred, who would prove suitable for treatment at home, is unlikely to overtax the resources of the scheme as it stands at present.

The visits to many of the homes of patients who could not be accepted for treatment confirmed the need for an 'information' or 'counselling' centre in the area, with authority to enlist the help of statutory and voluntary resources for the care of old people. Sometimes the family doctor is not aware of all the services available or, because they are scattered amongst several independent authorities and not co-ordinated through a single telephone number, he cannot afford time to do the necessary co-ordination himself. He is at a loss to know what action to take when confronted by the kind of decrepit elderly invalids referred to on p. 18, ill-kempt, underfed, and living without adequate help in neglected, derelict homes which they are often determined not to desert. The medical implications of such problems are generally outweighed by the social difficulties, and although the family doctors commonly seek advice from the geriatric department, the old people seldom wish to come into hospital, and those who do are brought in usually to put right their dehydration and malnutrition, to clean them up, and to shelter them until the almoner has sorted out the domestic difficulties. Unfortunately, although the patients and their homes can be cleaned and, to some extent, renovated, there is no effective system of after-care for such patients, and a return to former living conditions is inevitable if, as is usual, they refuse to accept local authority residential care on discharge. Readmission to hospital then becomes inevitable in a few weeks, or months, when the whole process starts over again.

There would seem to be a need for an informed 'go-between'. probably a Health Visitor, readily available on one telephone

number, whom the general practitioner could call upon to visit the patient and assess the situation, and who would have the executive power to focus the attention of all the necessary services on such homes; and the existing resources need the support of a laundry service and an extended 'meals on wheels' service before they can be really effective.

It has been said that the greatest misfortune of the Welfare State is the fact that so many people have come to lament the passing of the Relieving Officer who, with the wide resources of the Poor Law behind him, could deal with any situation single-handed. The results too often were far from desirable, and there must be few who would wish to return to those days. The Health Visitor is perhaps best qualified to assume the Relieving Officer's former responsibilities towards old people in trouble at home, her task being different in that the services she should be able to call upon to maintain health and comfort in the home offer a more attractive solution to an old person's difficulties than incarceration in the Workhouse or the limited help of outdoor relief. This suggestion, referring as it does mainly to patients who were considered unsuitable for home treatment, might be considered irrelevant in a report which is concerned with the results of treatment in those who were accepted, but we were no less perplexed than the general practitioners by want of a ready answer to distress and privation in several old people's homes which we felt unable to let pass without comment. Home treatment and rehabilitation has been successful in this trial within the limits defined earlier; it could be a useful aid to comprehensive home-care services for the aged.

VI

Summary

A TRIAL of home treatment and rehabilitation on disabled elderly invalids in Belfast, who did not want or who did not need hospital care, has been attempted from the geriatric unit of the Belfast City Hospital within a scheme sponsored by the Nuffield Provincial Hospitals Trust. The scheme was designed to bring into the home the medical care and physiotherapy practised in a geriatric ward, and was limited to this purpose so as to supplement and not supplant existing health and welfare services.

In twelve months 272 elderly patients were referred for treatment by 95 general practitioners, and 85 patients (23 men and 62 women) were accepted for treatment, according to their disabilities and home conditions. Of these, 37 had hemiplegia, 28 had arthritis, and 20 had other diseases including fractured hips, respiratory disorders, or debility from other causes. Social status did not affect selection.

Fifty-seven of the treated patients (67·0 per cent.) responded with improvement and 27 of these (31·7 per cent. of the series) were greatly improved. Twenty eight (33·0 per cent.) failed to respond. Age did not appear to influence the degree of improvement of women, but there was some evidence that it might be a factor affecting the result obtained for men, though the numbers available are too few to be certain about this. Co-operation and a hopeful outlook were prominent in those who made the best recoveries. A considerable proportion (37·8 per cent.) of the patients showing the greatest improvement were hemiplegic invalids who, though sometimes needing as many as fifty visits from the physiotherapist, appeared to respond to treatment as readily as those treated in hospital.

The cost of each physiotherapy treatment visit was 15*s.* 9*d.*, and the impression was gained from the trial that under suitable conditions geriatric rehabilitation can be accomplished successfully in many instances at home at a much lower cost than in a hospital bed.

Special reference is made to a number of the old people who could not be accepted for treatment and who were living in conditions of severe privation and even squalor. Such patients present complex problems because their needs can seldom be answered by a single authority and usually require the attentions of several different statutory and voluntary services. A busy general practitioner has not time to make overtures to each of these in turn, even if he happens to be familiar with all the services available, and it is suggested that a co-ordinating or counselling centre, controlled by Health Visitors with special experience in the care of the aged, might overcome some of the difficulties which at present appear insuperable to sick old people, their relatives, and their family doctors.

APPENDIX A

GERIATRIC UNIT,
BELFAST CITY HOSPITAL,
BELFAST.

11th July 1955

DEAR DOCTOR,

Many old people, ill at home, might avoid becoming permanently bedridden if some of the hospital facilities for restoration of activity were available in the home. Old people are often unwilling or unable to get to hospital for such treatment, and others, who have responded well while in hospital, sometimes lose heart on return home, becoming apathetic and helpless. Next October we hope, with your co-operation, to start a trial scheme, for one year, of home treatment for old people, based on the Geriatric Unit of the Belfast City Hospital. The plan is financed and sponsored by the Nuffield Provincial Hospitals Trust and Dr. Frances M. McQuitty has been appointed to make arrangements for individual treatment in consultation with the family doctor. She will have the help of a physiotherapist and a trained assistant. The intention is to provide treatment which may forestall needless disability in elderly invalids and to find out whether results comparable with those in hospital geriatric wards may be obtained, and maintained, in the home. Dr. McQuitty's work will not interfere in any way with the medical responsibility for the patient which must of course rest with the family doctor, nor will the scheme supplant existing services, but will be complementary to them.

The number of patients accepted for treatment must be limited because the team is small. Home conditions and family help will have to weigh as heavily in assessment of 'suitable' patients as the illness. For these reasons it will be best for Dr. McQuitty to visit each patient and reach a decision about treatment after discussion with the family doctor.

Patients referred for treatment should be those aged 60 and over, incapacitated by recent acute illness, or by degenerative conditions (such as arthritis, hemiplegia, Parkinsonism or an old fracture), who, you consider, may be restored to activity, or prevented from deterioration, by physiotherapy and exercises. Chronic invalids in the terminal stages of incurable disease, or those with advanced senile mental change and so unable to co-operate, should not be referred for home treatment.

If you are interested in this proposal and have, in your practice, elderly patients whom you would like Dr. McQuitty to visit, will you

please fill in their names and addresses on the form and return it in September in the prepaid envelope enclosed. Dr. McQuitty will, of course, get in touch with you before visiting the patients.

Your co-operation in this trial scheme will be greatly appreciated.

Yours sincerely,

G. F. ADAMS.

Physician to the Geriatric Unit,
Belfast City Hospital.

APPENDIX B

I wish to acknowledge your letter of 11th July and to refer the following patients for consideration in your scheme of home treatment from the Geriatric Unit of the Belfast City Hospital.

NAME	ADDRESS	DISABILITY

Signed.....

Date.....

Telephone No.....

APPENDIX C

SERIAL NO.	SURNAME	CHRISTIAN NAME	DIAGNOSIS	CIVIL STATE M S W	AGE	SOC. CAT.	DATE FIRST VISIT

HOUSING

Good
Fair
Bad
Own Home
With Relative
Lodgings
Other

Room Occupied 0 1 2 3 ½
Restricted Floor Space
Overcrowding
Inadequate Facilities
Ground Floor Room Available

MENTAL STATE

Fully Normal
Slight Confusion
Confused
Incontinent
U. F. D.

Most Co-operative
Co-operative
Willing but Unable
Unco-operative
Retarded

Over Optimistic
Hopeful
Sceptical
Depressed
Apathetic

HELP

Self Alone
Spouse
Daughter
Granddaughter

Housekeeper
Paid Servant
Landlady
Home Help

Competent
Incompetent
Unwilling
Unable to Cope

PHYSICAL STATE

Obese
Good Condition

Normal
Debilitated

Wasted
Ill

Bedsores

Contractures (*specify*).....

.....

Duration (Weeks)

Bedfast
Chairfast
Home Only

Stairs Up, Down
Brush Hair
Shave
Dress Self
Feed Self

Bedpan
Commode
W.C.
With Help
Without Help

Limited Outside (*specify*).....

Short Walk
Shopping
Public Transport.....

Predominant Handicap (*specify*).....

Mental
Physical .....
Housing
Help.....

REJECTED

L.S. Bedfast { Content / Hospital / Declined Admission }
At Full Capacity
Bad Risk
Social Problems { Poor Home / Inadequate Help / Alone }

ACCEPTED

Disabled for.....months

Treated for.....weeks

RESULT
Greatly Improved
Improved
No Change
Admitted to Hospital
Died

PATIENT REQUEST ADMISSION?
RELATIONS REQUEST ADMISSION?
DOCTOR SUGGEST ADMISSION?

DOCTOR CONSIDER ADMISSION UNNECESSARY
DOCTOR SUGGEST ADMISSION

PATIENT/RELATIVE DECLINED ADMISSION
PATIENT WAS IN HOSPITAL AND DISCHARGED

APPENDIX D

Physiotherapy equipment, and design of the clamp for Dexion Frames

THE following equipment is carried by the physiotherapist (Fig. 1):

1. An Isotherm 514 portable short-wave diathermy set with a trolley. The arms and electrodes are carried in a wooden box specially made to hold them securely when travelling in the car.
2. A portable infra-red lamp and stand.
3. A mains-supplied Multisurger.
4. A large vacuum container to hold crepe bandages soaked in hot wax. (These bandages are easy to apply to patients in their homes, and no time is lost in efforts to melt solid wax to an appropriate temperature.)
5. A few 50-lb. and 30-lb. springs, some broad slings and foot-pieces, bowls and other incidentals such as the time-clock complete the orthodox physiotherapy equipment.

Some special adaptors were made by the hospital electrician by soldering standard three-pin sockets, which fit the plugs of all our electrical appliances, to various types of flat and round-pinned plugs to fit the different power sockets met in the homes. This saves time on visits, which might otherwise be wasted on changing fittings, and the adaptors are all fused for added safety. The physiotherapist also uses a 'Testoscope' (Runbaken Ltd., Manchester) to check the electrical circuits in the homes.

Dexion frames and clamp

Mild steel Dexion angle-iron is used to construct a 'gallows' (Fig. 2). A 4-foot length and an 18-inch length are bolted together and reinforced with a nine-inch diagonal strut.

The clamp to support a frame on a bed-head or chair-back is made, in the shape of a letter 'h', of $\frac{3}{16}$ in. brass (Fig. 3). The base or upright of the 'h' is a plate measuring $6\frac{1}{2} \times 2\frac{1}{2}$ in. with two standard Dexion bolts welded into the upper end, and two at the bottom, spaced so as to fit the slots and holes in the broad side of the Dexion angle-iron. Midway down the opposite surface of the base plate a second piece of brass is welded on and bent at a right angle to form an arch, the remainder of the 'h', with a $2\frac{1}{4}$ in. gap between the two uprights so formed. The joint is reinforced by two brass 'shoulders' welded to the top of the arch and to the base-plate. A hole is then drilled in the centre of the second upright to

take a nut ($\frac{3}{8}$ in. Whitworth thread) carrying the screw of the clamp which is $1\frac{3}{4}$ in. long with a circular brass base $1\frac{1}{2}$ in. diameter on the inner end, and a turnkey on the other. The inner surface of the arch and the base of the clamp are lined with thick rubber stuck on with an appropriate adhesive.

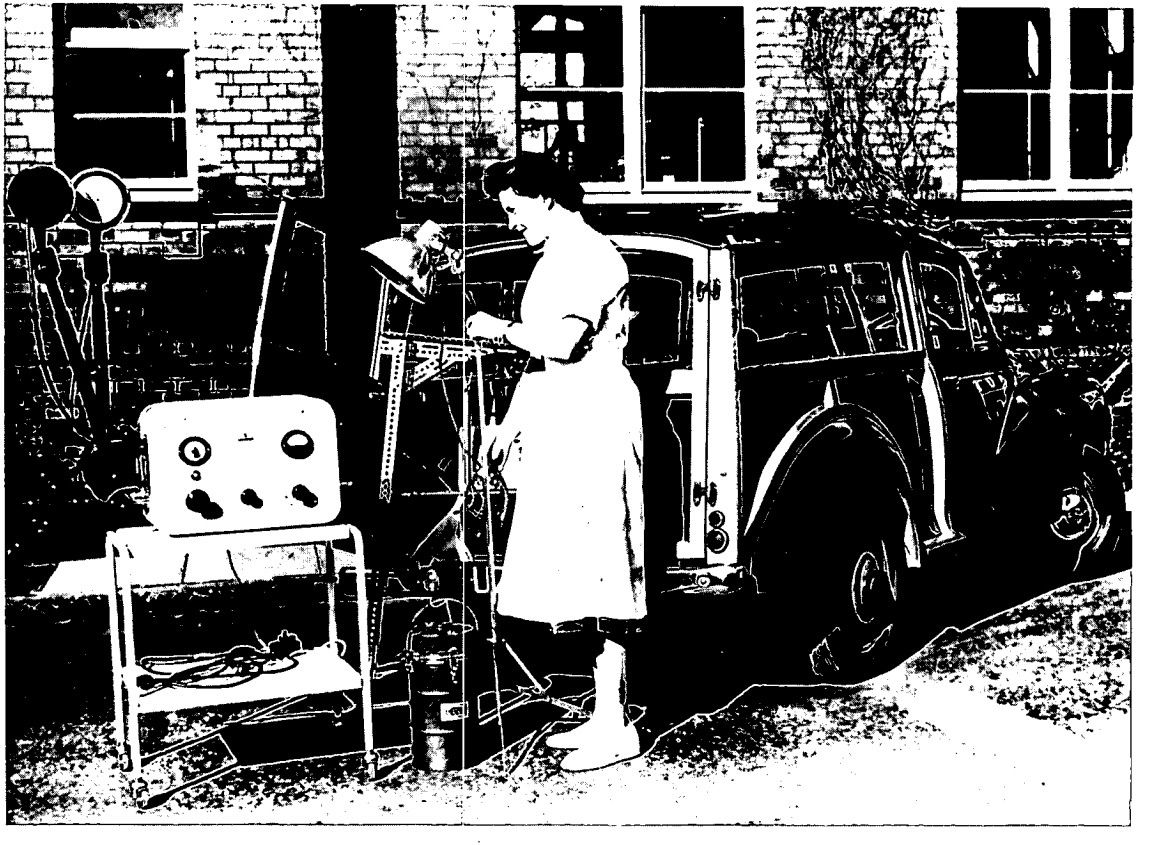

FIGURE 1. Physiotherapy equipment used for home treatment

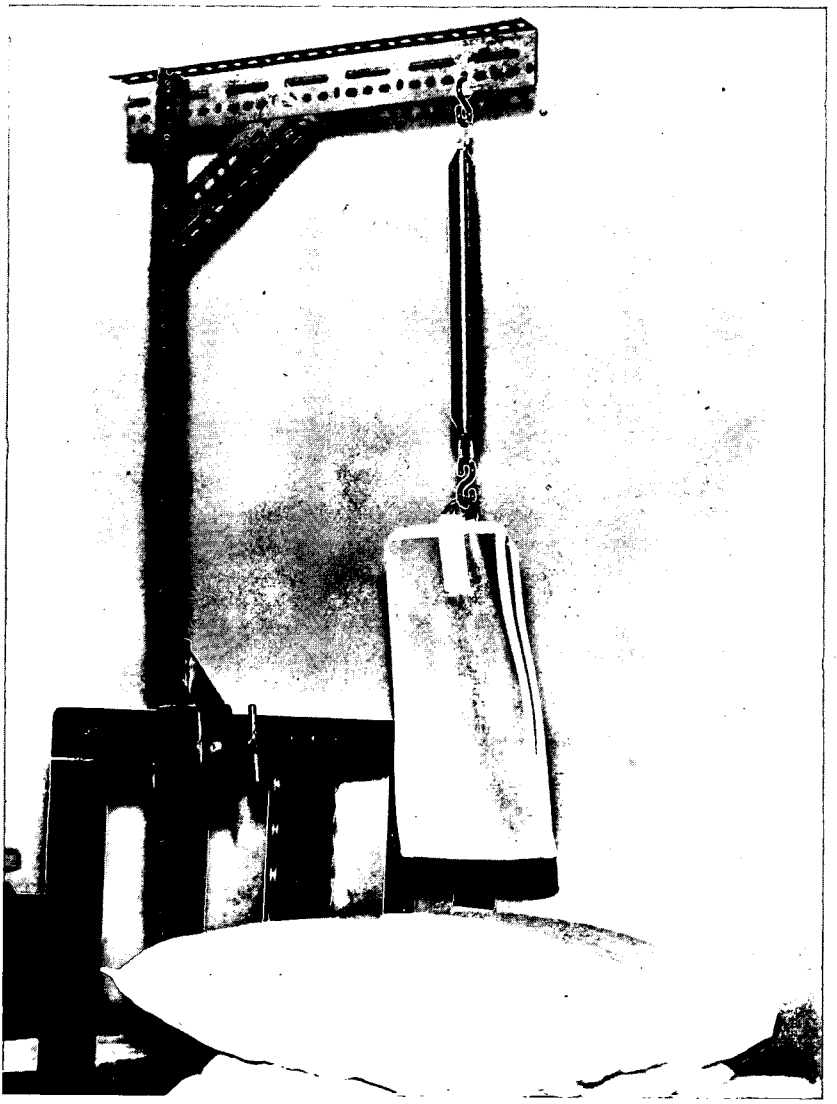

FIGURE 2. Portable Dexion frame and clamp attached to bed-head

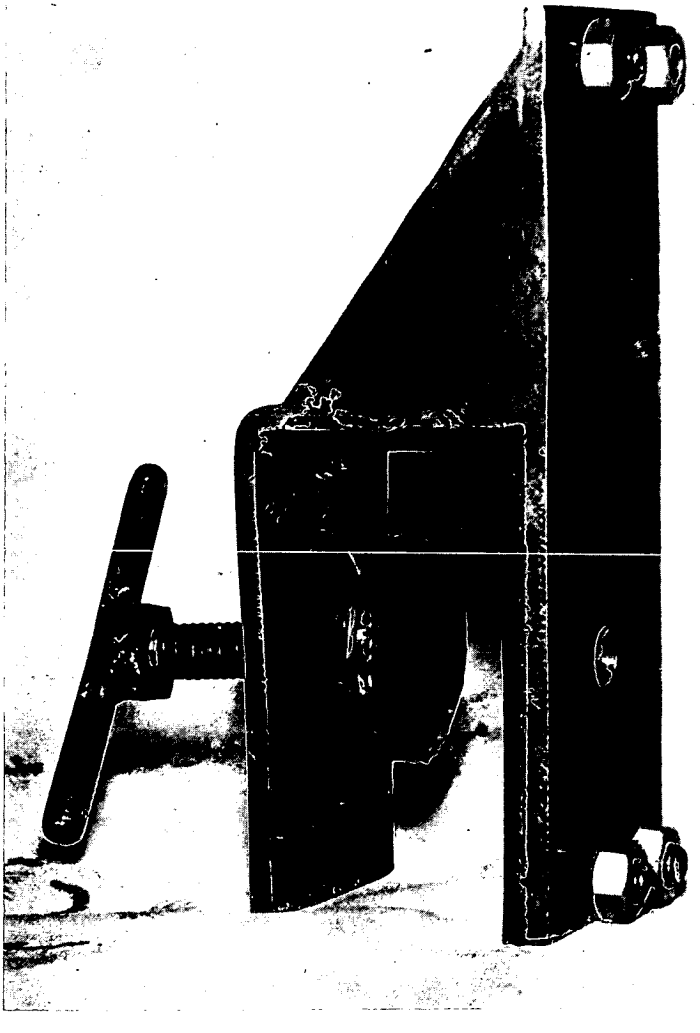

FIGURE 3. 'Universal' clamp designed to attach Dexion frames to any type of bed-head

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