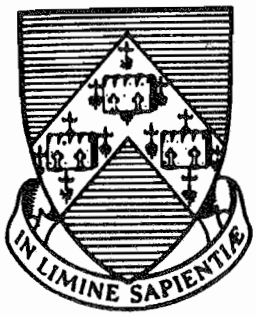

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A Cost-Benefit Analysis of Open Access to Physiotherapy for G.P.s

by
RICHARD FORDHAM
AND
CATHERINE HODKINSON

DISCUSSION PAPER 29

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by

Richard Fordham
and
Catherine Hodkinson

The Authors

Richard Fordham is a Research Fellow with the York Health Economics Consortium, University of York. Catherine Hodkinson is currently employed by Leeds East Health Authority. She has worked as a Research Fellow at the Institute for Research in the Social Sciences, University of York.

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ABSTRACT

A pilot scheme for general practitioner open-access to physiotherapy began with the Todmorden practice in June 1985. This pilot scheme was studied by the authors for a thirteen month period between August 1985 and September 1986 to establish the main cost-benefit implications of providing such a service in this area.

The study was designed in consultation with senior officers of the Calderdale Health Authority and involved the Hebden Bridge group practice as a means of comparing a similar practice with a similar population but without an open-access facility (control group). Patients in six pre-selected condition groups (see Section 3) were chosen as potential beneficiaries of this pilot service and in both practices the progress of these groups of patients were followed irrespective of whether they received physiotherapy via open-access or a consultant referral or not at all (in the case of some control group patients).

The main aims of the study were: i) to assess the impact of open-access on hospital and general practitioner workload and ii) to quantify the costs and benefits of such a scheme affecting patients, the physiotherapy service and (to a limited extent) on general practitioners).

The full conclusions of this study are to be found in Section 6. However, the following are the major findings of this report:

1) The additional (marginal) cost to the physiotherapy department of providing open-access for selected patients from one practice was around £3,298 per annum.

2) The service was used responsibly by referring G.P.s who, in their opinion, found it to be a very useful treatment option.

3) The availability of the open-access service reduced the number of consultant referrals (both urgent and non-urgent) especially those who would have ultimately been seen in the physiotherapy department.

4) The availability of the open-access service generated a demand for physiotherapy services which, under normal circumstances, would have gone unmet and been managed by the patients' general practitioner.

5) Open-access physiotherapy produced improvements in the patients condition (as assessed both by patients and by physiotherapists) although no greater difference in benefit could be found when compared with physiotherapy obtained by consultant referral (except Group 2) or no physiotherapy at all.

6) Open-access patients used significantly less physiotherapy time and sessions than their consultant referred counterparts. This reduced the average treatment costs per case from £42 to £25 (revenue costs only).

7) The availability of open-access did not reduce the general practitioners workload as measured in terms of the number of patient consultations.

8) Open-access patients waited significantly less time to obtain physiotherapy than those patients referred to a consultant. This was reduced from 124 days to 22 days in the study group.

This report is a summarised version of a full report prepared for the Calderdale Health Authority in 1987. Copies of the full report are available from the Authors on request.

1. Introduction

Whether or not hospital physiotherapy services should be made directly available to general practitioners without the necessity for a prior consultant referral has been the subject of considerable debate within the N.H.S. over the last decade.

The debate continues, nevertheless the concept of open-access to physiotherapy for G.P.s has been gaining ground steadily during this period under mounting public and professional pressure to reduce waiting times for hospital treatment. Orthopaedics in particular has suffered from the problem of long out-patient and in-patient waiting times.

Since orthopaedic departments are one of the heaviest users of physiotherapy facilities in main hospitals, proponents of open-access argue that patients with these types of conditions should be able to obtain physiotherapy treatment directly on the recommendation of their G.P. They argue this would reduce the waiting period for patients and reduce the amount of workload referred to Consultant Clinic unnecessarily.

This study of open-access in Todmorden, has looked closely at the main costs and benefits of such a scheme and compared them with normal consultant referral. However, for the first time comparison has also been made with a "no further referral" treatment group using a similar practice (Hebden Bridge) in the same area, without the open-access facility, as a control group.

Background

Between 1972 and 1981 the climate of opinion about open-access to physiotherapy for general practitioners changed considerably at a national level.

The subject of open-access was discussed by a Sub-Committee of the Standing Medical Advisory Committee Chaired by Tunbridge (DHSS: Tunbridge Report, 1972). This Sub-Committee recognised that General Practitioners should be closely involved with hospital rehabilitation departments by attendance at assessment clinics. However, they felt that General Practitioner referrals for physiotherapy were not appropriate because many General Practitioners were out of touch with modern concepts of remedial treatment. It was thought that this might lead to departments becoming overburdened with patients for whom unnecessary or inadequate treatment has been prescribed.

However, by 1981 a report of a Working Party to the Secretary of State for Social Service chaired by Professor Duthie (DHSS: Duthie Report, 1981) on Orthopaedic Waiting times clearly indicated that relationships between General Practitioners and physiotherapists had changed:

> "In order to lighten the burden on Consultant Orthopaedic Surgeons and to cut down on the time which patients have to wait for appointments in Orthopaedic out-patient Clinics, we recommend the extension of the present arrangement already operating successfully in many places whereby open-access to hospital physiotherapy departments is provided for general practitioners".

This change of philosophy was mainly brought about by a number of experimental open-access schemes around the country which helped to establish two important points. Firstly, that G.P.s could use open-access systems with discrimination and without the anticipated flood of unnecessary patients. Secondly, that physiotherapists were capable of managing patients using their professional expertise and not requiring over-prescriptive guidance from referring doctors. A few progressive departments of Orthopaedics were quick to see the potential benefits for their own workload of open-access and lent their support to local proposals for such schemes.

During this period (1975-1980) the role of the physiotherapist as perceived by the medical profession began to change more widely and the pioneering open-access schemes contributed to this mood. In 1973 a report on the Remedial Professions by a Working Party Chaired by McMillan (DHSS: McMillan Report, 1973) stated cautiously:-

> "...it should be possible for the doctor and the therapist to work together in an atmosphere of mutual respect and appreciation".

Their recommendations included several important principles upon which many open-access schemes are now based although open-access at the time was not one of the recommendations. These are:-

i. The referring doctor should provide a diagnosis and set out the aims of treatment, with limitations and contra-indications. The nature and duration of the treatment should be determined by the therapist.

ii. Doctor and therapist should have an equal right to terminate treatment which they consider not to be of value.

iii. The therapist should have direct access to the consultant clinically responsible for the patient.

By 1977 a Statement by the Standing Medical Advisory Committee (DHSS, 1977) reiterated these basic principles but went further in emphasising the skills and expertise of therapists:-

> "Therapists are in very close contact with their patients during treatment and therefore develop the facility for equating the different forms of treatment to the pattern of patient responses. More use should be made of this experience..."

This statement also recognised for the first time that clinical responsibility for initiating physiotherapy may also be in the hands of the General Practitioner:-

> "it is essential that the therapist should have direct access to the consultant or general practitioner clinically responsible for the patient".

A year later a comprehensive review of physiotherapy in the community (Partridge and Warren, 1978) identified open-access for G.P.s as an essential part of a district physiotherapy service. In a follow-up study in 1984 Partridge showed that open-access was available in 78% of districts compared with 65% of them in 1980.

Studies of open-access to physiotherapy

Quite a few studies of open-access have been made since the concept was introduced. These have been focussed on many different issues relating to the introduction of an open-access scheme. Early studies tended to concentrate on the feasibility of running open-access and the practical problems encountered (Norman et. al., 1975). Some studies began to concentrate on the workload implications of open-access in particular its effect on the level of referral to consultant clinics (Clifton, 1979 and Ellman et. al., 1982).

Identifying patient groups who most benefitted from open-access has also been the subject of several investigations (Ellman et. al., 1982, Hunt and O'Ryan, 1982 and Evans, 1984).

In recent years Health Authorities have become more conscious of efficient resource utilistion and cost and it is not surprising that more recent studies have tended to address the question "is open-access worth doing?" rather than "can it be done?".

An important study made in this respect was undertaken (Gentle et. al.,1984), which examined some of the resource implications of open-access as well as measuring patient outcome.

This study was designed as a randomised control trial. It found that a higher proportion of patients in the open-access (study) group received physiotherapy treatment than in the control group (who only had consultant

referral available). The out-patient referral rate in the study group was much lower than in the control group (17 per 100 patients, compared with 56 per 100 patients).

Resource use was looked at in terms of the number of physiotherapy sessions attended (not the actual physiotherapy time utilised), however no significant difference was found between the two groups of patients.

On the other hand, outcome of treatment under the two regimes was found to be significantly better under open-access. Patients progress was measured by undertaking an initial assessment upon entry to the trial and a subsequent postal assessment three months after entry.

Whilst this study was the first to try to properly assess both cost and outcome of treatment using a more rigorous trial design, the authors concluded that they had reservations about the applicability of this trial to services elsewhere. In particular, their randomised control trial technique precluded some patients from entry and thus the authors stated that "the patients excluded may not have been similar to those referred". Their scheme could not accommodate all patients because of limited resources and patients requiring hospital transport were excluded. Thus further work was still required on the cost-benefit relationships of open-access.

2. Aims and Objectives

The two main aims of the study reported here were:

i) to assess the impact of an open-access scheme on hospital and G.P. workload.

ii) to undertake a study of the costs and benefits of introducing and running an open-access scheme compared with the same costs and benefits of consultant referral as well as with the possible option of no further

referral.

Furthermore, to identify particular groups of patients from among the six condition groups chosen who benefit most from open-access.

With regard to the first aim, it was hoped to establish in particular whether the presence of an open-access service reduces the level of referral to consultant out-patient clinics in order to obtain physio-therapy, as some studies have shown (see Section 1). Or on the other hand, whether open-access generated a new demand for physiotherapy which has previously been unmet or met through other channels e.g., private treatment. Either of these possibilities would have implications for physiotherapy departments as well as general practitioners and these are examined.

With regard to the second aim, the costs and benefits measured can be classified into three groups namely those affecting:-

i. individual patients with the specified conditions (see Section 3).

ii. hospital services (physiotherapy)

iii. the patient's G.P.

More specifically, the costs and benefits measured include the following for each of the above groups:-

Individual patients:

i. treatment outcome as assessed by the physiotherapist

ii. treatment outcome as assessed by the patients

iii. quality of life as assessed by the patient

iv. amount of time spent waiting to obtain physiotherapy treatment

v. amount spent on non-NHS treatment

Hospital Services:

i. amount of physiotherapy sessions and treatment time used

General Practitioner Services:

ii. the number of consultations with the patients G.P. during the episode of illness

3. Methodology

In order to gain a contemporaneous comparison of the effects of the open-access pilot scheme in Todmorden another adjoining practice population (Hebden Bridge) was used as a control group. This practice did not have the open-access facility available to them during the course of the study although its geographic location and population structure are similar.

Comparison of the two practices

Both practices are based in small towns in the west of the Health Authority's area in predominantly rural locations. There is a distance of 4 miles between the main surgeries of the two practices. Their populations however are discrete due to the local geography based on a long valley. The Todmorden practice is further west than Hebden Bridge and borders closely on Lancashire. Both practices look mainly towards hospital services in Calderdale Health Authority although the Todmorden practice refers approximately 45% of patients out of the district to neighbouring authorities. The size of the practice population in Todmorden is approximately 14,500 and is 17,500 in Hebden Bridge. These populations are served by six general practitioners in Todmorden and nine general practitioners in Hebden Bridge. The average age of the two groups of G.P.s is 41 and 39 respectively.

The age and sex distribution and socio-economic composition of the two populations was found to be similar (see full report), although the Hebden

Bridge practice had a slightly higher proportion of single parent families and unemployed persons at the time of the Census in 1981.

Patient groups included in the study

The study began on 12th August 1985 and continued for twelve months plus a one month follow-up period at the end (completed at the end of September 1986). The open-access service actually began on 10th June 1985.

Prior to the start of the pilot scheme it was decided to offer the Todmorden G.P.s open-access to physiotherapy for patients with the following conditions:-

1. Acute neck and shoulder pain
2. Acute back pain
3. Osteoarthrosis and rheumatoid arthritis
4. Chronic obstructive airways disease (C.O.A.D.)
5. Recent soft tissue injuries, sprains and strains
6. Recent hemiplegia

The study was therefore designed to evaluate treatment for these six condition groups between the two practices.

The trial included in the study group all patients referred to open-access in the above condition groups and patients with these conditions referred to a Consultant (whether or not as a means of obtaining physiotherapy). Patients were also included if they were referred both to open-access and to a Consultant.

A small number of patients after consultation with their G.P. for one of the six specified conditions elected to seek private treatment. These patients were included in the study and followed up as far as possible.

In the control group patients in the six specified condition groups were included if they could have been referred to open-access had it been available or if they were referred to a consultant (whether or not as a means of obtaining physiotherapy).

There were no further exclusion groups in either practice.

All patients registered in the study received a questionnaire two months after initial registration, including those who were not referred further (Hebden Bridge patients). (See full report).

The purpose of the postal questionnaire was to elicit the patients opinions about the treatment they had received. Information was collected concerning the outcome of treatment, how their condition had affected their everyday activities, duration of condition and expenditure on private treatment.

The response rate to the postal questionnaire was good (71.9% amongst Todmorden patients and 63.8% among Hebden Bridge patients) and no further follow-up of non-responders was made. The age distribution of the non-responders was similar in both practices and their mean age was 46.2 years in Todmorden and 44.5 years in Hebden Bridge.

4. Results

SECTION 1 - Results of Main Study

General During the year (August 1985 - August 1986) in which the study was conducted, 390 patients who consulted with their G.P. were followed up by the research team. Only patients in six pre-determined condition groups were included in the study.

249 patients were registered in the study group and 141 patients in the control group. The age-sex distribution of study patients in each practice

is shown in Table 1.

Table 1a

Age of Patients

Age Group (years)	Todmorden	%	Hebden Bridge	%
0-19	11	(4)	7	(5)
20-29	28	(11)	15	(11)
30-39	55	(22)	35	(25)
40-49	25	(10)	31	(22)
50-59	56	(23)	19	(13)
60-69	37	(15)	21	(15)
70+	37	(15)	11	(8)
N/K	-	-	2	(1)
	249		141	

(mean age = 48.7 years) (standard deviation = 17.8 years)

(mean age = 46.2 years) (standard deviation = 16.4 years)

Table 1b

Sex of Patients

	Todmorden		Hebden Bridge	
Male	103	(41)	65	(46)
Female	146	(59)	76	(54)
	249		141	

The age of patients in the two groups is similar with a mean age of 48.7 years in Todmorden and 46.2 years in Hebden Bridge. This reflects the similarity of the general age structure of the populations of the two practices (see Section 3).

Table 1c below shows the number of patients in each main condition group by practice. The most common condition group in the study group was ACUTE NECK AND SHOULDER PAIN (101 patients) and in the control group this

was ACUTE BACK PAIN (48 patients).

Table 1c

Condition Groups of Patients

	Todmorden (%)	Hebden Bridge (%)
1. Acute neck and shoulder pain	101 (41)	43 (30)
2. Acute back pain	48 (19)	48 (34)
3. Osteoarthrosis and Rheumatoid arthritis	48 (19)	18 (13)
4. C.O.A.D.* and Bronchiectasis	6 (2.5)	2 (1.5)
5. Recent soft tissue injuries sprains and strains	45 (18)	28 (20)
6. Recent hemiplegia	1 (0.5)	2 (1.5)
	249	141

* C.O.A.D. = Chronic Obstructive Airways Disease.

The second most common condition group in Todmorden was equally divided between ACUTE BACK PAIN (48 patients) and OSTEOARTHRITIS/RHEUMATOID ARTHRITIS (48 patients). In Hebden Bridge the second most common condition group was ACUTE NECK AND SHOULDER PAIN (43 patients).

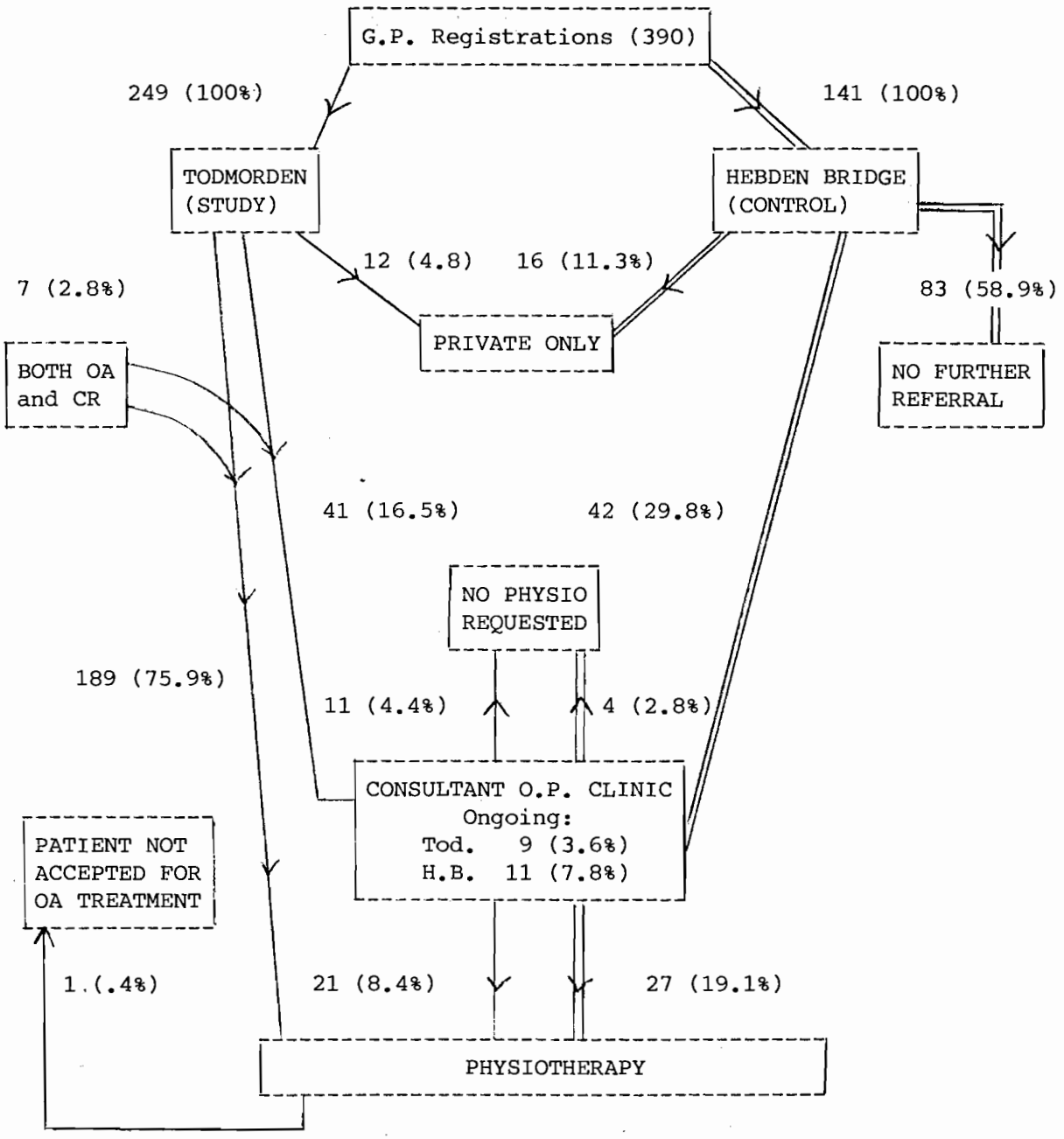
Condition groups 1, 2 and 3 accounted for the majority of patients (75%) in each practice.

Groups 4 and 6 were under-represented in both practices and this was accounted for by the presence in the practice areas of the 'Calderdale Mobile Physiotherapy Service' (a domiciliary physiotherapy service run on an independent basis).

Treatment pathways Table 2 shows the routes followed by patients in the study and control groups.

Table 2

Treatment pathways



KEY:

O.A. = Open-access
C.R. = Consultant referral
⟹ = Hebden Bridge pathways
⟶ = Todmorden pathways

N.B. Percentages are calculated from total registrations for each practice.

Treatment pathways followed by study group patients (Todmorden)

Of the 249 Todmorden patients registered in the study, 189 (75.9%) were referred directly to physiotherapy using the open-access facility.

41 patients (16.5%) were still referred to a consultant out-patient clinic of whom 21 (8.4%) had received physiotherapy up to one month after the close of the study (i.e., September, 1986). 11 consultant referred patients (4.4%) had not be referred onto physiotherapy during the study period and 9 patients (3.6%) had still not received an out-patient appointment by the close of the study.

A small group of 7 patients (2.8%) were referred both to a consultant as well as receiving open-access physiotherapy. 12 patients (4.8%) elected to seek private treatment (see Section 2), and only 1 patient was not found suitable for open-access treatment by the physiotherapy department.

Treatment pathways followed by control group patients (Hebden Bridge)

No open-access to physiotherapy was available to these patients. General Practitioners however were asked to record patients in the qualifying condition groups who would have been referred directly to an open-access physiotherapy service had this been available.

Of 141 patients registered in the study, 83 of these (58.9%) would have been referred to open-access but received no further referral (N.F.R.). These patients were given medication and/or advice. 42 patients (29.8%) were referred to a consultant and of these 27 (19.1%) had received physiotherapy up to the close of the study. 4 (2.8%) of the consultant referred patients had not been referred onto physiotherapy during the study period and 11 patients (7.8%) were still waiting for an out-patient appointment at the close of the study. 16 patients (11.3%) elected to seek private treatment

General implications of open-access on workload

i. Consultant referral appeared to be reduced by the presence of open-access physiotherapy. The proportion of Todmorden patients (study group) referred to a consultant was 16.5% compared to 29.8% in Hebden Bridge (control group).

ii. The proportion of patients referred onto physiotherapy from a consultant was higher in the control group (19.1%) than in the study group (8.4%). This suggests that some Todmorden patients who could have been referred to a consultant to attain physiotherapy were dealt with by open-access.

iii. Figure 1 shows that the majority of patients in the study group received open-access (75.9%) whereas the majority of patients in the control group received 'no further referral' (58.9%).

With regard to the higher proportion of consultant referrals, supplementary data was collected from the study practice team which supported this finding. This is shown below in Table 3.

Table 3

Consultant Orthopaedic referrals (rates per 1000 population)

Practice	1984/85	1985/86
Todmorden*	174 (12.0)	142 (9.8)
Hebden Bridge*	105 (6.0)	198 (11.3)

* The population size and age/sex distribution remained stable in these periods.

During the study period the Todmorden referral rate declined whilst the Hebden Bridge rate increased. Thus we would expect to find a higher proportion of study patients in Hebden Bridge referred to a consultant.

The change in the orthopaedic referral rate which took place in Todmorden was analysed further. Whilst the rate of referral to orthopaedics declined between 1984/85 and 1985/86 the general rate of referral in this practice to all specialties increased in the same period. However this was found to be statistically significant only at the 10% level of confidence (see Statistical Appendix).

In addition, the rate of urgent requests to orthopaedics was reduced from 30 per year to 9 per year whereas this remained fairly constant for referrals to all specialties from the same practice. This change was found to be statistically significant (see Statistical Appendix).

Treatment pathway and condition group

Table 4 shows the treatment pathways taken by the patients in each condition group in the two practices:

Table 4

Treatment pathway by condition group

A: TODMORDEN	Patients (% of condition group)				
Condition Group	Con. ref.	Open-access	Private	Both	Total
1. Acute neck and shoulder pain	8 (8)	86 (85)	3 (3)	4 (4)	101
2. Acute back pain	12 (25)	32 (67)	1 (2)	3 (6)	48
3. Osteoarthrosis and Rheumatoid arthritis	10 (21)	34 (71)	4 (8)	-	48
4. C.O.A.D. and Bronchiecstasis	-	4 (67)	2 (33)	-	6
5. Recent soft tissue injuries, sprains and strains	11 (24)	33 (73)	1 (3)	-	45
6. Recent hemiplegia	-	-	1 (100)	-	1
TOTAL	41	189	12	7	249

B: HEBDEN BRIDGE

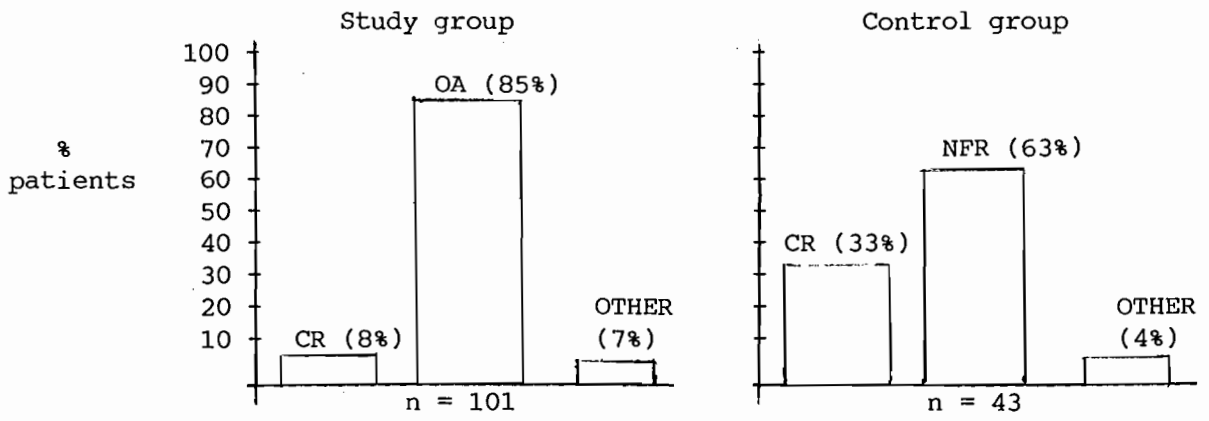
Condition Group	Con.ref.	NFR	Private	Total
1. Acute neck and shoulder pain	14 (33)	27 (63)	2 (4)	43
2. Acute back pain	16 (33)	25 (52)	7 (15)	48
3. Osteoarthrosis and Rheumatoid arthritis	8 (44)	7 (39)	3 (17)	18
4. C.O.A.D. and Bronchiecstasis	-	2 (100)	-	2
5. Recent soft tissue injuries, sprains and strains	4 (14)	22 (79)	2 (7)	28
6. Recent hemiplegia	-	-	2 (100)	2
TOTAL	42	83	16	141

Whilst the most common condition groups were similar, different patterns of management occurred in Todmorden due to the availability of open-access - primarily the substitution of open-access for no further referral.

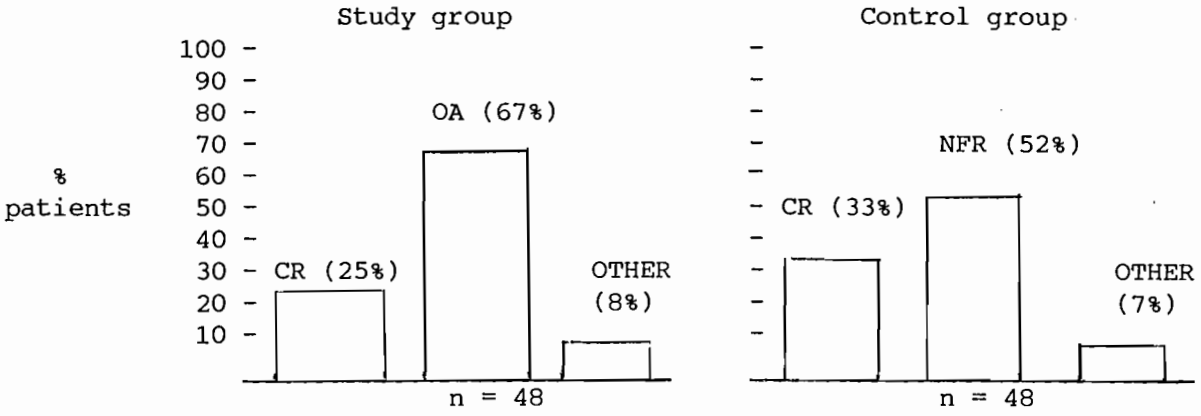
Table 5 shows patients in the three most common condition groups and their treatment pathways:

Table 5

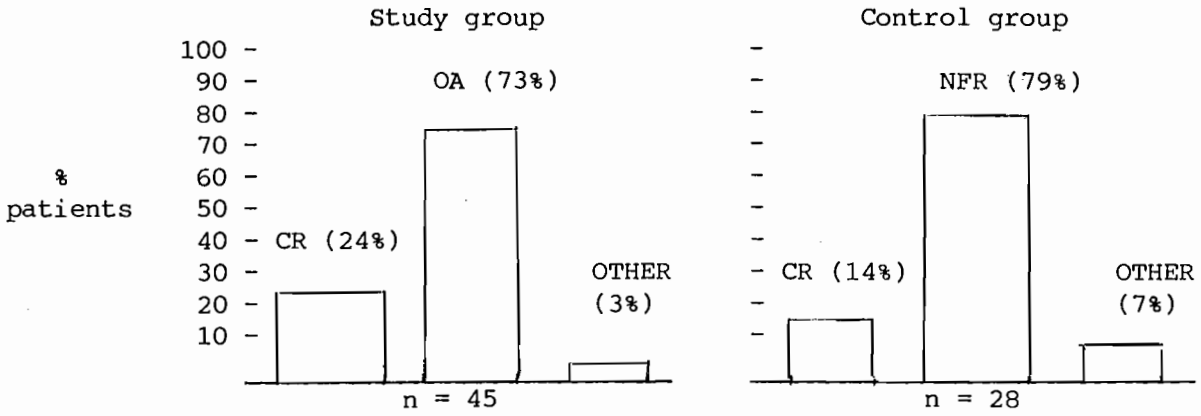
Group 1 Acute neck and shoulder pain - referral patterns



Group 2 Acute back pain



Group 5 Recent soft tissue injuries, sprains and strains



It appears that for the main condition groups, 1 and 2, open-access reduces the proportion of patients referred to a consultant. In condition group 5 however, the proportion of patients referred to a consultant was higher in the study group. A possible explanation of this may be that one of the G.P.s in the study group had an interest in sports injuries which may have increased referral to hospital.

The pattern of substituting open-access to physiotherapy for no further referral would support a widely held medical view that physiotherapy, in the conditions specified, is of greatest possible benefit at an early stage of treatment. Under normal circumstances this is not available as quickly where Consultant referral is the only (NHS) option and therefore the usual

alternative available to a G.P. is to manage patients by giving advice and/or medication where appropriate.

The costs of open-access physiotherapy

Physiotherapy costs

The study was designed to assess the resource advantages of open-access to the Health Authority as well as to the General Practitioner. In particular the hypothesis was tested that patients under an open-access regime should in total require less physiotherapy input than patients reaching physiotherapy after Consultation referral, due to the reduction in the deterioration period (i.e., between identification of the need for treatment and the treatment taking place).

Resources were measured in terms of total physiotherapy sessions as well as by physiotherapy time used by patients.

Table 6 shows the range of physiotherapy sessions used by patients in the open-access (OA) and Consultant referred (CR) groups.

Table 6

Physiotherapy Sessions

HEBDEN BRIDGE: CR		TODMORDEN: CR		TODMORDEN: OA	
Sessions	Patients	Sessions	Patients	Sessions	Patients
1	-	1	1	1	16
2	1	2	-	2	8
3	2	3	1	3	11
4	2	4	1	4	17
5	-	5	2	5	8
6	3	6	-	6	12
7	1	7	3	7	10
8	3	8	2	8	35
9	1	9	1	9	21
10	5	10	5	10	29
OVER 10	6	OVER 10	8	OVER 10	6
TOTAL	24	TOTAL	24	TOTAL	173
Average = 8.2		Average = 10.1		Average = 6.6	
SD = 3.3		SD = 5.3		SD = 3.1	

It can be seen that both Todmorden and Hebden Bridge consultant referred patients used on average more physiotherapy sessions than patients from the study group referred to open-access. This is due, in part, to a restriction on the number of attendances in a course of open-access treatment (reduced from a maximum of 10 to 8 during the study) and perhaps to the more acute nature of the conditions of open-access patients. This result was found to be statistically significant (see Appendix).

Table 7a

Physiotherapists treatment time

HEBDEN BRIDGE: CR		TODMORDEN: CR		TORMORDEN: OA	
Time (mins)	Patients	Time (mins)	Patients	Time (mins)	Patients
0-49	1	0-49	1	0-49	21
50-99	-	50-99	1	50-99	21
100-149	3	100-149	-	100-149	18
150-199	4	150-199	5	150-199	25
200-249	4	200-249	4	200-249	38
250-299	3	250-299	1	250-299	32
300-399	5	300-399	6	300+	18
400+	4	400+	6		
TOTAL	24	TOTAL	24	TOTAL	173
Average = 295 mins (4.9 hrs)		Average = 312 mins (5.2 hrs)		Average = 187 mins (3.1 hrs)	
SD = 199 mins (3.3 hrs)		SD = 182 mins (3 hrs)		SD = 99 mins (1.6 hrs)	

Table 7b

Physiotherapists helpers time

HEBDEN BRIDGE: CR		TODMORDEN: CR		TODMORDEN: OA	
Time (mins)	Patients	Time (mins)	Patients	Time (mins)	Patients
0-9	-	0-9	1	0-9	16
10-19	2	10-19	1	10-19	21
20-29	1	20-29	3	20-29	22
30-39	2	30-39	5	30-39	39
40-49	3	40-49	3	40-49	42
50-59	1	50-59	4	50-59	20
60-99	3	60-99	3	60+	13
100+	1	100+	4		
TOTAL	13	TOTAL	24	TOTAL	173
Average = 46 mins		Average = 56 mins		Average = 35 mins	
SD = 24 mins		SD = 42 mins		SD = 25 mins	

Open-access patients used on average 3.1 hours of a physiotherapists time plus .6 hours of a helpers time. Consultant referred patients in the control group used on average 4.9 hours of a physiotherapists time plus .8 hours of a helpers time. This result is statistically significant (see Appendix).

G.P. Visits

Patient visits to G.P.

The study also measured the number of patient attendances to both practices to see whether the availability of open-access reduced the General Practitioner consultation rate in the six condition groups.

The hypothesis being tested was that attendance at surgery during the episode of illness could be reduced by the presence of open-access, although it was recognised that consultation with the G.P. for other purposes (e.g. obtaining sickness certificates) could reduce this effect. Table 8 shows the average number of G.P. consultations by the main treatment pathways.

Table 8

G.P. Consultations

AVERAGE NUMBER OF PATIENT VISITS (INCLUDING FIRST)	HEBDEN BRIDGE	TODMORDEN
Consultant referred patients	1.0	1.1
Open access patients	-	1.2
No further referral	1.1	-
Private patients	1.4	1.2
Combined OA and CR patients	-	1.0
TOTAL	1.1	1.2

No significant difference was found in the level of G.P. consultations between open-access patients and the other main groups of patients.

The benefits of open-access to physiotherapy

What advantage does open-access have for patients? Our study looked at a number of potential benefits. These were the possibilities of:

* A reduction in waiting time for physiotherapy.
* A better outcome of treatment for patients who would otherwise obtain physiotherapy through a consultant referral and for patients who would otherwise not receive physiotherapy.

i) Waiting time

A major argument for the development of an open-access referral system is the potential for reducing waiting times for treatment which is seen as a significant benefit for patients. Waiting time between GP referral and first attendance for physiotherapy treatment was examined in the study. The results are shown in Table 9.

Table 9

Waiting times

HEBDEN BRIDGE: CR		TODMORDEN: CR		TODMORDEN: OA	
Days	Patients	Days	Patients	Days	Patients
Less 30	2	Less 30	3	0-4	23
30-59	7	30-59	1	5-9	11
60-89	5	60-89	9	10-14	12
90-119	4	90-119	1	15-19	24
120-149	2	120-149	-	20-24	32
150-179	2	150-179	2	25-29	24
180+	2	180+	8	30-34	19
				35-39	13
				40-44	8
				45+	7
TOTAL	24	TOTAL	24	TOTAL	173
Average = 91 days		Average = 124 days		Average = 22 days	
SD = 56 days		SD = 77 days		SD = 13 days	

The average waiting time for consultant referred physiotherapy for both practices was considerably longer than for open-access referral.

The average waiting time for open-access physiotherapy was 22 days compared with 91 days and 124 days for consultant referred physiotherapy in Hebden Bridge and Tdomorden respectively. The modal waiting time for open-access patients was between 20 and 24 days, although many patients were seen much sooner than this e.g. 23 patients (13%) were seen within four days of referral by their General Practitioners. This difference between waiting time for open-access and consultant referred physiotherapy is significant at the 5% level of confidence (see Appendix).

The difference in waiting time for consultant referred physiotherapy between the two practices was not found to be significant. There is therefore no reason to assume that the presence of open-access increases waiting times for patients referred to physiotherapy via a consultant. The difference between the mean waiting times for these types of patients is explained by a small number of patients in Todmorden waiting in excess of 180 days. (For a more detailed explanation of why a wait occurred at all for open-access patients see Full Report.)

ii) Outcome of treatment

Our study measured the outcome of the treatment for the six specified conditions in order to assess what benefits open-access in particular might have over other forms of management. Outcome was measured from two perspectives namely from a professional assessment made by the physiotherapists (where patients received physiotherapy) and from the patients' own perspective using a Patient Questionnaire.

The Physiotherapists Assessment

The physiotherapists treating patients were asked to rank outcome of treatment in terms of 'symptom free', 'great improvement', 'some improvement', 'no change' and 'worse' upon completion of treatment, where

possible for all patients (even those not completing their course of treatment). This assessment was based on the patients pain, range of movements and quality of daily living at the onset of treatment compared with their last visit to the Physiotherapy Department.

Table 10 below shows the results of these assessments:

Table 10

Physiotherapists assessment
patients (% of treatment group)

Outcome assessment	Open-access Todmorden	Consultant Referral Todmorden	Hebden Bridge
Symptom free (SF)	28 (19)	4 (17)	3 (13)
Great improvement (GI)	78 (52)	8 (35)	11 (48)
Some improvement (SI)	38 (26)	10 (43)	7 (30)
No change/worse	5 (4)	1 (5)	2 (9)
TOTAL	149(100)	23(100)	23(100)

The physiotherapist reported that the majority of open-access patients (52%) had made 'great improvement' as did the majority of consultant referred patients in the control group (48%).

Another way of looking at these results is to examine the proportion of patients who made at least some improvement. This is shown in Table 11 below:

Table 11

Proportion of patients making some improvement - Physiotherapists assessment

	Open-access Todmorden	Consultant referral Todmorden	Consultant referral Hebden Bridge
	%	%	%
SF	19	17	13
SF + GI	71	52	61
SF + GI +SI	97	95	91
NC/worse	3	5	9

KEY: SF = sympton free GI = great improvement
SI = some improvement NC = no change

From the above it can be seen that open-access achieved the highest proportion of patients (97%) with at least some improvement.

However, when the number of patients with at least 'great improvement' are compared with 'some improvement' or worse in the study and control groups these differences in outcome are not statistically significant. Therefore, using the physiotherapists assessment, open-access cannot be shown to be significantly more beneficial than physiotherapy received via a consultant referral. (See Appendix).

The Patient's Assessment

In addition patients were also asked to assess the benefits of the treatments. This involved sending all patients a postal questionnaire (for a specimen of questionnaire see full report). The same scoring system as the physiotherapists assessment was used. Table 12 below shows the results of the patients own assessment of treatment:

Table 12

Patients assessment
Patients (% of treatment group)

Outcome assessment	Open-access Todmorden	CR Todmorden	CR Hebden Bridge	NFR Hebden Bridge
Sympton free (SF)	9 (7)	1(3)	2(8)	5(10)
Great improvement (GI)	37 (28)	7(25)	6(24)	10(21)
Someimprovement (SI)	64 (48)	10(36)	13(50)	18(38)
No change (NC)	23 (17)	10(36)	5(18)	15(31)
	133	28	25	48

It can be seen from the above that the largest group of open-access patients reported 'some improvement' (48%). Likewise the largest group of consultant referred physiotherapy patients reported 'some improvement'. However the majority of patients who did not receive any physiotherapy, i.e. the 'no further referrals' in the control group, also reported 'some improvement'.

Analysing these results in a similar way to the physiotherapists assessment, the following results were found:

Table 13

Proportion of patients making some improvement
- patients own assessment

	Open-access Todmorden	CR Todmorden	CR Hebden Bridge	NFR Hebden Bridge
SF	7	3	8	11
SF + GI	35	28	32	33
SF + GI + SI	83	64	82	72
NC/worse	17	36	18	28

From the above it can be seen that open-access achieved the greatest proportion of patients reporting at least 'some improvement'. The differences in outcome, both between open-access and consultant referrral and between open-access and no further referral are not statistically significant. Therefore using the patients own assessment, open-access cannot be shown to be significantly more beneficial than consultant referred physiotherapy or no further referral. (See Appendix).

Outcome by condition groups

Outcome of treatment was examined by the three main condition groups using both the physiotherapists and patients assessment.

The three main condition groups were:

* (Group 1) Acute neck and shoulder pain
* (Group 2) Acute back pain
* (Group 3) Recent sprains, strains and injuries

The following results were obtained using the same method as above for all patients:

Group 1 - Acute neck and shoulder pain Neither the physiotherapists assessment nor the patients own assessment highlighted any greater benefit of open-access compared with consultant referral or no further action. (See Appendix).

Group 2 - Acute back pain The physiotherapists assessment highlighted a significantly greater benefit of open-access compared with consultant referred physiotherapy for this condition group. (See Appendix). However, this result was not supported by the patients own assessment which showed no significant benefit over consultant referral or no further referral. (See Statistical Appendix).

Group 5 - Recent sprains, strains and injuries Neither the physiotherapists assessment nor the patients own assessment highlighted any greater benefit of open-access compared with consultant referral or no further action. (See Statistical Appendix).

Other benefits of open-access

In addition to measuring outcome of treatment as described above other indicators of the benefit of treatment were included in the patient questionnaire. These consisted of some indicators of the quality of patients lives (see Full Report) below:

i) Activities of daily living

In the questionnaire patients were asked whether their condition had affected their daily living and in what type of activities. Table 14 shows the results from all responding patients in each practice:

Table 14

Patients reporting adverse effects with activiities of daily living

Activity	Hebden Bridge	Todmorden
Hobbies	47 (31.8)	83 (25.6)
Housework	39 (26.3)	102 (31.5)
Shopping	28 (18.9)	73 (22.5)
Visiting	18 (12.2)	31 (9.6)
Other	16 (10.8)	35 (10.8)
	148 (100%)	324 (100%)

N.B. Frequently reported 'other' activities were general mobility and driving.

It appears that a greater proportion of Hebden Bridge patients reported that their condition had hindered their 'hobbies' but this pattern was reversed for 'housework'. However no significant difference was found in these proportions. (See Statistical Appendix).

The number of these activities affected was also examined in each group and this was found not to be significant (see Full Report).

Summary of results of the main study

From the foregoing analysis of results there are a number of conclusions which can be made from the pilot open-access scheme operated in Todmorden.

Implications for workload:

1. Of the six pre-selected condition groups qualifying for open-access physiotherapy, only four of the groups utilised this service extensively. Patients suffering from C.O.A.D. and bronchiectasis (group 4) and recent hemiplegia (group 6) underutilised this service mainly due to alternative facilities available (a domiciliary mobile physiotherapy service).

2. During the period of the pilot scheme the proportion of study patients referred to a consultant was lower in the practice with open-access than in the practice without this facility. This pattern of referral appears to be significantly affected by the presence of open-access.

A smaller proportion of study group consultant referred patients received physiotherapy than their control counterparts. This supports the conclusion that consultant referral was reduced by open-access since General Practitioners did not use consultant referral as much to obtain therapy.

3. The presence of the open-access facility generated a demand for physiotherapy services which otherwise would have gone unmet and which would have been managed entirely by the General Practitioner.

The cost-benefit implications of open-access as a treatment pathway are:

1. Open-access produced favourable treatment outcomes (as measured by physiotherapists and the patients themselves) however generally these were not significantly any better than either the outcomes achieved by consultant referral or making no further referral.

There was some evidence to suggest that open-access was more beneficial than consultant referrals for back-pain according to the physiotherapist's assessment.

As far as other indicators of patient benefit are concerned (e.g. activities of daily living, length of incapacity, time off work, etc.) these did not appear to be affected advantageously by open-access (see Full Report).

2. Open-access patients used significantly smaller amounts of physiotherapy staff input than consultant referred patients obtaining physiotherapy although this could have been reduced by a ceiling on the number of attendances. The treatment cost per completed case in terms of physiotherapy input was therefore £25 compared with £42.

3. The open-access facility did not reduce G.P. workload. The number of patient consultations with General Practitioners in the open-access group was not significantly different from other groups.

4. There was significant benefit, compared with consultant referred patients, in the amount of time spent waiting for physiotherapy treatment. The waiting period was approximately three months shorter for open-access physiotherapy than for consultant initiated physiotherapy.

5. Private workload

A further cost taken into account by the study was the amount spent by individuals privately on obtaining teatment for their condition. The research protocol (see Full Report) stated:

> "A subsidiary question here will also be, what impact does this system (open-access) have on private medical, paramedical and complementary medicine referrals?"

The study was designed to highlight utilisation of the private health sector in two ways. Firstly, the General Practitioner registration card included a question about any private treatments sought by the patients (where known to the General Practitioner). This question came to be used by General Practitioners to indicate that the patient was being treated privately only.

Secondly, the Patient Questionnaire sent to all patients in the study asked two questions about private treatment. The first question asked patients whether they had received any treatment from non-NHS sources and if so, at what stage during NHS treatment (i.e. before, during or after). The second question asked patients to indicate broadly how much they had spent and on what types of private treatment.

The following results were obtained:

Table 15

Registration Card
Private Treatment

Private treatment to:	Todmorden	Hebden Bridge
Consultant	4 (33)	2 (13)
Mobile Physio	7 (58)	6 (37)
Other	-	7 (43)
Manipulation	-	1 (7)
Physiotherapy	1 (9)	-
	12	16

Although no statistically valid comparisons can be drawn from these results it appears that open-access may have had some effect on reducing the numbers of patients who sought private treatments other than those seeing a consultant privately or being treated by the mobile physiotherapy service.

Results from the Patient Questionnaire are shown below:

Table 16

Patient Questionnaire
Private Treatment

Sought private treatment?	Todmorden	Hebden Bridge
Yes	52 (29)	37 (41)
No	115 (64)	48 (53)
N/K	12 (7)	5 (6)
	179	90

From Table 16 it can be seen that the proportion of patients seeking private treatment at some stage during their condition was higher in the Hebden Bridge practice. However this result was not found to be statistically significant. (See Appendix).

Comparing the amounts spent on private treatment between the two practices the following results were obtained:

Table 17

Amounts spent on private treatment

Amount spent	Todmorden	Hebden Bridge
Less than £50	34 (65)	20 (54)
£50 - £100	10 (19)	4 (11)
£100+	7 (14)	10 (27)
Not known	1 (20)	3 (8)
	52	37

Despite a higher proportion of Hebden Bridge patients spending larger amounts on private treatment this result was not found to be statistically significant. (See Appendix).

Practice trends in private referral

Information was also collected on the number of private referrals to consultants before the study commenced and during the study period for each practice. This is shown in Table 18:

Table 18

Private referral rates to orthopaedics (Calderdale only) before and during open-access scheme

	Patients (patients per 1000 pop)	
	Todmorden	Hebden Bridge
Year immediately before study	21 (1.5)	24 (1.3)
During study year	27 (1.8)	32 (1.8)

Rather surprisingly the private referral rate to the orthopaedic specialty in Calderdale from the Todmorden practice increased slightly during the study period (whilst all private referrals from this practice decreased in the same period although not significantly - see Statistical Appendix). However, the private referral rate to the orthopaedic department also increased in Hebden Bridge during this period. The rate of increase was slightly higher in Hebden Bridge.

Conclusion

No evidence can be found from these results to show that the presence of open-access affects the rate of private referral to consultants. Neither can it be shown statistically that open-access has any effect on the amount of self-referral to other non-NHS therapies/treatments. There would also appear to be no statistical difference in the amounts expended on private

treatment by patients with and without the availability of an open-access physiotherapy service.

6. Main Conclusions of Study

1. The additional (marginal) cost to the physiotherapy department of providing open-access for selected Todmorden patients was around £3298 per annum.

2. The service was used reponsibly by referring G.P.s who in reply to a questionnaire found it to be a very useful treatment option (see Full Report).

3. The scheme was under utilised by two of the pre-selected groups (Group 4 and Group 6 - see Section 3).

4. The availability of the open-access service reduced the number of consultant referrals (both urgent and non-urgent) especially those who would have ultimately been seen in the physiotherapy department.

5. The availability of the open-access service also generated a demand for physiotherapy services which, under normal circumstances, would have gone unmet and been managed by the patients general practitioner.

6. Open-access physiotherapy produced improvements in the patients condition (as assessed both by patients and by physiotherapists) although no greater difference in benefit could be found when compared with physiotherapy obtained by consultant referral (except Group 2) or no physiotherapy at all.

7. Evidence from the physiotherapist's assessment showed that open-access to physiotherapy was more beneficial than consultant referral for patients in condition group 2 - those suffering from acute back pain.

8. Open-access patients used significantly less physiotherapy time and sessions than their consultant referred counterparts. This reduced the average treatment cost per case from £42 to £25. (Revenue costs only).

9. The availability of open-access does not reduce the general practitioners workload as measured in terms of the number of patient consultations.

10. Open-access patients waited significantly less time to obtain physiotherapy than those patients referred to a consultant. This was reduced on average from 124 days to 22 days in the study group.

11. The availability of the open-access facility did not affect the level of private treatment or the amounts spent on non-NHS treatment.

12. During the course of the study, patients other than in the six pre-selected groups were treated (see Full Report). These were mainly patients with chronic conditions and they had poorer outcomes than the patients in the six pre-selected groups despite consuming a greater amount of resources per head.

BIBLIOGRAPHY

CLIFTON, S. 1979 Open access to a physiotherapy department. Physiotherapy, October 1979, vol. 65 no. 10.

DHSS 1972 Rehabilitation: Report of a Sub-Committee of the Standing Medical Advisory Committee (Tunbridge Report), HMSO, London.

DHSS 1981 Orthopaedic Services: Waiting time for out-patient appointments and in-patient treatment. Report of a Working Party to the Secretary of State for Social Service (Duthie Report) HMSO, London.

DHSS 1973 The Remedial Professions: A report by a Working Party (McMillan Report) HMSO, London.

DHSS 1977 Health Services Development: Relationships between the medical and remedial professions. HC(77)33, HMSO, London.

ELLMAN, R., ADAMS, S.M., REARDON, J.A. and CURWEN, I. 1982. Making physiotherapy more accessible. British Medical Journal, 284, 1173-5.

EVANS, A. 1984 Open access to General Practitioners to a physiotherapy department. Unpublished, submitted for Part II of Membership for the Faculty of Community Medicine.

GENTLE, P.H., HERLIHY, P.J., ROXBURGH, I.O. 1984 A controlled trial of open-access physiotherapy service. Journal of the Royal College of General Practitioners 34, 371-376.

HUNT, E.J. and O'RYAN, A. Open access by general practitioners to hospital physiotherapy departments 1982. The Practitioner, Vol. 22, 609-10.

NORMAN, P., CLIFTON, H., WILLIAMS, E. and NICHOLLS, P.J.R. 1975 Access by General Practitioners to the physiotherapy department of a District General Hospital. British Medical Journal; 25 October 1975.

PARTRIDGE, C.J. and WARREN, M.D. 1978 Physiotherapy in the Community. Health Services Research Unit, University of Kent, Canterbury.

APPENDIX 1

ORIGINAL OPERATIONAL POLICY

PILOT STUDY OF OPEN ACCESS TO PHYSIOTHERAPY AT TODMORDEN
TRIAL PERIOD ONLY

Function To enable General Practitionerrs to refer cases directly to the physiotherapy Department at Todmorden (St. Johns Ambulance Hall).

Range of Services These will include all the usual agents employed in the department which are: rehabilitation, exercise, cervical and lumbar traction, heat or cold therapy, paraffin wax, electrical stimulation, ultrasonics, advice on the management of handicap and disability, postural drainage, breathing exercises.

Referring Agents For the purposes of the initial pilot study these would be registered medical practitioners at the Abraham Ormerod Medical Centre, Todmorden. Doctors are invited to visit the clinic during the week commencing June 3rd at lunchtimes (closed Wednesdays) to familiarise themselves with the physiotherapy service.

Method of operation

1. A letter written and signed by the Doctor, containing the diagnosis, relevant clinical details and investigations should be taken to the Physiotherapy Department at Todmorden, between 1.00 and 2.30pm on the Mondays and Thursdays in the first instance. If, on rare occasions, a patient would require ambulance transport, this should be noted on the referral letter, and the letter sent to the physiotherapist to arrange an appointment for the first visit.
2. The patient will be seen by a Senior Physiotherapist, who will make an assessment, arrange relevant treatment and send a pre-printed letter to the referring general practitioner outlining the course of action taken.
3. On completion of the course of treatment (usually a maximum of ten treatments will be given) the doctor will receive a further letter indicating the clinical state of the patient, and may include suggestions for other action.

Other factors

1. In the event of a waiting list situation, Consultant referrals to the Department will take priority.
2. The patient remains the clinical responsibility of the referring doctor while on treatment and will not be seen by a Consultant unless referred in the normal way. If accident, illness or anything untoward occurs, the patient will be referred back to the doctor.
3. The physiotherapist in charge must, by the ethical rules, decline to treat a patient if in his/her opinion treatment is contra-indicated, not likely to be beneficial or if insufficient information has been given.

Cases most likely to benefit from Physiotherapy

Neck and Shoulder Pain Acute or recurrent, with or without radiation to the arm, of muscular or spinal joint origin, must have intact reflexes, otherwise please send to a Consultant.

Back Pain Acute or recurrent, with or without radiation to the leg, must have intact reflexes and normal plantar response, no numbness, weakness, or bladder or bowel paralysis.

Recent Injuries Recent sprains and strains, haematomas, and other soft tissue injuries - procedures for reduction of swelling, relief of pain and restoration of function.

Arthritic conditions
Rheumatoid arthritis, sub acute - for teaching of home exercises and advice.
Osteo-arthritis - for short courses of pain relieving procedures and prophylaxis.

Chest conditions Asthma, chronic bronchitis etc., to teach posture drainage and exercises as required.

Recent Hemiplegias

STATISTICAL APPENDIX

THE TODMORDEN GROUP PRACTICE

PERIOD 1 (August 1, 1984 - July 31, 1985)

	ORTHOPAEDIC			ALL REFERRALS		
	ROUTINE NHS	URGENT NHS	PRIVATE	ROUTINE NHS	URGENT NHS	PRIVATE
HALIFAX	110	15	21	672	147	78
BURNLEY	5	4	1	208	46	14
ROCHDALE	20	8	1	318	63	57
OTHER	9	3	1	73	4	16
ALL HOSPITALS	144	30	24	1271	260	165

Categories are exclusive
All other referrals = 198
Ratio Urgent: all = 15.15%
Private: all = 12.12%

All referrals = 1696
Ratio Urgent: all = 15.33%
Private: all = 9.73%

THE TODMORDEN GROUP PRACTICE

PERIOD 2 (August 1, 1985 - July 31, 1986)

	ORTHOPAEDIC			ALL REFERRALS		
	ROUTINE NHS	URGENT NHS	PRIVATE	ROUTINE NHS	URGENT NHS	PRIVATE
HALIFAX	98	8	27	753	143	82
BURNLEY	9	1	0	216	44	10
ROCHDALE	16	0	7	354	58	47
OTHER	10	0	0	61	6	12
ALL HOSPITALS	133	9	34	1384	251	151

All orthopaedic referrals = 176
Ratio Urgent: all = 5.11%
Private: all = 19.32%

All referrals = 1768
Ratio Urgent: all = 14.05%
Private: all = 8.45%

Analysis

1. Orthopaedic referral rate reduced during study period 198 176, but general (referral rate increased 1696 1786). Significant only at p 0.1 ($\chi^2_1 = 3.004$), at p > .05. Not significant.

2. Reduced requests for urgent consultations to orthopaedics. Whereas generally stayed the same. Significant p > 0.01 ($\chi^2_1 = 10$).

   Orthopaedic 30→9, (15.15%→5.11%).
   All 260→251, (15.33%→14.05%).

3. Increased private referrals for orthopaedic but not generally. Significant only at p > 0.1 level at p > .05 not significant.

   Orthopaedic 24→34, (12.12%→19.32%).
   All 165→151, (9.73%→8.45).

Physiotherapy Sessions

Comparing the number of sessions used by open-access patients with all Consultant referred patients (i.e., Todmorden + Hebden Bridge patients) receiving physiotherapy.

$\chi^2_5 = 32.22$ ($\chi^2_{5, 0.995} = 16.750$)

therefore Significant at 1% level

Physiotherapists Time

Comparing the number of minutes physiotherapy received by open-acces patients with all consultant referred patients receiving physiotherapy:

$\chi^2_4 = 32.385$ ($\chi^2_{4, 0.995} = 14.86$)

therefore Significant at 1% level

Physiotherapist Helpers Time

Comparing the number of minutes of physiotherapists' helpers time received by open-access patients with all Consultant referred patients receiving physiotherapy:

$\chi^2_5 = 15.725$ ($\chi^2_{5, 0.975} = 12.83$)

therefore Significant at 5% level

Waiting Times

The waiting time is defined as the number of days between first seeing a GP (and being registered in the study) and starting physiotherapy treatment.

1) Comparing the waiting times between TODCR and HBCR patients:-
Test of variance between two groups f = 1.89 ($F_{23, 23, 0.975} = 2.3$ therefore NOT SIGNIFICANT, so can carry out the test of difference between average values (students t-test) t = 1.649 ($t_{45, 0.975} - 2.014$) so NOT SIGNIFICANT difference between means.

11) Comparing the waiting times between TOD OA and (TOD+HB) CR patients:-
Test of variance between two groups f = 29.464 ($F_{172, 47, 0.995} = 1.59$) so SIGNIFICANT AT 1% LEVEL therefore can't carry out students t-test. Using the Kolmogornov-Smirnov test statistic D = 0.794 ($D_{24, 25} = 0.375$) SIGNIFICANT AT 5% LEVEL and so can say that he waiting times for OA patients is significantly shorter than for CR patients.

a) Physiotherapists assessment

OUTCOME	TOD-OA	TOD-CR	HB-CR
SF	28(19)	4(17)	3(13)
GI	78(52)	8(35)	11(48)
SI	38(25)	10(43)	7(30)
NC/W	6(4)	1(5)	2(9)
TOTAL	150	23	23

Analyses:- using χ^2 test statistics, with Yate's correction factor for 2x2 contingency tables.

HYPOTHESES: H_o = No difference in SF+GI VS SI, NC+W for 2 treatment pathways.
H_1 = Is a difference.

i) OA-VS-TODCR

	OA	TOD-CR	TOTAL
AT LEAST GI	106	12	118
SI, NC, W	44	11	55
TOTAL	150	23	173

$\chi^2_1 = 2.353$

$\chi^2_{1, 0.975} = 5.024$

NOT SIGNIFICANT

ii) OA-VS-HBCR

	OA	HB-CR	TOTAL
AT LEAST GI	106	14	120
SI, NC, W	44	9	53
TOTAL	150	23	173

$\chi^2_1 = 0.496$

$\chi^2_{1, 0.975} = 5.024$

NOT SIGNIFICANT

iii) OA-VS-ALL CRs

	OA	CR	TOTAL
AT LEAST GI	106	26	132
SI, NC, W	44	20	64
TOTAL	150	46	196

$\chi^2_1 = 2.584$

$\chi^2_{1, 0.975} = 5.024$

NOT SIGNIFICANT

b) Patients Assessment

OUTCOME	TOD-OA	TOD-CR	HB-CR	HB-NFA
SF	9(7)	1(3)	2(8)	5(10)
GI	37(28)	7(25)	6(24)	10(21)
SI	64(48)	10(36)	13(50)	18(38)
NC/W	23(17)	10(36)	5(18)	15(31)
TOTAL	133	28	26	48

Analysis:- Using χ^2 test statistics with Yate's factor for 2x2 contingency tables.

HYPOTHESIS: H_o - No difference in SF+GI-VS-SI, NC+W for 2 treatment pathways.
H_1 - is a difference.

i)

OA-VS-TODCR	TOD-OA	TOD-CR	TOTAL
GI+SF	46	8	54
SI, NC+W	87	20	107
TOTAL	133	28	161

$\chi^2_1 = 0.154$

$\chi^2_{1,\ 0.975} = 5.024$

NOT SIGNIFICANT

ii)

OA-VS-NFA	TOD-OA	HBNFA	TOTAL
GI+SF	46	15	61
SI, NC+W	87	33	120
TOTAL	133	48	181

$\chi^2_1 = 0.059$

$\chi^2_{1,\ 0.975} = 5.024$

NOT SIGNIFICANT

iii)

OA-VS-all CRs	OA	CR(TOD+HB)	TOTAL
GI+SF	46	16	62
SI, NC+W	87	38	125
TOTAL	133	54	187

$\chi^2 = 0.230$

$\chi^2_{1,\ 0.975} = 5.024$

NOT SIGNIFICANT

Outcome of treatment - individual condition groups

OUTCOMES FOR GROUP 1 (Acute neck and shoulder pain)
- PHYSIO ASSESSMENT

OUTCOMES	TOD-OA	TOD-CR	HB-CR
SF	12	2	1
GI	35	2	7
SI	21	3	1
NC/W	1	-	1
TOTAL	69	7	10

OA-VS all CRs	OA	CR	TOTAL
SF+GI	47	12	59
SI+NC+W	22	5	27
TOTAL	69	17	86

$\chi_1^2 = 0.009$

$\chi_{1, 0.975}^2 = 5.024$

NOT SIGNIFICANT

No further comparisons possible due to small size of numbers.

- PATIENTS ASSESSMENT

OUTCOME	TOD OA	TOD CR	HB CR	HB NFA
SF	4	1	2	-
GI	18	-	2	4
SI	24	3	3	7
NC/W	10	3	2	5
TOTAL	56	7	9	16

OA VS all CRs	TOD OA	CR	TOTAL
SF+GI	22	5	27
SI+NC+W	34	11	45
TOTAL	56	16	72

$\chi_1^2 = 0.086$

$\chi_{1, 0.975}^2 = 5.024$

NOT SIGNIFICANT

OA VS NFA	TOD OA	HB NFA	TOTAL
SF+GI	22	4	26
SI+NC+W	34	12	46
TOTAL	56	16	72

$\chi_1^2 = 0.475$

$\chi_{1, 0.975}^2 = 5.024$

NOT SIGNIFICANT

No further comparisons possible due to small size of numbers.

OUTCOME FOR GROUP 2 (Acute Back Pain)

- PHYSIO ASSESSMENT

OUTCOME	TOD OA	TOD CR	HB CR
SF	6	1	1
GI	18	2	1
SI	5	5	2
NC/W	1	1	1
TOTAL	30	9	5

OA VA all CRs	TOD OA	(TOD & HB) CR	TOTAL
SF & GI	24	5	29
SI & NG & W	6	9	15
TOTAL	30	14	44

$\chi^2_1 = 6.488$

$\chi^2_1 = 5.024$

SIGNIFICANT AT 5% LEVEL

No further comparisons possible due to small size of numbers.

- PATIENT ASSESSMENT

OUTCOME	TOD OA	TOD CR	HB CR	HB NFA
SF	1	-	-	-
GI	8	4	2	6
SI	16	2	4	8
NC/W	4	2	2	5
TOTAL	29	8	8	19

OA-VS-NFA	TOD OA	HB NFA	TOTAL
SF & GI	9	6	15
SI & NC & W	20	13	33
TOTAL	29	19	48

$\chi^2_1 = 0.214$

$\chi^2_{1,\ 0.975} = 5.024$

NOT SIGNIFICANT

OA VS all CRs	TOD OA	CR	TOTAL
SF & GI	9	6	15
SI & NC & W	20	10	30
TOTAL	29	16	45

$\chi^2_1 = 0.0126$

$\chi^2_{1,\ 0.975} = 5.024$

NOT SIGNIFICANT

No further comparisons possible due to small size of numbers.

F. OUTCOME FOR GROUP 5 (RECENT SPRAINS, STRAINS AND INJURIES)

- PHYSIO ASSESSMENT

OUTCOME	TOD OA	TOD CR	HB CR
SF	8	-	-
GI	11	2	1
SI	1	2	1
NC/W	1	-	-
TOTAL	21	4	2

We cannot compare any of the treatment pathways due to low numbers.

- PATIENTS ASSESSMENT

OUTCOME	TOD OA	TOD CR	HB CR	HB NFA
SF	3	-	-	4
GI	7	1	1	-
SI	6	3	2	2
NC/W	4	3	-	4
TOTAL	20	7	3	10

OA vs NFA	TOD OA	HB NFA	TOTAL
SF & GI	10	4	14
SI & NC & W	10	6	16
TOTAL	20	10	30

$\chi_1^2 = 0.014$

$\chi_{1,\ 0.95}^2 = 5.024$

NOT SIGNIFICANT

Cannot make comparisons using the CR columns (either on their own or together) due to lack of numbers in SF & GI cell.

Patient Questionnaire Responses

Activities of daily living affected

1. Comparing the number of activities hindered between Todmorden and Hebden Bridge patients $\chi^2_5 = 3.409$ ($\chi^2_{5, 0.975} = 12.83$), therefore NOT SIGNIFICANT.

2. Comparing the types of activities hindered between Todmorden and Hebden Bridge patients $\chi^2 = 3.532$ ($\chi^2_{4, 0975} = 11.14$), therefore NOT SIGNIFICANT.

Length of incapacity

Comparing the length of incapacity between Todmorden and Hebden Bridge patients $\chi^2 = 5.346$ ($\chi^2_{5, 0.957} = 12.83$), therefore NOT SIGNIFICANT.

Time off work

Comparingtime off work between Todmorden and Hebden Bridge $\chi^2 = 4.704$($\chi^2_{3, 0.975} = 9.348$) therefore NOT SIGNIFICANT.

Mood affected

1. Comparing whether the patient's mood was affected in Hebden Bridge and Todmorden patients $\chi^2 = 0.58$ ($\chi^2_{3, 0.975} = 9.348$), therefore NOT SIGNIFICANT.

2. Comparing severity of affected mood between Todmorden and Hebden Bridge patients $\chi^2 = 0.01$ ($\chi^2_{3, 0.975} = 7.378$) therefore NOT SIGNIFICANT.

Section 2 - Private patients

Patient Questionnaire

Comparing the number of patients who had received a course of private treatment either before, during or after current treatment, between Todmorden and Hebden Bridge. $\chi^2_1 = 3.263$ ($\chi^2_{1, 0.975} = 5.024$), therefore NOT SIGNIFICANT.

Comparing the amount spent on private treatment by Todmorden and Hebden Bridge patients $\chi^2_2 = 3.305$ ($\chi^2_{2, 0.975} = 7.738$), therefore NOT SIGNIFICANT.