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Back Pain

Its Management and Cost to Society

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DISCUSSION PAPER 129

BACK PAIN: ITS MANAGEMENT AND COST TO SOCIETY

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SUMMARY

The aim of this Discussion Paper is to estimate the social costs of back pain in the UK and assess the potential for reducing these costs by increasing the appropriateness of management of back pain. Fifty to eighty percent of the population suffer from back pain at some stage of their life. With or without treatment, ninety percent of back pain problems improve within six weeks, but repeated episodes are very common. Although back pain and its management has been the subject of several thousand research papers over the past three decades, it still remains something of an enigma. Only fifteen percent of cases can be clearly diagnosed. However, the great majority are due to mechanical low back pain which is the focus of this paper.

Due to the paucity of data it is only possible to make crude estimates of the costs of back pain to the NHS, and these probably lie between £265 million and £383 million. Most of these costs are generated in 1) General Practice, due to the large number of consultations, and 2) Hospital in-patient management, due to the high treatment cost per person. Between 1986 and 1992 sickness and invalidity benefit claims for back pain alone increased in the UK by about 104%, while claims for other causes of sickness increased by 60%. The intangible costs of back pain and disability affecting the individual are likely to be considerable. When the problem has become chronic and intractable after about six months, the individual's functional and social activities may become severely curtailed.

The General Practitioner is the key worker for back pain patients, and recent data suggest that these account for between 5.8 and 8.6 million consultations every year. Most consultations are associated with a prescription for medication, and advice to rest, despite the fact that the evidence is heavily weighted towards early resumption of normal activities. The processes are not well understood and treatment therefore is usually palliative. High quality outcome research is hampered by a number of problems, such as diagnostic ambiguity, and the powerful effect of a placebo in reducing pain. There is some evidence of the usefulness of spinal manipulation, exercise and patient education to reduce

back pain disability, although more research is needed to clarify which particular interventions are most effective for which category of problem. In the UK, the use of 900,000 hospital bed days each year for back pain patients requires careful review. Hospitalisation is not only expensive, but also in combination with prolonged bedrest and excessive investigations may be harmful, unless surgery is clearly indicated.

Risk factors for back pain include manual handling, static postures, vibration exposure, and smoking. Both physical and psychosocial factors in the workplace have been linked with back pain. A number of intervention studies have indicated that both primary and secondary prevention of back pain and injuries in the workplace can be cost effective, but this work is incomplete. Once back pain has become chronic, more aggressive rehabilitation programmes appear to be the most effective way of returning individuals to their previous occupation.

The goal is to reduce the disability that may result from mechanical low back pain by appropriate active management. Reviews of the literature have pointed to more effective approaches to managing the problem of common low back pain, but these now need to be translated into practice to ensure that resources are used effectively.

1 INTRODUCTION

Back pain is a symptom that has afflicted humans since the beginning of recorded history [2], but according to some sources the disability due to back pain has reached epidemic proportions in Western societies [166], [148], [158]. It is most prevalent amongst people who are in their middle years when they are likely to be most productive at work [12], [73]. Back pain has been defined as pain which a person reports as emanating from an area between the buttock crease and the vertebrae prominens (base of the neck) [4]. It includes upper back pain and neck pain. In the literature the term "low back pain" is commonly used, and its upper limit is defined as the lower border of the rib cage [135], [162]. This paper is primarily concerned with conditions categorised by the International Classification of Diseases (ICD-9) codes 720 to 724.9, and also 846 and 847.

Mechanical low back pain accounts for the great majority of cases whereas back pain caused by systemic disease probably only accounts for about 2% [45]. Epidemiological descriptions are fraught with uncertainties relating to the definition, classification and diagnosis of the problem. There is a great diversity of methods of classification and diagnosis which is inevitable since back pain covers a wide range of conditions, and the aetiology and pathophysiological processes are poorly understood. The lack of agreement in terminology as used by different health professionals is a major stumbling block for clinical research. More details of different systems of classification are given in Appendix III.

Probably only about 15% of all cases of reported back pain can be definitely and reliably diagnosed [167], [46], [110]. Techniques of imaging which allow far better visualisation of all the structures of the spinal column do not appear to have made a significant impact on the classification of the remaining 85% of cases. Most of these are described as non-specific mechanical low back pain cases, or common low back pain [159]. It appears that only 5% of patients consulting GPs with back pain have the clear cut signs of a prolapsed intervertebral disc (PID) associated with nerve root compression [9], [135], which is often referred to as sciatica.

On anatomical grounds any structure in the lumbar spine can become a source of pain if it has a nerve supply [18]. The great majority of back pain cases presenting to the doctor are activity-related disorders of mechanical origin. In practice, it is usually impossible for the GP to provide the patient with a specific cause of their problem. The approach taken in the following sections, in line with most previous work, does not attempt to divide back pain into categories.

Earlier attempts have been made to estimate the size of problem in the UK [11], [166]. But most including the OHE research on the costs of back pain uses data collected in the 1970s and early 1980s [166]; this is especially the case with figures related to GP consultations and rates of recovery. Other epidemiology and costs studies have been attempted elsewhere, for example in North America [5], [63] where the health care system is not comparable with the UK.

Previous research has provided a somewhat pessimistic outlook for the immediate future of back pain [166]. This has turned out to be well-founded, and in spite of more research into the subject, in both basic sciences and clinical sciences, the situation has not improved.

The Department of Health is currently carrying out work on the "Burdens of Disease" and preparing a reference document listing conditions and their related NHS expenditure. The work is based on a methodology developed by Black and Pole [17] and more recently updated by the Department of Health in 1988 initially as an internal document [41]. The figures are based on published mortality, morbidity, and expenditure data and provide estimates of the cost of a certain illness expressed as a percentage of the total NHS expenditure, sometimes referred to as a "top-down" approach. In contrast estimates of NHS expenditure made in this paper by the Centre for Health Economics focus solely on the costs of back pain. An analysis from the viewpoint of UK society as a whole is made, attempting to identify where possible all the relevant costs and consequences.

The aim of this Discussion Paper is firstly to describe the problem of back pain, together with its current management and estimate its cost to the NHS, local authorities, individuals and society as a whole. Then by examining some of the evidence of the effectiveness of

treatment, an assessment is made about the potential for cost savings with more appropriate management.

1.1 The size of the problem: prevalence, incidence and disability figures

According to Andersson and colleagues [5], the prevalence of low back pain, that is the total number of cases at any one point or specified period of time, is reported as being between 12% and 35%. Recent data, derived from the Omnibus survey (Office of Population Censuses and Surveys) of a sample of 2,000 members of a general adult population in Great Britain, reports a one year prevalence of 34% of people with back pain, with 17% of these cases reporting constant pain during the past 12 months [120], equivalent to 6% of the general population.

The lifetime prevalence of low back pain for individuals surveyed in a number of studies varies between 49% and 80%. These studies were carried out in the UK, USA, Scandinavia and Holland [78], [75], [103], [112], [155], [12], [74], [65], [150], [162]. Using strict diagnostic criteria the lifetime prevalence of true sciatica amongst the general population is only about 4-5% (see section 3.1).

Back pain is a condition in which recurrences are common [157]. Pain and disability are not however synonymous. Individuals cope with pain in different ways depending on a number of psychosocial factors, including both intrinsic personality characteristics and extrinsic factors such as their occupation and domestic circumstances.

According to the Omnibus Survey, about 3% of individuals reporting back pain in the past 12 months, stated that they had spent two weeks or more lying down in the past 4 weeks, and 30% claimed to have been restricted in their activities in the past 4 weeks owing to back pain. Disability resulting from back pain appears to have increased significantly in Britain, according to Department of Social Security figures. Between 1986 when the benefit system was modified and 1992 the number of certified days of incapacity due to back pain in Britain rose by 104%, while all other causes of sickness rose by about 60%

(see Figure 1). According to the most recent figures, back pain accounts for approximately 13% of all certified days of incapacity [42] see source note*

However, these figures refer only to those claiming sickness benefit and invalidity benefits, and therefore represent primarily those on long term sickness, also people who are not in paid employment. Data from other Western Countries seems to be following a similar upward trend.

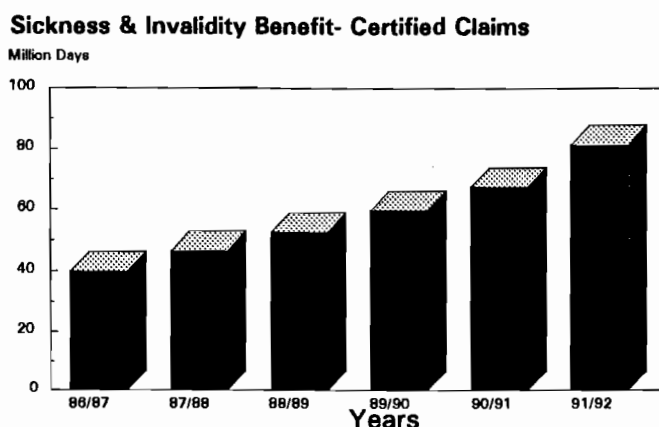


Figure 1. Certified Days of Sickness and Invalidation Benefit Claims for Back Pain from Department of Social Security 1986 to 1992

In the USA, according to available data for 1974 to 1978, disabling low back pain episodes increased by 26%, although during this period the population only grew by 7% [5]. Possible reasons for a discrepancy between pain reports and reported disability due to back pain have been discussed in a number of articles by Waddell and colleagues, for example [158], [159], [161]. One important factor contributing to these increases in disability claims, is the traditional method of medical management which is often based on

* Source note: Department of Social Security Figures. Crown copyright (1993) - Obtained from 1% DSS sample of claims to sickness and/or invalidity benefit which excluded days of incapacity where Statutory Sick Pay was claimed from the employer and most short spells of incapacity under 4 days in duration.

advice to rest [135], [158]. Other potentially exacerbating factors, which might be associated with chronicity and disability include:

- 1) The prevailing socio-economic conditions including higher levels of unemployment and the benefit system.
- 2) Greater awareness amongst the lay public of problems associated with back pain may encourage workers to feel they need to take care of their backs and take time off work.
- 3) Lifestyle changes towards a more sedentary, but more stressful way of life.

According to the Omnibus survey, 34% of the adult population who report having back pain in the past year state that the problem is work-related [120] and less than 58% of those who reported back pain in the past year were employed, or in some form of business. However, only 5% of these reported taking any time off work in the past 4 weeks. Prevalence of back pain according to a number of sources is higher in the lower socio-economic classes and is associated with poor educational attainment e.g. [14], [157]. But this may mainly be related to higher levels of heavy manual work in lower social classes. Walsh et al in a recent nationwide survey of low back pain and disability in Britain found that the relationship of lower socio-economic groupings with back pain only holds for men [162]. The prevalence is higher in manual occupations, and factors contributing to this are discussed further in section 6.1.

Although the level of morbidity associated with back pain is considerable, it is not a life-threatening condition and it was mentioned but not listed on the "Health of the Nation" targets [40].

2 GENERAL METHODS

2.1 Literature review

Medline, Social Science Citations, PsychLit and AMED databases were searched for the literature on the epidemiology, costs of back pain, and clinical effectiveness of treatment. Additional references were obtained through individual bibliographies. The survey of this

literature included primary research studies on the epidemiology and management of back pain and also several review articles on back pain.

2.2 Economic Analysis

Due to the limited epidemiological, clinical and cost data currently available, it is not possible to place an exact figure on the cost of back pain to society.

Published data were used to estimate costs wherever available and this was supplemented with surveys for the estimation of the cost of GP consultations and physiotherapy. These are described in more detail under the relevant sections. Additional information was also obtained from clinicians, providers and purchasers. Estimates based on the recent OPCS Omnibus survey [120] are also provided in Appendix II. We considered that the phrasing of questions in this population survey and the problem of recall, as in any population survey compared with data based on medical records, may lead to an overestimation of the size of the problem (see Table 1).

The costs associated with back pain can be broadly divided into direct and indirect costs. Direct costs include those incurred by the National Health Service, other organisations such as Local Authorities, as well as individuals' out-of-pocket expenditure. Indirect costs include production losses, and are the subject of debate among economists [53].

3 THE USE OF NHS RESOURCES FOR BACK PAIN AND THEIR COST.

The Department of Health work on "Burdens of Disease" referred to in the introduction uses a "top-down" approach to estimate the costs of illnesses including back pain [41]. In this method the total NHS aggregated figure for each condition is sub-divided into categories of health care, such as GPs and hospital out-patient services using a number of different data sources, for example the Royal College of General Practitioners morbidity surveys. The Centre for Health Economics study reported in this section is based on many of the same data sources but uses a different method to calculate the costs. All figures used for the estimation of costs in this paper have been adjusted to 1992/93 prices. Further details of how the estimates were made are provided in Appendix I..

NHS costs will be considered under eight main categories:-

- 1) General practice (personal medical services provided by GP's)
- 2) Pharmaceuticals
- 3) Hospital out-patients
- 4) Physiotherapy
- 5) Pain clinics
- 6) Radiology/Radiological procedures
- 7) Day Cases
- 8) Hospital in-patients

3.1 General Practitioner Consultations

Between 75% and 90% of these patients' back pain problems will have improved within six weeks regardless of treatment [148], [158] and recent research suggested that of patients with pain of only 72 hours not radiating pain below the buttock crease 90% recovered within 2 weeks [32]. However, back pain frequently runs a recurrent course [157].

General Practitioners are likely to prescribe rest, medication and provide a wide range of other advice [58], [135], [148], [158]. They may refer patients to a hospital specialist [33], that is either a rheumatologist, an orthopaedic surgeon, or if they believe the pain is related to nerve tissue embarrassment to a neurosurgeon. Many GPs have direct access to a physiotherapy department without referring the patient first for a hospital out-patient clinic appointment, which facilitates early treatment [57].

An increasing number of general practitioners are setting up individual contracts with physiotherapists, or have contracts with local hospitals, which expedites treatment for their patients, but the terms of employment vary greatly. Also some fund-holding GPs are now employing their own physiotherapist [69]. This enables a patient to gain even quicker access to treatment, and appears to be cost-effective [69].

GPs may also refer these patients directly to a private practitioner, such as a private physiotherapist, an osteopath or a chiropractor, or some other complementary medicine practitioner [153], [62]. More frequently the patients refer themselves to an alternative practitioner without necessarily having seen their GP [127].

Conservative treatment can include advice to rest, use of an orthopaedic corset, analgesics, non-steroidal anti-inflammatory drugs or muscle relaxants. In addition exercise, pain relieving devices such as "transcutaneous electrical nerve stimulation", patient education, or manipulation and massage, may be recommended. All these are commonly provided under the NHS but manipulation is more likely to be offered by osteopaths, chiropractors or by private physiotherapists outside the NHS.

The cost attributable to back pain through GP consultation is a product of the number of consultations due to back pain, and the cost of consultations. The results of six different studies are considered and they are summarised in Table 1. The upper four rows of data are derived from medical records whereas the last two are derived from population surveys.

National statistics are not recorded detailing consultations by consulting condition. Therefore, the number of GP consultations attributable to back pain is difficult to ascertain. Fry [62], based on the Royal College of General Practitioners Third National Morbidity Statistics from General Practice, 1981/82 [138], [62], estimated that 6% of (GP registered) individuals' reason for consultation was for back pain. A recent survey of medical records of 7,669 adults carried out in 2 separate practices in the Manchester area estimated that 6.4% of the adult general population consult their GP each year with back pain [123].

As the data from the Fourth National Morbidity Statistics were not available and the Third is over 10 years old, a small survey of general practices across the UK was carried out by the Centre for Health Economics in an attempt to achieve a more up-to-date estimate. The survey selected 13 general practices who were fully computerised, attempting to locate practices that would broadly speaking be representative of the UK population.

TABLE 1 SUMMARY OF STUDIES OF GENERAL PRACTITIONER CONSULTATIONS FOR BACK PAIN

Source	Sample Size	Source of data	How conducted?	Results
Centre for Health Economics 1993	43 GP's (with 80,000+ patients)	<i>Medical Records</i>	Analysis of 43 GP records over 1 year.	6.4 % of adults aged over 16 consult with back pain
Papageorgiou et al 1994	7,669	<i>Medical Records</i>	Prospective survey of GP records for patients reporting back pain.	6.4% of adults aged 18-75 consult with back pain.
Fry 1993	150 GP's* (332,000 patients)	<i>Medical Records</i>	RCGP results incorporated with Fry estimates.	6% of adults consult with back pain.
IMS 1994	500 GP's	<i>Medical Records</i>	Records of 500 GP's over 4 weeks analysed.	9.4% of adults aged over 15 consult with back pain
Walsh et al 1992	2,667	<i>Population Survey</i>	Postal survey of 20-59 year olds on 136 GP registers in 8 areas in Britain.	14.5% of 20-59 year olds consult GP with back pain.
OPCS Omnibus 1993	2,000**	<i>Population Survey</i>	Interview of randomly selected adults.	16% of adults aged 16+ consult GP with back pain.

* it is unclear how much weight Fry attaches to his own practice.

** only first month of three month study available - total sample is 6,000.

Seven of these practices were able to supply useful data; one practice in York with ten GPs; one in Exeter with four GPs; and five practices in Birmingham with a total of 29 GPs

provided data. Several other practices were unable to contribute as the GP did not always record the reason for a consultation. The practices who provided the data may not necessarily have been representative of the UK population, demographically, geographically or in terms of consultation rates. Walsh et al in an epidemiological survey of back pain found that two towns in the North of England had three to four times greater rates of consultation compared with two in the South [162].

Estimates based on the Centre for Health Economics sample of 43 GP's in seven practices with a total of 80,321 patients suggested that in 1992/93, 6.4 % of adults consult with back pain. From this survey it was found that these patients consulted 1.5 times on average each year. Coulter found that patients with back pain who were referred to out-patient clinics consulted 4 times a year but this is a selective group of those with more severe illness (33). A national rate of 2 consultations per year was therefore used in the CHE study, yielding a figure of 5.84 million consultations per annum. This contrasts with figures from the IMS (Intercontinental Medical Statistics), who estimated a figure of 8.63 million consultations for back pain based on a "snapshot" of the workload of 500 GP's in one week of each quarter in 1992 [79].

The average cost of a GP consultation in England in 1991-92 was £10.87 [39] and this adjusted for inflation, is taken as the average for the UK. On the basis of surveys by the Centre for Health Economics of GP records, Papageorgiou et al, Fry and the IMS it is estimated that the number of consultations due to back pain is between 5.84 and 8.63 million. This results in a total cost of back pain consultations in general practice of between £67.3 million and £99.4 million.

3.2 Pharmaceuticals

The cost of drugs prescribed by GP's for back pain is dependent not only on the number of consultations for back pain, but also on how often a consultation results in a prescription, which drug is prescribed, in what dosage and for what duration. Unfortunately there are no precise figures available for any of these variables. As discussed in section 3.1, the number of consultations for back pain probably lies between 5.84 million and 8.63 million.

The most commonly prescribed drugs for back pain appear to be either a non-steroidal anti-inflammatory drug (NSAID) such as ibuprofen, or an analgesic such as co-proxamol or co-codamol. No data exists on the level of prescribing nationally of these drugs for back pain, though IMS [79] estimate that 68% of consultations for back pain result in a prescription, which is close to the Omnibus estimate that 64% of those consulting a GP are "given treatment or a prescription". The IMS figure has been used to calculate the "high" estimate, while the Omnibus figure is used in the "low" estimate. It has been assumed that they are prescribed on each visit for an average period of three weeks. The results of the Centre for Health Economics survey of GPs indicated that about 40% of prescriptions for such drugs are for ibuprofen while co-codamol and co-proxamol together account for a further 40%. Much of the remainder is accounted for by the more expensive proprietary products, such as Voltarol and brand-named Naproxen. Assuming that these drugs make up the remaining 20% in equal proportions, the expenditure on pharmaceuticals for those with back pain is between £12.3 million and £33.5 million in 1992/93.

There are a number of uncertainties in this calculation. Firstly, it is inaccurate to assume that these would be the only drugs to be prescribed for back pain. A variety of other drugs, such as muscle relaxants and antidepressants may be prescribed but depending on their price and the number of prescriptions the pharmaceutical bill could either increase or decrease. However, given the recent emphasis on cost control in prescribing, it is likely that where there is little difference in the perceived effectiveness of alternative drugs, the less expensive will be prescribed. Secondly, the assumption that between 64% and 68% of consultations are associated with a prescription, could be either an overestimate, or underestimate. Thirdly, it is unlikely that these drugs are prescribed in every case for a period of three weeks. The figures on which these costs are based, are from the May 1993 edition of MIMS [1]. The Centre for Health Economics estimate is likely to be a conservative estimate not necessarily including repeat prescriptions.

3.3 Out-patient clinics

The estimation of any of the costs associated with back pain is difficult due to the lack of accurate data, but out-patient data are especially deficient. Assigning a value to the cost of out-patients treatment for back pain is therefore likely to be inaccurate. There are no national or regional data on GP referrals to out-patient departments. The cost that these referrals generate depends on which department the patients are referred to.

For the purposes of this analysis, it is assumed that those who are referred by the GP, attend either an orthopaedic clinic or a rheumatology clinic, and that they do so in equal proportions, the costs being similar. Using the CIPFA Health Database [29] the average cost per out-patient attendance at a rheumatology clinic is £32.20, and an orthopaedic clinic £28.06, giving an average cost per attendance of £31.94 (£30.13 at 1991/92 prices). It has been estimated using the RCGP Morbidity Statistics, Third national survey [138] that about 4.4% of back pain consultations result in a referral to an out-patient clinic. This is consistent with the Centre for Health Economics survey findings that less than 5% of GP consultations are associated with a referral to a hospital consultant, leading to a figure of between 256,960 and 379,720 out-patient referrals. Papageorgiou et al [123] found in their study that 10.7 % of patients consulting GPs for back pain were referred to an out-patient clinic.

One important variable is the number of times such individuals attend an out-patient clinic on average. Coulter et al [33] followed up 168 back pain patients referred to an out-patient clinic and found that the majority, 92 (54.8%) were discharged after one out-patient appointment. Six (3.6%) of this sample of patients had three or more appointments, whilst the information was missing on fifteen. Therefore the average number of out-patient visits is approximately 1.5. Using these figures, the cost of out-patient consultations due to back pain lies between £12.3 million and £24.3 million. In many cases there will be only one out-patient consultation which will result in referral to a physiotherapy or radiology department or to a hospital admission. These costs are considered later.

CHE estimates of the cost of out-patient consultations for back pain therefore ranges between £12.3 million and £24.3 million

3.4 Physiotherapy

To estimate the cost of physiotherapy within the NHS, for back pain sufferers, an attempt has been made to find the number of whole time equivalent (WTE) physiotherapists working solely on back pain in the UK. A survey of 75.8 WTE physiotherapists was conducted in York District, asking them to record the amount of time they spent each day over the course of one week treating people with back pain. This was calculated as an average number of hours per working week. Using this crude estimate and also taking into account data from a specialist orthopaedic hospital we estimated that 10% of their time was dedicated to patients suffering from back pain. As there are about 12,000 WTE physiotherapists within the NHS, it follows that there are the equivalent of 1200 WTE physiotherapists working constantly on back pain. Using a conservative figure of £20,000 per annum to cover their salaries and 'on-costs' and overheads, this yields a figure of £24 million for the cost of physiotherapy for back pain patients.

In addition, other patients may access physiotherapy through individual contracts with GPs which were not considered in this survey, possibly adding another 50% to costs giving an upper limit of £36 million.

3.5 Pain clinics

Pain clinics, mainly staffed by anaesthetists and run on an out-patient basis, provide a service particularly for chronic, intractable back pain. Some offer intensive pain management programmes based on exercise, and cognitive-behavioural principles. It is not possible however to put a cost on this service for back pain patients as no Korner coding exist to allow these patients to be counted. So any costs due to the use of pain clinics are excluded from the study.

3.6 Radiology

According to Papageorgiou et al [123] 13% of GP consultations result in a radiology referral between 759,200 and 1,121,900 direct referrals. In addition out-patient clinics frequently take another set of X-rays routinely from new patients. If each out-patient or every second out-patient had an extra set of X-rays taken then an extra 128,480-379,720 lumbar spine radiographic examinations would result. The cost per set of X-rays is likely to lie between £30 and £40 [171]. The costs of radiographic spinal examination therefore is estimated to be between £26.7 million and £60.1 million . Whilst there is an element of double counting in this figure, this is probably more than counter balanced by the extra cost of other much more expensive radiological examinations such as Computerised Tomography (CT) and Magnetic Resonance Imaging (MRI) which are sometimes used for non-specific mechanical low back pain .

3.7 Day cases

In 1989/90, there were approximately a total of 35,000 hospital day case patients in the UK [67]. The cost of procedures carried out on back pain sufferers can vary greatly, but most commonly these are spinal epidural injections or less commonly other procedures such as chemonucleolysis and the majority cost between £150 and £200 per procedure, based on information provided by the Oxford Region and Extra Contractual Referrals for Yorkshire and Northern Regions in 1993 [6]. Assuming the numbers treated as day cases did not alter substantially between 1989/90 and 1992/93, this can be estimated to have cost between £5.25 million and £7.0 million.

3.8 In-patients

The cost of in-patient episodes for back pain can be calculated as a product of the number of in-patients with back pain, and their cost. Alternatively, the cost of in-patients can be estimated as the product of the number of bed days occupied by back pain sufferers in hospital and the cost per in-patient day for a back pain sufferer. According to the most recent available figures, Hospital Episode Statistics [67] and personal correspondence with

the Welsh Office and NHS in Scotland, 830,476 bed days were attributable to back pain in Britain in 1989/90 (excluding figures for Northern Ireland which were not available). Adjusting this figure to include "sprains and strains of the sacroiliac region" and "sprains and strains of other and unspecified parts of the back", (ICD-codes 846 and 847) gives the total number of bed days attributable to back pain as 846,342. Extrapolating to include the population of Northern Ireland, the number of bed days in the UK was approximately 897,000. It is assumed that this figure did not alter substantially in the following year 1991/92, though the figures from Scotland indicate a slight decline in the number of bed days.

The cost per in-patient day is dependent on the speciality of the ward. Using figures published by CIPFA [29], and adjusting to 1992/93 prices, the daily cost in an orthopaedic ward would be £111.06. It is assumed that the majority of in-patients admitted for back pain would occupy a bed in an orthopaedic ward. However, some patients potentially undergoing surgery would be in a neurosurgical ward costing £224.18 per bed day. There is no national data on the proportion of back pain patients in each of these wards, or on the percentage of in-patients with back pain undergoing surgery on these wards. Calculations of the cost of in-patients is therefore based on the following assumptions :-

- 1) half of those back pain patients who may require surgery are admitted to a neurosurgical ward,
- 2) the remainder go into orthopaedics,
- 3) those not undergoing surgery are admitted to an orthopaedic ward,
- 4) the number of bed days occupied in each are the same.

The analysis also assumes that the percentage of back pain in-patients undergoing surgery is between 35% and 45% of the total number of back pain in-patients, and gives the range depending on which level of surgery is chosen. The percentages undergoing surgery are estimated from Hospital Episode Statistics, based on 1989 data, showing that there were approximately 110,500 in-patients with dorsopathies in England, and that 44,685 (40.4%) underwent some form of surgery [67]. It is assumed that levels of surgery in Scotland, Wales and Northern Ireland are similar to those in England. Using sensitivity analysis, if the percentage of back pain in-patients undergoing surgery is assumed to be 35%, the cost of back pain in-patients in 1992-93 in the UK was approximately £117.4 million. If the percentage of back pain in-patients undergoing

surgery was 45%, then the estimated cost to the NHS in the UK in 1992-93 was approximately £122.4 million.

CHE estimates for the cost of in-patient services back pain patients including surgery lie between £117.4 million and £122.4 million.

TABLE 2 NHS EXPENDITURE ON BACK PAIN 1992/93 UK FIGURES
(Centre for Health Economics estimates)

NHS Category	Low Estimate (£ million)	High Estimate (£ million)
General practice	£67.3	£99.4
Prescribed drugs	£12.3	£33.5
Out patients	£12.3	£24.3
Physiotherapy	£24.0	£36.0
Radiology	£26.7	£60.1
Day Cases	£5.3	£7.0
In-patients	£117.4	£122.4
TOTAL	£265.3	£382.7

3.9 Summary of costs to the NHS

The results of the Centre for Health Economics (CHE) analysis are summarised in Table 2 which show a total cost (attributable to back pain) to the NHS of between £265.3 million and £382.7 million in 1992/93. This accounts for between 0.65% and 0.93% of total NHS expenditure in 1992/93 in the UK (total expenditure estimated at £41.0 billion). The distribution of the costs between the different NHS sectors is shown in Figure 2.

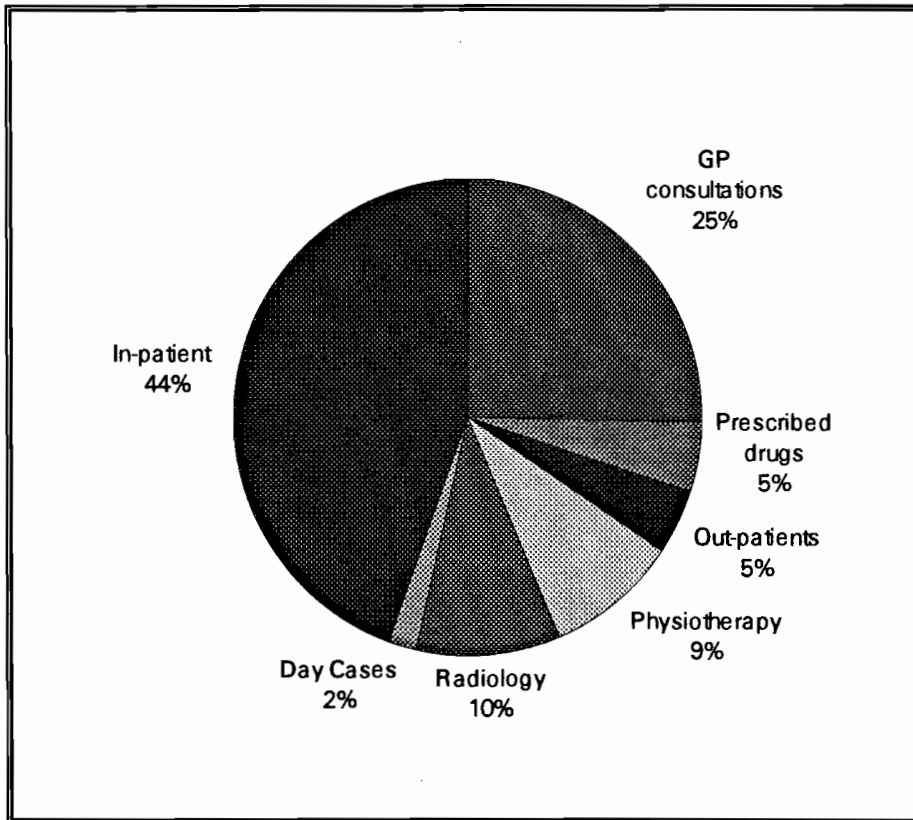


Figure 2 NHS Expenditure on Back Pain 1992/93 UK Figures

This analysis has used a disease cost approach to back pain. This method has been criticised on a number of grounds. In particular, it may be misused by policy-makers as the rationale for devoting more resources to a given disease. There is a danger that they may take the view that if a disease is large in terms of economic burden, it should have more resources devoted to it. The primary consideration for resource allocation should be whether a condition can be treated effectively at the margin (i.e. whether expansion of a treatment from its current level results in net benefit) rather than which has the "largest" burden.

3.10 Comparison with previous measures of NHS expenditure

The Office of Health Economics [166] estimated the total cost of back pain to the NHS to be £156.1 million in 1982, based on data from the 1970's and early 1980's. Crudely

adjusting this to 1992/3 prices, using the hospital and community service revenue (pay and prices) inflator the updated OHE figure is £329.1 million. This figure falls within the range of the estimates in Table 1. However, the sub-totals within the OHE figure are different from those on Table 1. Why is this?

Wells [166] estimated that General Medical Services (equivalent to the term 'General Practice' used in this paper) cost £25.7 million in 1982, or 16.5% of the NHS expenditure attributable to back pain. Using the recent survey of GPs, combined with other sources discussed in section 3.1, an estimate of between £67.3 million and £99.4 million resulted (25.4% of NHS expenditure on back pain based on the minimum estimates). This is primarily due to a higher level of GP consultations; Wells estimated 2.6% of GP workload was due to back pain making up about 6 million consultations, while Centre for Health Economics estimate between 5.84 and 8.63 million consultations. It is possible that an increase could have occurred over this time period, especially as Wells figure was based on the 1971/72 RCGP 2nd National Morbidity Study.

The small percentage attributable to General Medical Services in the Wells paper was balanced by the large cost attributed to pharmaceutical services provided by GP's, estimated at £38.9 million in 1982. The Centre for Health Economics survey estimate of between £12.3 and £33.5 million attributable to prescribed drugs for back pain in 1992/93 is considerably lower in real terms than the Wells figure. This is partly due to the differing rates of prescribing assumed (Wells assumed all consultations result in a prescription, whereas IMS data indicate 68%). Other important factors affecting the estimates include which drug is prescribed, and for how long. Wells took the average cost for 40 of the 64 NSAIDs listed in MIMS, while the 1992/93 figures reported in the Centre for Health Economics estimates were based on the five most commonly prescribed drugs for back pain in the sample survey. In this study, the drugs most commonly prescribed were found to be generally cheaper than the average NSAID and this is reflected in the lower figure. It is likely that there is measurement error in these estimates. The emphasis in the NHS on cost-effective prescribing may have lowered the drugs bill in real terms over this period, not only through a shift to generic prescribing, but also by substitution

across therapeutic categories (for instance, analgesics and NSAIDS are in different therapeutic categories).

The number of out-patient consultations in the Wells study is comparable with the Centre for Health Economics' lower figure, with Wells estimating 330,000 out-patient referrals compared to the Centre for Health Economics estimate of 256,960 to 379,720 referrals generating between 385,440 and 759,440 out-patient visits. Though the number of out-patient visits due to back pain is larger in the Centre for Health Economics study, the cost is lower in real terms, because of the assumption that most out-patients attend an orthopaedic clinic, which though not exact is felt to be a truer representation of the situation than that implied by taking the average cost per out-patient (which implicitly assumes that they go to all the different specialities in equal proportions). Also the Centre for Health Economics study considers physiotherapy and radiology separately, which Wells did not.

The cost attributable to in patients with back pain is comparable in the two studies.

4 OTHER HEALTH CARE COSTS

While the costs of back pain to the NHS are substantial, other health care costs are associated with the condition, and need to be considered.

4.1 "Complementary" medicine or therapy

The demand for complementary or alternative medicine is considerable and may be a reflection of the dissatisfaction with conventional medical management. Although there are several methods of alternative treatment which may give relief to some back pain sufferers, such as acupuncture and homeopathy, it would appear that the two most commonly chosen methods are chiropractic and osteopathy. An estimated 3.9 million chiropractic consultations [87] take place each year, and at least half of these are attributable to back pain (Bennett, M., Personal communication, Member of British Chiropractic Association. 1993). With each consultation costing the individual

approximately £20 [87], the total spending on chiropractic for back pain in the UK (assuming the number of consultations have not altered) in 1992/93 is at least £39 million.

The Osteopathic Information Service [121] estimate that there are approximately 5 million consultations each year with osteopaths and the same source claims that "about half" are attributable to back pain. The cost to the individual of an average 30 minute consultation varies throughout the country, but £20 represents an average figure. Using these figures, and assuming the number of visits to be the same, the total cost of osteopathy for back pain in the UK in 1992/3 was about £50 million.

Osteopaths and chiropractors are increasingly being accepted by the conventional medical establishment with the result that a small but increasing number can be found working within the NHS. This may be of consequence for the resource implications of back pain in the future but at present the majority of alternative medicine is practised in private clinics and financed out of the individuals' pocket.

4.2 Private physiotherapy

Private physiotherapists are another group who are frequently consulted by back pain sufferers. The Organisation of Chartered Physiotherapists in Private Practice [118], estimate that in 1992 there were 1.93 million consultations with private physiotherapists, which were attributable to back pain, costing £38.6 million.

4.3 Over-the-counter (OTC) medicines

It is possible that many back pain sufferers purchase "over the counter" treatments such as painkillers at a chemist before visiting their doctor. Though the size of the "over-the-counter" market for painkillers has been estimated at £179.5 million in 1992 [128], it is not known what percentage of this is attributable to back pain. Information from the IMS suggests that back pain is the fourth most common condition for which GP's advise patients to purchase over the counter medicine and that painkillers are by far the most commonly recommended. The absence of accurate data makes estimation difficult, but if 20% of the OTC painkiller market is accounted for by back pain sufferers, they would

have spent approximately £35.9 million on OTC's in 1992. If the proportion of the market is only 10% then back pain sufferers spend approximately £18.0 million.

5 NON HEALTH CARE COSTS OF BACK PAIN

5.1 Costs to local government

Though back pain is commonly a short term, self correcting condition, some individuals are significantly disabled by back pain. Using the OPCS 1985 survey of disability **, it was estimated that 34,288 individuals are handicapped severely enough with back pain to use some form of community care such as a home help or social worker. This showed that 20,256 local authority home helps, 8,063 social workers, and 4,982 meals on wheels services were employed to care for back pain sufferers. Home help costs for these people would then be about £18.9 million in 1992/93, based on a cost of £5.50 per home help visit [113] and 100 visits per annum, while social workers would cost approximately £1.3 million (1 visit per month at £13.05 per visit) and meals on wheels approximately £3.2 million (5 meals a week at £2.50 per meal). These costs exclude the costs of private domestics and voluntary workers.

In some cases those individuals listing back pain as a cause of disability in the OPCS survey, also report other causes of disability, which may be the main reason for requiring local government help. But it could also work the other way round. For example, a blind person may actually be rendered immobile because of their back pain, but would not be included in our analysis as this used only individuals who listed back pain first. The CHE figures could therefore either overestimate or underestimate the true costs. The Department of Health report on "Burden of Disease" takes a different approach and since the figures exclude all people with more than one problem listed, they can be considered a minimum estimate.

** OPCS. The survey of disabled adults living in private households, 1985 [computer files, Colchester, ESRC; data archive 1989]

TABLE 3 LOCAL AUTHORITY COSTS DUE TO BACK PAIN*

Based on OPCS Disability Data 1985

	Number of individuals requiring	Cost per visit	Total cost (£ million)
Home Help	20,256	£5.50 (100 visit p.a.)	£18.9
Social Worker	8,063	£13.05 (12 visits p.a.)	£1.3
Meals on wheels	4,982	£2.50 (5 meals / week)	£3.2
TOTAL			£23.4

TABLE 4 BACK PAIN EXPENDITURE 1992/93

(Centre for Health Economics estimates)

	Low Estimate (£ million)	High Estimate (£ million)
NHS	£265.3	£382.7
Local Authority	£23.4	£23.4
Out-of-pocket	£145.6	£163.5

5.2 Indirect costs (production losses)

Should production losses be included in the social costs of a condition such as back pain?

The main argument for their inclusion is that if production losses can be averted, there may be economic gain to society. But inclusion of production losses:-

- a) leads to a bias in favour of treatments that improve the health of those who are economically active at the expense of those who are inactive;
- b) implies that every time a worker is absent, a loss will be incurred. This may not be the case if there is a pool of unemployed labour in the economy which could be used to cover the period of absence (or if firms over-staff to allow for sickness absence). Alternatively, if the period of absence is short, the internal adjustments in a firm may maintain normal production levels;
- c) assume that wage is an accurate measure of marginal productivity. Clearly, this is not always the case, some workers are far more productive than others even though their wages are the same.

The cost to society due to working days lost is frequently quoted not only in the back pain literature, but also in the local and national press. The figures [41] suggest that in 1990/91, 67 million working days were lost because of back pain and that this cost £3 billion in lost production. These much cited DSS figures do not represent working days lost but rather 67 million *days of certified incapacity due to back pain* in the year 1990/91. Days of certified incapacity include previously unemployed individuals, who by definition could not lose working days, and also includes individuals who were not previously in the labour market. The figures do not account for employees (presently the majority of the work force) who are covered by Statutory Sickness Pay (SSP) or other employers scheme. These figures are a better measure of the chronic disability caused by back pain than working days lost.

A problem with using these figures as an estimate of working days lost is one of overstatement. According to the DSS figures there were 503 million days of certified incapacity (for all causes) in 1990/91 [41], whereas the total number of working days lost

for all causes of sickness reported in 2 large surveys is between 168 million [31] and 200 million [7]. The surveys claim that the loss of these working days cost respectively £9 billion and £13 billion. As this discussion indicates, the real cost is likely to be lower.

Unfortunately these studies did not analyse the number of days lost by condition, though the Industrial Society [7] report that back problems are perceived by managers to be the third most commonly reported (by employees) reason for absence after colds/influenza and stomach upsets/food poisoning. Interestingly, the same managers when asked what they thought were the real reasons for absence, listed back pain only sixth on the list. This implies a scepticism on the part of managers, and a belief that malingering is a common practice, which is not born out in the literature.

Although the number of days of certified incapacity cannot be used as a proxy for number of working days lost, it is possible that the percentage of days of certified incapacity attributable to back pain is a useful proxy for the percentage of working days lost due to back pain. If this is the case, and those who are absent from work are not significantly different from the rest of the workforce in terms of remuneration, then back pain accounted for 13.38% of working days lost (between 22.5 million and 26.8 million working days lost in 1992) at a cost of between £1.2 billion and £1.74 billion in 1992 (being 13.38% of the cost).

The range of values reported as the value of lost production is wide, but without further research into the conditions influencing absence from work, a more accurate estimate cannot be made. Given these reservations together with those expressed previously, the figures should be used with extreme care and with their limitations clearly stated.

5.3 Payment of benefits

Benefits received by individuals who are absent because of sickness are not a true cost but a “transfer payment” from one section of society to another sometimes via a government department. From a society perspective, there is therefore no net cost implication. Nevertheless, there is an opportunity cost involved, in that the funds could be spent elsewhere and it is estimated that such payments for back pain accounted for

approximately £394 million in 1992-93 assuming £5.89 as the average payment, the daily rate of sickness benefit for the year 1992/93 [131].

5.4 Intangible costs

There are other costs associated with a GP consultation or hospital appointment. Visiting the surgery or the out-patient clinic takes time, which in many cases could be more productively employed elsewhere (time costs). In addition, such journeys are often costly in terms of transport. While these costs ideally should be included in the costs of the illness, quantifying them is impossible using existing data.

Similarly, back pain itself imposes a cost on the individual depending on the level of pain and duration. While these costs are undoubtedly substantial and may from an individual perspective be the greatest cost of back pain, again they are unquantifiable.

6 INTERVENTIONS FOR BACK PAIN

A large variety of different interventions aimed at reducing back pain, are used by different health practitioners, many of which are not based on research evidence [147]. The clinical effectiveness of most methods of management have yet to be assessed in rigorous studies, and their cost-effectiveness have hardly been addressed.

6.1 Primary prevention

The aim of primary prevention is to reduce the incidence of back pain. Most efforts to prevent back pain and injury have been in the work place and therefore would only affect individuals who are employed. Some preventive programmes have been introduced into the classroom even at kindergarden level and encourage exercise and the avoidance of unnecessary biomechanical postural strain on the back [35], [36]. But the cost-effectiveness of this education, as for most health education, is not known.

A number of risk factors for back pain have been reported in the literature. These include:

- i) *Manual handling*, especially where frequent bending and twisting is involved [85]. Kelsey et al showed that this could result in a six fold increase in reported back injuries;
- ii) *Static postures*, including both sitting and standing [102], [86], where alteration in posture is infrequent;
- iii) *Vibration exposure*, which is also referred to as cyclic loading [124], has been the subject of much biomechanical research. Vibration may cause 'creep' and mechanical fatigue of the spinal structures; and
- iv) *Smoking*. The literature provides evidence of a link between smoking and back pain, [84], [74], [16],[44]. It has also been shown that the association is reduced after the cessation of smoking, and it is dose related, with those smoking 60 or more cigarettes a day having a twofold risk of back pain [44]. Research has shown that smoking may affect the nutrition to the disc [77]. An alternative mechanism explaining the link could be the effect of smoking in decreasing fibrinolytic activity [108], and therefore contributing to a chronic back pain syndrome [83], [81], [125].
- v) *Driving motor vehicles*, whether professionally or not , has been shown to be a risk factor [84], [163]. This may often expose the individual to more than one of the above factors, such as loading and unloading of heavy goods, prolonged sitting postures, and vibration .

Poor strength endurance of trunk muscles and /or decreased cardio-vascular fitness also have been linked to back pain [24], [22], [13]. But this appears only to be relevant to heavy manual work, and according to the results of the Boeing study of over 3,000 blue collar workers there is no evidence for a relationship in other populations [10]. It is likely that dynamic trunk muscle strength and endurance may be more important than static measurements, as fast and appropriate muscle response may be important in protecting the spinal structures from sudden potentially damaging perturbations [117]. Although according to Nordin [117] suitable techniques to carry out this research are now available, little work has been carried out in this field.

There is some evidence that preventive programmes in the work setting, including ergonomic interventions [145], can be effective but a number of confounding factors may play an important role. These include company support, the social security system and other environmental and psychosocial factors [47], [172]. The work environment itself appears to be an important predictor of back pain, in particular job satisfaction and job stress have been demonstrated to be associated with back pain [150], [16] and preventative programmes need to take these factors into account.

Primary prevention may not be achievable since much back pain is the result of the degenerative process. It is possible however that its impact may be reduced, by appropriate advice and management aiming to reduce recurrent and chronic pain and disability [94]. Secondary prevention is probably a more realistic aim and is discussed further under section 6.3.

6.2 Primary care of back pain

The General Practitioner is the key worker in the management of the problem. But some GPs, feel that they cannot adequately cope with the problem [159]. Frank [58] noted that medical training may actually hinder a satisfactory therapeutic approach with an excessive emphasis on excluding serious although very uncommon pathology, rather than aiming to alleviate the symptoms. This may partly be related to a lack of training in this area, and also the limited amount of time that they spend on each consultation [134], which may make the appropriate provision of advice and health education difficult.

Apart from controlling the patient's current pain, the main aim of primary management of acute (and early) episodes of back pain is to prevent recurrences and avoid patients developing into chronic sufferers, that is reduce chronicity.

6.2.1 Advice

Appropriate advice is probably the one single most important factor in the management of back pain. As discussed in section 1, it is not usually possible for the clinician to provide the patient with a precise diagnosis. But it has been advocated that the terms used by a clinician or therapist to label the condition should be carefully considered [64], [47].

Words such as degeneration, rupture, and arthritis should be avoided, in favour of strain, or muscle pain [159]. There is evidence that General Practitioner consultations and hospital referrals for back pain can be reduced by means of a simple educational booklet [135]. It may be that such a booklet could be devised to also encourage these patients to resume early activities and return to work, in spite of pain.

6.2.2 Rest

The mainstay of conservative treatment has been to advise rest. One study claimed to show that rest is beneficial for back pain [168], but this study was carried out on army recruits with back pain and suffered from several methodological flaws including a lack of an independent assessor blind to the treatment allocation. Other studies have concluded that rest is not beneficial, e.g. [66], [43],[152]. In a randomised controlled trial Deyo et al [43] compared 2 days bedrest with 7 days bedrest for patients with acute back pain, and found that those who stayed in bed for a shorter time missed 45% fewer days of work. The conclusion was that bedrest especially if prolonged may be an important contributory factor resulting in chronicity. It may lead to both the development of "a deconditioning syndrome" caused by prolonged and excessive self-protection [105], and also be detrimental in its psychosocial effects. Since work in itself is probably an important factor in reducing chronicity [111], a treatment regimen that encourages rapid return to work is important. The Quebec Task Force on Back Pain reported that 75% of back pain cases returned to work within a month, and 90% within three months [148].

6.2.3 Medication

Both analgesics and non-steroidal anti-inflammatory drugs (NSAIDs) are commonly prescribed to patients consulting their GP with back pain. These drugs may help an individual resume activities more quickly. Analgesics may have a palliative effect on back pain [168], and NSAIDs have been shown to be more beneficial than a placebo [45]. However, the longer term use of NSAIDs is costly and may have serious side effects leading to peptic ulcers [51], [132] and also raised blood pressure.

6.2.4 Exercise

There is some evidence for a link between weak spinal trunk and abdominal muscles and recurrent/persistent back pain [133]. However, the effectiveness of specific exercise regimens for the relief of back pain and disability is not well supported by research. Koes [91] in a blinded review of 100 papers on exercise programmes for back patients concluded that only four studies were not methodologically flawed. These studies did not provide evidence of the usefulness of any particular type of exercise regimen for back pain patients, a conclusion that was also reached in other reviews of the literature [89], [151], [50]. Strengthening exercises for the spinal muscles may be of benefit [143], [104]. Sinaki [143] demonstrated that simple exercises can strengthen the trunk muscles and do not need to be strenuous. Manniche [104] however concluded that patients benefit significantly more in terms relief of pain and disability, from an intensive exercise programme of one and a half hours exercising hard two or three times a week rather than the traditional less strenuous programme. McKenzie's approach to treating back pain [106] includes the use of passive stretching exercises and has the advantage of encouraging patients to take responsibility for their back problem. This approach is currently enjoying great popularity especially amongst physiotherapists, but whilst there is some evidence for its usefulness [130], [149], more research is needed. There appears to be a place for a fitness class in primary care which aims to encourage the early resumption of physical activities, and reduce the chances of back pain patients developing chronic disabling conditions. Such a programme, based on the successful outcome of a fitness class for chronic back patients carried out in Oxford [60], [61] is currently being evaluated in York using a randomised controlled trial comparing it with usual practice.

6.2.5 Spinal manipulation

The term manipulation is commonly used to refer to a high velocity thrust to a joint beyond its restricted range of movement, but it may also include gentle low velocity passive movements within or at the limit of the joint range. Manipulation may be carried out by a chiropractor but is more likely in the UK to be carried out by an osteopath or a physiotherapist, since there are only about 800 chiropractors in the UK compared to 2,000

osteopaths and 25,000 physiotherapists, of which a small proportion specialise in manipulation. Two systematic reviews of the research literature suggest that it has a place in the management of back pain [90], [141]. Both reviews conclude that manipulation can be effective in speeding up recovery in the acute stage between 2 to 4 weeks of onset.

Two other studies provide some evidence for its usefulness also in the management of chronic back pain patients [93], [107]. The second of these was a pragmatic study that received much media attention and compared chiropractic management with standard hospital management. There are many different interpretations of the positive findings of this study in favour of the chiropractors who used manipulation more frequently than the physiotherapists in the study. The physiotherapists were largely not specialists, and may not have been seen as such by the patients. Both the studies demonstrated a beneficial effect of spinal manipulation compared with standard physiotherapy in terms of functional outcome measures which became more apparent in the longer term [92], [93], [107].

It is considered possible that early intervention may reduce chronicity and this should be the major aim of primary care management of back pain. Hackett [69] reported that if early physiotherapy was provided in primary care, patients rated their management as above average and resulted in fewer hospital referrals.

6.2.6 Radiology

Guidelines for doctors referring patients for radiographic examinations have been produced by the Royal College of Radiologists [139], but according to a recent study carried out in a community hospital, half of the lumbar spine radiographs would not have been carried out if these guidelines had been observed [70], [28]. The guidelines recommend that a lumbar spine radiograph is only indicated in a number of limited cases- "that is when pain is worsening or not resolving, when there is a history of trauma, or when abnormal neurological signs are evident on clinical examination". They report that in 75% of the cases the patients had only been given a partial examination, and in 20% they had no examination at all.

6.3 Secondary prevention

Secondary prevention is aimed at reducing recurrences, where the individual has already experienced an episode of back pain. It should be an important component of primary care management and also hospital management, but may be especially effective in the workplace. Many of the approaches aimed at primary prevention, are also appropriate for these individuals and compliance with a programme may be better and attrition less at this stage.

Although 75-90 % of back pain patients have improved within 6 weeks regardless of any treatment provided [148], [158] repeated episodes are very common [157]. It is the chronic or repetitive problems that may be associated with disability and are responsible for the high cost to society. Patient education programmes, including ergonomic advice, encouragement to exercise and advice on how to control their pain may be effective [101], [21], [88], but the literature is inconclusive about the effects of educational programmes such as back schools on chronic back pain patients [94]. More research is needed to establish which type of programmes are likely to be most effective, and which components of the programme are important. Active graded exercises taking into account behavioural processes such as a fear of movement which might bring on the pain, and encouraging a resumption of normal activities [98], [99], [161], [61] are probably a key element in both secondary prevention and secondary care.

Since back pain is very common amongst people who are in their most productive working years, prolonged sick leave resulting in loss of productivity is of special concern to society. A few studies provide some evidence that workplace interventions can be effective in reducing absenteeism due to back problems and claim to be cost effective e.g. [154], [97], [20], [68]. They usually include ergonomic interventions, but some are based on exercise. They tend to be set up by North American or Scandinavian companies who may be more motivated to reduce medical claims, due to the differences in the benefit system compared with the UK. However, most evaluations in the area of health promotion suffer from a number of design problems and methodological weaknesses. Control groups are either not included, or unsatisfactory as contamination between the

groups is likely if the workers are on the same site, and if they are not the different settings may render the groups incomparable. Also the subjects tend to be self-selected with small numbers agreeing to participate in the programme leading to an insufficient sample size.

Partly for these reasons, and also because details of the intervention and assessment procedures used are lacking, as is baseline information to allow comparison of the groups, it is difficult to interpret their findings. High cost-benefits reported in these studies need be regarded with some scepticism. In addition, the avoidance of production losses included in the benefits lead to an exaggerated benefit figure. Although it is impossible to ascertain which components are beneficial, an important feature of a successful programme appears to be organisational involvement [172], [117], [47].

6.4 Secondary care

A patient whose back pain has not resolved and has not returned to work within six months has only a 50% chance of ever returning to work [158]. Once chronic pain and disability have become established, more aggressive and expensive rehabilitation programmes may be necessary if an individual is to have a chance of resuming normal activities. In the UK there are only a limited number of such programmes available, on both in-patient and out-patient bases.

The programmes that appear to be effective in restoring function and returning individuals with chronic back pain to work, all tend to consist of relatively strenuous exercises [104], [105], [99], [59]. They often include the following components: exercise, patient education providing information on self-help, ergonomic advice. They may also include "work-hardening" a concept which has gained popularity in North America where some comprehensive compensation schemes use an aggressive approach, aiming to get the claimant back to work. They are often run by a multi-disciplinary team including a doctor, nurse, physiotherapist, occupational therapist, and psychologist and may therefore be expensive.

The results of these studies point to the need to provide patients with a progressive exercise programme that will improve their general levels of fitness and above all their

confidence in their own spine. Some studies have sought to compare the usefulness of physical therapy with behavioural therapy, e.g. [72], [3], and have not found either treatment overall to be more effective. A combined programme is probably most effective as the two are likely to be interactive [114]. For longer term back pain patients with considerable reduction in functional capacity, cognitive and behavioural techniques can be effectively incorporated into an active exercise programme [59], [169]. Rehabilitation programmes may be goal-oriented, use "exercise quotas", according to the individual's baseline capacity and encourage family involvement. There is some evidence that patients who attribute their recovery to their own efforts are less likely to relapse [52].

Rehabilitation programmes that explicitly link in with the work-place appear to have a higher chance of success, especially in terms of returning the chronic back pain patient to work. The work environment has also been shown to be more important than many other physical and psychological variables in predicting individuals who are likely to report back pain [16]. There is some evidence of an important role which the supervisor in the work-place can play in helping the worker return to work. Above all the worker, who may be expected to carry out very tedious and possibly strenuous work in spite of his pain, needs to feel appreciated [47]. In any case there is evidence for the need to take into consideration psycho-social factors rather than just physical findings when assessing an individual with back pain.

6.4.1 Pain clinics

Patients with intractable back pain are often referred to pain clinics by their GP or by hospital specialists such as orthopaedic surgeons for pain relief [146].

There are about 200 pain clinics in the UK (Budd, 1994 personal communication), and a large proportion of this work is associated with back pain [37]. Many different forms of pain management are offered by these clinics which tend to be staffed by anaesthetists, often with input from nurses, physiotherapists and psychologists. Treatment methods used at pain clinics include drug therapy, physical methods which can be categorised as non-invasive, such as transcutaneous electrical nerve stimulation and acupuncture, or invasive physical procedures such as facet joint injections, and epidural injections. The relative

effectiveness of these different procedures is not yet known. Some pain clinics offer multidisciplinary pain management programmes where patient participation is the primary requirement [146].

6.4.2 Non-surgical hospitalisation

A small percentage of back pain patients are admitted to hospital as in-patients (see Figure 2), but this is an expensive way of managing the problem and also potentially harmful. Non-surgical hospitalisation is rarely indicated [38], but still used by many hospital consultants when a prolapsed intervertebral disc is suspected [38]. Bedrest with traction is used by many hospital specialists although there is no evidence for its effectiveness [122], [46]. Also epidural steroidal injections are commonly used although evidence for their pain relieving effect is lacking [34], [38]. According to Deane [38], in-patient beds are still used for diagnostic procedures such as myelograms, which are invasive and commonly associated with side-effects, although CT scans would be preferable in most cases [38]. Where an alternative can be found it is desirable to avoid hospitalisation for back pain [25].

6.4.3 Surgery

There is evidence that surgical treatment, even in patients with definite disc herniations and nerve root involvement, produces no better outcomes at 1 and 4 years than conservative treatment [140]. Weber [164] in a randomised controlled trial of surgery and conservative treatment found that 80% of patients treated conservatively were improved, and had satisfactory outcomes at one year's follow-up, compared with 92% of the surgically treated patients. However, by 4 years the differences were reversed with 88% of the conservative and 82% of the surgical group reporting a satisfactory outcome. Twenty-four percent of patients treated conservatively had suffered a serious relapse by this time but so had 15% of the surgical group. Previously the OHE [166] noted that probably less than 0.5% of patients who consulted their GP for back pain were likely to subsequently have spinal surgery. Traditional surgery for prolapsed intervertebral disc (PID) involves removal of the bony lamina to gain access for removal of the disc and

necessitates a large incision, whereas discectomies result in smaller incisions with no loss of bone and only the removal of loose material from the disc.

When surgery is indicated for a PID, minimally invasive surgery such as microdiscectomy may be the best option. In this intervention an operating microscope is used and the incision is much smaller than in a discectomy. They have been shown to have a good outcome, and allow early resumption of normal everyday activities [38]. Minimally invasive surgery has great potential to cut down on the use of hospital beds, since patients need only stay for 24 to 48 hours [48], although this would need changes in the organisation of the services [8]. Deane [38] on the basis of a literature review, and a survey of current methods of the management of PID, reported that this type of minimally invasive surgery was not widely available, and that it should in any case be carried out by surgeons specialised in the technique. Minimally invasive surgery is an example of a health technology that is rapidly being developed but is largely unevaluated [144]. This type of surgery is still invasive and potentially dangerous and its use therefore needs to be closely monitored [8].

7 MANAGEMENT IMPLICATIONS AND RESEARCH REQUIREMENTS

7.1 Data collection and documentation

There is a paucity of information on current methods of back pain management used by different members of the medical profession and other health professionals. In the Primary Care setting, even though GPs often have a computer, they may not always record the reason for the patient's consultation. Referral patterns to hospitals are complex, and variations across practices have been shown to be at least 2.5 fold [56], but the reasons are not well documented. It is therefore difficult to ascertain overall current practice in the UK. Waddell [160] has called for epidemiological monitoring and medical audit of back pain which would help to overcome some of these deficiencies.

7.2 Aetiology, the natural history of back pain, and diagnostic techniques

Although a great deal of research on back pain has been carried out, the aetiology of mechanical low back pain is still poorly understood. It is associated with pathophysiological processes such as nutritional deficiencies, and degeneration of the avascular disc, both of which are age-related [76], but the causal link has not been established. Smoking, exercise and vibration are known to have some effect on the state of the disc but further research in these areas could be helpful.

Further studies of the natural history of back pain in different settings including non-hospital situations such as the workplace and primary care settings, could contribute to a better understanding of the aetiology of back pain. Case-control studies are usually retrospective and may not reliably be able to draw on all the potential dependent factors. Longitudinal prospective studies might yield more information.

Accurate diagnosis prior to surgery using appropriate spinal imaging is reported to be the most important factor in the successful surgical treatment of herniated discs [23]. The most accurate imaging may not be the least expensive but according to Camp [23] is likely to be the most cost-effective. Sophisticated imaging techniques such as CT and MRI can improve the diagnostic accuracy of more serious spinal pathology, but do not usually provide useful information for simple backache [159].

7.3 Research into preventative programmes

There is some evidence for the usefulness of preventative programmes in reducing the impact of disabling back pain in the workplace, but most of these studies have been carried out in North America or Scandinavia. They frequently suffered from methodological problems and further studies in UK work settings could usefully link in with the recent EC Health and Safety at Work Regulations for Manual Handling [71].

Preventative programmes aimed at children in the classroom have been advocated but the research needed to test the effectiveness of these programmes, requiring large numbers of cohorts to be controlled and followed up for at least twenty years.

7.4 Radiography

According to the guidelines published by the Royal College of Radiologists [139] a large number of radiographic examinations for back pain are taken unnecessarily. Each lumbar spine investigation which usually is comprised of two or three films per patient, exposes the individual to 40 times as much radiation as a chest radiograph. Halpin et al [70] estimated that amongst the 700,000 people who have lumbar spine radiographs each year, there is a statistical probability of up to 19 deaths occurring as a result of radiation exposure. According to Chisholm [28] there now is a need to move away from the "traditional diagnostic work up" to a more selective investigative approach. The impetus for change is concerned not only with good clinical practice, and the recognition of the dangers of ionising radiation, but also the large costs involved. There is some evidence to show that spinal manipulation may speed up recovery from back pain and disability in the short term [142] and may also have some benefits in the longer term [107], [93]. However, what exactly is achieved through manipulation is not understood.

7.5 Conservative treatment and rehabilitation programmes

The Primary Care setting is seen to be the focus for the management of the vast majority of back pain patients but variations in practice need to be reduced. Improved communication between General Practitioner and hospital out-patient specialists could help to reduce the cost in two ways. It could cut down on the number of out-patient referrals, and also it could reduce the number that are referred on to the hospital physiotherapy department [33]. During the months of waiting there is a real risk that the individual through lack of activity and advice, and fear of aggravating their back pain problem, may become physically and psychologically debilitated.

There is evidence for the effectiveness of exercise and physical activity for back pain sufferers in many studies (see section 6). But no specific exercise programme has been shown to benefit back pain patients. This could be due to diagnostic ambiguity, and lack of homogeneity of the population under study. Depending on the patient's problem a particular exercise programme, aimed at reducing the deficiency in function, could be

expected to be effective. Currently there is a paucity of research into the specific effects of exercise related to different categories of back pain problems. It has to be acknowledged that in practical terms it is extremely difficult to obtain sufficient numbers of patients for a randomised controlled trial if patients with back pain are divided into many different categories. To some extent this problem can be overcome with the use of multicentre trials, although these are expensive and difficult to organise.

One way forward may be to encourage multidisciplinary research, with a specific view to gaining a better understanding of the natural history of the problem and its aetiology. This would provide a better classification of back pain, enabling more useful conclusions to be drawn from the results of clinical trials. Careful attention needs to be given to the design of trials and a number of review papers have addressed the issue of methodology in this difficult field [165], [90], [91], [142]. According to Koes [92] there are a number of common deficiencies in reported research into the effects of spinal manipulation and exercise programmes (see section 4.2.3.) [91], and these should be addressed in future studies. The design should include an adequate description of drop-outs, sufficient numbers of patients, a blinded assessor, and a placebo control group .

7.6 Research Priorities

Much of the research on back pain and published data has been carried out in the United States, and is not always directly relevant to the United Kingdom. The US Agency for Health Care Policy and Research has commissioned a 5-year study of the relative effectiveness of alternative ways of diagnosing and treating low back pain which is the most common cause of disability among adult Americans [54]. But most interventions are not based on any firm evidence of their clinical effectiveness [148], [147]. In Britain, the Clinical Standards Advisory Group, commissioned by the Department of Health, have just published management guidelines for back pain, based on epidemiological data and reviews of the literature. These were not available at the time of carrying out the CHE study. There are no Health of the Nation Targets for back pain.

Research priorities need to determine the clinical and cost-effectiveness of interventions, and in particular aim at:

- 1) Development of well-prepared educational booklets for GPs to give their patients (see section 5.2).
- 2) Early active interventions, such as exercise, education and spinal manipulation provided at a primary care level (see section 5.2).
- 3) Secondary prevention in the occupational setting (see 5.3).

8 CONCLUSIONS

The costs of back pain to society are huge. They are difficult to measure precisely but we have estimated that the NHS costs are between £265.3 and £382.7, comprising 0.65 to 0.93 % of the total expenditure in the UK. The majority of the cost is associated with Primary Care and In patient hospital management.

There is evidence that much of the treatment that is commonly used such as rest, and medication are not cost-effective, whilst many other methods of management such as physiotherapy have yet to be adequately researched. Non surgical hospitalisation is very costly and is rarely warranted. Surgery is not likely to be cost-effective except for a small group of patients with clear indications.

The main aim needs to be avoidance of chronic or recurrent disability which forms the greatest part of government expenditure in terms of DSS benefits and also loss of productivity. The effects of chronic back pain and disability are also very costly in terms of human suffering which cannot be quantified. One strategy that is likely to be effective is an emphasis on early active management through Primary Care in order to reduce the risk of individuals with acute attacks becoming established as chronic sufferers. Another strategy to reduce costs is to avoid unnecessary hospital referrals, including radiology and especially inappropriate admissions.

Further research is needed to identify the important components of these strategies, evaluate their cost-effectiveness and find the best ways of implementing them.

APPENDIX I: METHODS USED TO ESTIMATE COSTS OF BACK PAIN

The methods used to estimate the costs of resources used by back pain sufferers are based on a number of assumptions stated below. These are the best available.

i) GP consultations

a = Total population of the UK aged 16+ =	45.91 million
x = total number of consultations (aged 15+) for back pain (based on 5 Birmingham practices)=	5,355
y = total number of patients in these practices aged 15+ =	42,090
n = consultations per year per individual with back pain p.a =	2
	(Centre for Health Economics & Coulter et al 1991)
x/y = consultations per person over 15 for back pain p.a.	0.12723
(x/ny)100 = % of people consulting with back pain p.a =	<u>6.361%</u> of adults consult.
xa/y = total number of visits for back pain in year =	<u>5.84 million</u>
xa/ny = number of people consulting GP for back pain p.a =	<u>2.92 million</u>

Using £10.87 for a cost per consultation and adjusting this to 1992/93 prices (using Hospital & Community Health Services pay and prices index) gives a cost per consultation of £11.52.

This implies a cost of £67.3 million p.a based on a consulting rate of 6.4% , or £99.4 million based on a consulting rate of 9.4% (IMS data).

ii) Estimation of drugs prescribed by General Practitioners

Lower Estimate - based on 5.84 million consultations from the CHE survey and 64% result in a prescription i.e. 3.7376 million consultations result in a 3 week prescription

a) ibuprofen - 1200mg a day for 3 weeks = 2 x 600 mg for 21 days i.e. 42 tablets

$$42/100 \times \pounds 9.66 \times 3.7376 \times 40/100 = \pounds 6.07 \text{ million}$$

b) co-codamol/coproxamol - 4 tablets a day for 21 days = 84 tablets.

$$84/500 \times \pounds 7.10 \times 3.7376 \times 40/100 = \pounds 1.78 \text{ million}$$

c) Naproxen - one tab daily for 21 days = 21 tablets

$$21/56 \times \pounds 15.68 \times 3.7376 \times 10/100 = \pounds 2.20 \text{ million}$$

d) Voltarol - 3 x 25mg daily = 63 over 3 weeks

$$63/84 \times \pounds 7.88 \times 3.7376 \times 10/100 = \pounds 2.21 \text{ million}$$

Total cost (lower) = $\pounds 6.07 \text{ million} + \pounds 1.78 + \pounds 2.20 + \pounds 2.21 = \pounds 12.26 \text{ million}$

Upper Estimate

Estimates based on number of GP consultations being 8.63 million (IMS data 1994).

5.87 million consultations result in a 3 week prescription (68% of 8.63 million)

a) Ibuprofen - max is 1800mg a day for 21 days = 3 x 600mg per day or 63 x 600mg over 21 days.

$$63/100 \times \pounds 9.66 \times 5.87 \times 40/100 = \pounds 14.29 \text{ million}$$

where 63/100 is proportion of pack used, $\pounds 9.66$ is cost of that pack, 40% of prescriptions accounted for by ibuprofen.

b) co-codamol/coproxamol (same price). 8 tabs a day for 21 days = 168 tabs.

$$168/500 \times \pounds 7.10 \times 5.87 \times 40/100 = \pounds 5.60 \text{ million}$$

c) Naproxen (naprosyn). 42 tabs over 3 week period.

$$42/56 \times \pounds 15.68 \times 5.87 \times 10/100 = \pounds 6.90 \text{ million}$$

d) Voltarol. 63 tabs over 3 week period.

$$63/84 \times \pounds 15.32 \times 5.87 \times 10/100 = \pounds 6.74 \text{ million}$$

Total cost (upper) = $\pounds 14.29 + \pounds 5.60 + \pounds 6.90 + \pounds 6.74 = \pounds 33.53 \text{ million}$

iii) Estimation of hospital out-patient costs

Lower estimate

Based on the Centre for Health Economics General Practitioner Survey using figures at both ends of the range:

4.4% of GP consultations for back pain result in an out-patient referral (MSGP3/1986)= 256,960 referrals

Cost of each consultation= £31.94

Assuming an average number of visits per person= 1.5

(Centre for Health Economics 1993 & Coulter 1991)

Total cost (lower)of out-patient referrals= £12.3 million

Upper estimate

379,720 outpatient referrals are made (4.4% of 8.63 million). Assuming they visit twice results in 759,440 visits.

Total cost (upper)at £31.94 per referral= £24.3 million.

iv) Estimation of physiotherapy costs Based on a sample of 75.8 whole time equivalent physiotherapists

% of physiotherapy time dedicated solely to back pain= 10%

Number of whole time equivalent physiotherapists in NHS= 12,000

Number of NHS physiotherapists working full time on back pain= 1,200

Cost of NHS whole time equivalent physiotherapists for 1 year= £20,000

Cost of NHS physiotherapy for back pain = £24 million

Additional physiotherapy provided through individual GP contracts,
such as on-site physiotherapy- no figures available, notional extra 50% £12 million

Total cost of NHS physiotherapy = £36 million

v) Estimation of cost of radiology

13% of GP consultations result in a direct referral to a radiology department (Papageorgiou et al 1994)

Number of GP consultations estimated at between 5.84 million and 8.63 million.

Therefore between 759,200 and 1,122,040 direct referrals to radiology departments.

Costs of each referral estimated at £30-£40

Therefore the cost of radiology from direct GP referrals is between:

$759,200 \times £30 = \underline{£22.8 \text{ million}}$, and $1,122,040 \times £40 = \underline{£44.9 \text{ million}}$

In addition, there are radiology costs from out-patients referred on to radiology, based on Centre for Health Economics data.

Lower estimate Assuming 50% of outpatients (256,960) with back pain are referred to radiology

128,480 are referred to radiology at minimum cost of £30 per X-ray.

Minimal additional cost is £3.9 million.

Total lower estimate is £3.9 + £22.8 million =£26.7 million

Upper estimate Assuming 100% of outpatients with back pain are referred to radiology.

Higher estimate of outpatients with back pain is 379,720. Assuming a higher cost per X-ray of £40 results in an additional cost of £15.2 million

Total higher estimate is £15.2 + £44.9 million = £60.1 million

vi) Estimation of the cost of day cases

Cost per day case for back pain (eg epidurals)= £150-£200

35,000 day cases for back pain (Hospital Episode Statistics 1989/90)

Total cost of day cases for back pain = £5.3 - £7.0 million

vii) Estimation of cost of hospital in-patient management, including surgery on 35-45% of patients

Number of “bed days” for back pain (Hospital Episode Statistics 1989/90) = 897,000

110,500 hospital in-patients with “dorsopathies” of which 44,685 (40.4%) underwent surgery.

Using sensitivity analysis on the range 35% to 45%, and applying the inflation adjusted figures for orthopaedic and neurological wards, the cost of in-patient management including surgery:

Between £117.4 and £122.4 million.

Total cost of in-patient management = £117.4 - £122.4 million

viii) Estimation of cost of private physiotherapy, chiropractic and osteopathy

Consultations for private physiotherapy = 1.93 million

Consultations for osteopathy for back pain = 2.5 million

Consultations for chiropractic for back pain = 1.95 million

Total number of consultations for back pain = 6.38 million

Cost per consultation=£20

Total cost of consultations = £127 million

ix) Cost of over-the-counter (OTC) medicines

Over-the-counter painkiller market (Proprietary Association of Great Britain 1993 & IMS 1993) =£179.5 million

Estimate of proportion of market made up by back pain patients = 10-20%

Cost of painkillers purchased by back pain sufferers=£18-£36 million

APPENDIX II ESTIMATES FOR THE COSTS OF BACK PAIN BASED ON THE OPCS OMNIBUS SURVEY

General Practice

The findings of the OPCS Omnibus survey [120], based on 2000 members of the general population, covering Great Britain rather than the UK, does not correspond well with the Centre for Health Economics survey (see Table 1). Its results suggest that nearly seven million adult individuals (17% of the adult population) visit their GP every year with back pain, which would be equivalent to 13.7 million consultations if the individual consults 2 times a year. In contrast, the results of the Centre for Health Economics study of over 80,000 individuals visiting a doctors surgery, suggest that the number of individuals consulting their GP with back pain is around 6 % of the GP registered population. It would be expected that a sample population taken from those consulting a GP would report a higher consultation rate for back pain than the general population. The results of the Centre for Health Economics survey appears to be broadly consistent with most other estimates. A notable exception, apart from the Omnibus survey, were the findings of Walsh et al [162], who reported that 14.5% of adults aged 20 to 59 consulted their GP with back pain, but this varied greatly with geographic location. Unfortunately, neither Walsh et al, nor the Omnibus survey reported the number of consultations in a year, only the number of adults consulting. Therefore a figure for the number of consultations can only be calculated indirectly. If the consulting rate is 2 (i.e. 2 visits per annum) then the number of consultations due to back pain is 13.7 million at a cost of £157.9 million. A number of possibilities may explain the discrepancies between the Omnibus and Walsh studies and the other estimates, including that by the Centre for Health Economics:-

- i) For whatever reason, the Omnibus survey may overstate the number of individuals consulting GP's when extrapolated to the general population.
- ii) There may have been a considerable increase in back pain consultations which has not been picked up by the other studies.
- iii) Other studies based on medical records may have underestimated the number of GP consultations, or the number of individuals consulting.

One or more of these factors may explain the differences between the Omnibus survey and previously reported data on GP consultations. In any case population postal surveys consistently result in higher figures (see the last 2 rows of data on Table 1) compared with data from medical records (see last 3 rows). It seems that individuals when asked to recall how many times they consulted a GP in the past 12 months may report visits over a longer period of time (personal communication with Papageorgiou 1994).

The CHE survey from medical records resulted in a figure of 64 per 1000 registered GP patients, compared with 160 per 1000 according to the Omnibus data.

According to data derived from the Omnibus survey, 13.7 million GP consultations took place which cost is £52.4 million.

Out-patient referrals

The Omnibus survey estimates that 1.54 million individuals visit an out-patient department each year with back pain. If each person visited once and each visit costs £31.94, the cost would be £49.2 million. If each person visits twice, then the higher estimate becomes £98.4 million.

Physiotherapy

According to the Omnibus survey 1.45 million individuals (65 out of 1967) consult a physiotherapist each year. Assuming a consulting rate of 5.4 per patient, for private physiotherapists [118] and 7 per patient for NHS treatment [69] this leads to respective estimates of 7.83 million consultations for private physiotherapy and between 5.9 million and 8.2 million consultations per annum for NHS physiotherapy. If it is assumed that each NHS consultation is short and costs only £5, then the minimum cost of physiotherapy due to back pain is £29.5 million. If the average consultation is much longer and costs £15 per consultation, and there are 8.2 million NHS consultations, the total cost becomes £123.0 million.

Radiology

Based on the Omnibus survey about 1.77 million people with back pain visited an X-ray department in 1992 [120]. Using the same method as previously, the costs are estimated at between £53.1 million and £70.8 million.

Day Cases

The Omnibus survey does not report day cases data separately, but these are included in the "In-patient" costs (section 5.1.8).

Hospital In-patient admissions

The Omnibus survey shows that out of the sample of 1967, thirty six individuals, that is 1.83%, "visited a hospital ward" with their back pain [120]. It is not clear what proportion of these were day cases, nor how many underwent surgery, but extrapolating to the general population would result in over 800,000 people "visiting a ward" each year with back pain. Even applying the average cost per episode in an orthopaedic

ward (a conservative approach as they are cheaper than neurosurgical wards) a total of £1.077 billion is arrived at! If they were all day cases the cost would be £120 million which is considered the minimum.

According to the Omnibus survey, 1.83% of the UK population over 16 years old are admitted to hospital with back pain. However, from the Hospital Episodes Statistics in 1989/90 the number of hospital episodes for back pain in England were 110,500 which is the equivalent of 0.29% of the adult population.

This probable overestimation in the Omnibus survey is likely to be due to a misunderstanding of the question on the survey and possibly confusing out-patients with in-patients.

NHS EXPENDITURE ON BACK PAIN 1992/93 UK FIGURES

(Estimates based on Omnibus Survey)

NHS Category	Low Estimate (£ million)	High Estimate (£ million)
General practice	£157.9	£315.7
Prescribed drugs	£52.4	£104.8
Out patients	£49.2	£98.4
Physiotherapy	£29.5	£123.0
Radiology	£53.1	£70.8
In patients	£120.0	£1077.5
TOTAL	£462.1	£1790.2

Chiropractic

The Omnibus survey reports that there are approximately 380,000 individuals visiting a chiropractor each year with back pain. The consulting rate is not reported, but would need to be about 5.1 per person per year consulting to be commensurate with the Centre for Health Economics figure.

Osteopathy

The Omnibus survey reports that 30 people from the 1967 sample visited an osteopath. Extrapolating this to the general population means that about 670,000 individuals visit an osteopath each year with back

pain. Again, the number of consultations is not reported, but a consulting rate of under 4 would be required to be consistent with the Centre for Health Economics estimate.

Indirect costs due to time off work

The Omnibus survey reports that 23 individuals from the sample of 1967, missed work because of their back pain in the preceding 4 weeks. These individuals missed a total of 212 days. Extrapolating this to the general population for the whole year gives a figure of 62 million working days lost due to back pain, at a potential cost of £3.3 billion.

APPENDIX III SYSTEMS OF CLASSIFYING BACK PAIN

The systematic classification of back pain is essential, in order to evaluate advances that have been made in the basic sciences and in epidemiology and facilitate their application in clinical medicine [55]. The International Classification of Diseases [80] numerically lists diseases by pathology, anatomy and condition. Since the majority of back pain is of uncertain aetiology, any useful classification is difficult. The Quebec Task Force overcame this problem to some extent by devising a system based on patterns of pain distribution, duration of symptoms and work status [148]. This has been useful for defining treatment and employment capability as physicians are trained to label conditions by the recognition of such patterns [96]. But although the system of classification is often cited in the literature, it has its limitations as patterns of pain distribution are not necessarily reliable [55].

Fairbank and Pynsent developed a system of classifying back pain according to pathology [55], originally devised by Borenstein and Weisel [19]. In this system conditions are listed as mechanical, infections, tumours, endocrinologic and metabolic, haematologic disorders, rheumatologic, genetic, neurogenic and psychiatric disorders. The mechanical disorders which form the vast majority of back pain cases, and with which this paper is concerned were listed as follows: cauda equina compression syndrome, muscle strain, herniated nucleus pulposus, spinal stenosis, spondylosis, and spondylololsthesis. Frymoyer and Andersson [64] describe another aetiological approach to the clinical classification of back pain, emphasising the need to consider back syndromes within the context of age-related spinal degeneration, bearing in mind that the process of spinal degeneration begins in the second decade of life.

3.3 Back pain and spinal degeneration

Frymoyer and Andersson classified back pain as degenerative, congenital, inflammatory, neoplastic, metabolic, or traumatic [64]. Since the ageing process in the spine begins in the second decade, degenerative processes are likely to make a sizeable contribution to the problem [167]. By the age of 40 years when low back pain is most frequently reported at least 90% of individuals have degenerative discs [156]. However, there is a poor correlation between radiographic findings and patients' symptoms [109], [15], [170]. Degenerative changes are most likely to take place at the lumbo-sacral junction, but overall disc degeneration is more likely to be asymptomatic [30], [18]. Magnetic resonance imaging of the spine has shown that bulging discs are common even though often asymptomatic [126]. The effects of degenerative spinal changes may indirectly, give rise to back pain and referred leg pain. In fact, it has been suggested that up to 85% of back pain cases are due to degenerative changes, although they are often labelled as musculo-ligamentous injuries [167]. The use of the term degeneration as a diagnostic label in clinical practice can have many disadvantages for an individual, and may encourage a reduction in levels of physical activity [64], [47], [159].

A herniated nucleus pulposus, also referred to as a prolapsed intervertebral disc (PID) may occur as a result of degeneration or injury but normally resolves completely, in a few weeks. In less than 1% of PIDs, a massive posterior extrusion may result in a cauda equina lesion, which needs to be recognised as an emergency [95]. This is associated with loss of bladder and bowel function and requires urgent surgery to alleviate the compression on the cauda equina.

Degeneration of the facet joints may result in pain arising from a number of osteoarthritic levels in the spine. It may also give rise to nerve root problems, or may be associated with spinal stenosis [64]. The latter is an important cause of back pain which may be related to degenerative changes leading to narrowing of the spinal canal and/or nerve root foraminae. [115]. Patients with this condition, in its early stages, are often characterised by the need to limit the distance they walk, being forced to stoop or sit down at regular intervals, for relief of their leg pain. Spinal stenosis may be related to degenerative changes, trauma or congenital disorders. Spinal segmental instability arising from traumatic or congenital conditions may give rise to back pain and may require surgery. The technicalities of these conditions and their management are the subject of much discussion in the literature for example [116], [82].

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