3 Low Back Pain

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1 Summary

Low back pain is common. Both orthodox and complementary practitioners have traditionally regarded it as a mechanical problem of the spine and a wide range of therapies is claimed to relieve symptoms of presumed spinal disease. Despite this the incidence of work-related disability attributed to low back pain has soared in the past two decades. Research during that time has indicated that the symptom represents a complex social and psychological problem as well as a biological one. Low back pain can no longer be simply equated with spinal disease.

The assessment of the needs of people suffering from back pain is here based on the results of surveys in the general population. These rely on self-report of low back pain. The conclusion is that the critical dimensions for categorizing low back pain are:

- total days in pain over a period of one year
- extent to which it restricts activities of daily living.

The small but distinct subgroup of patients who have potentially serious pathology of the spine are dealt with as a separate category.

Overviews of trials of therapy in low back pain have emphasized their lack of rigorous methodology. However there have been randomized controlled trials on which a crude assessment of efficacy and cost-effectiveness can be based. The conclusion is that there is a reasonable basis for selection of treatments which are beneficial in the short term and for rejection of a number of regimens which do not have any basis in good scientific evidence.

The key question which the trials do not answer is whether these interventions have an impact on the prevention of recurrence and chronicity of low back pain. In the absence of good evidence for the efficacy of primary prevention, the potential cost-effectiveness of delivering effective care for new or recurrent episodes must rest on the optimistic assumption that what is effective in the short term will also be effective in the long term.

On this basis the models for care propose a shift of resources towards early intervention in an attempt to treat more actively a less disabled and chronic case-mix and to reduce the reliance on investigation. This may imply a change of philosophy among general practitioners (GPs), physical therapists, clinical psychologists and hospital specialists towards:

- positive but brief programmes of treatment in patients with new and recurrent episodes
- a more organized approach to the intensive therapy offered to those with long-term problems.

This proposal is in line with the recommendations of the Clinical Standards Advisory Group (CSAG) and its epidemiological implications are investigated.

2 Introduction

Back pain is common, whether it is measured as a symptom in the general population, as a source of disability, as a reason for seeking health care, or as a cause of both short- and long-term work loss. In any one year 38% of adults experience at least one day of low back pain – a figure which does not include menstrual pain or pain accompanying a feverish illness.[1,2] Some 10% of adults in any one month experience restriction of work or other activities as a result of low back pain. The course of low back pain in an individual's lifetime is often recurrent, intermittent, and episodic[3] and for 5% of adults it becomes a more persistently disabling condition.

3 Statement of the problem

It is helpful to distinguish three ways in which back pain may arise. The first two concern the direct results of disease or injury.[4]

1 Disease or injury (physical or chemical) involving spinal tissues (vertebral bone, muscle, ligament, joints, or the cartilaginous disc) can:
- irritate local nerve receptors, giving rise to pain located in the back. Terms such as lumbago are synonyms for such pain
- put pressure on the spinal cord, on the nerve roots arising from the cord or on the nerves tracking away from the cord. Such pressure might give rise to pain located in the back or to pain distant from the site of pressure. Sciatica refers to such pain in the leg or foot, radiating to areas served by the sciatic nerve.

2 Disease or injury of tissues and organs outside the spine can cause pain which is perceived as coming from the back (referred pain). Pain located in the back can thus result from disease elsewhere in the body.

An underlying disease or injury however can be identified in only a minority of patients with back pain and lumbago and sciatica are more often applied to pain which has no clear pathophysiology. There is much controversy and disagreement about the basis of such pain. The third mechanism of pain offers an insight into how back pain might arise and persist in the absence of continuing disease or injury.[5]

3 The biology of pain is more complex than the simple 'mind–body' model which depicts the brain receiving pain messages from irritated peripheral tissues. The central nervous system (CNS) has the ability to remember, reproduce and elaborate pain, even in the absence of continuing peripheral irritation and may be more prone to do so in the context of stimuli from elsewhere in the CNS, such as depression or fear.

Causes of back pain

The aetiology of most individual episodes of back pain is not understood. A small proportion of cases can be attributed to specific problems such as infection, inflammation, vertebral fracture or cancer. However most episodes of back pain can only be classed as non-specific – no convincing underlying explanation of the

episode.[6] This has not discouraged the publication of many schemes of classification of back pain based on unproven theories of causation.

The small number of cases where a specific cause can be identified is important in the assessment of health care needs. From the point of view of purchasing health care they provide the rationale for a classification based on pragmatic clinical questions, such as those outlined by Waddell[7] and taken up by the CSAG in its clinical triage approach.[8]

- Is there an underlying diagnosis which is potentially serious? If so, is it a spinal problem or a problem causing pain to be referred to the back?
- Is there evidence of pressure on a spinal nerve root and, if so, is it getting worse?

The answers to these questions guide important early clinical decisions and inform the need for urgent referral to a specialist and to diagnostic services. They will only identify and address the needs of a small group of back pain sufferers however. An alternative to classification by cause is required for the majority of back pain cases.

In considering the health care needs related to back pain, the potential for prevention in the general population should not be obscured. Investigation of factors which increase the risk of back pain in populations has shed some light on this preventive potential. Manual handling of heavy weights, sedentary work in poor positions, smoking, psychological status and job satisfaction may all contribute to back pain risks.[9–12] Since most back pain cannot be attributed to such factors however, strategies for prevention cannot be isolated from the wider need for effective treatment and care.

Classification of back pain

To address the needs of back pain sufferers in general requires a less traditionally clinical approach. On page 135 it is argued that measures of symptom duration and severity and of disability provide the best basis for subgrouping patients in terms of their needs. The dimensions measured must be broad enough to incorporate restriction of physical, psychological and social functions in everyday life.[13]

In our current state of knowledge, back pain cannot be equated to spinal disease. Abnormalities in the spine can give rise to back pain, but they frequently do not; and most back pain cannot be clearly attributed to a known spinal condition.[14,15] The most disabling and life-threatening spinal problems may not even present with back pain as a main clinical feature.

Many authorities, including leading orthopaedic surgeons from Europe and the US, have stressed that back pain is as much a problem of an individual's response to pain, as it is a problem related to the back itself.[16–18] Psychosocial, cultural, economic and political influences on the experience of pain are crucial to an understanding of the back pain phenomenon in its broadest sense. In biological terms this view clearly concords with the broader theory of pain mechanisms outlined previously as mechanism 3.[5]

The issue is relevant to needs assessment because current medical care has had little discernible impact on the occurrence of back pain in the population. On the contrary the economic impact of back pain in industrialized countries has accelerated in recent years because of the increasing number of lost working days attributed to the problem and the accompanying rise in sickness and invalidity benefit payments.[19] A recent estimate of the economic cost of back pain in Britain was £3.8 billion in lost production in one year. In addition social security expenditure due to low back pain was estimated at £1.4 billion per year.[19] Such figures dwarf the costs associated with health care of back pain sufferers. Yet the prevalence of back pain symptoms in the population appears to have changed little during this time. The 'epidemic' of back pain is as much to do with the politics, economics and culture of industrialized society as it is with inadequacies of health care.

However if health care were more effective in meeting the needs of back pain sufferers, then it might also influence these broader costs to society by:

- preventing the onset or recurrence of back pain
- limiting its effect on job status
- reducing its severity and duration.

The broader social and economic outcomes of effective interventions need to be kept in view.

Theoretical framework

The issues raised so far highlight one area of agreement in the back pain literature of the last decade: that back pain cannot be viewed simply in terms of the back or of pain. There have been two important contributions to conceptualizing this: the biopsychosocial model and the impairment, disability, handicap model.

Biopsychosocial model

This framework was applied to low back pain by Gordon Waddell, an orthopaedic surgeon.[13] Despite its catch-all title, it provides a simple encapsulation of the multiple influences on the symptom and its persistence.

Its premise is that pain cannot be divided artificially into physical or psychogenic, organic or non-organic, real or imaginary: physical disorders are inextricably linked to their emotional context and effect. The vast majority of backache starts with a physical source of pain. However distress (the emotional reaction to pain and disability) and illness behaviour (the presentation of distress to the carer) may come to dominate the picture, which in turn both affects and is affected by the patient's social interactions.

This model has expanded our view of low back pain from a narrow medical view (back pain as only a mechanical problem of the spine) to an emphasis on the crucial contributions which distress and accompanying illness behaviour make to the problem and on the relevance of the social world in which the patient lives and works.

Impairment, disability and handicap (IDH) model

This is the framework adopted by the World Health Organization in its international classification of the consequences of disease (ICIDH).[20] The system as a whole is not a particularly useful tool for classifying low back pain, but the underlying concepts are helpful. They expand the focus from pain and pathology to embrace an individual's ability to function in everyday life.

Impairment

This is the disturbance of normal structure or function which results from disease or injury. The term covers symptoms and signs and is concerned with both physical and mental functions. Back pain is an impairment. It can be categorized without reference to underlying pathophysiology: for example, by its intensity, radiation, duration, periodicity and the presence of other impairments. Such grouping can be done without implying that the different categories represent particular 'diseases'.

The traditional medical approach to impairments is to move backwards from symptoms and signs to causes and pathology. The IDH model, by contrast, moves to the consequences which impairments may

have for an individual's life. This is an advantage when characterizing a symptom such as low back pain, the underlying cause of which is usually not clear.

Disability

This is any restriction of everyday activity (physical or psychological) which results from an impairment. It represents the effect which specific impairments may have on general functioning. The presence of back pain for example might mean that a person is unable to lift a suitcase or has difficulty in walking to the bus-stop or cannot sit for too long in one chair. These are all disabilities. They can be graded and classified, for example by their severity or their number.

Handicap

This refers to the actual impact of disability on any individual's social functioning. It concerns the context of each individual's impairment and disability. If a person never has to catch a bus, their inability to do this anyway (disability) because of low back pain (impairment) is not a handicap to them. The commuter who has caught a bus for years and suddenly finds back pain makes this difficult, will find it a handicap. Although this is a highly individual assessment, it is useful to view general restrictions on social functioning, such as inability to do a job, as handicaps.

One way in which this model expands our traditional medical view of low back pain is that it encourages the use of different options for tackling the problem. For low back pain with a clear-cut cause, a primary preventive or curative approach might be possible. Methods of treatment which alleviate pain, but do not address its cause, might still reduce the consequent disability and handicap. If pain persists, treatment can still reduce disability by improving everyday psychological and physical functioning. Even if the latter remain restricted rehabilitation into a new job or adaptations of the home environment might mean that persistent disabilities cease to be handicaps.

Care of the back pain sufferer

It is clear that the attention of healers, both orthodox and heterodox, has a beneficial effect on the symptoms of many back pain sufferers. First this section considers which approaches might have the largest effects and when, how, by whom and to whom they should be delivered. Two issues addressed are:

- How long does any benefit last?
- Do any of the approaches reduce the disability and handicap as well as the pain of back sufferers?

Second this section considers the potential for prevention of back pain. There are two key questions for the public health which remain unresolved:

- Would more effective delivery of appropriate health care for individuals with back pain reduce the population prevalence of low back pain by preventing recurrence and chronicity?
- Are measures directed at the primary prevention of new episodes of low back pain likely to reduce the rising 'epidemic' of work loss attributed to back pain?

Clinical and epidemiological evidence supports the notion that health care for back pain sufferers could be more effectively delivered than at present. Whether more effective care set in the context of a primary prevention programme could reduce the occurrence and burden of back pain can only be answered by further studies.

Available sources of care

One manifestation of the size and complexity of the back pain problem and the lack of broadly effective treatment, is that the range of individuals, professions and agencies involved in the care of back pain is vast. This symptom impinges on most of the health care industry.

In any one year four out of five people with back pain will tackle their problem without seeing a GP, although the GP is the most sought after source of professional help for back pain in the UK.[2] In addition a variety of self-care activity – based on advice from family, friends, media, self-help literature and the local chemist – is reported by back pain sufferers in the community.[2,21]

However most of the population will consult their doctor about low back pain at some time in their lives and back pain is the commonest musculoskeletal symptom presented in primary care.[22] General practitioners have access to a bewildering variety of options, although they manage most back pain episodes without further referral.[21] Access to secondary services varies from place to place. Open access to lumbar spine radiography is common but utilization varies greatly. Practice-based physiotherapy or open access to hospital physiotherapy is not universal – where it is available, back pain tends to dominate reasons for referral.[19]

Patients may refer themselves to various forms of physical therapy, notably physiotherapy, chiropractic and osteopathy. Parliamentary assent is now in the process of ensuring official recognition of chiropractors and osteopaths.[23] Some referrals to them are already made from primary care and there are medical practitioners who hold qualifications in these modalities.

Other complementary therapies are popular for back pain treatment, including acupuncture, homeopathy, aromatherapy and the Alexander technique. Again health service practitioners may practise some of these techniques.

Back pain is the main reason for using complementary therapies in America, where as a whole they command more out-of-pocket payments than health service treatments.[24] In the UK the demand continues to rise for such approaches to back pain, the limiting factors being cost and availability.[25]

Although there are regional variations, the dominant hospital specialty to which back pain sufferers are referred is orthopaedics, although only a minority undergo surgery.[21] Neurosurgery occupies a distinct, albeit small, niche for the management of back pain associated with nerve compression. Back pain is the most common problem dealt with by outpatient pain services, whether urgent or routine. Some hospitals now employ orthopaedic physicians, skilled in manipulation and injection techniques, who have a specific remit to concentrate on back problems.

The extent of rheumatological involvement in back pain varies from hospital to hospital, depending on the workload and interest of the specialist and on local referral preferences.[26] Where the cause is suspected to be an inflammatory disease, such as ankylosing spondylitis, most rheumatologists will be involved. Rehabilitation specialists or rheumatologists with a rehabilitation interest have chronic back pain as a major part of their workload.

Accident and emergency (A and E) departments are involved in the management of back pain for two main reasons:

- back injuries – isolated or part of multiple trauma such as road traffic accidents
- acute back pain episodes presenting to A and E departments.

Many hospital specialists' involvement in back pain is because they are the point of access to other services – physiotherapy, orthotics (notably lumbar supports), rehabilitation and occupational therapy.

Plain radiography of the lumbar spine is commonly an open access service and represents an estimated 15% of outpatient radiography requests.[27] Imaging, particularly the newer non-invasive techniques of computerized tomography and magnetic resonance imaging, is increasingly popular in the investigation of

back pain patients referred to hospital and some GPs are beginning to request direct access to such specialized investigations.

Psychologists are important members of a multi-disciplinary approach to rehabilitation and are also involved in the assessment of back pain problems at earlier stages.[28,29] In the community occupational health services, both in the manual industries and in sedentary occupations, have back pain and back injuries as a major part of their workload.[30] Such work involves surveillance, prevention, education, treatment and rehabilitation. Industrial rehabilitation services and social services for the chronically disabled are actively involved in the care of chronic back pain sufferers. Health education units, the unions, and the Health and Safety Executive provide ergonomic advice and education. The voluntary sector will clearly contribute locally, but national organizations, such as the National Back Pain Association, Arthritis Care and more disease-specific groups such as the National Osteoporosis Society and the National Ankylosing Spondylitis Society, provide sources of support, advice and education for back pain sufferers.

4 Sub-categories of back pain

Back pain can be classified into pain in the neck, the upper back and the low back (cervical, thoracic and lumbo-sacral). Low back pain is the commonest back problem, it is the most heavily researched and findings related to low back pain are likely to apply in more general terms to pain higher in the back. The assumption will be made that low back pain in general means pain in the lumbo-sacral area. A more precise definition which has been used in population surveys and in clinical research is given in section 9.

Classification stage I: Is there a serious disease?

The simplest clinical approach is a pragmatic classification, designed to separate serious from less serious reasons for low back pain. A number of authors have proposed broadly similar systems[7,31,32] and the same principles form the basis for the triage approach to classification of low back pain in primary care adopted by the CSAG of the Department of Health.[8]

The relevance of this classification to needs assessment and purchasers is three-fold:

- it is simple and pragmatic and recognized as such by GPs
- it clarifies the important areas for which specialist and urgent care must be provided
- it highlights the fact that the vast majority of cases of low back pain fall into the non-specific category, for which there is no good evidence that hospital specialist care and investigation are required, although a minority will require specialist pain relief and rehabilitation services.

Pragmatic classification of low back pain

- Low back pain arising from potentially serious or life-threatening spinal disease:
  a) cancer (including metastases)
  b) infection
  c) inflammation and metabolic disease (particularly ankylosing spondylitis and osteoporosis).
- Low back pain accompanied by cord or root compression. (Such compression may also occur in the absence of low back pain):
  a) cancer, infection, inflammation
  b) disc prolapse (including cauda equina lesions)
  c) spinal and root canal stenosis.

- Low back pain arising as a result of systemic disease outside the spine – this is essentially a problem of referred pain.
- 'Non-specific' or 'mechanical' low back pain: the vast majority of low back pain in our current state of knowledge falls into this category.

Other clinical or spinal disease classifications of low back pain are used by clinicians, surgeons or therapists to justify therapy or to link assumed structural or functional abnormalities of the spine to low back pain. The approach taken in this chapter is that none of these classifications is of proven general use or help in the broad sub-categorizing of low back pain, although this does not imply a judgement on the therapies associated with them. The treatment of spinal disorders such as scoliosis is particularly problematic in this regard because the treatment of the spinal deformity *per se* is an issue separate to the management of low back pain. The links between low back pain and scoliosis and between low back pain and many other structural abnormalities of the spine are weak and unclear.[33,34]

Classification stage II: Categorizing non-specific low back pain

How is it best to classify the rest of low back pain for the purpose of needs assessment and purchasing of health care? The needs of patients with long-term problems are different to those presenting with new episodes. In the face of the sheer size of the problem, health service practice has tended to focus on delivery of care (diagnosis and treatment) to patients whose symptoms have become persistent, and this has meant a traditional sub-categorizing of low back pain to acute and chronic. We present an alternative to this.

The argument adopted by the CSAG[8] is considered here in an epidemiological context: namely that effective intervention early in an episode of low back pain may reduce the impact and burden of persistent problems. For this a simple classification which covers the spectrum of low back pain in the general population is required. A proposed scheme is shown in Box 1.

Impairment: time-course

The traditional classification is into acute and chronic. This is helpful only in part. The recurrent, fluctuating, intermittent, variable course of low back pain does not accommodate easily to such a simple dichotomy. The most useful distinctions follow.

- **New episode** Onset or recurrence of low back pain after a pain-free period.
- **Exacerbation** An episode which represents more severe pain in the context of persistent background pain.
- **New episode, recurrence or exacerbation lasting more than four weeks** A commonly used cut-off for an episode which is beyond the acute stage.
- **New episode, recurrence or exacerbation lasting more than three months** Another arbitrary point used to define a persistent low back problem.
- **Chronic low back pain** Low back pain in which the notion of episode has been lost and it is seen as a long-term problem, regardless of current severity.

Box 1: Sub-categorizing low back pain

Category 1 Low back pain due to serious spinal disease

- cancer
- infection
- inflammation

Category 2 Low back pain with cord or root compression

- cancer, infection, inflammation
- disc prolapse (including cauda equina)
- spinal and root canal stenosis

Category 3 Non-specific low back pain

- Total days in pain during past 12 months
  a) < 1 week
  b) 1+ weeks
  c) 5+ weeks
  d) 13+ weeks
  e) whole year
- Restriction of daily activities due to low back pain
  a) none
  b) moderate
  c) severe

In this scheme, pain referred to the back because of disease in other systems has been omitted.
Categories 1 and 2 are small but important because of the need for early diagnosis and appropriate treatment. The majority of patients who have clinical signs of root or nerve compression will not have progressive damage and they can be classified with category 3 because the same sub-categorizing criteria (total days in pain and extent of disability) are relevant to the assessment of health care needs.
Patients in severe pain form a small but important sub-category of those with severe restriction of their daily activities, particularly when it is a feature of a short duration problem.

However the concept of most importance is that low back pain encompasses an individual's life history. Four observations are relevant to this:

- between 60 and 80% of the population experience low back pain during their lives[35]
- by the age of 30 years 45% of the population recall an episode of low back pain which lasted for more than 24 hours[36]
- the strongest known risk for developing a low back pain episode is a history of a previous episode[37]
- most acute episodes of pain presented to the GP improve rapidly.[38]

Figure 1a (after Deyo[3]) better represents the experience of low back pain than the acute–chronic dichotomy. Low back pain, once started, is potentially chronic. Individuals with this chronic problem can experience episodic exacerbations of pain, as well as periods of freedom from pain. However each exacerbation will increase that person's overall experience of back pain and the likelihood of a further episode is thus increased. Over time the cumulative experience may become more persistent and more disabling.

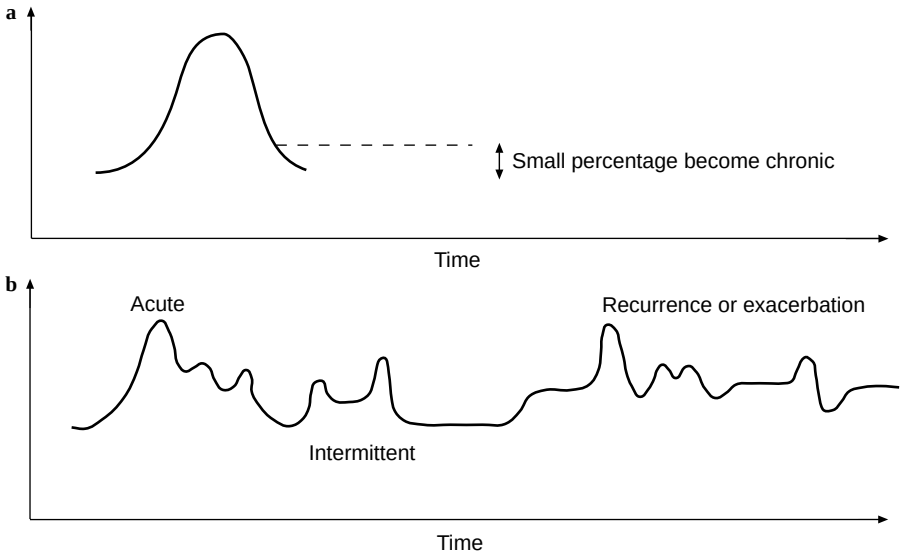

Figure 1a: Assumed course of acute low back pain; **b:** real course of low back pain.[3]

This means that the best sub-categorizing for needs assessment is likely to be a summary of experience over a period of time and across episodes or exacerbations.[39] This might be a sub-categorizing based on categories of duration (less than seven days, seven days to six weeks, seven weeks or more and so on) which does not assume a particular definition of what is, or is not, acute and chronic.

More useful however is the total number of days on which back pain has been experienced during a defined period (the past six months; the past 12 months) putting aside assumptions about the nature or length of the current episode.

The other dimensions of low back pain which have been used to sub-categorize impairment are:

- pain severity, usually on a visual analogue or numerical scale
- presence of pain in areas other than the low back.

These are less amenable to simple summary over time.

Disability and handicap: restricted activities of daily living

The impact of low back pain on daily living – physical, psychological and social – has emerged as the other important way to classify non-specific low back pain in the general population. There are a number of measures available and these are considered in section 9 (outcome measures).

Combined scales for sub-categorizing the back pain population

Workers in the US and Germany have begun investigations in the general population and in primary care, using scales which combine days in pain with scores of physical and psychological disability.[39,40] This pooling of different dimensions of the back pain experience provides the most promising basis for classifying non-specific low back pain for needs assessment.

There is an urgent need for population and practice-based studies which utilize these schemes, but they have not yet been carried out in Britain. The most recent population surveys in this country have used some of these dimensions and these will be considered in section 5.[1,2,36]

5 Prevalence and incidence

Introduction

The argument is now further developed that, for an intermittent, recurrent, episodic problem such as low back pain, prevalence needs to be measured across a defined period of time.

The one year period prevalence (the proportion of people in the general population who experience the problem in the course of one year) is a useful measure of occurrence, for which there are now national published data.

The incidence of new episodes or recurrences of back pain is estimated in relation to the background prevalence in the previous year.

The most useful measure of need is based on sub-categorizing low back pain according to severity, in particular the total days in pain during a one year period and the extent of any restriction of daily activities which the symptom imposes. The prevalence of these sub-categories is estimated from population survey data.

Low back pain

Population surveys rely on self-report of low back pain. The intermittent, recurrent, episodic nature of low back pain means that traditional measures of prevalence in the community such as 'point prevalence' are less appropriate as a basis for needs assessment than measures which summarize experience over time.

Lifetime prevalence: do not use for needs assessment

In two separate UK surveys[1,36] the proportion of adults aged 18 years and over who had ever experienced low back pain was reported as 59%. A similar figure was reported from a Belgian population study.[41]

The age distribution of lifetime prevalence of back pain which has lasted for more than 24 hours in the adult population is shown in Figure 2. By the age of 30 years, 45% report ever having had this symptom; by the age of 60 years and above, this has risen to 63%, a paradoxically lower figure than for the 45–59 years age group. There may be a number of subtle explanations of this paradox, such as selective survival of generally fitter people or a cohort effect in which the older generation has experienced less back pain. However it is more likely that recall is influenced by age and circumstance: recalled 'back pain ever' is likely to be dominated by more recent symptoms.[42]

The observation that low back pain is established as a common experience before the age of 30 years is an important one. However this 'lifetime' measure is a confusing and difficult summary of prevalence for the purpose of needs assessment. Measures related to a defined period of recalled time, regardless of age, are more appropriate.

Period prevalence and episode incidence: general principles

Because the symptom of low back pain is already a common experience by early adulthood, the traditional meanings of incidence as the first ever occurrence and of prevalence as the product of incidence and disease duration are difficult to apply.

The resolution adopted here is to treat the population as containing a dynamic prevalence pool. During their lives most people will at some point move in and out of this pool. Helpful measures of prevalence can be identified by taking a defined period of time (a period of 12 months which is referred to as the prevalence

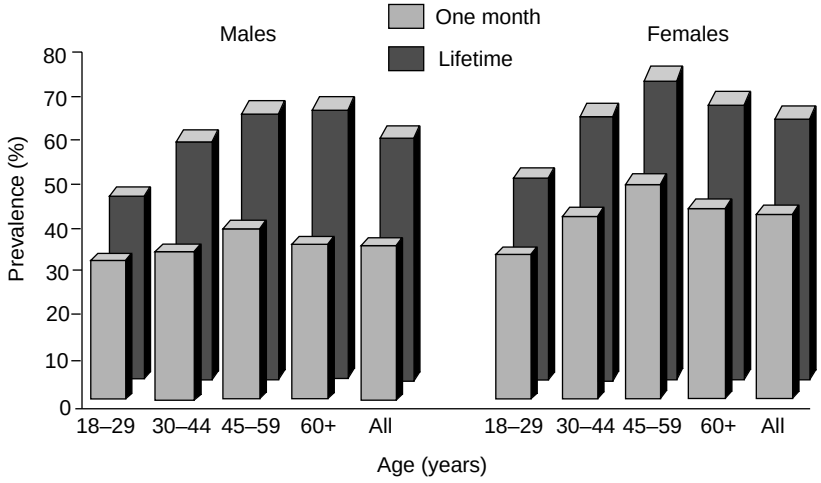

Figure 2: Age distribution of lifetime prevalence of 'back pain that has lasted for more than 24 hours' in the UK adult population. Taken from the South Manchester population survey.[36]

year), estimating how many people are in the pool during that time and classifying them by the sub-categories in Box 1.

Incidence can then be measured by identifying episodes during the 12-month period following the prevalence year. (This second year can be called the incidence year.) These are counted separately for:

- people who were in the prevalence pool in the previous year (the episodes will be recurrences or exacerbations)
- people who were free of low back pain during the previous year (new episodes).

The choice of one year as the window is arbitrary. However a number of population studies have adopted a year as the period for recall of symptoms in questionnaire schedules.[1,2] Subjects whose back trouble has persisted continuously for more than one year present a very different set of needs to those whose episode or recurrence or exacerbation has a more recent onset.

One year period prevalence

Low back pain during the past year has been reported in two different UK surveys.[1,2] In each study the one-year adult population prevalence of low back pain lasting for more than one day was 38%. Peak prevalence was in the 45–59 year age group, but variation overall with age was small. There was little difference between men and women. Basic prevalence and incidence data can thus be summarized crudely across age and gender categories. (Figures throughout this section refer to the adult population aged 18 years and over.)

Table 1: Low back pain in the adult general population: prevalence and incidence

Year 1: period prevalence pool		Year 2: cumulative incidence (new episode or recurrence)	
	% of whole population	% within group	% of whole population
Group I: no low back pain	62	31	19
Group II: low back pain for part of year	32	46	15
Group III: low back pain all year	6		

The assumption about the pool of continuous low back pain is that, in year 2, approximately one-third (2% of the whole population) leaves that pool and becomes intermittent or recurrent, but is replaced by a similar number coming into this pool from the new or recurrent groups. The proportion of long-standing low back pain in the population thus remains constant at about 6%.
The overall period prevalence in year 2 thus remains at 38%.
Figures have been calculated from the OPCS study and the Manchester prospective studies [2, 21, 36]

Episode incidence

The figures for incidence and prevalence are summarized in Table 1. At the start of any twelve-month period the adult population can be separated into three groups by prevalence in the previous prevalence year:

- **Group I** Those who have been free of low back pain for the previous 12 months (62% of the adult population).
- **Group II** Those who have had intermittent or moderately disabling pain during the previous 12 months (32% of the adult population).
- **Group III** Those who have had long-standing or serious disabling low back pain during the previous 12 months (6% of the adult population).

New episodes

Among people free of low back pain at the start of the incidence year (group I) the estimated proportion who develop a new episode of low back pain in the year is 31%.[21,36] Since group I forms 62% of the whole adult population at baseline, the cumulative incidence of new episodes is 19% per annum for the adult population as a whole. Only a small minority of them are experiencing their first ever episode of low back pain.

Recurrences

The proportion of people in group II who report a further episode of low back pain during the following incidence year is 46%. Since group II forms 32% of the whole adult population at the start of the incidence year, this represents an annual cumulative incidence of recurrent low back pain episodes in 15% of the population as a whole.

Persistent problems

In group III the assumption is that pain continues in the majority of those who have had serious disabling or long-standing low back pain during the prevalence year, but that one-third of them (i.e. 2% of the whole adult population) will have less severe problems during the incidence year. They will be replaced by a comparable number of people from groups I and III who develop severe or disabling problems during the incidence year and enter group III. The result of this is that the prevalence pool of chronic disabling low back pain is maintained at around 6% of the population.

Overall the incidence figures are such that the annual period prevalence of low back pain in the adult population as a whole at the end of the incidence year is 38% – as it was at the start of the year.

Summary

These figures are derived from prospective and retrospective studies and the two sources produce surprisingly consistent figures, although both methods do rely on patients recalling episodes of low back pain.

The message from the figures is that, in any one year, recurrences, exacerbations and persistence dominate the experience of low back pain in the community. Even among those classified above as having new episodes, most will recall having had low back pain at some time in the past.

Low back pain by sub-category

The basic period prevalence figures illustrate just how common is the symptom of low back pain. In order to quantify potential health care need, the one year prevalence must be further sub-categorized. Summaries of the prevalence according to the pragmatic and the severity sub-categorizing are shown in Tables 2 and 3.

Low back pain due to serious spinal disease

There are no straightforward data on the occurrence of malignancy and infection presenting as back pain. It can be assumed that all such patients will be among the 7% of the adult population who present to their GP with low back pain in one year.[22] The Royal College of Radiologists estimates that one in 2500 plain lumbar spine films carried out in general practice would detect a serious problem.[43] This leads to an estimate of three cases per year per 100 000 adult population. However these figures will underestimate the numbers because of lesions which are not detectable initially by X-ray. Deyo's US-based figures give ten cases per 100 000 adults per year.[31]

The prevalence of ankylosing spondylitis in the population is approximately 100 per 100 000,[44] higher in men than in women.

Low back pain with cord or root compression

Population studies from the UK,[1,2] Finland,[45] Denmark[35] and the US[45] are in broad agreement. The one year period prevalence of low back pain which radiates to the legs below the knees is 12 to 15% of all adults. However as Waddell has described,[46] the majority of such cases do not indicate 'true' sciatica or nerve root compression.

Heliovaara has estimated the prevalence of true sciatica at 5%,[46] whilst Deyo puts the prevalence of surgically important disc herniation, the commonest cause of root compression, at 2%.[31] The prevalence of other conditions causing root compression – notably spinal stenosis – is simply not known to any degree of accuracy.

Most prevalent cases with cord or root compression are treated non-surgically in the same way as all other low back pain, depending on persistence and the degree of disability. Many cases will be associated with chronic or persistent problems and represent the health care needs associated with these problems rather than the need for surgical intervention. We have thus chosen the more conservative Deyo figures to indicate new episodes of low back pain with potentially serious cord or root compression.[31]

Cauda equina lesions – centrally prolapsing discs with progressive and potentially catastrophic damage to the spinal cord – represent the real emergencies and are rare. From Deyo's figures the annual cumulative incidence might be three per 100 000.

Total days in pain

The prevalence of low back pain which has occurred on more than four weeks in the past year is 16%; 10% of adults report that they have experienced it for more than three months in the previous year; 6% of the adult population state that they have had low back pain continuously throughout the past year.[2]

Disabling low back pain

In the OPCS survey, 11% of the population had restricted their activities in the month prior to the survey because of low back pain; 3% had spent at least one day in the past month lying down.[2] It is likely the proportions of people affected by low back pain in this way are higher during the course of a whole year, but Scandinavian studies[46,48] confirm the broad estimate that 25 to 30% of subjects who report low back problems have impairment of daily activities: i.e. 10 to 12% of the adult population as a whole.

Another UK study attempted to define more significant disability.[1] Their figures suggest that during the course of a year 5% of the adult population experience considerable difficulties with mobility or extreme difficulty with putting on socks, stockings or tights because of low back pain.

None of these studies showed major contrasts between men and women. There was greater disability attributed to low back pain above 45 years compared with younger ages but no further increase in the older age groups. However this may ignore the problem of co-morbidity. In a careful German population study of back pain,[40] restriction of physical activity increased linearly with age and on a score which combined pain severity and physical and psychological restrictions on daily life, there was a higher proportion of severe problems in the elderly.

An estimate of the population prevalence of low back pain for needs assessment combining total days in pain during the past year with clinical and restriction of daily activity gradings is shown in Table 2.

Other groupings not included in the 'needs' classification scheme

Low back pain causing work loss

In the OPCS survey it was estimated that the employment of 4% of the population aged 16 to 64 years was affected by low back pain in the course of a four-week period: one-third because of time off sick and two-thirds because low back pain was given as one reason for not being in current employment. Figures were similar for men and women.[2]

The effect over a period of 12 months was estimated by the Southampton group to be 10% of men and 7% of women, aged 20 to 59, who had low back pain which had led to time off work.[1]

Table 2: One year period prevalence of low back pain by sub-category

	In whole population	By total days in pain in past year				
		<7	7–28	29–84	85+, but <1 year	All year
Prevalence of low back pain (%)	38	7	15	6	4	6
Prevalence of low back pain with leg pain (%)	11	4		1	2	4
Prevalence of severe sciatica (%)	2	0.1		0.1	0.3	1.5
Prevalence of moderate and severe disability (%)	10	0	0	2	3	5
Prevalence of severe disability (%)	6	0	0	1	2	3

The category 'low back pain with leg pain' includes severe sciatica

Chronic low back pain

The prevalence of low back pain during the past year which had started long before the year in question was 30% in the OPCS survey.[2] Such a definition of chronicity for health needs purposes is clearly unhelpful, since it constitutes the majority of low back pain in the population and affects almost a third of all adults. This emphasizes the need to get away from traditional notions of chronicity – most people with low back pain have experienced it before in some form. The smaller pool of chronic low back pain with specific needs is best defined by a combination of disability and days in pain during the previous year.[39,40]

Pyramids of need

The two broad classifications for estimating prevalence with respect to need, namely the pragmatic and the severity sub-categories, can be translated into numbers.

In a population of 100 000 adults, the likely number presenting with potentially serious problems for urgent investigation is ten to 50 in one year. The number with ankylosing spondylitis of varying severity, but posing mostly long-term problems, will be 100.

The number of patients with radiating leg pain which might represent cord compression from a disc lesion or spinal stenosis is summarized in the 'surgical pyramid' in Box 2.

The numbers of low back pain patients can be summarized separately in a 'severity pyramid', using total days in pain and disability as the classifying features (Table 3).

Box 2: The 'surgical pyramid'

*	Need surgery
2 000	Serious sciatica
11 000	Radiating back pain
38 000	Low back pain during one year
100 000	Total adult population

These are inclusive categories. *The proportion of severe sciatica cases who need surgery is not known.

Table 3: The 'severity pyramid'

Number of days with low back pain in past year	Number of people in each category	Number of people with moderate and severe disability	Number of people with severe disability
All year	6 000	5 000	3 000
85+	10 000	8 000	5 000
29+	16 000	10 000	6 000
1+	38 000		
	Population base 100 000		

These are inclusive categories

6 Current service use

Introduction: case-mix and service use

The pragmatic classification highlights small but important groups who will present to the hospital services. In the following sections some ideas about the likely relation between back pain sub-categories and general practice consultations are discussed.

It is difficult however to relate current levels of care to the sub-categories of 'need' in any comprehensive way. The evidence on the case-mix of patients seeking or referred to different sources of health care is not available.

One piece of evidence does give an indication of what is going on. In studies in Manchester the total days in pain during the past year were estimated in three separate groups of people:[21]

- those with low back pain in the general population who had not consulted their GP about the symptom during the previous year
- those who had consulted their GP in the past year
- a group referred to a district general hospital for specialist opinion.

The results of this comparison are shown in Table 4.

The table provides evidence of some differences between consulters and non-consulters in the community, mainly with respect to working days lost through the previous year. However the main contrasts are between back pain sufferers in the community or primary care and those attending hospital outpatient

Table 4: Back pain sufferers in the community/primary care/hospital

	Population base		
	Non-consulters in general population (%)	**GP consulters (%)**	**District hospital attenders (%)**
Continuous pain	17.6	30.5	59.0
Pain down leg	46.1	35.6	75.6
>3/12 pain in past year	36.7	37.7	65.4
Need bed rest all day	18.1	20.0	39.7
Restricted activity	43.5	55.0	62.8
Lost days from work	8.3	23.0	33.3

clinics. The latter are more likely to have had more than three months of pain during the previous year or to have been in continuous pain throughout the year.

So the circumstantial evidence points to the conclusion that hospital consultations for low back pain (most of which are with orthopaedic surgeons) are mainly for patients who have persistent problems and whose total days in pain and disability levels are highest. In section 7 (effectiveness) the question of whether this is a reasonable match of need to care is discussed.

Consultations for low back pain

Prospective studies of consultations in primary care indicate that approximately 7.2% of adults in the UK population will consult their GP at least once in the course of a 12-month period because of low back pain.[22] About two-thirds of these consultations will be for new episodes, which may be first ever episodes or recurrences; whilst one-third is for more long-term problems: exacerbations or repeat visits about persisting symptoms.

Surveys of the general population which ask subjects to recall whether they have visited the GP during the past year because of low back problems give higher estimates of consulting levels.[1,2] Waddell has considered this in detail in the Annex to the CSAG report.[8] It is likely that subjects focus their recall on a period which is in reality longer than one year, whilst GPs may not identify low back pain as a specific reason for consultation in the context of multiple complaints. An additional explanation is that patients are probably expressing in their recall a measure of perceived severity of their problem.

One other aspect of relevance to health needs assessment which has not been investigated fully is the observation from one study[1] that there is considerable regional variation in consultation rates for low back pain, as measured by patient recall. In Peterlee and Arbroath for example, patients with low back pain during the previous 12 months were more than three times more likely to have consulted their doctor as those living in St Austell and Dorking, an effect not explained by social class or severity of symptoms.

Consultation incidence according to baseline period prevalence

The following groups are taken from the definitions given on page 141.

- **Group I** Among adults free of low back pain at the start of the incidence year, the proportion who

consult at least once for low back pain during the year has been estimated as 4.2%.[21] Since this group is 62% of the total adult population, this means a cumulative incidence of 2.4% new episode consulters in the adult population as a whole.

- **Group II** The proportion of people who consult at least once during the incidence year in this group (those who reported episodic low back pain during the previous prevalence year) is 7.1%, i.e. 2.5% of the total adult population.
- **Group III** The OPCS survey suggests that about 50% of those with persistent problems causing appreciable disability will consult their GP in the course of a year.[2] The prevalence of such continuous problems in the adult population is estimated on page 142 to be 6%, so the expected proportion who consult at least once in the incidence year would be approximately 3% of the adult population.

In summary, in one year in primary care:

- one-third of all people who consult during the year because of low back pain will be attending with a new episode after at least 12 months free of low back pain
- one-third will be coming with recurrences of a problem which they had suffered for some part of the previous year
- one-third will be coming with a persistent disabling problem.

Prescribed medication

Studies from UK general practice suggest that 67% of those who attend with low back pain are prescribed medication. This figure is remarkably consistent, but it is also the figure for the average percentage of consultations which result in a prescription for whatever reason. Among low back pain sufferers in the general population during a 12-month period who did not attend the GP, 19% reported taking medication and this presumably represents the prevalence of over-the-counter medication.

The duration of therapy will be dictated by case-mix. The evidence from US studies is that a high percentage of those with persistent low back pain continue to take prescribed medication.[49] A conservative assumption might be that rather more than half of those consulting with persistent, disabling problems (i.e. 1.5% of the adult population) will take prescribed drugs for three months of the year in total.

In the CSAG document, the assumption was made of an average two or three week prescription per consultation. An audit in a single general practice confirmed an average of two weeks at maximum dosage for an initial prescription.[50] We have applied this figure to those patients who receive a prescription but who do not return after a single consultation for low back pain (3.8% of the population).

Fitton's study of the costs of prescribing for low back pain in general practice[51] suggested that compound analgesics were more popular than nonsteroidal anti-inflammatory agents for low back pain but this may have changed in the decade since the study was published. More recent work suggests that these drugs are now prescribed about equally as frequently for low back pain.[19,52] Based on current NHS costing in MIMS, a two-week course could cost from £2 to £15. An average of £7 will be assumed here.

Summary

In one year, one in five of subjects who experience low back pain in the population will present to the GP. This is one estimate of demand for health care. It is in these patients that initial estimates of the impact of treatment on the natural history of low back pain must be made.

The likelihood of consultation is higher among those with a recent history of problems. Hence roughly equal numbers of consulters each year will come from the three groups in the prevalence pool. Most (two-thirds) will be new episodes or recurrences or clear exacerbations.

In a population of 100 000 adults, during a 12 month period, approximately 5000 receive at least one prescription for low back pain, with analgesics and nonsteroidal anti-inflammatory tablets dominating. Of these 1500 are on prescribed drugs for their low back pain for a minimum of 12 weeks in the year, whilst 3500 receive a single short course of therapy for an average of two weeks.

A further 6000 take over-the-counter tablets for low back pain.

Repeat consultations for low back pain

In the Royal College of General Practitioners' Morbidity Survey the annual rate of total consultations for low back problems was twice as high as the figure for the annual proportion of people who consult. This means that each patient who consults with low back pain has on average one further consultation within a year about the same symptom.[22] In a study of two group practices, three month follow-up of all patients who consulted at least once with low back pain revealed a skewed picture:[21] 60% of consulters did not return, but some people had returned more than twice within the three-month period.

Hospital referral

Specialists

During one year 10 to 20% of low back sufferers seen in primary care are referred to a hospital specialist. The majority see an orthopaedic surgeon, although there are likely to be regional variations, with the others being seen mainly by rheumatologists, neurosurgeons and pain specialists. A study of two hospital groups in Manchester[21] produced estimates of the annual rate of referral from local GPs which were similar to those reported by the National Morbidity Survey in General Practice.[22]

In a population of 100 000 adults, an estimated 800 will be seen in the course of a year by a specialist because of low back pain as the main presenting problem; a further 800 will be seen in A and E departments with low back pain as a presenting problem.

Radiology

During one year 15 to 20% of general practice attenders are referred for a lumbar spine X-ray, with wide variation between practices. In addition 40% of new hospital attenders with low back pain will be X-rayed and most A and E attenders with low back pain will have an X-ray.[21] There will in addition be X-rays carried out in private practice, and by chiropractors and osteopaths.

In a population of 100 000 adults, 3000 lumbar spine X-rays will be carried out in one year to investigate low back pain.

Physical therapists

Based on Waddell's summary of available evidence from surveys of the practitioners themselves or from their professional bodies,[19] the following estimates apply to new referrals for physical treatments of low back pain in a population of 100 000 adults during one year:

- 2000 (2.0%) to NHS physiotherapy
- 600 (0.6%) to private physiotherapy
- 1500 (1.5%) to osteopathy
- 600 (0.6%) to chiropractic.

This however will range widely from region to region depending on socio-economic mix and availability. In one population survey in Manchester, 1.9% had seen a physiotherapist, 1% an osteopath, 0.6% a chiropractor.[21] In a national sample studied by the OPCS, the figures were 3%, 2% and 1% respectively.[2]

The case-mix poses an interesting problem. European evidence is emerging that osteopaths and chiropractors tend to see sufferers early in their episode, who are in work and remain in work during their episode and who tend to be from better-off social classes as measured by low smoking, low levels of obesity and non-manual jobs. Those people at higher risk of low back pain are under-represented, as is the pool of persistent, more severely disabled back sufferers.[53,54]

Physiotherapists in hospitals by contrast will tend to receive specialist referrals which will reflect the dominance of persistent problems in this group. Direct referrals from GPs to physiotherapists in their surgeries, in community clinics, or in hospital will inevitably produce a different case-mix for the physiotherapist. Private physiotherapy practice presents another referral picture.

A crucial issue is the number of treatments offered. This is a major influence on the number of patients seen and on the costs per patient. In the US chiropractors have a higher number of visits per episode than other practitioners.[55] In the UK the average number of visits within an episode of low back pain appears to be similar for all physical therapists: six, five and six for physiotherapists, osteopaths and chiropractors respectively[19] and the proportion of back patients who see a chiropractor or osteopath is also much lower here than it is in the US. There is no clear scientific basis for specifying the length of a set of treatments.

The possible role of fee for service in determining the number of treatments cannot be ignored. In a recent US study[55] patients presenting with new episodes of low back pain to primary care physicians were compared to patients presenting with similar problems to chiropractors and to orthopaedic surgeons. Clinical outcomes were similar in the different groups and charges for each radiograph and each visit were lower in the chiropractic group. However the latter had a far higher number of treatments (and hence visits) per episode. This high volume made chiropractic a far more expensive option than the physicians and surgeons.

Inpatient care

The most detailed review of hospital admissions for low back pain appears in Waddell's Annex to the CSAG Report,[19] which is based on Hospital Episodes Statistics for England and Wales and Scottish Health Service Statistics. His considered estimate of the total number of patients in England and Wales admitted to hospital in 1989–90 for back problems is in excess of 100 000. In a population of 100 000 adults, the equivalent number would be more than 200. This figure excludes ankylosing spondylitis and combines ordinary and day case admissions. However it includes cervical and thoracic problems, which on the basis of surgical procedures would constitute some 20% of all back admissions.

Admissions for low back problems would thus total 160 patients in one year in a population of 100 000 adults: 115 ordinary admissions and 45 day cases.

In a survey of low back pain in one Manchester hospital 10% of new clinic referrals with low back pain were admitted for inpatient care within three months and a further 4% were admitted as day cases. This would represent some 112 patients in a population of 100 000: 80 ordinary and 32 day cases. This is an underestimate of ordinary admissions, since some patients will be admitted later than three months after their initial visit. So these figures are compatible with Waddell's estimate. They are however about one-quarter of the numbers as calculated from the OPCS population survey using recall of 'treatment on a hospital ward' during the past year.[2] Waddell, working from hospital discharge statistics, estimated a figure for inpatient treatment which was also one-quarter of that in the population survey. This suggests the estimates of current workload given above are reasonable.

From the Hospital Episodes Statistics 1989–90 there is also a breakdown of surgical procedures for the low back.[19] The operations are dominated by lumbosacral disc procedures, but the majority of procedures were paraspinal injections.

In a population of 100 000 adults, there are approximately 84 procedures performed on the lumbosacral spine each year: 28 disc operations and 56 other procedures, mostly paraspinal injections.

Some of these may be on the same people so they are not directly comparable to the admission data, but we will assume that for a one year period these represent people rather than events.

There is no evidence about the exact number and nature of admissions for non-surgical inpatient care of low back pain, such as bed rest, traction and plaster jackets. In the Manchester studies, 13% of hospital attenders and 1% of the general population reported receiving lumbar traction during the previous 12 months.[21] These figures do not distinguish between inpatient admissions for treatment and treatment provided for physiotherapy outpatients. If it is assumed that recalled figures are again approximately a four-fold inflation of the true prevalence of such treatment, this gives a figure of 30 patients receiving traction annually in a population of 100 000.

Ankylosing spondylitis accounts for 1% of the hospital admissions for back pain. Since the estimated prevalence of this condition in the general population is one per 1000, this suggests that approximately 1% of people with ankylosing spondylitis in the general population are admitted to hospital in any one year.

Apart from ankylosing spondylitis and the small number of emergency admissions, the problem in assessing these figures against subgroup prevalence figures is that there are no details about the case-mix of hospitalizations. If we assume that the majority are for low back pain with cord or root compression, this suggests that about 10% of potentially serious sciatica in the community is hospitalized in any one year, of whom rather less than half have surgery. In Weber's carefully followed group of 208 acute lumbar radiculopathies, four underwent surgery during a 12 month follow-up.[56] It seems unlikely that there is a large unmet need for lumbosacral disc surgery, although it is not known whether those who have the need are receiving the operations. Against this has to be placed the finding that the US and Holland have four to five times the spinal surgery rate of the UK.[57] Once again the possible influence of fee for service and of cultural views about surgical intervention must be taken into account when interpreting such comparisons.

Other services available

Occupational health services

In the OPCS and Manchester population surveys, approximately 1% of low back pain sufferers reported a contact with the occupational health services (doctor or nurse) during a one year period.

The most recent information from the Health and Safety Executive suggests that 75% of all employees in England and Wales are in establishments where there is coverage by occupational health services of some sort.[58] The high figure reflects wide coverage in large firms and in the public sector. Approximately 50% of all employees have access to a health professional of some sort through the workplace.

This indicates that there is less use made of occupational health services compared with attendance in primary care, but that a back pain service in the workplace could be available to approximately 20% of low back sufferers (i.e. 50% of the low back pain sufferers who remain in work).

In a population of 100 000 adults during one year 7500 people who experience low back pain have potential access to an occupational health professional but only 400 will utilize this service.

Occupational therapy

In the OPCS survey 1% of subjects reported having seen an occupational therapist because of low back pain during the previous year, but in the Manchester study no one recalled using this service.

Corsets

These remain a popular treatment for low back pain: reported by 10% of low back patients attending their GP and 25% of new attenders with low back pain in hospital clinics.

Self-care

This may follow the advice of professionals or may be gleaned from other sources. Sources of general information include:

- **National Back Pain Association** Individual access to advice and information. Educational material, information pack, local group membership.
- **Arthritis Care** Telephone help-line, comprehensive information sheets on pain management and back pain.

In the Manchester studies bed rest as a therapeutic approach to low back pain was reported by 25% of individuals who had had low back pain during the past year; 17% had tried exercises; 50% had avoided heavy lifting; 40% had tried cream or sprays. In each case those who had consulted their GP were more likely to have tried these approaches than those who had not.

Summary and estimated costs of current care for low back pain

The summary of main sources of health service care is shown in Table 5. Total costs are slightly lower than the CSAG estimate when applied to a population of 100 000. The figure here should be regarded as a probable minimum because:

- the prescription figure is likely to be higher if more patients with persistent pain are on medication for longer than three months in a year

- costs of hospital treatment do not include emergency admissions for pain relief; secondary referrals to other specialist services such as psychology and psychiatry; orthotics; or multi-disciplinary treatments where these are available. The inpatient estimates are dominated by surgical admissions.

So the costs might be as high as £800 000 per year in an adult population of 100 000. The CSAG costings[a] used different approaches to reach their figure, although we have used a number of their quoted item costs as the basis for our calculations (for example, the average cost of a GP consultation, of a hospital outpatient visit, and an A and E department attendance). The CSAG figure was £880 000 for a population of this size, the main difference being that they assumed an average of four consultations per patient consulting with low back pain in primary care.[19] Figures from the National Morbidity Surveys in primary care suggest this is an overestimate.[22] However the possibility that consultation data underestimate what the patient perceives as back pain consultations (page 146) underlines that such costs could be higher.

Table 5: Main sources of health care for patients with low back pain with approximate costs (1993 prices)

	Number seen	Total contacts	Cost (£)
Primary care consultations	7 500	15 000	165 000
Prescribed medication*	5 250	3 700 single	26 000
		1 500 multiple (persistent and severe)	63 000
A and E attendances	800	800	28 000
Specialist referrals	800	2 400	72 000
Hospital episodes	170	138 inpatient admissions 32 day cases	200 000
Physical therapy	2 000	10 000	100 000
Plain lumbar radiographs	3 000	3 000	90 000
Specialist imaging	160	160	16 000
Total estimated costs			670 000

* Based on estimates from MIMS. Unit cost of single contact = £7 and multiple contacts = £42. Estimated unit costs are as follows (source in brackets): GP consultations £11.00 (CSAG); Outpatient consultations £30.00 (CSAG); Physical therapy £9.00 (CSAG); Inpatient day £133.00 (CSAG); A and E £35.00 (CSAG); X-ray £30.00 (CSAG); Imaging £100.00 (NHS Trust).
Hospital episodes have assumed an average of ten days per episode.

[a] Since this section was compiled, a fuller version of the CSAG economic analysis has been published by the University of York: Klaber Moffett *et al.*[120] This has used a number of other sources and provides a detailed and valuable estimate of the costs of back pain. Its range for total costs to the NHS, at 1993 prices, was £270–380 million per annum. This range is close to the estimates in the previous paragraph when applied to the adult population of the UK.

7 Effectiveness and cost-effectiveness of treatments

This will be considered in two parts:

1 Short-term relief of symptoms: important, but always to be put in the context that symptom relief will occur in the majority of patients seeking health care for low back pain, regardless of the treatment given.
2 Long-term relief of symptoms and improvement in mobility, functioning, work capacity and psychological well-being among patients whose problems are established and persistent and in whom spontaneous improvement is less likely to occur.

The following question is rarely addressed but it is crucial to the public health perspective: does early treatment of new episodes help to prevent long-term problems of pain and disability?

In general overviews of randomized controlled trials of treatment of low back pain reach the pessimistic conclusion that their quality is poor.[59,60]

Our approach is that, despite their flaws, these studies can be used to inform judgements on the efficacy and effectiveness of different interventions. The real gap in the literature is in trials of longer term outcome among study populations sufficiently unselected to be generalizable to the health care requirements of all low back pain sufferers.

Current efficacy of primary care

The diagnostic triage

The CSAG report made clear that the small proportion of potentially serious cases could best be sorted out by general practice diagnostic triage followed by appropriate referral, investigation and hospital treatment, using the pragmatic classification outlined on page 135. This includes those with severe nerve root pain, who may not require referral but for whom extended bed rest for example is a recommended option.

The efficacy of diagnostic triage remains to be tested, despite the enthusiasm of the CSAG for it. It has strong expert recommendation and is potentially cost-effective because it should keep unnecessary investigation and referral to a minimum. However it may demand initial investment to support a full hospital emergency back pain service.

From a strictly epidemiological point of view, it remains possible that the diagnostic triage could increase referrals if it were to have a poor specificity for serious pathology in the primary care setting (i.e. many patients referred with possible serious pathology, who turn out to have non-specific low back pain). Good clinical epidemiological studies of the outcome of triage in the aftermath of the CSAG report are needed.

Management of non-specific low back pain

The presumed benign outcome of low back pain seen in primary care is based on a restricted view of the problem.

Among subjects with localized low back pain (i.e. no radiation to the leg) who attend their GP within 48 hours of its onset, there is rapid recovery in 90%.[38] These are a minority of cases attending primary care.

Overall 55% of primary care attenders will have completely recovered (25%) or improved (30%) from their presenting symptoms within three months.[21] The proportion of those who are the same or worse will vary according to the status of the episode as new, recurrent, or an exacerbation – i.e. the point in the patient's whole back pain history at which this particular episode is occurring.

There is evidence that some general practice interventions can affect the natural history of low back pain in the short term (see below). It is GPs in the main who apply the pragmatic classification of low back pain and refer potentially serious problems for investigation and management. Patients who require sickness certification for more than one week will also attend.

The question of overall efficacy has been circular however. Since the impression given by the clinical medical literature is that, left alone, most low back pain will get better, then the question of whether GPs or members of their team could actively improve the short- and long-term outcomes has been by-passed.

Patient advice and education

The idea that educational approaches to the low back pain patient will improve outcome is an attractive one. In an interesting and important study in UK primary care, consecutive surgery attenders with low back pain were randomized to receive or not to receive an information booklet.[61] After 12 months the booklet group had reduced consultations and referrals, although there was no impact on working days lost. A study in a Dutch general practice suggested that the 'information/simple analgesics' approach was as good as physiotherapy in influencing recovery.[62]

In a Finnish study workers presenting to an occupational health service with acute low back pain were randomized to receiving bed rest, or to specific back-mobilizing exercises or to simple advice to 'avoid bed rest, not to engage in specific back exercises and to continue normal activity to the extent that they were able to tolerate it'.[63] The simple advice group showed better recovery at three and 12 weeks than the first two groups (see also page 158, psychological approaches).

More intensive educational approaches have received attention: particularly 'back schools'. Swedish in origin, these are group educational programmes, of variable length and content broadly designed to educate low back sufferers in pain management, ergonomics and general measures to improve back 'fitness'.[64] There have been a number of randomized controlled trials of this approach and several overviews of the trials[65,66] – most recently the detailed and careful review by Cohen.[66] The conclusions were that the case for back schools remains unproven. Some short-term benefits in reducing pain intensity in both acute and chronic episodes have been observed, but there are no convincing long-term effects on function, symptom recurrence or work loss. Where there is reported benefit, it seems to be in the short term and to be non-specific. The case for choosing group educational methods to achieve this is doubtful. The difficulty lies in identifying the important therapeutic features of the programmes given the wide variation in content and approach detailed in the literature.

One of the better trials of the group educational approach did note other benefits when it was linked with visits to and liaison with the workplace.[67] As part of secondary prevention approaches in industry there is a stronger case for the back school.[66]

Tablets and injections

Simple analgesia, narcotic analgesia, nonsteroidal anti-inflammatory drugs, muscle relaxants, sedatives – all are used in the treatment of low back pain. Patients in severe acute pain need pain relief, so the use of appropriate short-term analgesia is not in doubt. The question is whether other therapies offer any additional advantage over simple analgesia.

In the very short term (i.e. seven days or less) some active therapies appear to do better than their placebo in terms of the proportion of patients who recover or of the degree of pain relief achieved (nonsteroidals and muscle relaxants). In one careful trial of treatment of acute low back pain within 48 hours of the onset of an episode piroxicam offered no advantages over placebo in terms of reported pain relief by seven days, although

it had reduced the need for simple analgesia and had resulted in more subjects returning to work. However there seemed little advantage in the active tablets over placebo for outcomes after one week.[68]

An overview of injection therapy concluded that there was little good trial evidence to recommend it.[60] The possible options include steroid or local anaesthetic injections (or both) into tender soft tissue points, discs, ligaments, facet joints or the epidural space. The most positive trial evidence suggests some effect beyond placebo, but in one careful trial (of methylprednisolone to facet joints) the effect was entirely explained by concurrent medication.[69] Likewise with acupuncture, there is little firm evidence to support its use as a specific treatment for low back pain.[70]

The same pattern of evidence appears in most trials of analgesia: considerable improvement is seen in 60 to 70% of all participants regardless of therapy. The active therapy under investigation is attributed with the benefit in one-third of the patients who improve. The difficulty of interpretation is that such additional improvement might be important but not specific to the particular treatment under investigation.

Bed rest or early activity?

Two randomized controlled trials, one in primary care and the other in a 'walk-in' US clinic, have provided evidence that bed rest interferes with return to full activity in acute back pain.[71,72] Early mobilization (after a maximum of two days in bed in one of the studies) resulted in a reduction in total days lost from work up to three months later; the second study however found no difference 12 months later between groups treated with and without early activity. The Finnish trial discussed on page 154 has provided new evidence that patients with acute low back pain who are advised to rest in bed for as little as two days do not do as well as those who are encouraged to continue ordinary activity.[63]

Up to two weeks bed-rest still seems to be the advised conservative approach for severe radicular pain; however one study has found that early mobilization is beneficial even in this group.[72] Since it is agreed that patients with progressive neurological problems should be referred, it seems only a very few patients need to remain in bed for any length of time.

Physical therapy

Physiotherapists offer three general approaches in addition to education and information:

- **Back exercises** These can be active (taught to the patient) or passive (aided by the therapist). Flexion, extension and physical strengthening exercises form three of the main group of exercises. Different 'schools' of physiotherapy place different emphasis on these: the McKenzie method for example stresses extension, the Williams school favours flexion.
- **Manipulation and mobilization** These are discussed on page 157, together with osteopathy and chiropractic.
- **Technology** Various pieces of equipment have been introduced to the physiotherapists' approach to low back pain, including trans-cutaneous electrical nerve stimulation (TENS), ultrasound and laser therapy.

Exercise

If bed rest is bad and early activity is good, the next question is whether specific exercises can achieve anything which general encouragement to stay active cannot.

Early intervention

In a review of randomized controlled trials of exercise therapy from physiotherapists most trials which compared specific exercises in acute low back pain with no exercise or with placebo were negative.[73] There is some evidence of an early effect on pain relief but it does not appear any better to other methods of treating pain. In one important general practice study, 512 patients presenting with localized low back pain of three weeks duration or less were randomized. Exercise sessions (for five weeks, twice a week, at 20 minutes per session) were no better at preventing recurrences during a 12 month follow-up period compared with usual care and standardized information given by the GP.[62] There were some symptomatic benefits from physiotherapy attention in the first three months (decreased tiredness and emotional problems) but exercise sessions were no better than parallel placebo ultrasound sessions in achieving this. Disability was unaffected but repeat consultations were reduced in the physiotherapy groups, whilst some physiotherapy referrals occurred in the usual care group.

Later intervention

In chronic back pain, there is evidence that exercises do improve symptoms. In a US study designed mainly to evaluate TENS therapy, subjects with at least three months of low back pain recruited through newspaper adverts were randomized.[74] Exercises (taught for home use and coupled with three physiotherapy sessions over one month) had a clear benefit during three months follow-up in increasing activity and reducing pain. Once again there was no effect on disability. By three months, only half the patients were still performing the exercises regularly and the overall effect in the treated groups was diminishing. Since these were well-motivated patients, not at the severe end of the disability scale, it seems unlikely that the observed effects would persist in practice without further visits and reinforcement.

A controlled trial of an exercise, education and behavioural programme run by a physical therapist involved subjects who had been off work for six weeks because of a persistent episode of low back pain. There was an earlier return to work (average eight weeks earlier) and improvement in mobility and fitness 12 months later in the actively treated group.[75] The evidence points to exercise in such patients being as much about improving confidence and managing pain as about direct effects of exercises on physical capacity.

A similar result was found when chronic sufferers of more than six months duration were followed for 12 months: here disability score was improved as well as physical performance.[76] The estimate was that 50% of such people under the age of 50 years could be safely involved in a vigorous multi-disciplinary rehabilitation programme.

A recent UK study has provided important new evidence, which suggests a more cost-effective approach is possible.[77] Patients with at least six months of low back pain were randomized to a fitness class where eight group exercise sessions were carried out over a four-week period by a physiotherapist who used psychological principles as an integral part of the intervention. This meant that attention was diverted from the back and the pain and on to a more positive 'sports exercise' approach, focused on what the individual could do in terms of general fitness exercising. Both the intervention and the control groups were also taught specific back exercises and were referred to a back school. Six months later the fitness group had lower disability than the control group. In summary, there is evidence that, in those who have been off work for some weeks or months because of low back pain, exercise programmes confer benefit for up to 12 months.[74–77] The interventions however have ranged from simple advice sessions to involvement of multiple disciplines and range widely in complexity, cost and duration. Supervised group fitness programmes which emphasize positive psychological approaches to pain seem to offer a promising cost-effective option.

Manipulation and mobilization

Although individual practitioners emphasize the importance of tailoring treatment to the individual patient, overviews of studies of 'hands-on' approaches to manipulation or mobilization of the spine have tended to group different methods together in an attempt to judge their efficacy. In the absence of a clear justification for treating them separately, the same approach was adopted in the CSAG report, in which manipulation and mobilization by physiotherapists were bracketed with treatments given by osteopaths and chiropractors and these three groups were referred to collectively as 'physical therapists'. Manipulation is taken here to mean high-velocity thrusts to the spine beyond the patient's restricted range of movement and mobilization to mean low-velocity passive or assisted movements within or at the limit of the patient's range of movement.

In general the evidence supports a short-term benefit of manipulation or mobilization in patients with a short duration of the current episode, particularly with respect to reduction in pain intensity measured by either self-report or a reduced need for analgesia.[78,79] The effect was less in those seen very early on in their episode – hardly surprising given the increased likelihood that such patients settle rapidly anyway. Studies which include longer term follow-up provide no convincing data to suppose that these therapy approaches do alter the long-term course and there is insufficient evidence yet to reach a conclusion about their contribution to secondary prevention of recurrent and persistent low back pain.

Two interesting studies stand out. Hadler's study, although small, showed an advantage of a single treatment involving a high velocity thrust compared with mobilization omitting the thrust. This was seen in patients with less than one month of pain in the current episode, who were attending a primary care rheumatology clinic in the US.[80] Follow-up was for two weeks only. The study is important because:

- it demonstrated the efficacy of a single treatment (much of the concern about the cost-effectiveness of physical therapy relates to the seemingly open-ended number of sessions provided for any one case)
- it began to tackle whether one form of manipulation or mobilization was superior to another – the general absence of data on this makes it difficult to make recommendations about specific forms of physical therapy.

The second was a controversial pragmatic randomized comparison of patients referred to chiropractors or to hospital physiotherapists.[81] Although interpreted as an unfair assessment of physiotherapy undertaken under usual NHS conditions, its importance lay in demonstrating that a physical therapy can have an effect on disability in the longer term, i.e. after two years. A recent follow-up has suggested that the effects persist for even longer.[82] What aspect of the chiropractic intervention was important is not clear, but it is one of the few studies to suggest that intervention might alter the future natural history and therefore contribute to secondary prevention.

In general the available overviews are agreed that in early treatment manipulation–mobilization hastens short-term recovery, but the long-term benefits are unknown. From available studies the average size of the effect 2–4 weeks after treatment averages 20%. The problem is that half of the patients are going to get better anyway. The additional effect seems worth achieving, but it might not be specific to the particular treatment studied and the costs of extending it to all who might benefit in the short term could be prohibitive.

It is here that the lack of evidence about long-term effects is frustrating. If manipulation and mobilization were an intervention with secondary prevention benefits, the case for providing it on a wide scale would be stronger. As it is, one argument states that there has to be some selection to identify which patients presenting with low back pain should receive such intervention. The conclusion of the CSAG was that persistence of an episode for two weeks was a suitable criterion for referral.[8] This has not been put to the test and it is quite plausible, given the known occurrence of low back pain in primary care, that even this sift would result in an overload on the system. There is an urgent need for evidence about the results of

introducing such a policy in terms of the rates of referral to physical therapists, of actual attendance and of follow-up visits generated, as well as the overall costs.

The lack of evidence about costs and benefits of early physical therapy means that these must be conjectural. However it seems reasonable to suppose that it would have other benefits (reduced emphasis on diagnosis in the majority of low back pain patients, reduced medication costs as an alternative symptomatic treatment, improved education and information for individuals). Against these points there are likely to be costs, such as needless treatment and multiple visits to the therapist.

The empirical evidence suggests that the likelihood of major side-effects of routine manipulation and mobilization is extremely low,[83] but acute progression of cord or root compression can occur very rarely. There is little evidence on which to recommend courses of manipulation for more chronic low back pain.

Cost-effectiveness of physical therapy

In studies which have compared manipulation with other forms of physiotherapy, one feature was that manipulation courses were shorter than therapy courses. Clearly this is dependent on local conditions, trial protocols and therapist variation but does suggest that short courses of manipulation in the treatment of acute pain are potentially cost-effective.

The cost-effectiveness of exercise programmes in more chronic low back pain is difficult to judge, since the content of the programme has varied enormously in published studies. In one study, the authors state that the intervention was simple and inexpensive; in another, a multi-disciplinary team of a physician, psychologist, social worker, physiotherapists, occupational therapist and work trainee were involved. However the simple group exercise programme for moderately disabled patients with chronic low back pain outlined in the Frost *et al.* study discussed previously was less costly than providing individual therapy sessions.[77]

Technology

Good randomized controlled trials have provided no evidence of the superiority of these interventions over placebo in acute or chronic low back pain; nor do they offer advantages over other methods of pain relief.[84,85]

Psychological interventions

There is a large body of evidence that psychological factors are important predictors of the progress and outcome of episodes of low back pain.[86] These embrace emotional factors, such as depression and anxiety; cognitive factors, which concern elements of the individual's appraisal of their pain, such as catastrophizing thoughts; and pain-related behaviour, such as previous propensity to seek health care for painful symptoms. There is now strong observational evidence about the influence which such factors have on the course and outcome of episodes of low back pain.[87–90]

Trials of psychological interventions have been carried out, although many have tended to concentrate on patients with long-standing problems and on the psychological component of multi-disciplinary interventions. The trials have ranged from programmes which have concentrated on behaviour change, such as the 'operant conditioning' methods pioneered by Fordyce and colleagues,[91] to those which have tackled thoughts and feelings about pain and its consequences, the cognitive-behavioural approach.[92] For chronic back pain sufferers the message seems clear: combining behavioural or cognitive-behavioural approaches with physical rehabilitation is more successful than a physical regime alone. There is evidence that such multi-disciplinary approaches are effective in improving the ability of some patients with long-standing disability and handicap to function in the world.[90]

However there is very limited evidence about the benefits of psychological interventions early on in a back pain career when the population impact could potentially be enormous. In particular the nature of an effective psychological intervention for primary care attenders is an urgent area for investigation. There is some evidence that it is worthwhile. Fordyce for example reported on a trial of behavioural versus traditional management of acute back pain, which showed some differences in favour of the behavioural group up to 12 months later.[93] In multi-disciplinary treatment of chronic cases this would mean expensive specialist time. However brief interventions at an earlier stage might be cost-effective if they enhanced the secondary prevention component of other treatments.

It is likely that the emerging case for active management of new episodes or recurrences rests on it having a 'cognitive–behavioural' element. The randomized controlled trial evidence for simple encouragement to keep active in acute episodes[63] or for a 'general fitness approach' in those with more persistent problems[77] suggests that reduction of fear and improving confidence are beneficial. In addition Symonds and colleagues have recently shown that the inclusion of material which tackles emotions and beliefs about low back pain in an educational leaflet for factory workers was associated with a reduced number of subsequent work absences due to low back pain.[94]

Efficacy of diagnosis

How important is diagnosis in low back pain? Since most cases of low back pain cannot have a label attached (or only one for which there is no good or consistent clinical epidemiological evidence of validity or utility), then the rationale of 'needing' a diagnosis must be questioned.

Imaging

The role of imaging in the management of low back pain focuses on the relationship between the 'low back pain' syndrome and spinal abnormality. Requests for lumbar spine films are the most frequent referral by GPs in their management of low back pain (10–20% of low back consulters but with wide variation between practitioners); in hospital, one-third of new attenders were referred for an X-ray in a district teaching hospital despite the fact that 80% of them had already had one previously.[21]

The evidence points strongly to the inappropriateness of lumbar spine films in the early management of low back pain. There are two main reasons as follows.

- In population studies, the prevalence of abnormalities on X-ray are common in those with and without low back pain.[95,96] Disc degeneration, spondylolisthesis and scoliosis are only weakly associated with pain.
- There is no clear evidence that treating these abnormalities, even if they were responsible for some of the pain, is beneficial.

Imaging is needed for two reasons as follows.

- To investigate the possibility of a serious diagnosis – i.e. malignancy, fracture or infection. These are so rare as causes for low back pain that the use of a routine lumbar spine film to screen for them is not justified – the 'yield' in one series of 2500 adults aged under 50 years was one. The low yield and the unnecessary radiation argue against routine use of such plain films in the assessment of uncomplicated low back pain.

  The need for an X-ray can be based on clear clinical indications: the CSAG report gives a list of 'red flag' symptoms and signs. Even the usual caveat (pain for more than six weeks) does not justify a routine

X-ray in the absence of other clinical indications, since simple persistence of low back pain for more than six weeks will apply to a majority of patients presenting in primary care.

Consultation behaviour, anxiety, the cultural perception of the importance of the X-ray, doctor variation – all these cannot be ignored in judging the current place of lumbar films, and yet there is little or no research-based evidence of their importance. They need to be weighed against the lack of evidence that lumbar spine films contribute to diagnosis and management in patients other than those in whom clinical suspicion of a serious problem is strong.

- To justify surgical procedures. The diagnoses of disc herniation and spinal stenosis do not depend on plain lumbar radiography, and so the lumbar film is unlikely to influence management in cases being considered for invasive procedures in hospital. Whether myelography, CT or MRI should be used as the diagnostic procedure of choice for these two conditions is unclear.[96] The popular move is towards MRI because it can identify other pathologies also (such as tumours), but there is no good evidence comparing these three approaches with respect to utility and cost benefits.

  There is strong evidence against routine use of these procedures in low back pain management. The MRI has revealed how common disc bulging, protrusion and extrusion are in the human population, regardless of symptoms.[97] The implication of this is that imaging should only be undertaken when clinical suspicion is high. Since the prognosis of root pain is good, investigation of persistent sciatic root symptoms after conservative therapy is one indication for imaging.

Other forms of imaging are controversial. An example is discography, in which discs are injected under imaging control to investigate whether pain is reproduced, on the basis that discs may cause pain even when not herniating. There is no clear evidence that such procedures lead to more effective treatment.

Imaging in primary and secondary prevention

The observation that disc abnormalities are common in teenagers and in asymptomatic adults suggests that there may be fruitful lines of research into early influences on spinal health. Despite the lack of a cross-sectional relationship between structural abnormalities and low back pain, it is possible that altering the early natural history of spinal problems may have a later influence on symptoms.

However there is no evidence that screening for spinal abnormalities contributes to secondary prevention of low back pain, either in childhood or for example in industrial placement. The debate on the value of two-stage childhood screening (clinical plus imaging) for scoliosis of the spine continues, but its value is debated in terms of preventing progressive structural deformity rather than preventing low back pain.

Surgery

In an international study comparing spine surgery rates, the most dramatic difference was the five times higher rate in the US compared with England and Scotland.[57] Within the US rates also vary,[98] and during the past decade operation rates there have dramatically increased whilst non-surgical hospitalization rates for low back pain have fallen.

Open disc surgery, chemonucleolysis and microdiscectomy each have their advocates as treatment for herniated discs; laminectomy for spinal stenosis and lumbar fusion for degenerative disease with spinal instability are the other major procedures.

There seems to be a consensus that open disc surgery for herniated lumbar discs is a reasonable option. The small minority of patients with a cauda equina lesion or progressive neurological signs constitute

surgical emergencies. However it is not clear whether surgery should be advocated for herniated discs which are not in these serious categories.

Conservative therapy for radicular pain is a reasonable approach, as discussed earlier. In Weber's randomized controlled trial, there were clear short-term benefits for surgery compared with conservative therapy, but at long-term follow-up the differences had disappeared.[56] In Hoffman's overview he stated that 'most studies had design flaws and omitted important clinical data' but reached the conclusion that short-term relief of sciatica was better in those who had undergone surgery.[99]

Against this must be placed the following points.

- Weber's studies also showed that 70% of patients with sciatica of less than 14 days duration (i.e. acute) were pain-free one year later after conservative treatment only.[56] This is broadly similar to the improvement seen in trials and studies of many active therapies. It supports the clinical view that surgery is not usually indicated for uncomplicated early sciatica.
- The faster pain relief obtained by surgery has to be put beside the admittedly rare rate of serious complications of open disc surgery (estimated at less than 1% of cases) and the consistent finding that disc surgery confers a risk of further surgery – 10% re-operation at one year, 18% by five years. Such figures could of course reflect patient selection, but there is no evidence that conservative therapy leads to a similarly high rate of subsequent operation. In many randomized trials of intervention in low back pain, an important predictor of poor outcome is a previous history of back surgery.
- Randomized trial evidence offers little support for newer procedures in disc surgery. Chemonucleolysis carries a consistently higher rate of subsequent operation than conventional surgery, together with problems of post-operative pain, and no evidence of symptomatic superiority over conventional surgery one year later.[100] Because of the subsequent operation rates it costs more. Microsurgical techniques in one randomized trial also carried a high rate of re-operation.[101]

Overviews of fusion and surgery for spinal stenosis have concluded that there is no clear evidence yet available concerning the efficacy of these procedures.[102,103] In three out of four randomized controlled trials of fusion identified by Turner, there was no advantage of surgery with fusion compared with surgery without; there appeared to be unacceptably high rates of complications. It would thus seem likely that there are only very select populations for whom fusion is an advantage; one randomized controlled trial has indicated that fusion added to laminectomy for spinal stenosis with spondylolisthesis had a better outcome in terms of pain relief two years later, although there were design flaws in this study.

Inpatient traction remains a popular choice of treatment in some centres. There has been good randomized controlled trial evidence available for some years now that shows no effect in the short- or long-term, although these same studies did suggest that manual traction provides short-term relief of pain.[104,105]

Summary and tables of evidence

The critical reviewer of evidence must exercise caution and humility. For many interventions used in low back pain treatment there is simply insufficient good evidence to either support or refute their effectiveness. Forms of evidence other than the randomized controlled trial are important to the clinician in making judgements about treating individual patients. 'No scientific evidence' should not be interpreted as 'strong evidence against'. With this caveat, the following summary represents a personal view of the evidence reviews published to date.

New or recurrent episodes

The evidence is summarized in Table 6.

Quality of evidence

This applies to short-term outcome only. Some trials have given results for 12 months or longer, but we do not have clear evidence of the potential for these interventions to prevent subsequent low back pain.

Cost-effectiveness

This is coded as follows. 'Yes' means that the intervention is almost certain to be cost-effective in primary care, even if demand increased. 'No' means that the intervention could not be applied to the generality of patients without major cost implications. 'Possible' means that cost-effectiveness is likely to depend on the demand and the actual process involved in implementing it: a single visit to a physical therapist for example could be highly cost-effective even if it was applied to a lot of patients. If that visit were to become a 'course' of six visits per patient, then it could not be applied to everyone without major cost implications. 'X' means that it is cost-effective to reduce or phase out such treatments.[a]

Persistent and disabling low back pain

The summary of evidence on efficacy is shown in Table 7. Again it is focused on relatively short-term questions of efficacy. The difficult question is how to relate this to the severity of the sub-categorizing. Most trials have taken place in long-term patients; the maximum efficacy might be achieved in patients who have accumulated, for example, six weeks of low back pain. This is addressed in the 'models of care' section. The cost-effectiveness column reflects this uncertainty: most of the interventions, if applied to all those with a total of 12 weeks or more of pain in a year, would have to prevent long-term or recurrent problems to be cost-effective.

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[a] The system of grading evidence and strength of recommendation is common to all the reports in this series and is explained in the introduction to *Health Care Needs Assessment Volume 1*. Edited by A Stevens and J Raftery (1994). In summary:

Quality of evidence

I	at least one properly randomized controlled trial
II-1	well-designed controlled trials without randomization
II-2	well-designed cohort or case controlled analytic studies
II-3	multiple timed series with or without the intervention
III	opinion of respected authorities based on clinical experience etc.
IV	inadequate owing to problems of methodology.

Strength of recommendation

A	good evidence for acceptance
B	fair evidence for acceptance
C	poor evidence for acceptance
D	good evidence for rejection.

Table 6: Efficacy table: new and recurrent episodes

	Quality of evidence	Recommendation	Cost-effectiveness
Use of the pragmatic classification by GPs	III	B	Possible
Information and educational leaflets	I	A	Yes
Encourage normal activity within pain	I	A	Yes
Simple analgesia or cheapest nonsteroidals[a]	I	A	Possible
Single manipulation or mobilization	I	B	Possible
Cognitive–behavioural approaches	I	B	No[b]
Specific back exercise regimens	I	C	X
'Back schools'	I	C	X
Orthoses	II-I	C	X
Bed rest (excluding root pain)	I	D	X
Non-surgical hospitalization	I	D	X
TENS; ultrasound; laser therapy	I	D	X
Plain lumbar radiography in non-specific low back pain	II-2	D	X
Other imaging for non-specific low back pain	II-2	D	X
Injection therapy	II-I	C	X

All treatments assume that the GP has classified the episode as non-specific.

[a] The implication of this restriction is that blanket use of expensive nonsteroidals or of combined analgesia would not be cost-effective. However prescribing for pain is a complex issue and clearly there will be individuals who will benefit – but that statement applies to all the other therapies listed. In population terms there is no strong evidence in favour of one type of analgesic.

[b] This is a problem of process. Behavioural therapy has worked in some trials. The uncertainty is how best to put this into practice in an efficacious and cost-effective way. It could be taken as part of the primary care or physical therapy 'package', but this has yet to be tested in trials set in primary care.

Table 7: Efficacy tables: low back pain persisting for 12 weeks or more

Fitness programmes, supervised by physical therapist:	Quality of evidence	Recommend-ation	Cost-effectiveness
group	I	A	Yes
individual	I	B	Possible
'Back school':			
community	I	C	X
workplace	I	B	Possible
Multi-disciplinary rehabilitation including psychological treatments	I	B	Possible
Manipulation	I	C	No
Surgery for non-specific low back pain	III	D	X
Disc surgery for persistent sciatica with accompanying clinical evidence of nerve root compression	I	A	Yes

8 Models of care and their consequences

Introduction

In this section some alternative models of care will be considered on the basis that the current situation reflects a probable mismatch of needs and management. The main proposal will examine the consequences if more active early therapy was offered and was made available to the community in general and not only to those who visit the GP. Less radical options will also be explored.

Model I: Shift in emphasis from the search for a diagnosis to active treatment of episodes and to secondary prevention of recurrence and persistence

Diagnosis

Early in an episode

For this we will assume that the number of people in the population who delay seeking health care, when the need is for urgent diagnosis, is very small. Evidence from surveys of patients attending osteopaths and chiropracters suggest that most of them have already consulted their GP.

The proposed model of care assumes that the need for early referral for imaging or further assessment can be restricted to:

- patients with clear clinical indications that systemic disease is a possible diagnosis
- patients in whom neurological signs of cord compression are progressive.

There appears to be no rationale for plain lumbar radiography as a 'screening' procedure for patients in whom there are no clinical indications of a serious diagnosis ('red flags' in the terminology of the CSAG report).

The estimated requirement for lumbar films for diagnosis in one year would be one per 1000 primary care attenders with low back pain, i.e. ten patients in a population of 100 000 adults. This however ignores the function of the X-ray as reassurance and the question of whether more positive approaches to therapy might provide alternative reassurance – an urgent topic for research.

The estimated requirement for urgent referral for investigation of progressive neurological impairment in one year is one per 2000 attenders with low back pain. This will underestimate all such referrals because a number will occur in patients who do not present with low back pain.

Later in an episode

Apart from small numbers of subjects for whom investigation of persistent low back pain is indicated (suspicion of inflammatory disease such as ankylosing spondylitis, or of osteoporosis in the elderly) the main epidemiological question is: how many patients with radicular pain suggestive of a prolapsed disc (and to a limited extent, spinal stenosis) require referral to an orthopaedic or neurosurgeon for diagnosis and assessment of need for operation?

The number of patients in primary care who present with persisting radicular pain needing further assessment is estimated at 200 per 100 000 adult population per year. At present 800 low back referrals are seen in specialist outpatients, the vast majority by surgeons, most of whom are not followed up.

The conclusion from this is that the need to assess patients for possible surgical intervention is probably being met. The lack of evidence for the efficacy of many surgical procedures other than conventional disc surgery and laminectomy (and possibly fusion) for spinal stenosis suggests that the use of these should remain restricted and the subject of research on carefully selected patients.

The crucial point is that specialists see many patients at present in whom there is no indication of a need for a diagnosis or for specialist involvement in their management. This is presumably why 70% are not followed up.

There is evidence to support investment in measures designed to organize referrals to hospital back pain services and specialists. One example, practical and popular with patients,[106] is to institute a gate-keeper for hospital referrals: in one study a physiotherapist[106] and in another a trained nurse practitioner.[107] Waiting lists were reduced and services used appropriately. Such measures should only be needed in the short term if referrals are ultimately reduced by adequate community management. They should therefore prove neutral in cost terms, but they do depend on a strong multi-disciplinary service in support and this may require additional investment.

Early symptomatic care

The CSAG report has drawn attention to the need to provide a service for immediate treatment of very severe pain.[8] There are no epidemiological data on which to base an estimate of the need for such a service, but numbers are likely to be low.

Otherwise there are three broad issues.

Improvement in care

Could there be improvements in the care of patients who present in primary care with new episodes or exacerbations of low back pain and who will recover within six weeks regardless of the type of intervention?

The answer is a cautious 'yes'. Putting the evidence of efficacy beside the picture of current treatment suggests that the following changes could have an impact on the length and costs of the episode:

- reduce bed rest to a minimum, unless there is true radicular pain
- encourage activity and an early return to work
- choose simple analgesia
- early manipulation or mobilization procedure from a trained therapist as a single or short-term programme.

Early treatment changes

Much more important is the question, unanswerable at present, as to whether changes in early treatment would:

- prevent recurrence of pain and disability in those whose immediate problems settle in the short term
- prevent the persistence of symptoms and disability in patients whose low back pain is not going to recover spontaneously within six weeks.

The issue is whether early treatment would carry the bonus of secondary prevention by altering the long-term course of low back pain and thereby reducing the prevalence of low back pain.

There is some evidence from the review of efficacy for such an effect from the following interventions:

- information: ensuring that all patients consulting in primary care have adequate access to information and explanation about low back pain and that fears about the consequences of the symptom are addressed
- manipulation and mobilization: very limited evidence suggests that there may be longer term benefits from early manipulation–mobilization
- exercises taught under supervision for the patient to continue at home: the evidence from studies in patients whose pain has become persistent is hopeful that this may have an effect beyond immediate relief of symptoms
- involvement of the workplace: the apparent efficacy in some trials of physical therapy and back school interventions which involved visits to the workplace suggest added benefit when the intervention is linked with early return to suitable work and liaison with occupational health service
- early use of psychological approaches.

The model would require a reorientation of haphazard services into a true community back pain service in which primary care, hospitals and the private sector were all involved. The purpose would be to make early physical therapy and education available for primary care consulters; the implication is that the need for diagnostic referrals would be lowered and streamlined and that the delivery of therapy (physical and psychological) would be standardized within certain limits, notably the number of treatment sessions.

The CSAG suggests that this type of intervention be considered if the primary care attender has persistent problems after two weeks. The delay is to allow for the expected improvement in many patients and thus to act as a 'sieve' for further referral. The conundrum however is that already by the time of their first consultation in an episode, the length of time since the onset of the episode is already a key predictor of early outcome. Also for many attenders the precise onset will not be clear: the background will be of vague exacerbation.

Implications

Assume that early physical therapy which emphasized a 'positive' approach to low back problems was offered to all people who experience more than four weeks of moderate or disabling low back pain during a 12 month period, excluding those with long-term persistent pain. From the prevalence figures this would be some 5% of the adult population. In a population of 100 000 adults this would mean 5000 requests in one year. This is not too far from the current total of new physical therapy referrals for a population of this size (4700, see page 149).

However this ignores:

- the figure for physical therapists' current workload includes a majority of patients who are currently seen outside the health service
- the demand for such a service from those who have shorter periods in pain.

But it does include people who at present do not attend their GP with the pain.

This model might therefore mean the purchase of more new patient contacts with physical therapists. Against this can be balanced the following points:

- traditional physiotherapy for low back pain tends to have a high number of treatment sessions per patient. The evidence from randomized controlled trials suggests that the emphasis in the early treatment should be on short treatment courses with manipulation and mobilization, education and training in exercises and active rehabilitation with a positive approach, away from the emphasis on machinery and technology. The cost of the increased throughput of patients and additional therapists could be balanced by a reduction in numbers of sessions per patient.
- the unknown potential of such a service for secondary prevention – the crucial question in the longer term.

Care of prevalent problems: persistent disabling low back pain

The previous section viewed low back pain as an 'episodic' phenomenon, regardless of the background time-course of any one individual's episode. However there is also the patient with a more persistent history of low back pain, perhaps already treated in multiple ways, including operations.

The review of efficacy of controlled trials of management approaches to the chronic low back pain patient suggested that, although complete recovery is not the norm, short-term improvement certainly appears to be. As with interventions in 'episodes' there is no good evidence of a long-term effect and so the potential impact of rehabilitation programmes on the prevalence of chronic low back pain is difficult to gauge.

The CSAG recommends multi-disciplinary rehabilitation for patients with low back pain which persists for three months or longer. This is a crucial aspect of this model of care. Resources cannot suddenly be shifted to early low back pain management in the community, without at the same time ensuring an adequate service for those who do emerge with more persistent problems.

The estimate of the need for such a service in an adult population of 100 000 would be as many as 10 000 patients in a year. However if only patients with severe disability were included, the number would be 5000. Furthermore 3000 of these represent a long-term pool, some of whom would already have received such treatments. The rising numbers of those receiving long-term invalidity suggest that this prevalence pool may now be losing fewer than it gains each year, so demands on a rehabilitation service may well increase each year.

On present evidence it is likely that this 'prevalence pool' would continue to make demands on any dedicated service of rehabilitation for low back sufferers.

Balanced against the increased costs of providing such a service are the following:

- much health care expenditure goes on this group anyway: among patients attending as 'new' referrals to a hospital with a tertiary referral centre for back problems, 90% had experienced more than three months of low back pain during the 12 months prior to the outpatient visit
- the enormous costs of sickness and invalidity benefit. There is randomized controlled trial evidence to suggest that a dedicated back pain service could reduce the numbers of working days lost, although the pragmatic question of whether this could be achieved in the current employment climate has not been answered.

Model II: Evidence for secondary prevention is limited: services should be concentrated on those at high risk for persistent problems

This assumes arguments from the first model apply about a) reducing the emphasis on diagnosis and b) the need for an integrated service for those with longer term disability from low back pain.

However the approach in the second model would be that there is no good evidence that anything other than simple pain relief can alter the natural history of episodic low back pain. No resources therefore, other than encouragement to self-care and reassurance and information from the GP are required.

Can individuals be identified who are at unusually high risk that their back pain will not settle in the short term or will recur at an early stage? A whole body of research work now points to psychosocial distress, illness behaviour and pain cognitions as major influences on the course of low back pain.[28,29] However there is no available evidence on the therapeutic implications of this to make a judgement on how it could contribute to the provision of health care. There are a number of possibilities:

Psychological treatments for low back pain

Some of the randomized controlled trial evidence supports the incorporation of cognitive and behavioural therapies into multi-disciplinary treatment of chronic low back pain. Unfortunately there is little evidence on which to base a model of care in which these therapies were offered to those who are distressed on first presentation with low back pain. It is clearly an area worth exploring, given the following:

- the success of non-specific 'encouragement' and group fitness programmes in recent trials suggest that the cognitive and behavioural aspects of primary care interventions and physical therapies may be critical to their superiority over 'back-centred' approaches[63,77]
- the failure of current therapies to prevent the increase in sickness absence and disability payments
- the accumulating observational evidence that psychological measures are the strongest predictors of outcome in low back pain patients consulting GPs or community physical therapists[29]
- the evidence of effectiveness of psychological approaches in patients with longstanding low back problems[90] – in these patients it is negative cognitions and illness behaviours that are being tackled and, by extrapolation, tackling them earlier on in the low back history may carry even more potential for benefit.

The other major difficulty, apart from lack of evidence of efficacy in early low back pain, is that if psychological approaches were to be generally applied earlier in low back pain, then the need to develop

'brief' intervention packages would be essential. Even if efficacy were compromised the higher volume of patients treated should prove cost-effective and carry a potential impact on the total occurrence of persistent low back problems.

Preferential treatment service

An alternative is that a service which provided a range of the measures which seem to improve symptoms in the short term (education, physical therapies, exercise programmes, and psychological approaches) should be offered preferentially to those who are distressed and depressed. This would focus the type of acute back pain service discussed previously on to those who might gain most in terms of later secondary prevention.

Despite the evidence that psychological measures are the best predictors of the course of low back pain, there is a need for evidence that selectively intervening on the basis of these measures would have an impact on low back pain occurrence and outcome.

Workplace screening

Screening for suitability for jobs does not appear to be a viable option for those who have no low back pain. Job selection as part of a rehabilitation programme for low back sufferers has more evidence to commend it.[66]

Compensation procedures

The difficult problem of compensation procedures has been extensively written about in the US and Australian literature. The influence of compensation on the total occurrence of low back pain in the UK is probably small.

Model III: The course of low back pain episodes at any point is dictated by previous experience of low back pain: reducing the incidence of 'episodic' low back pain

There is epidemiological evidence about risk factors for low back pain episodes. There is very little empirical evidence that programmes of primary prevention reduce the impact of low back pain.

In theory the following should contribute (i.e. there is observational and analytic epidemiological evidence for an association between these factors and low back pain).

Workplace

- better employment and wage opportunities
- improved job satisfaction: this incorporates both physical and psychological environments at work
- improved manual handling regulations and their application
- reduction of injury incidence
- education about back problems
- use of orthoses (such as belts) in high risk jobs.

In a review of the controlled trial evidence for prevention, the authors' conclusion was that exercise programmes in industry had some evidence to commend them, but to date untargeted programmes for education and use of orthoses had no proven value.[108]

Lifestyle

- reduction in smoking
- improved physical activity levels throughout life
- postural education, better seating, less constant driving
- specific back strengthening programmes.

To the extent that certain factors, such as smoking and physical activity, are the targets of health promotion programmes in general, then there will be potential benefits of such programmes in reducing the occurrence of low back pain. Lahad *et al.* concluded that this was indeed the main hope for primary prevention, since current evidence did not point to large benefits from prevention programmes tailored specifically to prevent low back pain.[108]

Co-morbidity

- primary prevention and treatment of depression
- improved management of common symptoms, particularly pain, throughout life.

Society

Employment opportunities, income differences, benefit systems and the cultural propensity to somatize distress all influence low back pain occurrence in a powerful way. The difficulty in assessing needs is that, as Nachemson and Waddell have emphasized,[70,89] health care has created as many of the problems of low back pain as it has solved. The politics and economics of low back pain require political and economic solutions; throwing health care at the complex problem of low back pain is unlikely to make it go away.

9 Measuring outcome

The ICIDH provides a conceptual framework for classifying a problem like back pain with respect to its clinical features and its consequences.[20]

Grading impairments

Pain in the back and other areas

An arbitrary definition of the low back is the area between the lower costal margins and the gluteal folds. This definition standardizes what is meant by low back, has appeared in many epidemiological studies and has been used in the three most recent population surveys in the UK.[1,2,36]

Location

- pain drawings using a pre-shaded low back area
- the number of sites of pain, analysed from pain drawings or from simple lists in questionnaires or interviews.

Intensity

- visual analogue, numerical rating or verbal rating scales.

Duration

- current episode if the onset can be defined
- number of days on which pain has been experienced during a defined period such as the last 12 months ('every day in the past year' may be a useful subgroup)
- period of time for recall: 'pain today' does not reflect the intermittent, fluctuating nature of low back pain; low back pain experienced during the past month or the past year appears to be the most useful definition for prevalence
- time course: acute, intermittent, persistent. (A recurrence is assumed to be a new episode in the context that pain has been experienced at some time in the previous 12 months.)

Symptoms other than pain

There are instruments available which provide scales of severity for bodily symptoms, psychological distress and dysfunctional cognitions and behaviours.[29] These are emerging as useful predictors of outcome, although their relevance as measures of the outcome of intervention is not established.

Clinical measures

Many clinical measures can be categorized or ranked to provide a grading of severity, such as Schober's test, the fingertip to floor test, lateral flexion and straight leg raising. They appear to be useful as outcome measures of spinal mobility but do not necessarily correlate with symptom measures.

Summary

Available evidence suggests that grading symptoms and signs of low back pain fails to measure all important consequences of back pain. Impairments are followed by disabilities and handicaps but do not fully predict them.

Grading back pain related disabilities and handicaps

Restriction of activities of daily living (disability) and impact on social life (handicap)

Questionnaires

Roland and Morris' scale is a short back pain specific version of the Functional Limitations Profile, a large general interview about disability.[109] It was developed in primary care and has been used in other settings and is well validated.

The Oswestry Disability Index was developed in a hospital setting, and its utility in primary care is not as well established as the Roland and Morris questionnaire.[110] However it has been used in many studies,

including two important intervention trials of physical therapy among patients selected from primary care referrals.[77,83]

A short set of questions suitable for use in population surveys and with good general population figures of prevalence is to be found in the scheme developed by Walsh *et al.*[1]

More recently, the Aberdeen Low Back Pain Scale was published, accompanied by a comprehensive account of its methodological development.[111] Its roots are more heavily clinical and impairment-orientated than the Roland and Morris scale, but it has been validated in primary care populations. Curiously the paper made no reference to the Roland and Morris questionnaire. The latter has been the measure of choice in recent US studies and would be our recommendation, until the Aberdeen scale has been compared with it in clinical trials and follow-up studies.

Single measures

Simple quantifying measures are the number of days during a specified period:

- spent in bed
- of restricted activity attributed to low back pain.

These were used in the OPCS survey.[2]

Work loss

Days off work, days in receipt of disability pensions, or the time to work resumption have been promoted as the most meaningful end-points for low back pain. There are problems with their use, even though they are the measures which describe the so-called back pain epidemic. Application to patients who are not working anyway is difficult, whilst return to work is contaminated by other factors such as local unemployment rates.

However in terms of public policy and the overall impact of back pain on society, many commentators regard this as by far the most important way to classify back pain (see the CSAG Annex for example). In addition it is an attempt to measure handicap directly. This contrasts with the restriction of daily activity questionnaires where the actual impact on the individual's life is not necessarily measured. For needs assessment in the general population however it is problematic to use work loss as the main measure of impact or severity.

Composite grading schemes

The Pain Grade of von Korff and colleagues combines pain intensity, disability score and disability days.[39] The authors demonstrate its association with 12-month outcome in a series of back pain patients who had presented in US primary care, although the information was gathered by telephone. Kohlmann *et al.* in Germany have similarly combined elements of disability and pain intensity in a general population sample and shown this to predict subsequent outcome.[112] Such a grading shows potential as a measure of outcome of health care, although it has not been put to the test in this form yet.

The Distress and Risk Assessment Method[29] provides a four-point classification of the psychological distress associated with low back pain (normal, at risk, distressed depressive, distressed somatic) based on two scales which quantify emotional factors and the extent of awareness of bodily symptoms other than pain (the Modified Zung Depression Index and the Modified Somatic Perception Questionnaire). In preliminary studies of patients presenting to osteopaths and in primary care, this was a strong predictor of outcome. As with other psychological measures, its exact place as a measure of outcome of treatment of low back pain is not clear and needs to be established.

An alternative to these specific schemes is to use validated measures of general functional status; the SF 36[111] and Nottingham Health Profile[113] are the two most popular examples. They are not specific for back pain but have been used in back pain research.

In general more empirical data are needed for many of these instruments with respect to their population-based distribution, their application in selecting individuals for specific treatments and their use as relevant measures of the outcome of health care.

Health care consumption

Utilization of health care appears as a category in some low back pain classifications. The Quebec Task Force scheme,[114] for example, includes surgery to the back as a classifying feature.

Attendance in primary care and referral to secondary and tertiary care (imaging, surgery, complementary medicine, physiotherapy, psychological intervention, comprehensive pain treatment) have been used to measure outcome of back pain episodes, as well as being measures of health care provision and demand among back pain sufferers.

Patient satisfaction with health care

Methods for measuring this in low back pain patients appear to be in their infancy, although a number of studies of back pain treatments have used a scale derived from a general questionnaire about satisfaction with treatment.[115–117]

Summary

The best way to summarize the low back pain experience and to measure outcome is by quantifying the following.

- **Impairment** Pain severity and total days in pain during a specified time period
- **Disability and handicap** Restriction of daily activity and for some purposes, days off work.

10 Targets

Potential outcome targets abound in the field of low back pain. Two examples are:

- to slow and reverse the exponential rise in number of working days lost
- to reduce the period prevalence of severely disabling, persistent low back trouble in the population.

The problem with these targets is that it is not known whether the effective treatments discussed previously would actually influence them (given, for example, the employment situation, or the nature of long-term disability).

It seems to be more practical to take some process measures as the targets, so that the extent to which the results of randomized controlled trials are actually put into practice can be judged. The nature of their impact

on the period prevalence of low back pain, in particular severely disabling and persistent pain, and on work loss and benefit payments could be measured subsequently.

Proposed targets

- In any one year, for a brief physical therapy, education, exercise and cognitive–behavioural 'package' to be available for all people who develop moderate or severely disabling low back pain of more than four weeks duration.
- Single manipulation or mobilization available for general practice attenders with a new or recurrent episode.
- Provision of a hospital-based back pain service which can support the introduction of the CSAG 'diagnostic triage' approach in primary care. This would incorporate adequate urgent specialist availability and offer a multi-disciplinary course of rehabilitation to all patients in the community who have had severely disabling low back pain of more than three months duration. A supplementary short-term target would be the appointment of an appropriate person to co-ordinate the response to referrals to such a service.

The costs of these targets should theoretically be kept close to current costs if there are concomitant targets for reduction of services and interventions.

Proposed targets for reduction

- Lengthy courses of physical therapy and the use of technology in physical therapy departments.
- Expensive analgesia.
- The numbers of outpatient attendances and non-surgical inpatient admissions.
- The number of diagnostic investigations in the absence of clear clinical indications.
- A limitation on further growth in surgical operation rates would seem desirable in the face of limited evidence that high rates in the US have reduced disability or that new techniques are achieving anything. This must take account of the need to support good trials of promising treatments where evidence is lacking (to avoid the assumption that 'no evidence' is equivalent to 'evidence of no efficacy').

11 Information

Local

There are two main areas where easily available local information would greatly enhance the needs assessment exercise.

First reliable outpatient data, which can be related to GP referral, would include the specialist's diagnosis and management plan, and would link to A and E, radiology, physiotherapy, day case admissions and inpatients. Many areas are moving towards this type of information system. In particular the use by GPs of computers for morbidity recording should enable links with outpatient records systems to be initiated and for demands to be made on consultants to participate in morbidity recording also.

The reason for this is that a condition such as low back pain is a classically difficult problem to pin down – it does not cause many people to die, inpatient admissions are a very small proportion of the problem, many different parts of the health care system are likely to be involved and mapping the health care being provided in a district is like hunting the haystack needle.

The second point is related. The full range of community therapy which is available for back pain sufferers and the throughput of their patients should be known at a local level. This would include not only the orthodox services, such as community physiotherapy, occupational therapy and social services, but alternatives as well. Such is the popularity of alternative treatments that information about them should be available at a local level. In particular the regional availability of osteopathy and chiropractic, in the light of their now official status, would be helpful information. There seems to be no reason why such practitioners should not also be involved in local morbidity returns.

National

Once good systems of outpatient record linkage are in place they should be co-ordinated nationally in order to compare referral rates between regions. Again it is important that information on the context of regional variations should be available. To this end national registers of practitioners offering back pain treatment will be a useful addition; sentinel practitioners (physiotherapists, chiropractors, osteopaths) who took part in periodic morbidity recording would be worthwhile supporting.

A major national contribution should be through surveys, such as the one carried out by OPCS, [2] and this is addressed in the research section. In particular we need more detailed information on the health care provided by different sectors: what physiotherapists are actually doing around the country for low back pain patients for example; how many GPs can manipulate spines and how many would want to; what patient groups are being seen by psychologists.

12 Research priorities

The main priorities with respect to needs assessment research are:

- Population-based prevalence studies which assess disability levels, pain severity and total days in pain, using explicit measures. This chapter has discussed studies that were not designed to measure need and the figures in the tables need to be given more substance. There is no purpose in doing further studies of how much back pain there is in any local community – there is sufficient agreement on this. It is the subgroups which need more investigation – nationally and in smaller scale local studies.
- There is a need to combine such traditional quantitative surveys with in-depth qualitative interviewing of subjects from within the subgroups to establish the patient's perspective on need. The data on patient satisfaction suggests that hospital attenders in particular are a dissatisfied group, reflecting perhaps the mismatch of care and need which is apparent even from currently available data. This needs more investigation in relation to available care and current levels of pain and disability.

Pragmatic trials are also required, particularly primary care based interventions which examine the potential for using the principles of cognitive–behavioural therapy and brief physical therapy to produce generalizable treatment packages. Ideally these should be large and long term to address the crucial issue of secondary prevention of recurrence and persistence.

Appendix I Note on source materials

During writing, two systematic and thorough overviews of the evidence concerning treatment appeared[118] or were about to appear.[119] The view of the evidence presented here is based on a mixture of original articles and published reviews of individual topics and has not used the new overviews directly. The interested reader should consult both these publications for a more detailed review of all published evidence.

Some items from the United States Agency for Health Care Policy and Research (AHCPR) review[118] were available in the form that they were presented as evidence for the British Clinical Standards Advisory Group on Back Pain, and in this form have been used here.

Another useful publication *The costs of low back pain* from the University of York Health Economics Group has been published,[120] which updates and expands the analysis in the Annex to the CSAG Report. It is the CSAG version which has been used here.

The CSAG evidence summaries (which in turn reflected the AHCPR work) have been broadly adhered to in order to preserve some consistency, but overviews of specific topics and new trial evidence which appeared in the literature 1994–95 have been added. The interpretation and rating of the evidence referenced here is the author's responsibility alone.

Finally this needs assessment was not based on the formal system of systematic reviewing which is the hallmark of the Cochrane Collaboration. There is an obvious need in the field of low back pain for such collaborative reviewing of new evidence. The greatest need however is for a better supply of evidence.

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