National Health Committee

Low Back Pain:

A Pathway to Prioritisation

National Health Committee (NHC)

The National Health Committee (NHC) is an independent statutory body charged with prioritising new and existing health technologies and making recommendations to the Minister of Health.

It was reformed in 2011 to establish evaluation systems that would provide the New Zealand people and the health sector with greater value for money invested in health.

The NHC Executive is the secretariat that supports the Committee. The NHC Executive's primary objective is to provide the Committee with sufficient information for it to make decisions regarding prioritisation and reprioritisation of interventions and services. They do this through a range of evidence-based products chosen according to the nature of the decision required and timeframe within which decisions need to be made.

The New Zealand Government has asked that all new diagnostic and treatment (non-pharmaceutical) services, and significant expansions of existing services, are to be referred to the NHC.

In August 2011 the NHC was appointed with new Terms of Reference and a mandate to establish the capacity to assess new and existing health technologies. Its objectives (under Section 4.2 of its Terms of Reference – www.nhc.health.govt.nz) include contributing to improved value for money and fiscal sustainability in the health and disability sector by:

- providing timely advice and recommendations about relative cost-effectiveness based on the best available evidence;
- providing advice and recommendations which influence the behaviour of decision makers including clinicians and other health professionals;
- providing advice and recommendations which are reflected in resource allocation at national, regional and local levels; and
- contributing to tangible reductions in the use of ineffective interventions and improved targeting to those most likely to benefit.

In order to achieve its objectives under Section 4.2 and to achieve 'Value for Money', the NHC has adopted a framework of four assessment domains – Clinical Safety & Effectiveness; Economic; Societal & Ethical; and Feasibility of Adoption – in order that assessments cover the range of potential considerations and that the recommendations made are reasonable.

It is intended that the research questions asked will fall across these domains to ensure that when the Committee comes to apply its decision-making criteria, it has a balanced range of information available to it. When the NHC is setting those questions they will have the decision-making criteria in mind.

The 11 decision-making criteria will assist in the determination of the NHC work programme and in the appraisal and prioritisation of assessments.

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Executive Summary

A referral for the evaluation of spinal fusion was put forward by Waitemata and Auckland District Health Boards (DHBs) as part of the NHC 2013/14 sector reactive referral round. Low back pain is regularly experienced and is a common reason for presentation to health care services. A full Model of Care approach is currently unavailable for this patient group

This report explores the current approach to care for patients with low back pain (LBP) and identifies interventions where the National Health Committee (NHC) could conduct further evaluation in order to improve health outcomes and efficiency within the New Zealand health system.

The focus of the analysis, presented in this report, is on LBP with mechanical causes, such as nerve root-related conditions (radiculopathies), degenerative conditions, herniated or ruptured discs or congenital conditions and non-specific LBP.

Currently, management includes: reassurance and education, analgesia, spinal manipulation, exercise, and pain management programmes. Surgery is indicated only in selected patients, with persistent pain, after optimal nonsurgical treatment.

Fusion procedures are performed mostly for spinal instability; in conjunction with the clinical conditions of spondylolisthesis (forward displacement of a vertebra), herniated discs and spinal stenosis, indications for which the evidence of benefit is more robust. Laminectomy (a surgical procedure to create space by removing the lamina) is performed to relieve pain caused by the compression of spinal nerves. Analysis of national hospitalisation data demonstrates that surgical procedure rates for mechanical and non-specific LBP have shown increasing trends over time, particularly for the more common procedures of laminectomy and fusion. However, the rates have stabilised in the last three years. Spinal fusion costs $23,000 per procedure on average. In 2013/14 there were approximately 340 spinal fusion procedures funded by DHBs for low back problems, at a total cost of close to $8 million. Intervention rates for laminectomy and fusion show variation across DHBs when considered from the perspective of patient domicile. About 11 percent of fusion procedures, performed over the last three years, were done for clinical conditions for which the evidence of benefit is less clear.

There has been an increasing trend in the hospitalisation of patients with mechanical and non-specific LBP. Patients, who do not have surgery, appear to be hospitalised for diagnostic reasons and for delivery of therapeutic injections. There are indications that access to diagnostic imaging, for

patients with chronic low back pain, is sub-optimal and this may be a partial explanation of acute non-surgery related hospitalisations.

Patients with chronic LBP receive lower levels of manual therapies and allied care services when their care is funded through Vote: Health than through the Accident Compensation Corporation (ACC). Specialised pain services appear to be generally underprovided and see patients late in their clinical course. Additionally, patients who have had surgery for LBP in the public health care system have low levels of access to specialised pain and physiotherapy services before and after their surgery.

Costs associated with LBP that are covered by Vote: Health are estimated to be about $215 million per year and more than $325 million per year when ACC costs are included.

The current assessment indicates that the provision of specialised pain services (both in hospital and primary care settings), access to diagnostics, and manual therapies for patients with chronic low back pain are potential areas for further assessment. These assessments may be of higher value than further assessment of spinal surgery within the model of care for LBP.

This Tier 2 LBP and proposed Tier 3 assessment work, along with work done within the National Health Board Business Unit for Electives on the establishment of a community based work plan around Musculoskeletal conditions, including the establishment of the Ministry's expert advisory board and the update of the Ministry's orthopaedic surgery prioritisation tool, has the potential to add real value to patient outcomes and system sustainability.

Close collaboration between the NHC and the NHB Business Unit, as the Tier 3 assessments and the community based musculoskeletal workplan are developed will be required to achieve this.

1 Purpose

This report explores the provision of care for patients with low back pain (LBP), to give context to a health sector referral received by the National Health Committee (NHC). The report identifies the current model of care and presents evidence around the optimal package of interventions necessary to improve health outcomes for this patient group and efficiency for the care system. It also identifies where further investigation is warranted, to understand the impact of introducing new or missing interventions to optimising the current care continuum.

2 Introduction

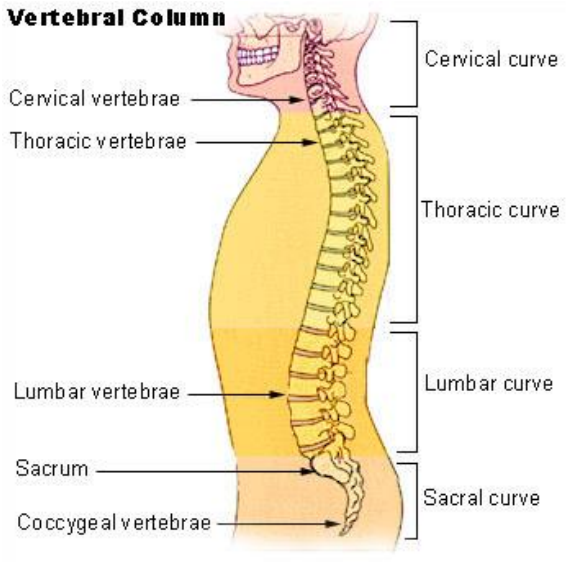
A referral for evaluation of spinal fusion was put forward by Waitemata and Auckland District Health Boards (DHBs) as part of the 2013/14 sector reactive referral round. In order to understand the issues surrounding this referral, it was necessary to understand the current model of care for all of LBP in New Zealand and to understand how this model compared to evidence of best practice for this condition. The assessment considers sub-populations of the LBP spectrum and assesses the size of these sub-populations, the interventions delivered, the evidence for interventions and the associated costs. This report is limited to LBP because it is much more common than upper back pain and thus has much greater health burden and financial implications for the New Zealand health and disability sector.

3 Background

3.1 Back pain description

The spine is made up of 32-34 vertebrae that are classified within four regions (Figure 1). The cervical vertebrae sit within the neck. The thoracic vertebrae make up the upper back, while the lower back is comprised of the lumbar vertebrae. The sacrum and coccyx sit within the pelvic area, and the vertebrae are fused. This report focuses on low back (lumbar) back pain. Low back pain is two to four times more common than upper back pain, and patients may experience both upper and lower back pain.[1, 2]

Figure 1. Simplified diagram of the spine



Back pain can be considered both in terms of its underlying pathological condition and in terms of its duration and impact on function.

LBP can be caused by a variety of conditions. Table 1, below, provides a classification of causes for back pain with their underlying conditions[3]. For the vast majority of patients no clear-cut diagnosis can be confirmed. Nonspecific or idiopathic causes, including strains or sprains, account for over two-thirds of chronic low back pain[3]. A further quarter of chronic low back pain is related to mechanical causes such as nerve root-related conditions (radiculopathies), degenerative conditions, herniated or ruptured discs or congenital conditions. Only a small number of cases are caused by other non-mechanical diseases such as Paget's disease, cancer, inflammatory arthritis and inflammatory bowel disease. Some of the key conditions and their sequelae are described in the Glossary (Appendix 2).

Table 1: Classification of low back pain with prevalence of condition type within back pain in the United States

Classification	Types of conditions	Percentage of back pain in the US
Nonspecific/ idiopathic	Lumbar strain or sprain, nonspecific back pain	70
Mechanical	Radiculopathy, spinal stenosis, degenerative processes of discs and facets, herniated or ruptured discs, congenital disease (e.g. scoliosis), spondylosis, etc[a]	27
Non-mechanical	Malignancy, infection, inflammatory arthritis (e.g. ankylosing spondylitis, rheumatoid arthritis) and bowel disease, metabolic bone disease, Paget disease etc[b]	1
Referred pain (non-spinal source)	Aortic aneurysm, disease of pelvic origin, gastrointestinal or renal diseases etc.	2

a Pain may also be caused by traumatic or osteoporotic fracture, but this tends to be acute rather than chronic pain

b Pain caused by infection (e.g. osteomyelitis, abscesses, shingles) is more likely to be acute rather than chronic pain.

Source: Last AR, Hulbert K. Chronic Low Back Pain: Evaluation and Management. Am Fam Physician. 2009;79(12):1067-74

Phases of back pain are usually defined as acute when lasting less than six weeks, sub-acute when lasting six to twelve weeks and chronic when lasting more than twelve weeks[(4)].

Acute low back pain is usually self-limited, normally resolving within two to six weeks. Chronic low back pain can be persistent or fluctuating back pain that lasts longer than 3 months.[(5)] When pain is persistent and/or severe, it can be associated with a significant loss of function or disability.

While back pain is not in itself fatal, the health burden is large when considered across the population.[(6)]

We are focussing this review of the LBP model of care on non-specific and mechanical low back pain. The patient groups considered are outlined in Table 2 and differ in terms of persistence and severity of clinical presentation.

Table 2: Low back pain population groups

General Population	Acute Lower Back Pain	Chronic Lower Back Pain	Chronic Lower Back Pain-Severe	Chronic Lower Back Pain-Hospitalised
The population aged 18 years or more at risk of developing low back pain through exposure to genetic and environmental factors	Those patients with episodes of acute back pain at risk of developing subsequent chronic symptoms	Those patients with established chronic nonspecific and mechanical low back pain likely to last at least six months	Those patients chronic nonspecific and mechanical low back pain who receive specialist pain management	Those patients established chronic nonspecific and mechanical low back pain who are hospitalised either with or without surgery

Source: 2015 NHC

3.2 Health outcomes

Back conditions are associated with a significant burden of health loss across the population. The Global Burden of Disease 2010 ranked LBP as the third biggest contributor to health loss in New Zealand, as measured in disability-adjusted life-years (DALYs)[7] . Disability-adjusted life-years combine both fatal and non-fatal outcomes such that one DALY is equivalent to loss of one year of healthy life. Using different definitions, the New Zealand Burden of Disease Study (NZBDS) estimated that back disorders were associated with 27,112 DALYs in the New Zealand population in 2006 (2.8% of all DALYs) and ranked seventh (Table 3)[6].

The NZBDS estimated for 2006 that 10% of the New Zealand population, or around 437,000 people, had a back condition[1][8]. Prevalence increased with age such that 20% of those aged over 65 years were affected. However, back conditions are rarely a primary cause of death, with only 12 deaths reported in 2006. Of note, the NZBDS considered "back conditions" as a group of conditions associated with disorders of spinal structure (excluding spinal cord injury and spinal fracture). Thus the definition is broader than low back pain. It also considered back pain from the context of chronic pain rather than acute episodes.

Nevertheless, it has been acknowledged that the estimation of DALYs for back conditions in the NZBDS may not be robust and likely underestimates the burden of back disorders (especially non-specific low back pain), most probably due to undercounting of cases.[6]

[1] Condition self-reported as diagnosed by a doctor and at least some pain or interference with normal work or housework in the previous 4 weeks.

The Global Burden of Disease 2010 study shows that globally LBP was ranked sixth for health loss measured by DALYs. For the Australasian, European and North American regions the DALYs loss for LBP is in the top three rankings. When considered from the perspective of health loss associated with living with disability LBP is the highest ranked loss globally and for the above regions.[9]

LBP is the leading cause of activity limitation and work absence throughout much of the world, imposing a high economic burden on individuals, families, communities, industry, and governments. In the United Kingdom, low back pain was identified as the most common cause of disability in young adults, with more than 100 million workdays lost per year. In the United States two-thirds of the total cost of LBP is due to lost wages and lower productivity.[2]

Table 3: Top ten conditions accounting for DALYs in the total New Zealand population in 2006[6]

Specific condition	DALY count	Percentage of total DALYs	Rank
Coronary heart disease	89,159	9.3	1
Anxiety and depressive disorders	50,954	5.3	2
Stroke	37,688	3.9	3
Chronic obstructive pulmonary disease (COPD)	35,339	3.7	4
Diabetes	28,808	3.0	5
Lung cancer	28,570	3.0	6
Back disorders[a]	**27,112**	**2.8**	**7**
Colon and rectum cancers	24,012	2.5	8
Traumatic brain injury	21,728	2.3	9
Osteoarthritis	20,738	2.2	10

a. Including lumbago (low back pain), sciatica, other chronic back pain and chronic neck pain, and vertebral or disc related diseases e.g. spinal stenosis and spondylosis, but excluding spinal cord injury and spinal fracture (further described in Appendix 1).

Source: New Zealand Burden of Diseases, Injuries and Risk Factors Study, 2006-2016(6)

[2] http://www.who.int/medicines/areas/priority_medicines/Ch6_24LBP.pdf

4 Management pathway for acute low back pain

Acute LBP is usually self-limited, although 10% or more may go on to develop chronic pain if adequate prevention strategies are not put in place[5, 10]. Acute LBP is normally managed in general practice. In most cases the cause of the pain is non-specific and a conclusive diagnosis is not possible or useful. The exception to this is cases where 'Red Flags', indicative of a serious underlying pathology or other significant neurological deficits, are present; such cases require immediate evaluation and referral where appropriate (Table 4).

Table 4: Summary of "Red Flags" that indicate potentially serious conditions and "Yellow Flags" that represent psychosocial barriers to recovery from acute low back pain

Red flags for a high likelihood of a serious underlying pathology	
Sign/symptom	**Concern**
Signs or symptoms of cauda equina syndrome (e.g. bladder or bowel dysfunction, altered sensation in saddle area)	Cauda equina syndrome (emergency referral required)
Progressive or persistent neurological (motor or sensory) deficit or widespread neurological signs	Cauda equina syndrome (emergency referral required) Cancer
Severe worsening or unremitting pain, especially at night or worse when lying down	Cancer Infection
History of significant spinal pathology or osteoporosis	Fracture Specific spinal pathology
Significant trauma or penetrating wound near spine	Fracture Infection
Unexplained weight loss	Cancer
History of cancer or suspicion of recurrent cancer	Cancer
Fever, chills, recent urinary tract or skin infection	Infection
Use of intravenous drugs or steroids, substance abuse or immunosuppression	Fracture Infection
Patient aged over 50 years with first episode, and especially age over 65 years	Osteoporotic fracture Cancer
Yellow flags for psychosocial barriers	
Belief that pain and activity are harmful and/or fear-avoidance behaviour	
Low or negative mood, social withdrawal	
"Sickness behaviours" (e.g. extended rest)	
History of back pain, time-off, other claims	
Problems with claim and compensation	

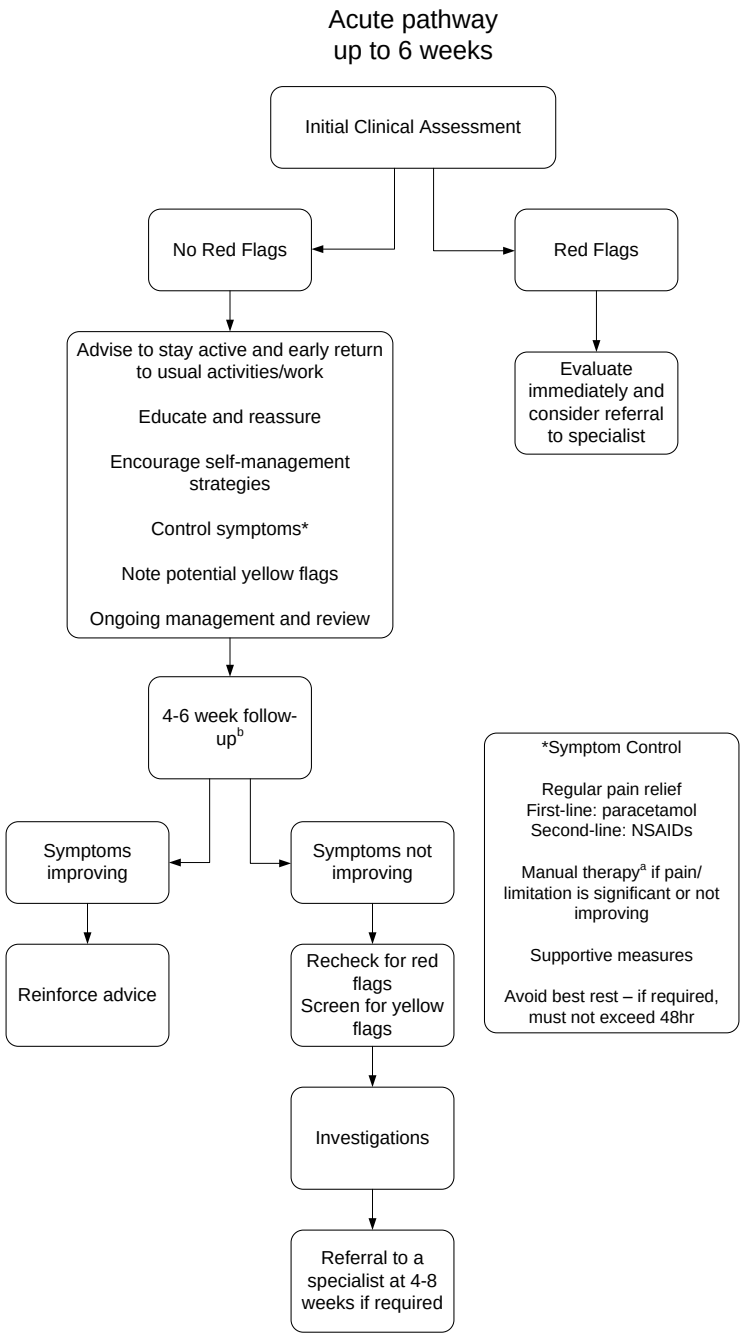
Problems at work, poor job satisfaction
Heavy work, unsociable hours (e.g. shift work)
Overprotective family or lack of support

Source: New Zealand Acute Low Back Pain Guide and ACC Nursing Treatment Profile(5, 10), Alberta Guideline for Primary care Management of Low Back Pain(11), and Last et al.(3)

Psychosocial barriers ("Yellow Flags"), that may impede recovery and increase the risk of an acute episode becoming a chronic condition with long-term disability and work loss, have also been identified.

The treatment pathway for acute LBP is outlined in Figure 2 and is focussed on patient education, encouraging early return to usual activities and work and control of symptoms with pain relief and spinal manipulation if required (e.g. physiotherapy, osteopathy or chiropractic manipulation)[5, 10, 11]. Prolonged bed rest beyond 2 days may be harmful. There is little controversy around the treatment of acute low back pain.

Figure 2: Management pathway for acute low back pain



a Physiotherapy, osteopathy or chiropractic manipulation and/or referral to a physician specialising in musculoskeletal medicine

b Follow-up may occur earlier if pain is severe and not resolving

NSAIDs = nonsteroidal anti-inflammatory drugs.

Source: New Zealand Acute Low Back Pain Guide and ACC Nursing Treatment Profile (ACC 2004, 2008)(5, 10) and Alberta Guideline for Primary Care Management of Low Back Pain(11)

5 Management pathway for chronic low back pain

The pathway of care in this section refers to chronic LBP where there is not a cause that should be addressed by a more specific pathway, such as cauda equina syndrome, malignancy, infection, fracture, ankylosing spondylitis and other inflammatory disorders, metabolic bone disease or non-spine related referred pain.

Whilst NZ has an established model of care for acute LBP, it is important to highlight that there is no similar model of care for chronic LBP. Similar to acute back pain, the building blocks for the management of chronic back pain are clinical assessment to exclude Red Flags or other specific conditions, advice and information to promote patient self-management, including exercise and return to usual activities as much as possible [11, 12].

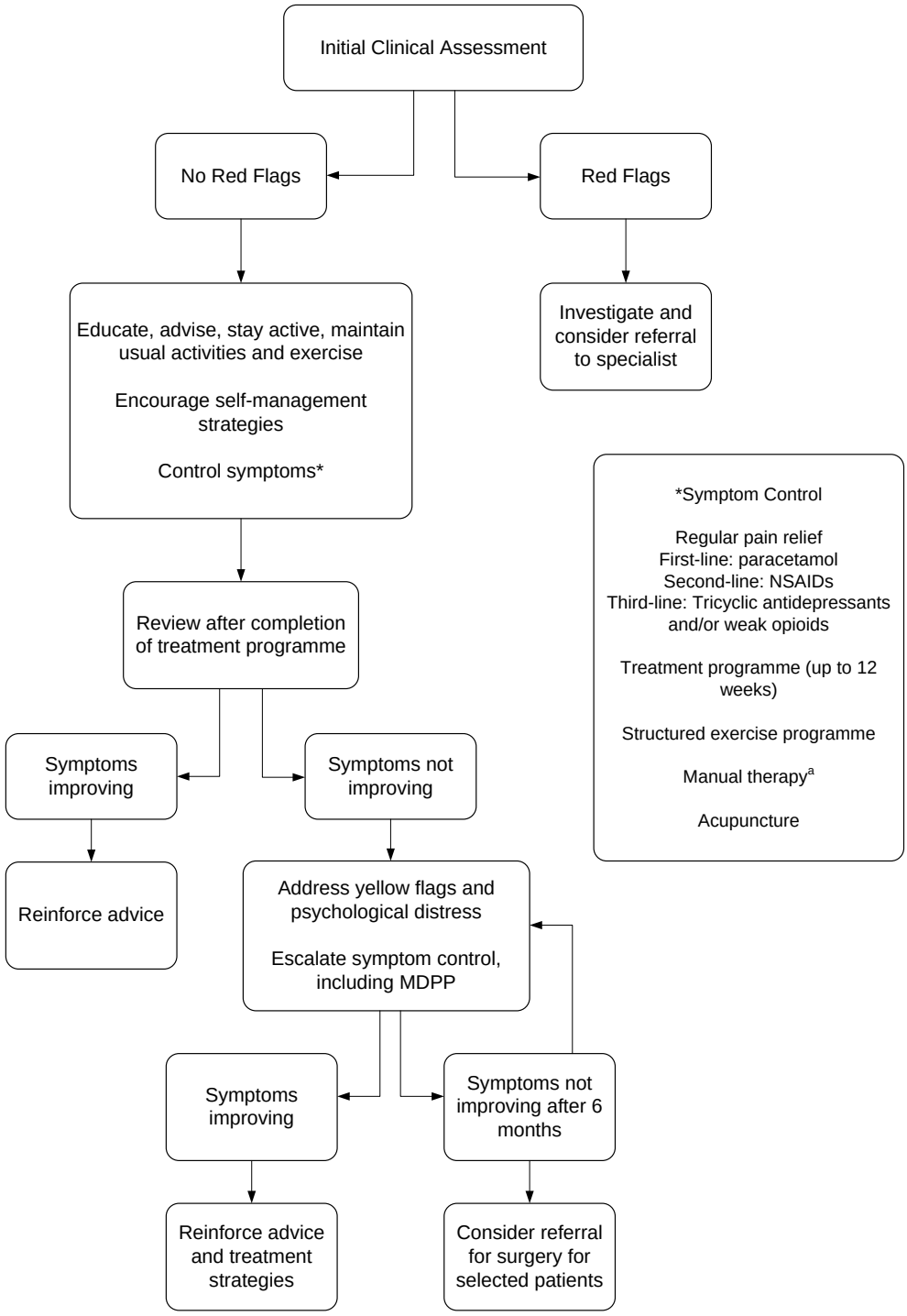
Analgesia is provided through a stepped approach, and combined with treatment programmes including exercise, spinal manipulation and/or acupuncture (Figure 3). Any psychological distress, or Yellow Flags, that present barriers to recovery must be addressed. For those patients who fail to respond, an intensive multidisciplinary pain programme, including physical and cognitive-behavioural therapy, is recommended.

Surgery may be considered for selected patients, who meet the criteria and are willing to consider surgery; indications and patient selection for spinal surgery are discussed further in Section 7.5. However, it is important that patients, especially those with nonspecific persistent LBP, have access to the range of nonsurgical services outlined to prevent referral to surgery before appropriate rehabilitation has been undertaken.[13] These are outlined in the pathway in Figure 3 which is derived two international guides; the National Institute for Health and Care Excellence. (12) and the Alberta Guideline for Primary care Management of Low Back Pain. (11)

Surgeons may also refer the patient for additional treatment such as physiotherapy, pain management or other assessments before deciding on surgery. Patients are only prioritised for surgery once the clinician has determined that surgery is the best treatment option.

Whilst DHB's use a variety of care pathways (such as Map of Medicine, Health Pathways, Bay Navigator), there is currently no set national pathway for chronic LBP management.

Figure 3: Management pathway for chronic non-specific and mechanical back pain in the first 12 months



a Spinal manipulation (treatment by a physiotherapist, chiropractor or osteopath), spinal mobilisation or massage and/or referral to a physician specialising in musculoskeletal medicine.

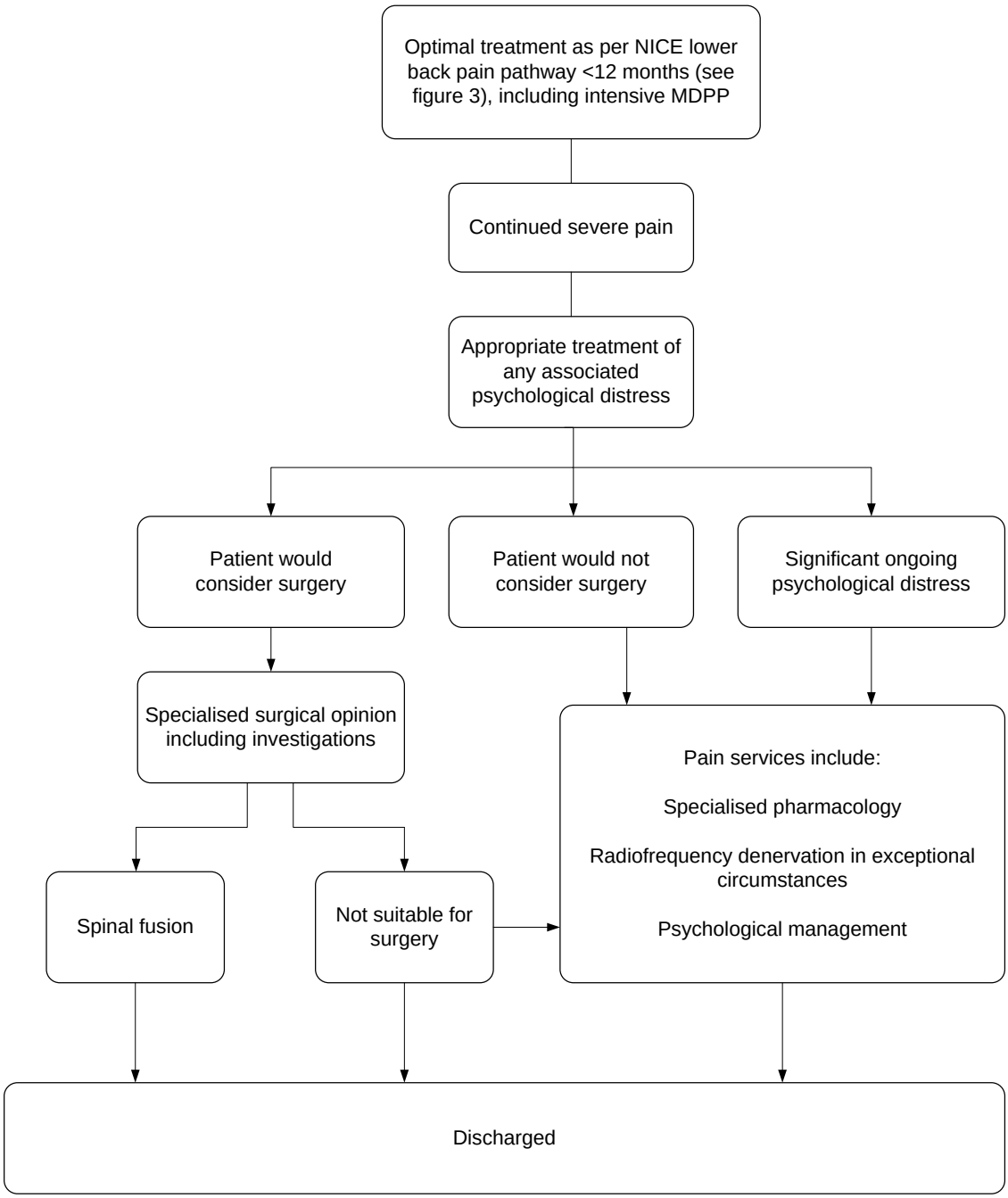
NSAIDs = nonsteroidal anti-inflammatory drugs.

Source: National Institute for Health and Care Excellence. Low Back Pain: Early management of persistent non-specific low back pain.(12) and Alberta Guideline for Primary care Management of Low Back Pain (11)

In the United Kingdom (UK) it has been identified that spinal care pathway models vary across the country[13] and there is some evidence of this in New Zealand, for instance with regards to spinal fusion (see Section 9.6). The National Health Service (NHS) in England is in the process of developing a standard Model of Care Pathway for spinal patients, with adaptation to local circumstances. This model focuses on improvements to the interface between primary and secondary care, both before and after referral, and extending into the treatment phase.[13] Strategies include: more frequent use of conservative clinical management options in primary care prior to referral to hospital where such treatment is appropriate and evidence based; streamlining of care pathways through the use of direct access in the community to diagnostic procedures such as magnetic resonance imaging (MRI); and supporting patient choice where more than one treatment option can be offered.

As part of this process, the NHS has developed a pathway for non-specific LBP, persisting for longer than one year (Figure 4). This pathway is a continuation of that shown in Figure 3, which focuses on the first 12 months of management.

Figure 4: English pathway for non- specific low back pain persisting beyond 12 months



MDPP = multidisciplinary pain programme including physical and psychological therapy

Source: National Health Service - England[13])

UK commissioning guidance considers the patient pathway from primary, to intermediate and to secondary care[14]. Similarly it considers 'red flags' to identify causes of LBP that require more urgent or specific therapy. Activity and simple analgesia are recommended for early presentation plus the stratification of patients for the intensity of physiotherapy using the STarT Back Tool. The validated tool is used to allocate patients with both acute and chronic pain to one of three groups based on an

assessment of their prognosis.[15] Risk is categorised using a 9 point scale that covers physical and psychological function[3].

Table 5: STarT Back tool categories and summary of treatment packages

Category	Aim/s	Treatment
Low risk	Support and enable self-management	A one-off consultation including: - Patient worries, concerns, social impact - Brief physical assessment - Medication review - Encouragement of activity and self-management
Medium risk	Restore function, minimise disability and support appropriate self-management	- Elicit concerns and adequate physical examination - Tailor treatment - Course of physiotherapy – may be brief - Specific physiotherapy interventions if relevant based on examination - General functional activities if no clear linkage between examination and back pain complaint - Specific treatment with end time point - Referral to specialist services when needed
High risk	Reduce pain and disability and improve psychological functioning	Delivered by physiotherapists with additional training, mentorship and ongoing professional support. - Six 45-60min physiotherapy appointments over three months using combined physical and cognitive behavioural approach - Enable patients to manage ongoing and/or future episodes of low back pain - Focus on cognitive, emotional and behavioural responses to pain and their impact on function - Identification of potential obstacles to rehabilitation Identification of possible targets for intervention.

[3] http://www.keele.ac.uk/sbst/startbacktool/usingandscoring/

Source: http://www.keele.ac.uk/sbst/matchedtreatments/

At the intermediate stage, combined physical and psychological programmes (CPPP) are recommended. If there is a failure to respond, the next step is: referral to secondary care for assessment by a multi-disciplinary team, access to imaging, specialist injections, pain management services and surgery. The commissioning guide also recommends audit and peer review measures and quality indicators to aid the implementation of high value pathways. For example, audit of the proportion of GPs using the STarT Back Tool and the success of CPPP in terms of physical function and pain scales.

6 Improvements to the Musculoskeletal Model of Care

An update and roll out of the Ministry of Health's orthopaedic surgery prioritisation tool, with input of the New Zealand Orthopaedic Society is underway. The tool produces a final score that shows strong correlation with clinical rating and is based on a number of input components:

- Patient valuation of quality of life
- Surgeon derived impact on patient in terms of pain and function
- Likelihood of significant deterioration over the next six months
- The consequence deterioration over the next six months
- An estimation of the benefit from surgery
- The risk of surgery.

The prioritisation tool can be used as a capacity management tool. The tool generates a score for each patient and surgery will be offered if the patient's score reaches the pre-determined threshold. The thresholds for surgery are locally derived. It is envisaged that scores may show variation within providers initially as a result of differences in resources between sub-specialities. Overtime it is expected that the thresholds will equalise as local resources are adjusted. It is also possible that providers with low thresholds may become a regional resource for those DHBs who have a higher threshold.

Reporting by all DHBs will allow comparison of the thresholds across DHBs and it expected that consistency across DHBs will be promoted.

In the 2015 budget, the Minister of Health allocated an extra $98m for more elective surgery in order to improve the prevention and optimise the treatment of orthopaedic conditions. $50 million

of this amount is being invested over three years to support extra orthopaedic and general surgeries, and to create early intervention orthopaedic teams. This includes:

- $30 million to lift surgery for people with a range of orthopaedic conditions (such as hip, knee, shoulder and spinal conditions);
- $14 million for extra general surgeries (including hernia, vein and gall stone operations);
- $6 million to create community based programme of care for people with musculoskeletal conditions, helping to improve patients' quality of life and avoid unnecessary hospital visits.

An expert multidisciplinary advisory group has been tasked by the Ministry of Health to provide advice on the approach, scope and scale of any projects undertaken. They will guide the electives team where priorities lie and how to undertake these community based projects.

This establishment of the advisory group is in the early stages of establishment and the group is finalising their approach to the roll out of projects.

7 Intervention points on the pathway

7.1 Investigations

Clinical guidance documents consistently emphasise that investigations, such as blood tests and diagnostic scans, do not provide clinical benefit unless Red Flags are present or there are other specific clinical indications for further investigation[5, 11]. 'Choosing Wisely' advises against the use of imaging for non-specific back pain in the absence of 'red-flags'[16, 17], and unless imaging is necessary for the planning and/or execution of a particular evidenced-based therapeutic intervention on a specific spinal condition[17]. MRI is best reserved for the assessment of radicular pain that is not settling[18]. Approximately 90% of older adults have incidental findings on spine imaging[19] that can lead to unnecessary interventions with associated morbidity[17, 19]. Among adults aged 65 years and older presenting with acute LBP, early imaging is not associated with better 1-year clinical outcomes[19].

MRI is indicated in the context of non-specific LBP of up to 12-months duration, when a condition needing a specific approach is suspected (e.g. infection or malignancy) and where required, as part of work-up of a patient being considered for surgery[12].

7.2 Analgesia

For acute LBP there is consistent recommendation for pharmaceutical pain relief management: paracetamol, NSAIDs and weak opioids [11, 12].

First-line medication for both acute and chronic LBP is regular (rather than as-needed) administration of paracetamol and second-line nonsteroidal anti-inflammatories (NSAIDs) and/or weak opioids, giving consideration to possible side-effects and the role of gastric protection medication[5, 11, 12]. Muscle relaxants, such as orphenadrine, may be considered where pain is related to muscle spasms and simple analgesics are not adequate. Escalation of pain management in chronic pain to third-line medications includes alternative classes of medication; tricyclic antidepressants (at lower doses than used for depression), other anti-depressants and anti-convulsants [20] in patients who don't respond to simple analgesics. Opioids are not recommended for use in acute or chronic LBP other than short-term use for very severe pain[12].

Upper gastrointestinal side-effects are well recognised with the use of NSAIDs. Gastro protectant medication may be used for those who develop symptoms on treatment, or with a previously known

sensitivity, and is recommended in those over the age of 45 years[12]. Treatment with regular paracetamol and diclofenac acid with omeprazole (as a gastro protectant) could be expected to cost less than $20 to $50 per month, depending on formulation, while treatment with codeine and/or the tricyclic antidepressant amitriptyline could be expected to cost less than $20 per month. The use of medication for acute LBP may be relatively short as an estimate of the median time to being pain free is 58 days and return to previous work hours and activities is 14 days.[21]

Strong opioids (e.g. tramadol, morphine, oxycodone, fentanyl etc.) are used only where pain is severe and require careful management[11, 12]. Pharmaceutical costs may be in the range of $30 to $300 per month, depending on the choice of agent[22]. Furthermore, there may be additional costs around managing opioid treatment to minimise the risk of dependence or abuse. However, the issues around prescribing of opioids are not back pain-specific and outside the scope of this report.

PHARMAC's pharmaceutical expenditure was $795 million for 2013/14. Paracetamol was the most commonly prescribed medication. The cost of analgesics, opioid and non-opioid, was $22.4 million and the cost of NSAIDs was close to $8 million.[23] However, these expenditures cannot be fully attributed to LBP as they are used for clinical indications other than LBP.

7.3 Spinal manipulation

The evidence based guidance is broad with regards to the types of spinal manipulation/mobilisation that are recommended, including physiotherapy, osteopathy or chiropractic manipulation. An outpatient or domiciliary physiotherapy appointment within a DHB is around $82 per session. Private treatment from a spinal manipulation practitioner is usually in the range of $50 to $75 per visit.

Costs are split between Vote: Health, Vote: Accident and patients. For injury-related back pain, treated in primary care, the Accident Compensation Corporation (ACC) will cover some or all of the treatment costs (approximately $25 per session for spinal manipulation)[24]; in most cases patients are required to pay a part charge. For non-ACC back pain, patients can be referred to a DHB for treatment[4]. Non-ACC acute pain patients may access spinal manipulation services privately, but timely access to this intervention could be affected by the cost barrier. Data for access to private physiotherapy providers, for LBP in New Zealand, is not available.

[4] Personal communication: selected DHBs

The overall volume of physiotherapy, funded by DHBs, for all indications has been increasing by approximately 5% per year in the period 2008/09 to 2012/13, while total costs have been increasing by about 10% per year. However, guidelines for back pain limit the duration of spinal manipulation treatment, mitigating the risk of inappropriate expenditure in this area. In the first four to six weeks of acute LBP[5] up to 9 sessions over 12 weeks are recommended[12]. For lower risk patients, fewer sessions may be required, but for higher risk patients the addition of psychological services is recommended[14]. Manual therapies show modest effect and are more cost effective when combined with exercise programmes[12]. Furthermore, the risk of inappropriate use will be further diminished by adherence to good practice guidelines that treatment should be discontinued and/or an alternative method employed if there is not a good response after an appropriate number of sessions.

In acknowledgement of the heterogeneity of patients, presenting in primary care, a stratified model has been developed to target care (STarT Back Screening Tool, see Section 5, Table 5). STarT is used to allocate patients, with both acute and chronic pain, to one of three groups based on an assessment of their prognosis. Alternative treatment pathways are applied to the different groups. The stratified approach shows improvement in disability, quality of life and cost savings compared to standard care.[15]

Longer term programmes, for chronic back pain, may be accessed through DHBs. Guidelines recommend a treatment programme for up to 12 weeks, including a structured exercise programme and/or spinal manipulation and/or acupuncture[11, 12]. Where patients do not improve after at least one treatment programme, cognitive-behavioural therapy and/or multidisciplinary chronic pain programmes (in combination with exercise programmes) may be required.

There is some evidence that comprehensive multidisciplinary pain programmes have good cost-effectiveness and may even be cost saving[25, 26]. However, these programmes may be being underutilised. The Australian National Pain Strategy states that expert consensus and a growing body of research shows that best-practice pain management often requires interdisciplinary assessment and management, addressing physical, psychological and environmental factors. While this model of care is provided by comprehensive multidisciplinary pain programmes, these programmes often have long waiting lists and are poorly integrated with other services[27].

7.4 Epidural injections

Epidural corticosteroids may be helpful for treatment of radiculopathy and leg-dominant pain that doesn't resolve within 6 weeks[11] but are not recommended for LBP without nerve-related leg pain[17]. The use of epidural corticosteroid injections in spinal stenosis has limited benefit[28].

7.5 Spinal surgery

In acute back pain, referral for surgery is only recommended for specific indications and is not recommended for nonspecific acute back pain[5].

In chronic LBP, surgery may be considered for selected patients, where the patient has failed to respond to an optimal treatment programme and any psychological distress or yellow flags have been addressed. The appropriate selection of patients is complex, and in order to avoid inappropriate use of surgery that is unnecessary, ineffective or a poor use of resources; it is critical that the patient is only prioritised for surgery once the clinician has determined that surgery is the best treatment option.

Decompressive surgery is an option where the patient has sciatica or other radiculopathy (indicated by leg-dominant pain caused by compression or inflammation of spinal nerves or neurogenic claudication) that does not resolve after 6−12 weeks of nonsurgical intervention[11]. Surgery may also be appropriate where there is evidence of a defined disc lesion and ongoing pain beyond 6−12 weeks.

Laminectomy is a decompressive surgery that is commonly used to alleviate pain associated with spinal stenosis, in which pressure on the nerves is created by enlargement of the facet joints and narrowing of the intervertebral foramina through which the nerves pass. Laminectomy removes a small portion of the vertebral bone over the nerve root and/or disc material, bone spurs and ligaments that are pressing on nerves. Success rates in relieving pain are often in the range of 70 to 80%.[29] The majority of patients with spinal stenosis are treated non-operatively and report no substantial change in symptoms over a year period. Watchful waiting, for patients with intolerable symptoms, is not appropriate as dramatic spontaneous improvement is uncommon[30]. A trial of laminectomy versus usual care for spinal stenosis found surgical complications were rare but associated with increasing age, co-morbidity and when fusion had also been performed.

Discectomy, which involves removing damaged parts of discs, can produce more rapid resolution of pain in disc-related conditions such as prolapsed or herniated discs (where the outer surface of the

disc ruptures, allowing the inner gel to leak and often causing nerve compression) in appropriately selected patients[31]. However, non-operative approaches may also provide adequate resolution of pain associated with disc herniation, but over a longer period of time, for some patients.

Where pain is thought to be related to spinal instability or weakness, spinal fusion may be considered. Spinal fusion joins two or more vertebrae to reduce movement in the spine. While various methods are used, the procedure involves fixing pieces of bone or bone-like material into the space between the vertebrae. This stimulates bone healing to create a bone fusion. The vertebrae may be additionally held in place by metal plates, screws or rods (internal fixation). Spinal fusion may be done in combination with other procedures such as discectomy or laminectomy.

While discectomy and laminectomy are the standard of care for selected patients, the growing use of spinal fusion is creating concern. Improved anaesthetic and imaging techniques have likely enabled increased surgery in older patients[32]. Levels of use vary geographically, indicating a potential lack of professional consensus on the clinical criteria for surgery.

Spinal fusion has been used successfully for a number of decades in specific indications, such as trauma, malignancy, severe scoliosis, spinal infection and tuberculosis, and fractures[32, 33]. However, in recent years, use of spinal fusion has been expanded to include pain from degenerative diseases, with the majority of procedures now performed being for spondylosis (spinal degenerative diseases), disc disorders and spinal stenosis (in the absence of deformities)[32].

A reviewer considered that in comparison to other orthopaedic procedures lumbar fusion has poorly defined indications[34]. There are 14 conditions, under specified clinical criteria, considered to be indicated for lumbar fusion by an international society[33]. In addition to trauma, revisions, tumour and infection, the mechanical conditions include:

- Spondylolisthesis
- Spondylosis
- Recurrent disc herniation
- Stenosis with documented instability
- Degenerative disk disease.

Evidence supports use of spinal fusion in lumbar spondylolisthesis (anterior displacement of a vertebra on the one beneath it) and potentially in selected patients where a definitive diagnosis of disc degeneration as the cause of pain can be made[32, 33, 35, 36].

For spinal stenosis, associated with lumbar spondylolisthesis, fusion with laminectomy is better than laminectomy alone and fusion is better than non-surgical treatment for spondylolisthesis. For patients with spinal stenosis, without spondylolisthesis, evidence is mixed regarding the additional benefit of fusion with laminectomy.[32]

However, the evidence to support use in degenerative spinal disease is not consistent, with some studies finding that the surgery offers little clinical benefit beyond that achieved with intensive rehabilitation programmes, that include cognitive-behavioural therapy[37, 38].

The evidence for the role of lumbar fusion in degenerative disk disease has different interpretations. A systematic review of randomised trials indicated limited benefit of spinal fusion.[39] Diagnosis with provocative discography is considered controversial[32] and is not recommended[40]. A later systematic review, that included studies of surgery versus non-surgery as well as prospective surgical cohorts and other trials, showed positive effect of surgery for pain and disability[36]. Positive results for surgery were shown in trials against non-surgical treatment. In patients with degenerative changes, benefits of fusion are small and most patients do not have a good or excellent outcome.[40]

Whether spinal fusion produces clinically important benefits compared with nonsurgical care in nonspecific chronic LBP is uncertain[41]. In such patients, no subgroups have been identified for whom spinal fusion will be predictably effective, and current clinical tests cannot identify which individual patients will respond[42]. Guidelines from the International Society for the Advancement of Spine Surgery state that spinal fusion should only be used where the cause of the pain can be clearly identified (e.g. MRI or other imaging identifies spondylosis, instability or degenerative disc disease consistent with the symptoms)[33]. Choosing Wisely Canada notes the difficulty in precisely locating spinal pain and recommends against spinal fusion in patients with mechanical axial LBP from multi-level degeneration in the absence of radicular features or structural pathology[17].

Furthermore, spinal fusion can be associated with surgical complications and can cause increased stress on adjacent vertebral segments, leading to new sources of instability, degeneration and pain.

Operative deaths are uncommon with fusion but in trials early complications occur in 18% of patients[40]. Compared to operations without fusion, the addition of fusion is associated with: doubling of the risk of complications, increased risk of transfusion and post-operative mortality at six weeks[32]. In older patients, the risk of life-threatening complications is increased with complex compared to simple fusion[43].

Rates of spinal fusion are increasing, both internationally and in New Zealand (section 8.6). In the US the annual number of spinal fusion procedures more than doubled between 1998 and 2008[44]. Spinal fusion costs about $23,500 on average, although complications can greatly increase this cost estimate.

Artificial total disc replacement has been proposed as an alternative to spinal fusion, with the potential advantage of better preserving biomechanical function and mobility, and lessening stress on vertebral segments adjacent to the operative site that can lead to further degeneration. There is some evidence that artificial disc replacement is at least as effective as spinal fusion in the short term.[45, 46] However, caution about adopting this technology on a large scale has been recommended because there is currently insufficient information on the harms and complications that could occur in the long term[46]. These procedures are performed rarely in New Zealand, with only eleven procedures performed in 2011 and two in 2012.[47]

7.6 Other interventions

Other interventions that are considered to be of little or no value, in the management of acute and/or chronic LBP, are summarised in Table 6.

Table 6: Interventions considered to be of low or uncertain clinical value for management of low back pain (LBP) [5, 11, 12]

Intervention	Recommendation	Comments
Diagnostic imaging (X-rays, CT scans) in the absence of Red Flag conditions for acute LBP	Unnecessary unless specifically indicated (e.g. suspicion of fracture or tumour)[5, 11, 12]	Poor specificity and potential harm from unnecessary radiation exposure May be appropriate if no improvement after 6 weeks
MRI in the absence of Red Flag conditions	Unnecessary unless specifically indicated or as part of referral for spinal fusion[11, 12]	
Blood tests (FBC, ESR etc.) in the absence of Red Flag conditions	Unnecessary unless specifically indicated (e.g. suspicion of cancer, infection or inflammatory disorder)[5, 11]	May be appropriate if no improvement after 6 weeks
TENS	Ineffective for acute LBP[5, 11] May be useful as an adjunct in chronic LBP, but limited evidence	

Intervention	Recommendation	Comments
	of efficacy[11]	
Traction	Produces no improvement and may cause harm[5, 11, 12]	
Oral, intramuscular or epidural injections of corticosteroids	Use inappropriate in acute LBP and chronic nonspecific LBP in the absence of radiculopathy or other specific inflammation[5, 11]	The potential for adverse effects associated with systemic absorption of corticosteroids should be considered
Injection of therapeutic substances into the back	Inappropriate for nonspecific back pain[12] Recommended for pain originating from lumbar facet joints[11]	
Therapeutic ultrasound	Inappropriate for use in acute LBP Insufficient evidence of efficacy in chronic LBP[11, 12]	
Short-wave diathermy	Insufficient evidence of efficacy[11]	
Low-level laser therapy	Insufficient evidence of efficacy and not recommended[11, 12]	
Interferential current therapy	Insufficient evidence of efficacy and not recommended [11, 12]	
Intradiscal electrothermal therapy	Not recommended for nonspecific LBP[12]	
Percutaneous intradiscal radiofrequency thermocoagulation	Not recommended for nonspecific LBP[12]	
Radiofrequency facet joint denervation	Not recommended for nonspecific LBP.[12] May be used in exceptional circumstances where pain is persistent.[13]	

a Red Flag conditions are described in Table 4.

CT = computed tomography scan; ESR = erythrocyte sedimentation rate; FBC = full blood count; MRI = magnetic resonance imaging; TENS = transcutaneous electrical nerve stimulation

8 New Zealand Beliefs and Attitudes to Back Pain

A New Zealand survey of 1,000 adults investigated beliefs regarding back pain and showed uncertainty about the links between pain and injury[48]. The presence of back pain was considered by over half of respondents to mean the back is injured and 89% believed that ignoring pain could lead to more damage. Many people were open to the idea that non-physical factors influence pain intensity and prognosis. A high proportion (80%) believed that they should remain active when they have back pain though at the same time vigorous exercise was viewed negatively. Seeing a health care practitioner was considered important by a high proportion (85%) of respondents.[48]

A qualitative study analysed the beliefs regarding acute back pain of New Zealand General Practitioners (GPs). Overall GPs approached acute back pain from a biomedical perspective, and the assessment and management of psychological influences was not a priority. There was conflict between guideline management and the need to protect damaged tissue resulting in mixed messages regarding activity and being careful. GPs considered the management of chronic pain more challenging than acute pain. The ruling out of alternative pathologies was a key consultation priority. Psychosocial factors were seen as being more relevant to chronic pain and difficult to raise in the initial consultation. Findings indicate that GPs need to be informed of the guidelines, but also why and how clinical guidance improves outcomes.[49]

The New Zealand public have mixed views regarding LBP but acknowledge the importance of physical activity and the influence of psychosocial factors[48]. New Zealand GPs consider chronic LBP more challenging and for which psychosocial factors are more relevant[49].

9 Low Back Pain sub-populations

9.1 Introduction

For the purpose of describing the clinical spectrum for LBP, the following sub-populations have been used: the general population; those with acute LBP; those with chronic LBP; those with severe chronic LBP; and those with severe LBP who require hospitalisation (see Table 2 in Section 3.1 above).

9.2 General population

9.2.1 Prevention

Non-specific LBP is, by definition, of unknown cause. However, many factors have been identified as possible causes of pain or important in its development.

Increasing age is an important association with increasing prevalence until the 7th decade, as is lower educational status[50]. Mechanical factors have been considered important, however, systematic reviews, including the application of the Bradford-Hill criteria for causation, have found it unlikely that manual handing, pulling and pushing, lifting, carrying and other mechanical factors were causative of LBP[4]. Obesity has been found to be associated with risk of LBP[4, 51] and in children obesity has been found to be associated with musculoskeletal symptoms including back pain[52]. Genetic disposition is considered important for back pain[4, 51]. Physical activity has a positive protective effect[51].

Findings, from systematic reviews of trials in the prevention of LBP, show that only exercise interventions appear to be effective whilst back education, back supports and stress management are not[4].

9.2.2 Prevalence/incidence of risk factors

The New Zealand Health Survey (NZHS) showed that for 2013/14 almost 1 in 3 adults (aged 15 years and over) were obese (30%), a further 35% were overweight. Also, 45% of Māori adults were obese and 68% of Pacific adults were obese. There has been an increase in obesity in females from 27% to 30% and in males from 26% in 1997 to 30% between 2006/07 and 2013/14.[53]

In terms of physical activity the NZHS showed that 51% of the total population were physically active (did at least 30 minutes of exercise on five or more days in the past week). Men were more active

than women; 55% versus 49%. The proportion achieving this level of activity was similar across the age groups other than the 75+ years age group (42%). Pacific people were significantly less active than non-Pacific people and Asian people less active than non-Asian people. Individuals in the least deprived socio-economic group are significantly more active than those in the most deprived socio-economic group. For the total New Zealand population there has not been a significant change in physical activity between 2006/07 and 2013/14.(53)

9.2.3 Policy Drivers

The Green Prescription programme offers a community support programme, for adults and families, to promote physical activity and is prescribed by their primary care health professional. The budget for Green Prescriptions was increased in 2013 with the expectation of increased referral of patients with diabetes and pre-diabetes. Referrals are expected to reach 68,000 per year in 2016/17. The programme is cost-effective.[5]

Healthy Families New Zealand is an initiative that aims to improve people's health where they live, learn, work and play in order to prevent chronic disease. The initiative is being implemented in selected areas and will comprise locally fashioned interventions to improve nutrition and activity.[6]

Fuelled4life is a free practical tool that supports schools and early childhood education (ECE) services in providing healthier food to children. It is managed by the Heart Foundation and is a collaborative initiative that involves the education, health and food industry sectors working together to make it easier to have healthier food in schools and ECE centres.[7]

Breastfeeding has a positive influence on the health status and social wellbeing of the baby, mother, family and community. The Ministry of Health recommends that infants are exclusively breastfed for their first six months of life and the *National Strategic Plan of Action for Breastfeeding* has objectives across Government, community, healthcare and early childhood services.(54)

Other areas of action to tackle obesity that the Ministry of Health and the Health Promotion Agency support include: the Fruit in Schools programme, public health nutrition and physical activity

[5] http://www.health.govt.nz/our-work/preventative-health-wellness/physical-activity/green-prescriptions

[6] http://www.health.govt.nz/our-work/preventative-health-wellness/healthy-families-nz

[7] http://www.health.govt.nz/our-work/preventative-health-wellness/nutrition/food-and-beverage-classification-system

contracts and Health Promoting Schools. Physical activity is promoted by Sports NZ and food labelling regulation by the Ministry of Primary Industries.[55]

9.3 At risk population: acute back pain

Patients who suffer acute pain are at risk of developing chronic symptoms and disability.

9.3.1 Prevalence/incidence

Measurement of LBP includes prevalence (the presence at any point in a defined period), the incidence of symptoms (new episode in a time period) and incidence of accessing health care services. Studies indicate that the experience of back pain symptoms is common internationally and in New Zealand.

Studies use different definitions in terms of site of origin of pain and minimum duration of pain. In studies, set in Europe or Canada, for first ever back pain in the general adult population, the proportion experiencing LBP in the previous year ranged from 6.3% to 15.4% and when also considering recurrent pain between 19% and 36%[50]. Across eight GP practices 36% had a one year prevalence for LBP of at least 24 hours duration[56]. In a UK urban area annual incidence of LBP was 47/1000, for adults aged between 25 and 64 years[57].

A New Zealand telephone survey reported that in the previous seven days back or neck pain has been reported in 35% of New Zealand men and 42% of New Zealand women. Of the 46 conditions noted, back or neck pain was rated the 10th most intense.[58] In various occupations, New Zealand studies have reported the annual prevalence of any low back symptom (pain, ache, discomfort, "complaints") to be around 50−60%[1, 59]. Twelve month prevalence of reduced activities, due to low back symptoms, was 18% and absenteeism was 9% in a survey of 3000 working age New Zealanders[60].

In another New Zealand study, the lowest estimate of current back pain was 16%[48], while a UK study estimated the proportion of people to suffer LBP on a single day to be 19%[57].

9.3.2 Diagnosis: Presentation to General Practice

Various UK-based studies have found consultation rates for GP practices for back pain to range from 3.7% per year for the working age population and up to 9% per year for older age groups[15, 56, 61-64]. This was at the lower end (4%), when measuring lower back consults more specifically. Rates were

lower for 0–14 year olds and higher for older adults (5 to 7%).[63] A French-based study estimated the consultation rate at 4.5% per year[65].

The mean number of primary care consultations, per patient for LBP, has been reported as approximately 1.7 per annum in the UK[61, 64].

Applying a presentation rate of 5%per year would mean that 170,000 New Zealand adults present acutely annually. The total acute ACC claimants for 2012/13 were 120,436 leaving an estimated balance of nearly 49,000 patients who would present with non-ACC-covered LBP.

9.3.3 Treatment: Service use and manual therapy care

Physical therapy options include physiotherapy, osteopathy and chiropractic. The funding of visits to these practitioners can be through the public healthcare system, self-funded or partially funded through ACC with an additional self-funded contribution.

Studies based in the UK have found physiotherapy referral rates for acute LBP from 9% to 14%[57, 62, 64], with one older national survey finding patients attended on average seven physiotherapy sessions[64].

In 2012/13 approximately 50% of ACC claimants with acute mechanical/ non-specific LBP accessed physiotherapy for a median of eight treatment sessions (Table 7). Other manual therapy practitioners accessed for care by ACC claimants included chiropractors (15%) and osteopaths (10%). Other practitioners seen were acupuncturists (8%), orthopaedic specialists (2.6%) and musculoskeletal (1%) or sports medicine specialists (0.5%).

Table 7: Service use by ACC acute low back problem clients, 2012/13

Provider/Service	ACC clients	Usage rate (%)	Median number of 'visits'
Acupuncturist	9,799	7.7	15
Ambulance Officer	977	0.8	1
Chiropractor	18,518	14.6	13
Diagnostic Radiologist	16,295	12.9	2
General Practitioner	59,802	47.3	2
Mental health	56	0.0	28
Musculoskeletal Medicine Specialist	1,264	1.0	4
Not Specified	6,566	5.2	23
Nurse	334	0.3	4
Occupational	106	0.1	6
Orthopaedic Surgeon	3,339	2.6	4
Osteopath	12,847	10.2	6
Other	2,016	1.6	4

Provider/Service	ACC clients	Usage rate (%)	Median number of 'visits'
Painkillers	72,261	60.0	
Physiotherapist	63,526	50.2	8
Rehabilitation	5,013	4.0	6
Sports Medicine Specialist	652	0.5	3
Total	120,436		

Source: 2015 NHC analysis of 2012–2013 ACC claim payments data

These data indicate a significantly higher access rate to manual therapies in New Zealand, for ACC claimants, than the reported UK experience. This is understandable given New Zealand's ACC insurance model that subsidises access to services.

Referral data to hospital physiotherapy services in New Zealand are not easily accessible. A number of DHBs were contacted directly for available data regarding patient referrals to physiotherapy for LBP.

A broad estimate of the referral rate for physiotherapy from five DHBs was 2.2 per 1000 of the adult population per year[8]. The proportion of referrals from GPs averaged 80% and is at least 50% for each DHB. Some referrals are ACC-related for patients who cannot afford the co-payments charged by private physiotherapists. Applying this estimated referral rate to all DHBs would indicate that about 6,000 patients are referred to Vote: Health funded physiotherapy by GPs. This would equate to about 12% of the estimated 49,000 non-injury related LBP patients presenting to primary care. This proportion, receiving physiotherapy, is much lower than for ACC clients, but possibly more in keeping with the UK reported experience. It is not known how many people with LBP access physiotherapy by self-funding for non-injury related LBP though it is reasonable to assume that some patients do so.

Additionally, the DHBs gave an indication of typical treatment provided for patients with LBP. At Auckland DHB all patients referred with LBP are triaged by an orthopaedic specialist and all patients that are not considered likely to need surgical intervention are seen by a specialist musculoskeletal physiotherapist initially. About 55% do not require further input after their initial treatment plan and about 25% have further physiotherapy input. About 1% have structured exercise programmes and

[8] NHC executive analysis of data from Auckland, Capital and Coast, Hutt Valley, Mid Central and Whanganui DHBs

others are referred on to orthopaedic or pain services[9]. At Capital and Coast DHB, patients with LBP are seen one to one with a specialist physiotherapist. A group back care class is also available.[10]

9.3.4 Costs

To consider the total costs related to acute LBP, the total number of patients presenting is assumed from international experience, that covers injury and non-injury related presentation. As above, an estimated five percent of patients presenting with acute LBP has been assumed. Table 8 presents the number of ACC claimants accessing service providers, and the median price ACC paid for these services, this is combined with the median number of 'visits' presented in Table 7 to estimate a total cost to ACC for each type of service. Note, this does not include any patient co-payments paid for example for GPs, radiology and physiotherapists. The total cost for ACC funded patients is nearly $58 million, with about 50% seeing a physiotherapist, 15% a chiropractor and 10% an osteopath with costs of $14.7 million, $5.2 million and $2.2 million respectively.

Table 8: Estimated ACC service costs for ACC acute low back problem clients, 2012/13

Provider/Service	ACC clients (N)	Median price ($)	Per person 'cost' ($)	ACC 'cost' ($)
Acupuncturist	9,799	55	820	8,044,000
Ambulance Officer	977	669	670	653,000
Chiropractor	18,518	22	280	5,238,000
Diagnostic Radiologist	16,295	56	110	1,823,000
General Practitioner	59,802	30	60	3,557,000
Mental health	56	22	610	34,000
Musculoskeletal Medicine Specialist	1,264	155	620	783,000
Not Specified	6,566	114	2620	17,184,000
Nurse	334	22	90	29,000
Occupational	106	41	250	26,000
Orthopaedic Surgeon	3,339	157	630	2,098,000
Osteopath	12,847	28	170	2,150,000
Other	2,016	41	160	331,000
Painkillers	72,261		1.62	117,000
Physiotherapist	63,526	29	230	14,667,000
Rehabilitation	5,013	29	170	868,000
Sports Medicine Specialist	652	108	320	212,000
Total	120,436			57,814,000

Source: 2015 NHC analysis of 2012–2013 ACC claim payments data

[9] Personal communication, Auckland DHB

[10] Personal communication, CCDHB

Assuming that 49,000 patients, presenting without injury, each see a GP twice (as per ACC funded acute patients and similar to the international data[61]) and they use regular analgesia for a two week period (estimated from the period to return to work[21]). Combining this with the 6,000 patients who are assumed to be seen by a physiotherapist in the public system and the median of eight visits (as per the ACC data) comes to a total cost estimate of $7.6 million (Table 9). If the ACC cost structure is applied to the non-ACC funded patients the cost would be $22 million, though this may not reflect the level of service received.

Table 9: Estimated cost of non-ACC acute lower back pain treatment, 2012/13

Provider/Service	Estimated price per patient ($)	Estimated number of 'visits'	Number of patients (N)	Estimated total cost ($)
GP visit	37	2	49,000	3,626,000
Physiotherapy visit	82	8	6,000	3,936,000
Analgesic medication	1.62		29,400	48,000
Total				**7.6 million**

Source: 2015 NHC analysis

9.4 Chronic Back Pain

9.4.1 Symptom duration and persistence

It is commonly reported that people with acute LBP recover reasonably quickly and that about 10-15% develop chronic symptoms [4, 21], though others estimate that only 20-40% are not reporting pain or disability after one year[66]. A systematic review of studies performed in the US, Australia and Europe on patients with non-specific back pain showed that 65% of patients still experienced pain at 12-months follow up[67].

An Australian cohort study, of adults with recent onset LBP, showed a median time to recovery from disability of 31 days. Recovery was achieved in 55% by 6 weeks, 73% by 12 weeks and 83% by 12 months. Complete recovery from pain, disability and return to work took a median of 59 days and occurred for 72% by 12 months. Median time to being pain free was 58 days and return to previous work hours and activities was 14 days.[21] UK studies set in primary care have shown 26% of patients still have symptoms three months after presentation.[57]

9.4.2 Prevalence

The prevalence of chronic LBP has been estimated from the 2013/14 New Zealand Health Survey. Respondents were asked if they experienced chronic LBP, that had lasted or was expected to last for more than six months and that had been present almost every day but could be of variable intensity.

The prevalence of chronic LBP is 9.1% (approximately 305,600 people) of New Zealand adults, aged 18 years and over. This is present in 9.7% of females and 8.5% of males. Chronic LBP increases with age; 5.2% in the 18-39 age-group, 10.0% in the 40-59 years age-group and 13.6% in the 60+ year group. Chronic LBP increases with increasing social deprivation, experienced by 7.6% of those living in the least deprived quintile and 11.0% of those living in the most deprived quintile.

From the ACC dataset, 20,332 claimants were identified to have a prevalent claim lasting more than six months in 2012/13. This leaves 285,249 other people with chronic LBP.

9.4.3 Service Use

In 2012/13, the most common service accessed by ACC claimants with chronic LBP was physiotherapy with 51% of patients accessing it with a median of 9 visits in 12 months. Other physical therapists accessed were osteopaths (18%), and chiropractors (28%). Diagnostic radiology was used in 34% of cases and a GP seen by 46% of cases. An orthopaedic surgeon was seen by 16%, musculoskeletal specialist by 6% and rehabilitation services by 7% of claimants.

For the chronic patients, funded by ACC, the proportion seeing a physiotherapist is about the same as acute patients though the median number of sessions is marginally greater at 9 compared to 8 sessions. Contact with other manual therapists, orthopaedic and other specialists, rehabilitation and mental health services are more common.

Table 10: Service use by ACC chronic low back problem clients, 2012/13

Provider/Service	ACC clients	Usage rate (%)	Median number of 'visits'
Acupuncturist	2,724	13.1	11
Ambulance Officer	142	0.7	1
Chiropractor	5,758	27.6	10
Diagnostic Radiologist	7,025	33.7	2
General Practitioner	9,677	46.4	4
Mental health	137	0.7	88
Musculoskeletal Medicine Specialist	1,304	6.3	4
Not Specified	2,648	12.7	57
Nurse	164	0.8	10
Occupational	166	0.8	4

Provider/Service	ACC clients	Usage rate (%)	Median number of 'visits'
Orthopaedic Surgeon	3,381	16.2	3
Osteopath	3,679	17.6	6
Other	1,680	8.1	3
Painkillers	8,539	42	13
Physiotherapist	10,706	51.3	9
Rehabilitation	1,389	6.7	7
Sports Medicine Specialist	626	3	3
Total	20,332		

Source: 2015 NHC analysis of 2012–2013 ACC claim payments data

9.4.4 Costs

For patients with chronic LBP, the proportion funded via ACC is small compared to the total estimated with chronic LBP through the New Zealand Health Survey. However, service utilisation and cost is more readily available for ACC funded patients. The total cost for the ACC funded chronic LBP patients is $39.6 million (Table 11). Of the specified costs the larger contributors are for physiotherapists, acupuncturists, chiropractors, GPs, orthopaedic surgeons and mental health services. High ranking specific costs are physiotherapy at $2.8 million, acupuncture at $1.6 million, and chiropractic at $1.3 million, GPs at $1.2 million, orthopaedic specialists at $1.1 million and mental health services at $1.1 million. Painkillers only account for $0.2 million.

Table 11: Estimated ACC service costs for ACC chronic low back problem clients, 2012/13

Provider/Service	ACC clients	Median price ($)	Per person 'cost' ($)	ACC 'cost' ($)
Acupuncturist	2,724	55	600	1,640,000
Ambulance Officer	142	669	670	95,000
Chiropractor	5,758	22	220	1,253,000
Diagnostic Radiologist	7,025	56	110	786,000
General Practitioner	9,677	30	120	1,151,000
Mental health	137	89	7,800	1,068,000
Musculoskeletal Medicine Specialist	1,304	152	610	794,000
Not Specified	2,648	180	10,240	27,119,000
Nurse	164	26	260	43,000
Occupational	166	73	290	48,000
Orthopaedic Surgeon	3,381	106	320	1,079,000
Osteopath	3,679	27	160	604,000
Other	1,680	106	320	536,000
Painkillers	8,539	1.62	21	179,000
Physiotherapist	10,706	29	260	2,781,000
Rehabilitation	1,389	29	200	281,000
Sports Medicine Specialist	626	106	320	200,000
Total	20,332			39,657,000

Source: 2015 NHC analysis of 2012–2013 ACC claim payments data

Data for the non-ACC funded patients is limited, but analysis of the 2013/14 New Zealand Health Survey data provides some estimates of service use among chronic LBP sufferers outside of ACC (Table 12).

Assuming that the proportion of non-ACC claimants receives services, as outlined in Table 12, and that the median number of contacts is the same as those identified for ACC claimants, the estimated cost is $180 million.

Table 12: Estimated service use by Non-ACC chronic low back problem patients, 2012/13

Provider/Service	Number of (non-ACC) patients	Usage rate (%)	Median no. of visits	Mean price of last visit ($)
Acupuncturist	3,188	1.1		
Chiropractor	22,024	7.7		
General Practitioner	132,365	87.5	3	37.10
Mental health	11,152	3.9		
Occupational	2,454	0.9		
Osteopath	20,461	7.2		
Physiotherapist	59,463	20.8		

Source: 2015 Ministry of Health analysis of 2013/14 New Zealand Health Survey estimates

9.5 Chronic Low Back Pain-Severe

For the purposes of analysis, the more severe patients with chronic LBP are those that require access to multidisciplinary pain programmes after their care has been escalated beyond analgesia, manual therapy and structured exercise programmes.

Secondary care pain management services that provide complex care, including combined physical and psychological care, are indicated[(14)]. Cognitive behaviour therapy should be a component. More intense programmes are more effective than low intensity ones and combined programmes should have a duration of around 100 hours. There is evidence that screening for higher risk patients is effective in identifying those who will benefit more intervention.

9.5.1 Treatment: Pain management services

There are no easily accessible data for referrals to hospital pain services in New Zealand. A number of DHB service providers were contacted directly for available data regarding patient referrals for LBP.

The Royal College of Anaesthetists in the UK and the British Pain Society recommend one full-time pain specialist per 100,000 population.(68) In the New Zealand context this equates to about 40 full-time equivalent specialists though there are about 15 currently.[13] However clinical pain specialists are only a marker of service provision as multi-disciplinary services are important in the assessment and management of patients with chronic pain[11].(14) (69)

New Zealand pain services are provided across the country, but are better developed in some areas. The centres with more developed services are Christchurch, Wellington and the Auckland region. The Auckland Regional Pain Service (TARPS) is the oldest in the Auckland region and provides services for Auckland DHB. There are separate services for Waitemata and Counties Manukau DHBs that commenced in 2010. Less well developed services are provided in Waikato, Northland and Taranaki. In the South Island, there are services provided in Christchurch, at Burwood Hospital, Timaru and Dunedin. However, Burwood Hospital provides most of the clinical service and acts as the provider for all of the South Island.[13]

For the Wellington Hospital pain service, chronic LBP comprised about 8% of the referrals. The source of referrals is about half and half from primary care and specialists, and about one in six referrals are ACC related.[12] For Auckland about 30% of referrals are for LBP[13]. For Burwood, about 10% of the total referrals are for chronic LBP. General practitioners are the referral source in 43% of patients and 25% are ACC related.[14] These reports indicate variation in referrals for LBP and that most are not funded by ACC.

The following are descriptions of selected pain services:

The Wellington service provides pain education, exercise programmes and pain management group. Personnel include a pain specialist, occupational physician, a psychiatrist, clinical nurse specialist, occupational therapist, physiotherapist and clinical psychologist.[15]

[11] National Service Specification-Pain Management Service. http://www.nsfl.health.govt.nz/apps/nsfl.nsf/pagesmh/300

[12] Personal communication: Team leader, Pain Management Service

[13] Personal communication: Clinical Lead Auckland Regional Pain Service and member of the Faculty of Pain Management National Committee

[14] Personal communication: Service manager, Canterbury DHB

[15] Personal communication: Team Leader, Pain Management Service, Wellington Hospital

At Auckland Regional Pain Service the typical care process is:

A Comprehensive Pain Assessment that comprises medical and psychosocial assessment and also a physical capacity evaluation from a physiotherapist. After that the management options vary:

- Medication review
- Further investigations if considered relevant
- Functional Reactivation Programme (physiotherapist only)
- 12-week (1-2 sessions per week) Activity Focus Programme (Physiotherapist and Psychologist, Occupational Therapist or Nurse Specialist)
- or a 3-week Pain Management Programme with input from a multidisciplinary team.

Comments were made that "a 'typical' patient with LBP who comes to TARPS has usually 'failed' treatment interventions with others"[16] and similarly "patients tend to attend our service as a 'last chance saloon' and our main purpose is to educate how to live life best despite the pain".[17] Also, the Burwood service is "capacity limited" in that last year about 4,000 new referrals were seen but about 1,800 new referrals were declined.[18]

At Burwood the potential service provision includes:

- Assessment: either a 1 hour medical assessment only or 3 hour comprehensive pain assessment then 30 minutes of medical follow-up
- Treatment options:
    - Activity Focused Programmes for a 12 week time period, with 2 to 3 clinicians for 1 hour slots once per week
    - CHOICES Programmes (6-8 patients) 15 full days, utilising up to 6 clinicians and hydrotherapy pool sessions with 1 clinician per group of up to 6 patients.

Using the data supplied by the clinics the regional population referral rate has been broadly estimated for LBP for each of the larger clinics (Table 13). Taking the mean referral rate of the three estimates (4.9 per 10,000 population) and applying this to the New Zealand adult population gives a figure of approximately 1,700 patients in 2012/13. The variation in rates may imply unmet need and is in keeping with other information regarding timeliness of access.

[16] Personal communication: Clinical Nurse Specialist, Auckland Regional Pain Service

[17] Personal communication: Service manager, Canterbury DHB

[18] Personal communication: Medical Director Burwood Pain Clinic.

9.5.2 Costs

The annual cost of the specialist pain services has been estimated, assuming that each patient has a Comprehensive Pain Assessment followed by an Activity Focussed Programme. This gives a cost of $5.6 million.

Table 13: Estimated referral rate per adult population for low back pain to New Zealand pain clinics

Region	Estimated referral rate
Auckland	7.0/10,000
Christchurch	5.0/10,000
Wellington	2.7/10,000

Source: 2015 NHC analysis of communications with Auckland, Capital and Coast and Canterbury District Health Boards

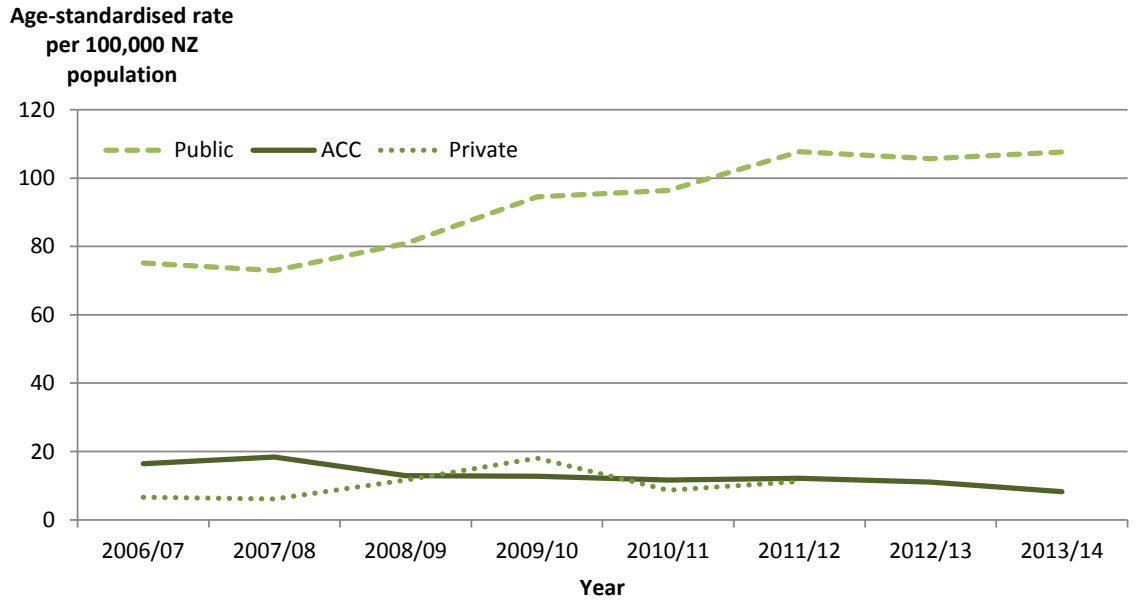
9.6 Chronic Back Pain-Hospitalised

A published method, to identify patients with mechanical and non-specific LBP from administrative databases[70], has been adapted to use National Minimum Dataset (NMDS) data to identify severe patients who have required a hospital admission (see Appendix 1). Primary diagnostic codes for admission episodes have been classified into clinical categories of either 'herniated disc', 'probable degenerative changes', 'spinal stenosis', 'possible instability', 'fractures', 'non-specific backache', 'sequelae of previous back surgery' or 'miscellaneous'. Criteria are applied to exclude children under 18 years, infection, malignancy and pregnancy. Patients are categorised into non-surgical and surgical. The surgical group is defined by the presence of procedure codes classified into 'laminectomy', 'discectomy', 'fusion' and 'other'. Examination of the data over calendar periods allows for the description of time trends for admissions and interventions.

9.6.1 Trends over time

Hospital discharges, for non-specific and mechanical LBP, have increased over time, including those for surgical procedures. There was an increasing trend for admissions in the Vote: Health public system from 2006/07 until 2011/12 when the admission rate reaches a plateau (Figure 5). Private and ACC funded rates are low in comparison. The ACC rate has been trending lower over time and the private rate shows variation around an apparently stable level. 'Private' data are privately funded discharges, these are under-reported and any facilities that have not reported at any point in the period have been removed from this analysis. ACC-funded discharges are also under-reported where these occur in private facilities.

Figure 5: Low back problem hospital discharges, age-standardised rate per 100,000 New Zealand population, 2006/07–2013/14

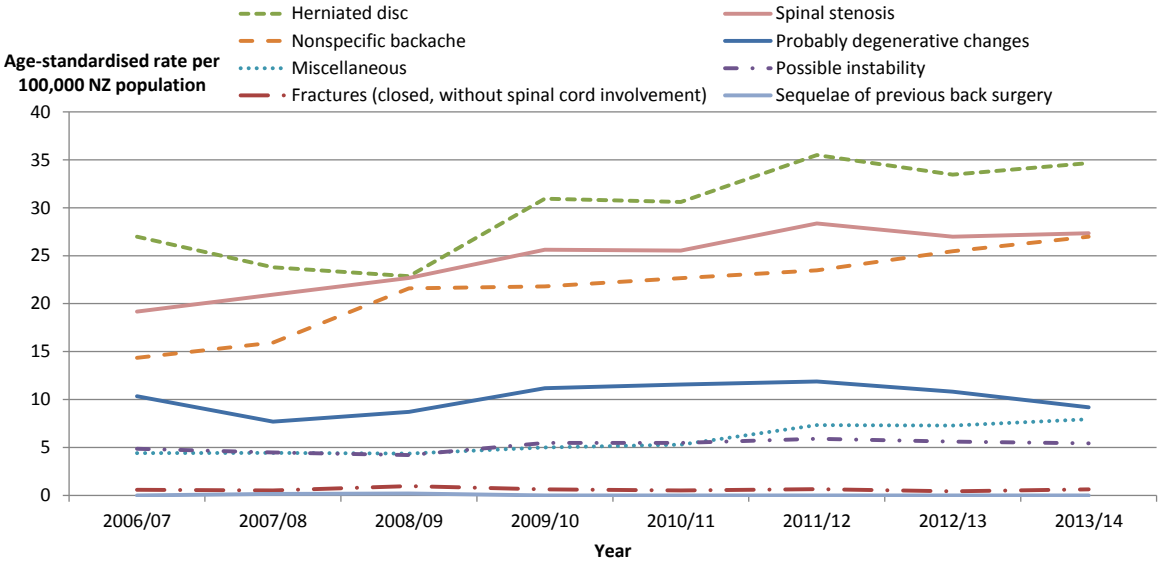


Note: Denominator population is New Zealand Health Tracker population; age-standardisation is to the 2014 New Zealand Health Tracker population.

Source: 2015 NHC analysis of 2006–2014 National Minimum Dataset

Herniated discs, spinal stenosis and non-specific backache are the three most common low back hospitalisation categories, all showing an increasing trend (Figure 6). This trend is more marked for the herniated disc category. The other categories have lower admission rates. Degenerative changes show an increasing trend over the last three years and over the full period shown the other diagnostic categories are stable.

Figure 6: Types of Vote:Health publicly funded mechanical low back problem hospital discharges, age-standardised rate per 100,000 New Zealand population, 2006/07–2013/14



Note: Denominator population is New Zealand Health Tracker population, age-standardisation is to the 2014 New Zealand Health Tracker population.

Source: 2015 NHC analysis of 2006–2014 National Minimum Dataset

For 2013/14, there were 3,688 publically funded hospital discharges, meeting the criteria for LBP conditions (Table 14). Of those, 2,820 (76%) were 'non-surgical' and 868 (24%) were 'surgical'. The most common categories for discharges are herniated disc and stenosis and then non-specific, which together comprise about three-quarters of the conditions.

Changes in discharges for non-surgical may be a reflection of coding of patients seen in Emergency Departments whose duration of stay determines their discharge status, which may explain the increase in the non-specific clinical category in particular. Greater presentation may be explained by increased expectation on the part of patients and clinicians to clarify the underlying basis of the LBP.

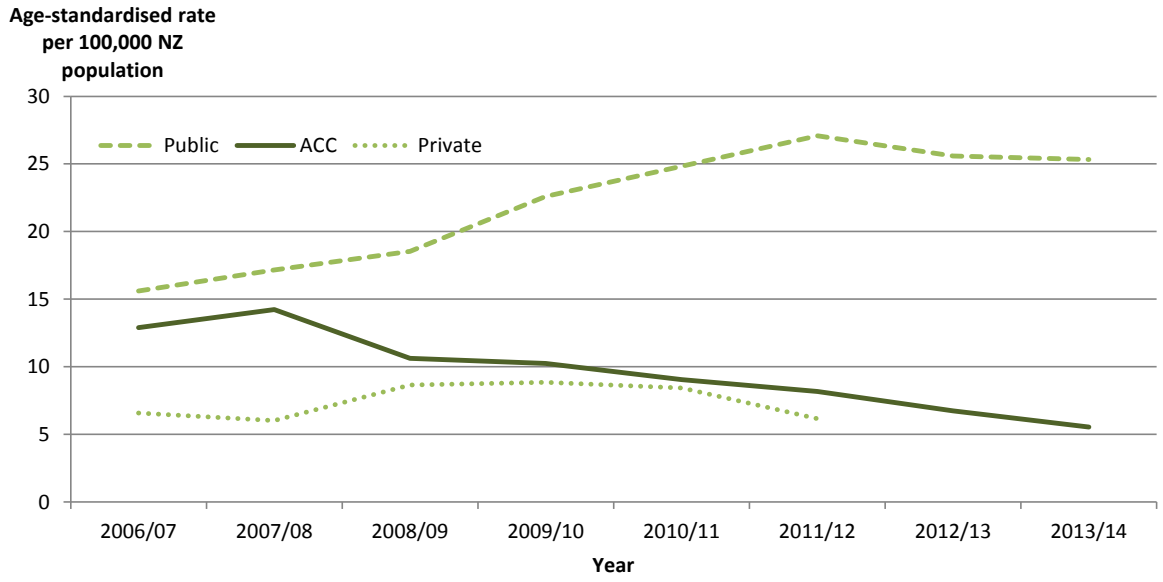
Table 14: Types of Vote:Health publicly funded low back problem hospital discharges, 2013/14

Condition group	Number of discharges (N)	Proportion of total discharges (%)
Fractures	22	1
Herniated disc	1188	32
Miscellaneous	272	7
Nonspecific backache	925	25
Possible instability	186	5
Probably degenerative	315	9
Sequelae of previous back surgery	2	0
Spinal stenosis	937	25
Total	3688	

Note: As discharges can have more than one diagnostic code there are some that are categorised in more than one condition group.

Source: 2015 NHC analysis of 2006–2014 National Minimum Dataset

Figure 7: Low back problem surgical hospital discharges by funder, age-standardised rate per 100,000 New Zealand population, 2006/07–2013/14

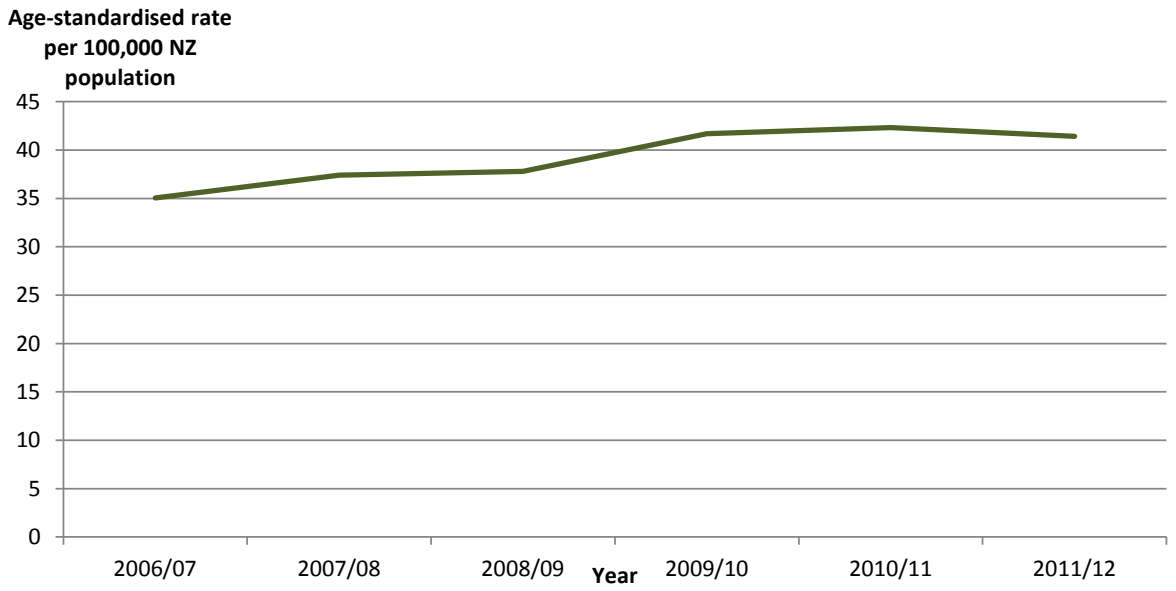


Source: 2015 NHC analysis of 2006–2014 National Minimum Dataset

There is an increasing trend for the rate of publically funded surgery and a reduction in the rate for ACC funded surgery (Figure 7). The rate for privately funded surgery does not appear to show a trend, though private facilities do not have to report to the Ministry of Health, so while efforts have been made to adjust for this, the data are somewhat incomplete. The combined rate for surgical discharges shows an overall increase (Figure 8). It appears that some of the increase in publically funded surgical discharges may be the result of a transfer of surgical discharges funded by ACC to the public health system. However, this does not explain all of the increase in surgical discharges

over time. Patients may also be referred to surgical care for reasons other than surgery, including the provision of clinical advice around condition management.

Figure 8: Total Vote:Health public, ACC and privately funded low back problem surgical discharges, age-standardised rate per 100,000 New Zealand population, 2006/07-2011/12



Source: 2015 NHC analysis of 2006–2014 National Minimum Dataset

The reasons behind the trends shown are multifactorial. As mentioned above, imaging is a key process that needs to be undertaken to confirm the cause of the back pain. The quality of MRIs and other imaging modalities have improved enabling this process and allowing surgeons to more precisely tailor their interventions to benefit patients. This also helps identify problems that were difficult to previously diagnose. However, access to MRIs has not necessarily been straightforward for all DHBs. These access issues may lead to a patient being admitted acutely so that a clinician can offer a more specific diagnosis and assessment for surgery in a timelier manner.

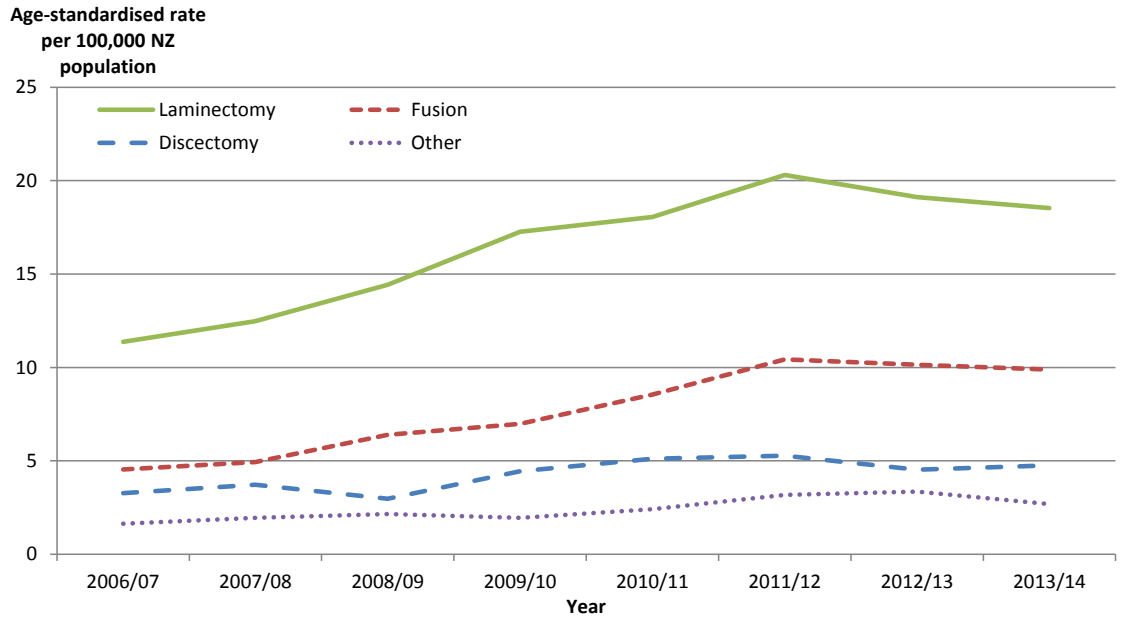
There has also been an increase in new implants and techniques over the last several years making more complex surgery possible and allowing treatment of previously untreatable conditions. Surgical techniques are also more minimally invasive making surgery more accessible to patients who otherwise might not have wanted or may have been discouraged by the time away from work needed for recovery. Clinicians are encouraged by evidence that earlier surgical intervention is more beneficial to patients with some conditions.

Underlying the trend is also the ageing population, who want to remain active for longer and who want to get back to work. Previous surgical procedures may not be sufficient to prevent ongoing degeneration and pain, resulting in patients returning for further treatment.

Additionally, from about 2006 there has been an increase in the available pool of orthopaedic surgeons who are sub-specialised in spinal surgery[19].

Figure 9 presents the pre-selected surgical procedures and shows the age-standardised procedure rates for Vote:Health spinal surgery over time. Rates are highest for laminectomy, then fusion and then discectomy. All show an initial trend for increase over time, which is more marked for laminectomy, but reaching a peak around 2011/12. Post 2011/12, the trend is reversed for both laminectomy and fusion with discectomy remaining more stable over the same period.

Figure 9: Low back Vote:Health publicly funded surgical procedure types, age-standardised rate per 100,000 New Zealand population, 2006/07–2013/14



Note: Denominator population is New Zealand Health Tracker population, age-standardisation is to the 2014 New Zealand Health Tracker population.

Source: 2015 NHC analysis of 2006–2014 National Minimum Dataset

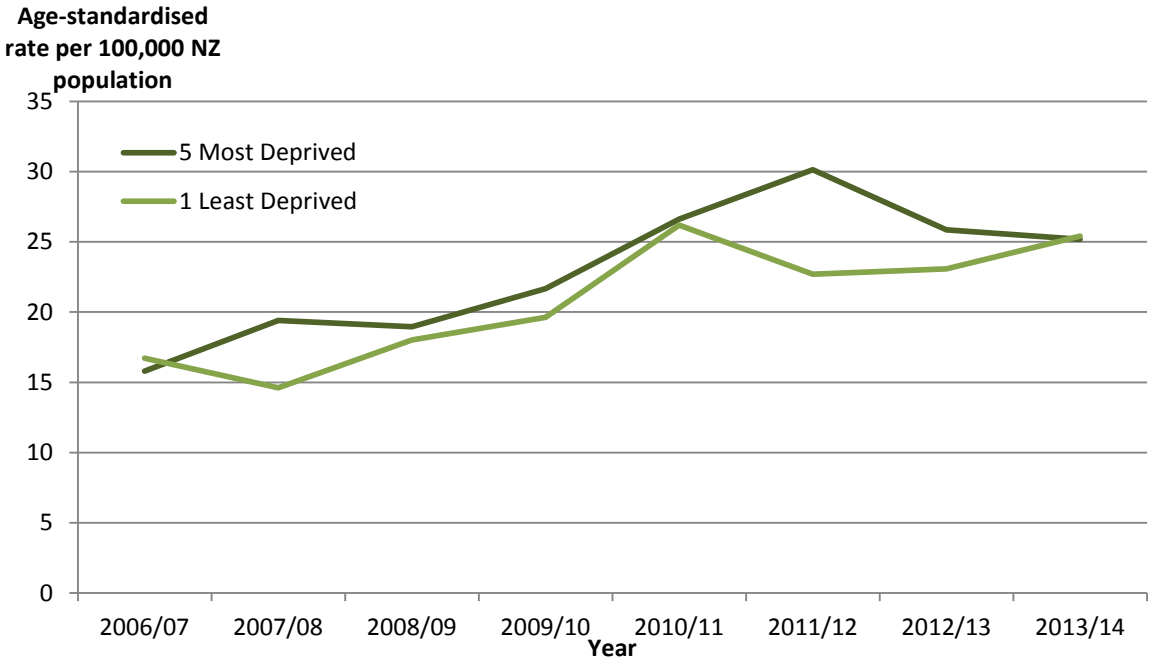
Despite the trend for increasing admissions in the public sector, more clearly for patients with herniated disc, spinal stenosis and nonspecific backache, there is an apparent reduction in rates for

[19] Personal communication

the most common surgical procedures in recent years. The apparent reaching of a peak surgical intervention rate and subsequent reduction in surgical intervention for laminectomy and fusion could have a number of explanations. With improved technology, improved diagnosis and surgical techniques the appropriate intervention rate for the eligible patient population for spinal surgery may have been reached from the historically lower rate. The reduction may be a true reduction in surgery and alternative interventions are not replacing surgery. Potentially the availability of other services prior to the consideration of a surgical intervention has improved and so fewer patients are being considered for surgery. It may be that the reduction is a true reduction in surgery brought about through application of patient selection criteria by DHBs. Alternatively the reduction might be a true reduction in surgery and alternative interventions are replacing surgery such as joint injections. Other factors were considered with further analysis:

- It does not appear to be due to a data coding issue.
- While surgeries for those living in the least deprived areas peaked a year prior to those living in the most deprived areas, there does not appear to be an overall difference in trend by social deprivation (Figure 10).

Figure 10: Low back problem surgical hospital discharges, patients from most and least deprived areas, age-standardised rate per 100,000 New Zealand population, 2006/07-2013/14

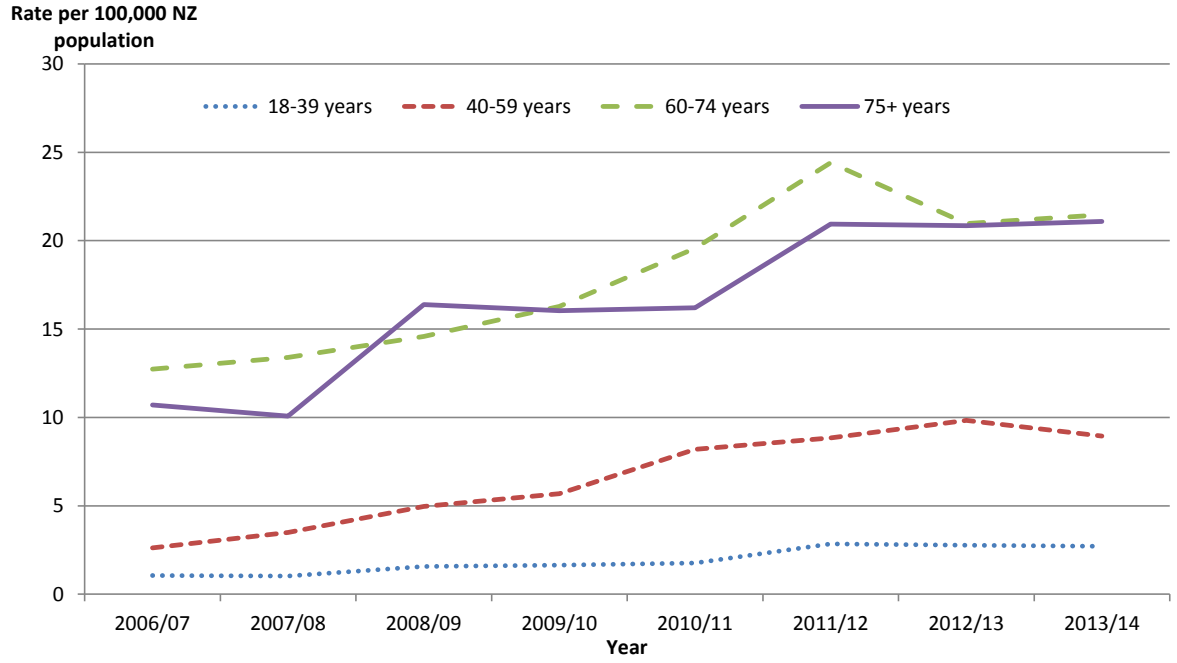


Source: 2015 NHC analysis of 2013/14 National Minimum Dataset

9.6.2 Spinal fusion surgical discharges

When Vote:Health publically funded spinal fusion is considered alone it is shown that rates are increasing for all age-groups (Figure 11). Fusion rates are higher in people aged 60 years and over. The rate of fusion has about doubled for all age-groups with the rate in the 40-59 years group, more than tripling since 2006/07.

Figure 11: Vote:Health publicly funded spinal fusion surgical discharges, by age group, rate per 100,000 New Zealand population 2006/07–2013/14



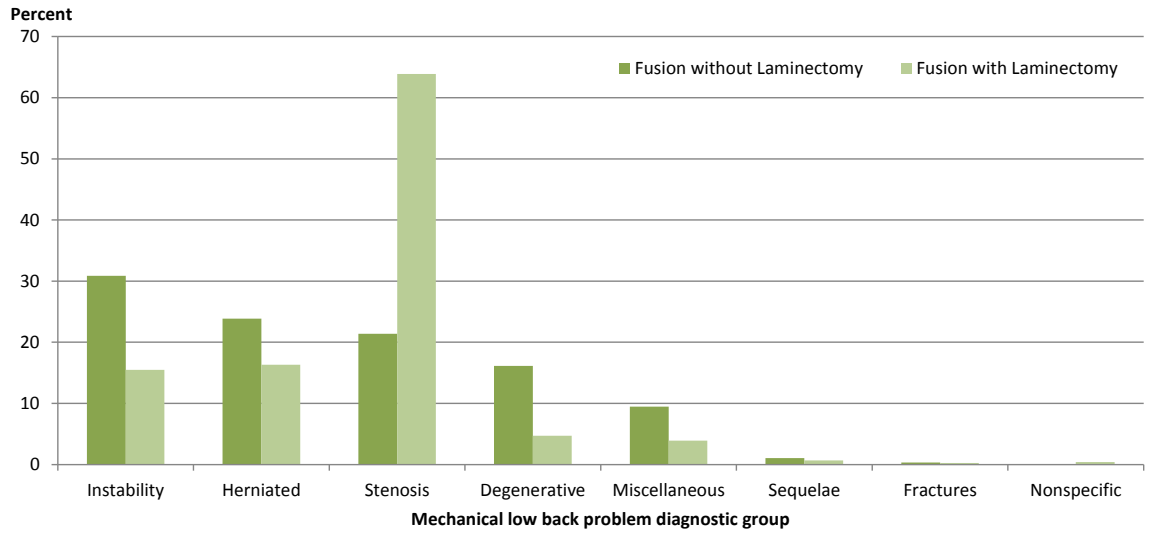
Source: 2015 NHC analysis of 2006 to 2014 NMDS

Spinal fusion without laminectomy is performed most commonly for patients with instability, herniated disc disease and spinal stenosis (Figure 12). When fusion is performed with laminectomy it is most commonly done in patients with spinal stenosis. As noted above, the evidence of benefit for fusion is stronger for instability associated with spondylolisthesis, with laminectomy there is less agreement over benefits and any are considered small. Over the 2011/12 to 2013/14 period fusion was performed in 10.5% of patients whose hospitalisation diagnosis category only included degenerative, miscellaneous or non-specific causes.

Cumulative re-operation post fusion has been reported at 20.1% at 11 years [(71)], 18% at 5 years[(72)] and 15% at 2 years of follow-up[(73)]. Re-operation rates maybe higher for spinal fusion than for laminectomy or discectomy without fusion and higher with internal fixation devices than bony fusion

alone[32]. Analysis of the LBP surgical patients, across all funders, shows that of those who had a spinal fusion procedure performed 90% did not have a subsequent hospitalisation for surgery within the time period covered. About 2.3% had a further fusion and 0.2% had two further fusion procedures. Subsequent fusion procedures were performed a mean of 30 months after the original. Of the remainder about 7% had their spinal fusion after a previous hospitalisation for another surgical procedure type and about 1% had another surgical procedure after fusion. Repeat surgery after spinal fusion appears low compared to international published estimates, though the timescales may be too short to give a true reflection and the method used may under-estimate further surgical episodes. The total time for follow-up may be inadequate to capture all re-operations and inadequate for those with recent first operations.

Figure 12: Vote:Health publicly funded spinal fusion surgical mechanical low back problem discharges, by diagnostic category, 2011/12–2013/14

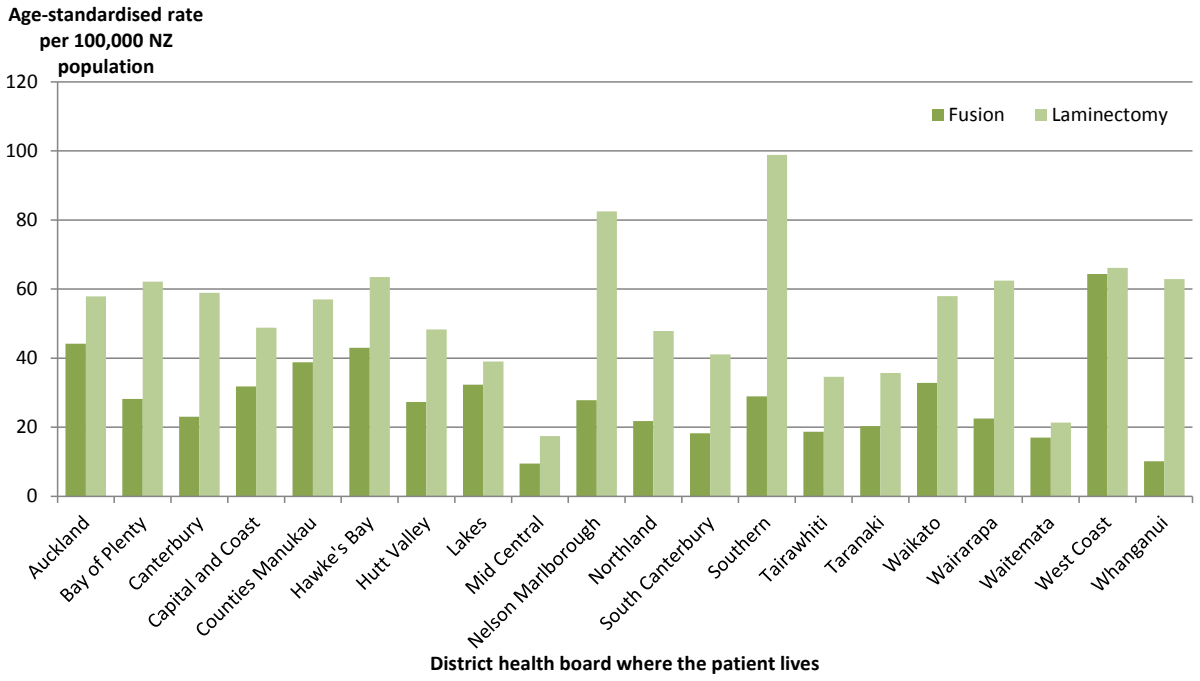


Source: 2015 NHC analysis of 2011 to 2014 NMDS

9.6.3 Variation in geographical access to spinal fusion

Rates for laminectomy are higher than fusion across all DHBs (Figure 13) and shows more variation than for spinal fusion. Some DHBs show marked variation in the ratio of laminectomy to fusion. This may reflect differences in the clinical presentation of patients but may also reflect a lack of clinical consensus regarding the optimal choices for clinical care.

Figure 13: Low back Vote:Health publicly funded spinal fusion and laminectomy, by District Health Board, age-standardised rate per 100,000 New Zealand population, 2011/12–2013/14



Source: Source: 2015 NHC analysis of 2011–2014 National Minimum Dataset

Mid Central, Waitemata and Whanganui DHBs have relatively low rates of spinal fusion and West Coast DHB has a relatively high rate. The rates for laminectomy appear relatively high for Nelson Marlborough and Southern DHBs. The ratio for laminectomy to fusion is relatively high for these two along with Whanganui DHB. It is important to note that this analysis is based on the DHB the patient lives in, rather than the DHB that provided the service.

The majority of DHBs perform most of their own fusion surgeries, however while the numbers are low it appears that Whanganui, South Canterbury, Tairawhiti and Wairarapa DHBs are largely reliant on other providers, with Lakes, MidCentral and West Coast also making some use of other DHBs (Table 15). We are aware that DHBs with higher numbers of patients experiencing lower levels of deprivation are more likely to have patients accessing services privately. The number of spinal surgeries in a DHB also depends upon whether and how many spinal orthopaedic and neurosurgeons are employed there. The ratio in West Coast DHB is likely somewhat indicative of the occupational mix of the population who live there being more likely to comprise physical activity. The rates are similar in the larger more specialised centres of the Auckland region, Wellington and Canterbury.

Table 15: Distribution of fusion surgical procedures for mechanical low back problems across District Health Boards, 2011/12–2013/14

DHB the patient lives in	Number of procedures carried out for patients who live in that DHB	Percentage of procedures where patient is treated in the DHB that they live	Percentage of procedures where patient is treated in another key DHB	Percentage of procedures where patient is treated by other DHBs	Name of 'key DHB'
Auckland	148	93.9	0	6.1	
Bay of Plenty	50	88	6	6	Auckland
Canterbury	100	100	0	0	
Capital and Coast	72	97.2	0	2.8	
Counties Manukau	138	98.6	0	1.4	
Hawke's Bay	56	96.4	0	3.6	
Hutt Valley	34	76.5	23.5	0	Capital and Coast
Lakes	27	33.3	51.9	14.8	Waikato
Mid Central	11	36.4	63.6	0	Capital and Coast
Nelson Marlborough	34	76.5	11.8	11.7	Canterbury
Northland	34	94.1	0	5.9	
South Canterbury	8	0	87.5	12.5	Canterbury
Southern	76	98.7	0	1.3	
Tairawhiti	7	0	85.7	14.3	Waikato
Taranaki	19	78.9	10.5	10.6	Capital and Coast
Waikato	99	91.9	6.1	2	Counties Manukau
Wairarapa	9	0	66.7	33.3	Capital and Coast
Waitemata	72	76.4	19.4	4.2	Auckland
West Coast	21	47.6	52.4	0	Canterbury
Whanganui	5	0	80	20	Capital and Coast

Note: 'Key DHB' has been defined as the DHB, that is not the DHB of domicile, doing the highest number of procedures where this is at least five percent.

Source: 2015 NHC Executive analysis of 2011–2014 National Minimum Data Set

Historically the provision of spinal fusion in New Zealand has been greater in the private sector than in the publicly funded sector (Table 16). However, privately funded spinal fusion numbers are only reliably available for those provided by Southern Cross. In the three most recent years for which data is available around 340 spinal fusions have been funded annually through Vote:Health. In comparison the annual ACC volumes have dropped markedly from 75 to 21.

Table 16: Provision of spinal fusions by funder 2006/07–2013/14

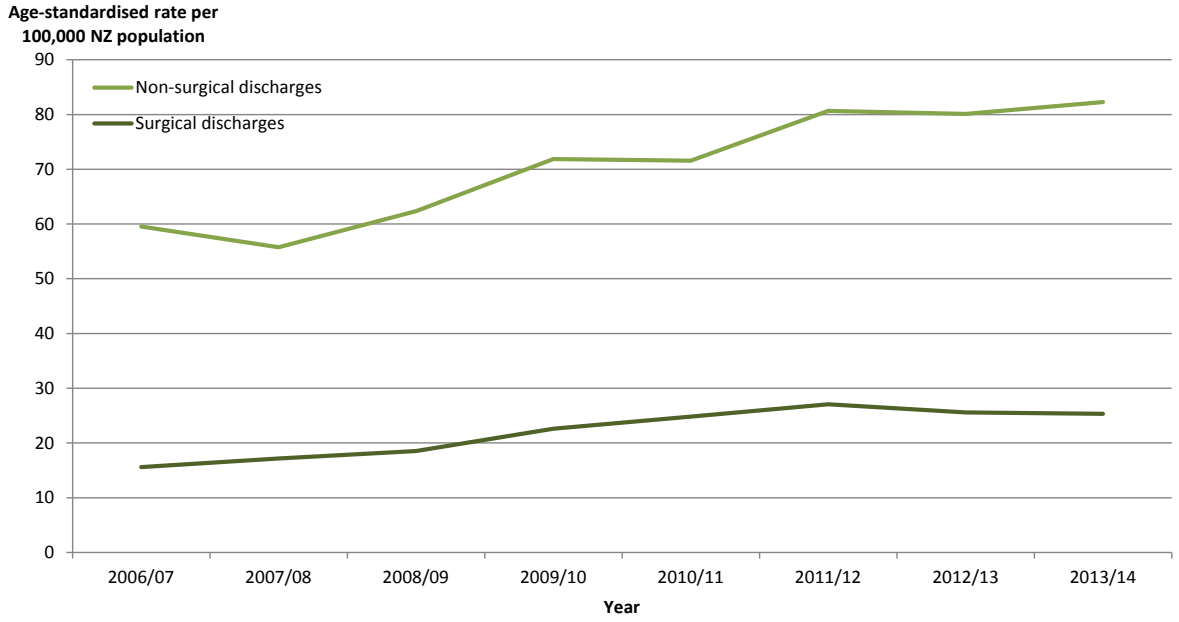
Financial Year	Vote:Health	ACC	Southern Cross
2006/07	127	61	184
2007/08	146	73	257
2008/09	197	87	213
2009/10	215	77	224
2010/11	276	77	213
2011/12	345	75	179
2012/13	342	56	247
2013/14	339	21	194

Source: 2015 NHC Executive analysis of National Minimum Data Set and Southern Cross

9.6.4 Surgical and non-surgical discharges

Both surgical and non-surgical discharges have increased and then plateaued (Figure 14). Acute non-surgical discharges are the highest type of LBP admission, increasing the most and continuing to increase in recent years when the other types of discharges plateaued (Figure 15).

Figure 14: Vote:Health publicly funded low back hospital discharges, age-standardised rate per 100,000 New Zealand population, 2006/07–2013/14

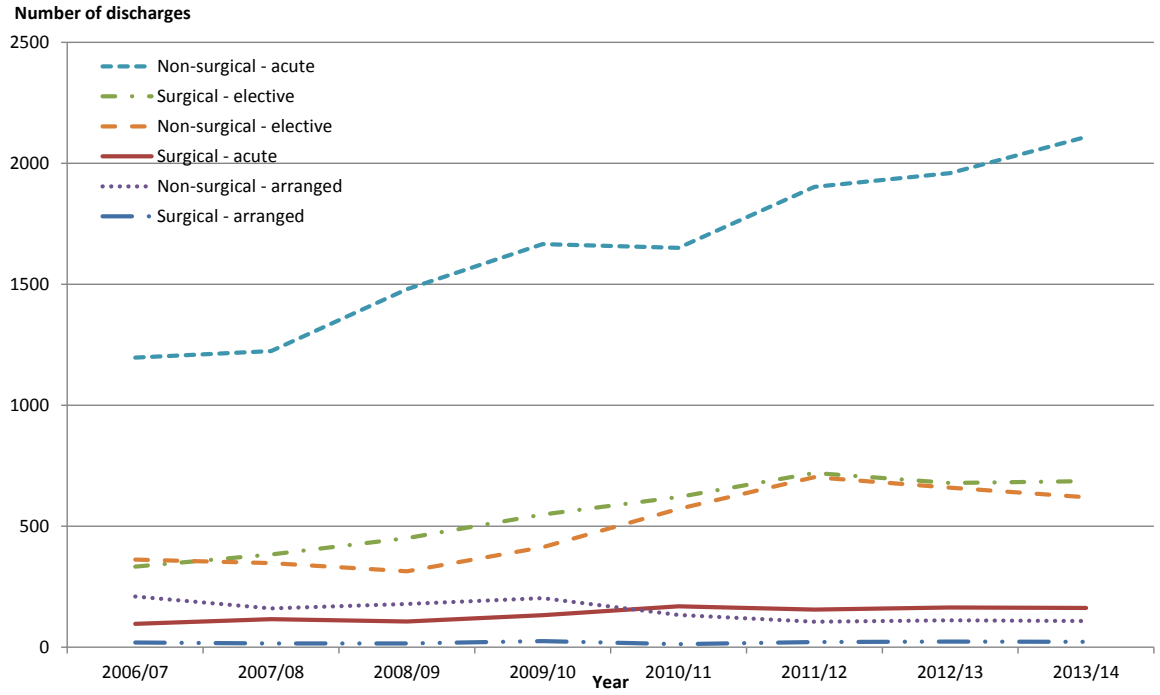


Source: 2015 NHC analysis of 2006–2014 National Minimum Dataset

As commented above, the non-surgical admissions may be partly explained by presentations to emergency departments and this may be particularly relevant to the acute non-surgical trend (Figure 15). To provide some insight as to why 'non-surgical' patients are admitted the first three procedure codes for these admissions were searched and categorised (Table 17 and Table 18). For the 'non-surgical' admissions, where codes are present it can be seen that those admitted acutely

predominantly have diagnostic procedures and that those admitted electively predominantly have injections. The elective admissions are likely to be explained as day-case events, but these have not been specifically identified in this analysis.

Figure 15: Number of Vote:Health publicly funded low back problem hospital discharges, by admission type, 2006/07-2013/14



Source: 2015 NHC analysis of 2006–2014 National Minimum Dataset

The tables below (Table 17 and Table 18) offer some explanation for the 'non-surgical' admissions, which include patients receiving therapeutic injections and admissions that include diagnostic investigations. Patients appear to be being admitted for pain relief with a package of care including attendance to any social issues and perhaps introduction to physical therapy being wrapped around the patient while they're in hospital. Implementation of ways to improve access to MRI should reduce admissions driven by diagnostic need and so a reduction in admissions would be expected. Additionally, if the acute discharges are explained by emergency department attendances, these may be explained by inadequate access to pain control services in the community. The reason for the increase in the 'non-surgical' discharge rate is not clear and in particular the greater increase related to acute admissions.

Table 17: Types of procedures (first three procedure codes) carried out during Vote:Health publicly funded non-surgical acute admissions, 2011/12–2013/14

Procedure type	Count
Anaesthesia	58
Diagnostic	2203
Injection	426
None	14330
Occupational	234
Other	109
Pharmacy	92
Physiotherapy	346
Social work	112

Source: 2015 NHC analysis of 2011–2014 National Minimum Data Sets

Table 18: Types of procedures (first three procedure codes) carried out during Vote:Health publicly funded non-surgical elective admissions, 2011/12–2013/14

Procedure type	Count
Anaesthesia	94
Diagnostic	265
Injection	1997
None	3514
Other	76

Source: 2015 NHC analysis of 2011–2014 National Minimum Data Sets

9.6.5 Ongoing Care

In 2012/13, there were 783 Vote:Health funded patients and 420 ACC claimants who had surgery for low back problems. The clinical services or providers accessed by the ACC claimants in the 12-month period before and after their surgical episode are presented in Table 19.

Table 19: Service use by ACC low back surgical clients, 2012/13

Service/provider	Number of ACC clients	Usage rate (%)	Median no. of 'visits'
Acupuncturist	63	15	16
Ambulance Officer	8	1.9	1
Chiropractor	55	13.1	12
Diagnostic Radiologist	397	94.5	4
General Practitioner	401	95.5	13
Mental health	21	5	40
Musculoskeletal Medicine Specialist	39	9.3	6
Not Specified	385	91.7	133
Nurse	31	7.4	27
Occupational	30	7.1	6
Orthopaedic Surgeon	386	91.9	10
Osteopath	51	12.1	9
Other	199	47.4	8
Physiotherapist	340	81	18
Rehabilitation	79	18.8	14
Sports Medicine Specialist	18	4.3	3

Source: 2015 NHC analysis of 2015 NHC analysis of 2009–2014 ACC claim payments data

It would be expected that contact with an orthopaedic surgeon, GP and radiology would be 100% for patients undergoing surgery. However the proportions are close to 100% and so the data regarding contact with other services may be assumed to be a reasonable reflection of actual service use. It is notable that about 81% of patients have seen a physiotherapist, 12% an osteopath and 13% a chiropractor. About 19% received rehabilitation services and 5% mental health services.

Table 20: Summarised pathway of secondary publically funded care for Vote:Health publicly funded surgical patients in 2012/13

Pathway of care components	Percent
Only Surgery	2.17
Outpatient pain intervention/therapy and any other combination of treatment	6.90
Neurosurgery outpatient consultation/s and no other related outpatient events	6.77
Orthopaedic surgery outpatient consultation/s and no other related outpatient events	45.21
Outpatient physiotherapy and no other related outpatient events	2.30
Physiotherapy & Neurosurgery outpatient consultation/s	2.43
Physiotherapy & Orthopaedic surgery outpatient consultation/s	29.37
Physiotherapy, Neurosurgery & Orthopaedic surgery outpatient consultation/s	1.02
Other pathway type (eg, specific pharmaceuticals or spinal consultations and surgery)	2.17

Note: Patients' (N=673) pathway of care was limited to looking one year prior and one year post the admission date for their surgical event.

Source: 2015 NHC analysis of National Minimum Data set and National Non-Admitted Patients Collection

Assessing the pathway of care data for people who had Vote:Health funded surgery in 2012/13 (Table 20) the data indicate that 2.2% of patients receive surgery alone and that about 35% receive

physiotherapy and about 7% pain services. The low figure for patients only having surgery in the public system could be explained by pre and post care being delivered in the private system. Of these surgical patients 45% appear to receive only orthopaedic outpatients contact and about 76% have orthopaedic contact. We are aware of at least one DHB in which candidates for back surgery are as likely to be referred to neurosurgeons as orthopaedic surgeons, including neurosurgery consultations brings the proportion of those who have seen a specialist to 88% still lower than the ACC orthopaedic surgeon consultation figure but sufficient to consider the data reliable and informative. Physiotherapy services were received by 39% of surgical patients and 51% had received pain modifying medication (anti-depressants or anticonvulsants).

Of those patients, indicated to have received pain services, about 50% receive them before hospitalisation and 50% after. More surgical patients are accessing pain services prior to surgery (67%) which would be expected. For non-surgical patients access to pain services is greater after hospitalisation (59%) possibly in keeping with these patients being admitted in part for pain relief and diagnostic assessment.

The results of this analysis may be compromised by the quality of the data collection but do appear outside reported clinical experience. If the data are considered sufficiently robust, in comparison to the ACC funded patients receipt of physiotherapy care appears low, as does having rehabilitation and pain intervention services. If the data are a true reflection of service provision then patients having surgery in the public system receive less rehabilitation services than those funded by ACC.

In 2012/13 there were 2,022 Vote:Health publicly funded non-surgical hospitalised patients and 80 ACC funded non-surgical hospitalised patients. For admitted non-surgical patients funded by ACC the services received are less than for the surgical patients. The number of patients is small but 31% received physiotherapy and 9% were seen by an orthopaedic surgeon. In contrast for the public system patients 22% received physiotherapy and 5% pain interventions.

The data analysing the clinical services need to be viewed with some caution. However, the data do indicate that a greater proportion of surgical patients have greater contact with additional care services than non-surgical patients and that ACC funded patients have greater contact with additional care services than Vote:Health publicly funded patients.

9.6.6 Costs

The estimate for the cost of Vote:Health publically funded patients is $23.2 million while the estimate for the ACC funded patients is $12.8 million. The costs are for 2,805 Vote:Health publicly funded patients and 500 ACC funded patients. The ACC data is more complete and patients receive more services than Vote:Health publicly funded patients and the costs cover the full history of their claim. For the Vote:Health publicly funded patients the data for services received is less reliable and limited to the two year period around their hospital event.

The average national price of a surgical discharge is about $18,000 and for spinal fusion (with or without laminectomy) is $23,300. In 2013/14 there were approximately 340 spinal fusion procedures funded by DHBs for mechanical low back problems, at a total cost of close to $8 million.

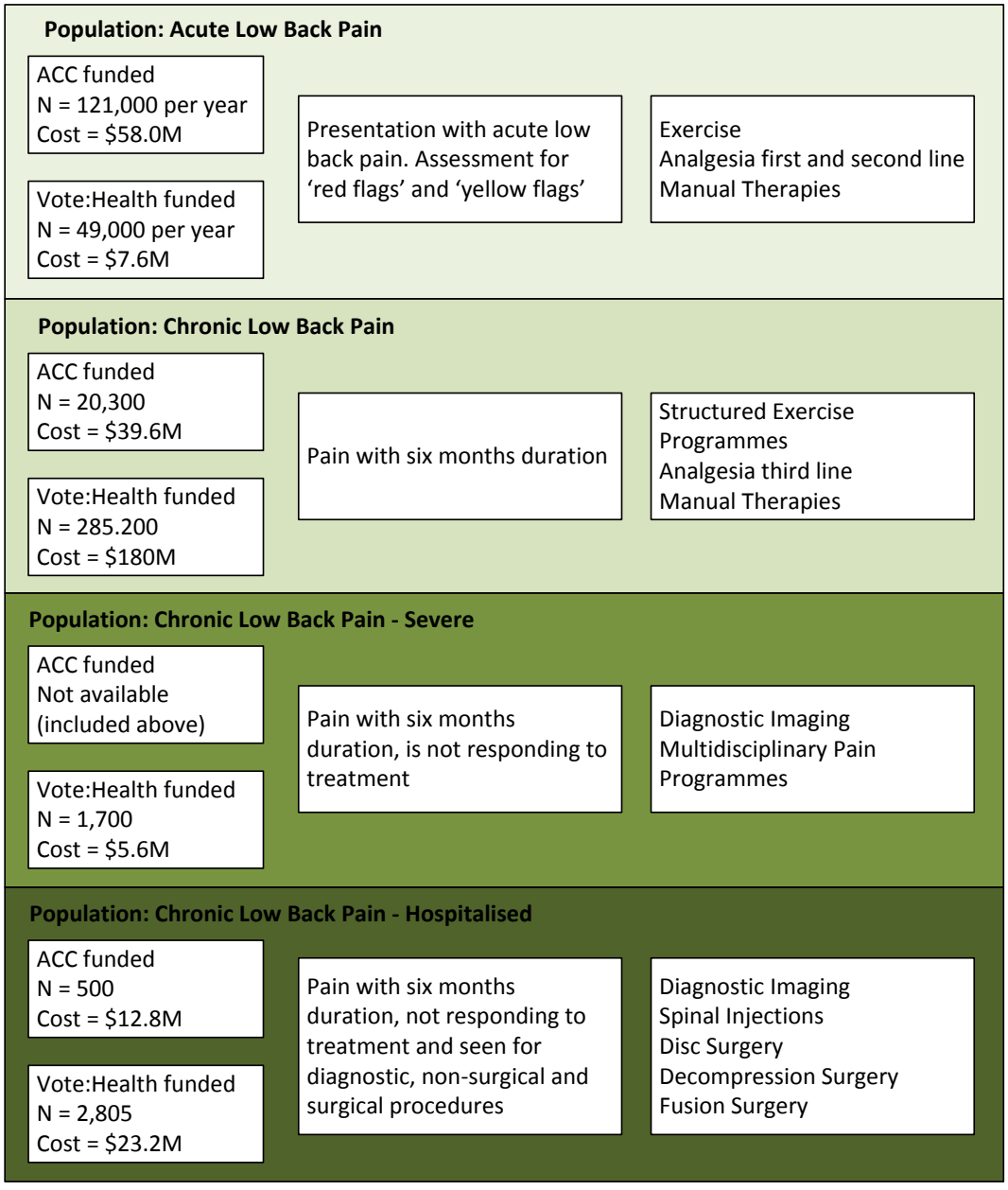
Southern Cross Health Society provides coverage for about 61% of the insured population in New Zealand. The number of insured adults in 2015 is about the same as 2006 with a peak in 2009, about 2.5% above 2006.[20] Southern Cross total surgical volumes for lower back episodes varied per annum from 600 to 850 in the period 2006/07 to 2013/14, with more recent years at the higher end. In this period average costs per episode steadily increased from around $12,000 to over $22,000. Southern Cross spinal fusion volumes varied over the period ranging from 184 to 257 per annum, with average costs showing a similar steady increase in average cost, from around $24,000 to $45,000.

[20] Personal communication

10 Overview

Figure 16 provides a summary overview of the LBP population groups for Vote:Health publicly funded and ACC funded patients.

Figure 16: Summary model of care with costs by ACC and Vote:Health public system funding, 2012/13



Source: 2015 NHC analysis of 2012/13 ACC claims data, National Minimum Data Set, Pharms Warehouse, and National Non-admitted Patients Collection

Of the total patients, funded by either ACC or Vote:Health, the percentage funded by ACC varies from around 70% for acute LBP patients, 7% of chronic LBP patients and 15% of those hospitalised for LBP.

From the ACC cohorts analysed, mechanical and non-specific low back problems, cost approximately $110 million per year. The average cost per ACC client varies considerably from $480 for an acute claim, $1,950 for a chronic LBP patient and $25,600 if the client has surgery. In comparison, estimated costs for Vote:Health patients for acute, chronic and hospitalised LBP patients average at around one third of ACC costs, although a large proportion of Vote:Health hospitalised patients do not receive surgery. The ACC costs are health care provision related and do not include income compensation payments.

The reliability of the cost estimates vary, however, depending on the data sources and the assumptions that have had to be made. The ACC claims data are more comprehensive. The total costs of care for ACC clients are greater in the earlier stages where the number of patients affected is much greater but for Vote:Health patients they are greatest for those with chronic LBP.

There are significant healthcare costs across the model of care for LBP with approximately 70% of direct healthcare costs for treatment by chiropractors, general practitioners, massage therapists, physiotherapists and acupuncturists.

However the total cost for LBP, including those related to injury, is greater than that described above. Significant economic costs will also arise from prolonged loss of function leading to decreased work productivity and disability payments covered by ACC or other social welfare benefits. A New Zealand study of LBP in young New Zealanders estimated the cost of loss of income as $640million (adjusted to 2015 dollars).

ACC has an injury cost calculator for employers to use to estimate how much an injury will cost their business in for example lost productivity and replacement staff.[21] Approximately 61% of people with (chronic) LBP are 18-59 years and the employment rate is 65%. Applying these figures to the LBP population represented in Figure 16 we can estimate the cost of LBP to businesses to be approximately $1.7 billion. However, an indication of the size of the total non-health care costs is given by an Australian study which estimated that the direct healthcare costs associated with LBP in adults were Aus$1.02 billion in 2001.(74) The indirect costs (such as loss of productivity) were

[21] http://www.acc.co.nz/preventing-injuries/at-work/injury-cost-calculator/PI00079

Aus$8.15 billion. Applying this ratio of direct to indirect costs to the direct costs outlined in Figure 16 we get an estimate of non-health care costs of LBP of $2.6 billion, putting the total costs of LBP at close to $3 billion. [75]

Summary

Care for patients with LBP is funded by three sources: Vote:Health, Vote:ACC and private insurer/out of pocket contributions and is provided in primary and specialist secondary services regardless of which funder pays.

Currently, there is no full Model of Care approach that provides a clear pathway across acute and chronic.

The rate of surgical discharges, for LPB treatment, has increased over time with laminectomy and spinal fusion procedures being the most commonly performed procedures. It appears the peak seems to have been reached and there has been a slight decline in recent years. Reasons for this decline are not known but may feasibly be accounted for by a change in clinical behaviour or provision of alternative treatments.

Reasons to explain the historical increase in spinal surgical discharges are likely multifactorial; including improvements in diagnostic imaging identifying the likely cause of pain, the development of surgical techniques to treat a greater range of conditions, increased numbers of and access to orthopaedic spinal specialists, and patients desiring to remain active into old age.

There has been an increasing trend over time in the procedure rate of spinal fusion, across all age groups, with the rate stabilising in more recent years. The use of spinal fusion has been expanded to include pain from degenerative diseases, with the majority of procedures now performed being for spondylosis (spinal degenerative diseases), disc disorders and spinal stenosis (in the absence of deformities)[32]. The clinical outcomes of spinal fusion are variable, leading to continuing debate about which patients might benefit from the procedure[32]. Laminectomy is indicated for the treatment of spinal stenosis.

In the 2011/12 to 2013/14 period about 11% of those patients receiving spinal fusion have been for clinical conditions for which the evidence of benefit is less robust, such as non-specific LBP. Spinal fusion has a relatively high cost compared with non-invasive management strategies for chronic LBP and associated with a significant complication rate. It is estimated that the cost of fusion surgery for mechanical and non-specific low back problems was about $8 million for 2013/14. However, fusions are performed in conjunction with other spinal surgery, though the cost of fusion with laminectomy is similar to that without laminectomy.

The appropriateness of surgery with reference to a patient's clinical condition is more nuanced than can be considered from the analysis of administrative data. However, there is some variability across DHBs for laminectomy and spinal fusion intervention rates. This could indicate that some patients are not receiving beneficial surgery or that some patents are receiving surgery that is less beneficial. Overuse of surgery may reflect variation in the assessment of clinical benefit but also could be a reflection on the inadequate provision of effective non-surgical management options.

Evidence suggests that patients with non-specific LBP should only be referred for surgery after having completed an optimal package of care[12] and where complex care has failed to provide significant improvement[14].

Effective treatment, earlier in the patient's course, improves outcomes and prevents the development of chronicity and so provision earlier in the model of care may reduce the number of patients with more severe clinical conditions presenting to specialist services.

However this optimum package of care is not currently uniformly available in the New Zealand system, regardless of which of the three funders (Vote:Health, Vote:ACC or private out of pocket insurer) pay for patient care.

The intensity of service provision is greater for those patients funded through Vote:ACC. That is, patients with chronic LPB, have greater access to physiotherapy and complex pain services while patients who have surgery funded through Vote:Health are not commonly being seen by pain management services.

This variation in intensity may be due to a number of factors, including the differing roles and responsibilities of the funders; for example ACC's role as a national insurer, with an emphasis on rehabilitation to enable return to work and so reduce reliance on income compensation; and the type of patient (underlying pathology of injury or chronic deterioration of the spine) each funder deals with.

While the expected level of access to complex pain services is not known, it is apparent that access to specialised pain services for patients with chronic LBP regardless of funding source is inadequate overall. There appears to be geographical variation in the provision and variation in the pain management components offered.

Provision of pain specialists is low against a standard of specialists per population, and it appears that not all patient referrals are being assessed in a timely manner and patients with LBP are being seen late in their clinical course.

It is feasible that improved and adequate provision of specialised pain services provided appropriately earlier in the clinical course will improve clinical outcomes for patients with LBP and avoid referral to surgical services and future surgical interventions.

In depth assessment of the impact of increased access to specialist pain services would enable better estimation of an appropriate surgical intervention rate for LBP.

In conjunction with assessing specialist pain services in secondary care, the provision of pain services in the primary care/community setting delivered earlier in the clinical course could also be assessed. The various components of pain services could be considered, their relative effectiveness within the service delivered and the transferability of these interventions to alternatives settings.

Vote:Health publically funded patients with chronic LBP appear to receive a lower level of physiotherapy and other allied health services compared to ACC funded chronic LBP patients. Access to similar levels of manual therapies for all chronic LBP patients may decrease the numbers of patients who progress to receive surgery.

Evidence suggests that manual therapies and structured exercise programmes improve health outcomes, and are considered modestly effective. Additionally structured exercise programmes are considered effective in reducing pain and disability though the effect is small but cost effective compared to general care.[12] A stratified approach to the provision of physiotherapy shows improvement in disability, quality of life and cost savings compared to standard care.[15]

The sector is generally concerned by the inappropriate use of diagnostic testing [76], and this issue is best dealt with through the provision of relevant information and guidance for patients and practitioners about the management of acute and chronic low back pain. The New Zealand Council of Medical Colleges is spearheading the astute application of the New Zealand version of the 'appropriate use of resources / Choosing Wisely' thinking in this area.

However there has been an increasing trend in the hospitalisation of patients with mechanical and non-specific LBP. Patients who do not have surgery appear to be hospitalised for diagnostic reasons and for delivery of therapeutic injections. There are indications that access to diagnostic imaging for

patients with chronic low back pain is sub-optimal and this may be a partial explanation of acute non-surgery related hospitalisations.

Diagnostic imaging is necessary in the detection of underlying causes of LBP, that may be indicated by clinical 'red flags", that require a different approach to that pursued for patients with mechanical or non-specific LBP. Timely diagnostic imaging would facilitate improved stratification of patient need for more intensive treatment and so allow for the fast tracking of patients into specific care.

11 Next Steps

The estimated non health care costs to the New Zealand economy are estimated to be of $2.6 billion, putting the total costs of LBP at close to $3 billion.

New Zealand through Vote:Health and Vote:ACC spends $321.2 mil per annum on the care of patients with acute and chronic low back pain, with $36 million on direct hospitalisation costs.

Over the three year period 2011/12 to 2013/14 approximately 11% of spinal fusions done were not clinically indicated. These hospital events totalled approximately $2.5million over this period, which might have been better invested in services in other settings that delay or avoid the need for surgery.
In addition to unwarranted surgery costs, the patient benefit and return on investment from $321.2 mil in other cares is also likely to be limited given New Zealand does not have a complete evidence based model of care for the treatment of chronic low back pain.

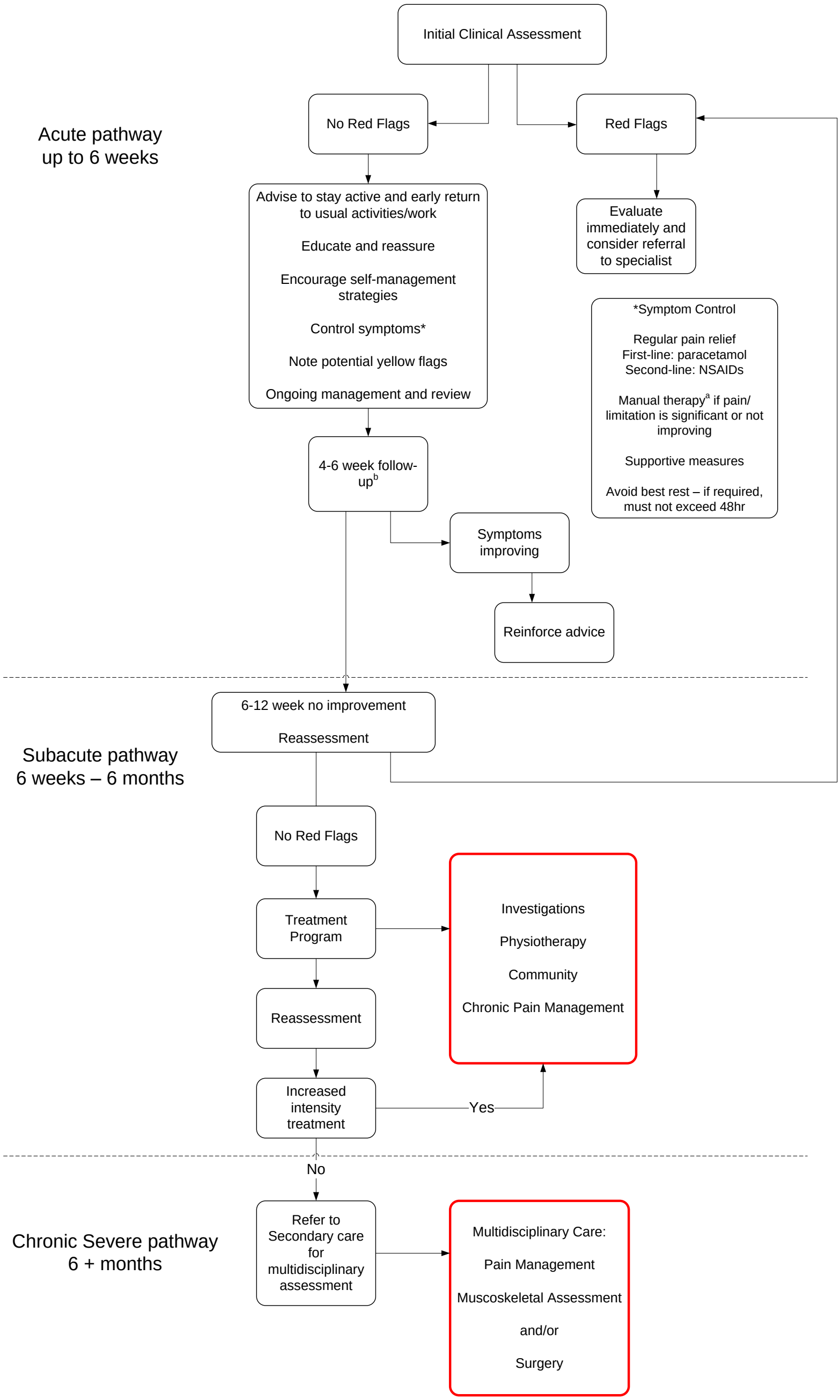
Evidence presented in this assessment proposes that there are critical treatment options that if in place could significantly improve outcomes for patients and the sector.

It is imperative that treatment options to prevent the deterioration of the patient's condition whereby surgery is necessary or indeed the only treatment available to be offered to the patient. These include:

- Improved access to community diagnostics
- Access to manual therapies and targeted exercise programmes
- Community based chronic pain management programmes
- Improved access to comprehensive specialist complex pain management

These services are illustrated below in a proposed New Zealand Model of Care for chronic low back pain in Figure 17 below.

Figure 17: Proposed New Zealand Model of Care for patients with low back pain.



In order to understand the utility of this new model of care the NHC proposes to complete 2 Tier3 assessments

Both assessments will apply the NHC standard business cases for change methodology; with the first assessment concentrating on the optimum package of community based cares (access to community investigations, manual therapies and chronic pain management) to identify the evidence of effectiveness, mix and volume of services necessary to achieve benefit, and the impact on patient outcomes and system sustainability.

The second assessment will similarly investigate the optimal configuration of specialist multidisciplinary pain management services.

These Tier 3 assessments will provide evidence based commissioning advice for service funders and care providers on the following:

- Service components and service delivery design including service connectivity requirements within community and primary care settings
- Size and description of target populations
- Service level investment requirements for operational costs, workforce and capital
- The expected return on investment including the impact on referrals to secondary care for first specialist assessments, investigations and medical and surgical admissions and procedures
- Service performance expectations and indicators, including for example the levels of intervention at part of the Model of Care

Appendix 1: Methods

Model of care

To inform the model of care, various guidelines were searched, including the New Zealand Acute Low Back Pain Guide,[5] UK National Institute for Health and Care Excellence (NICE) guidelines,[12] British Orthopaedic Association/ Royal College of Surgeons of England commissioning guide[14] and other relevant guidelines from the US and Canada.[3, 11] Systematic reviews and consensus documents were used to provide additional information about specific interventions.

Population: New Zealand Health Tracker

The New Zealand health Tracker (NZHT) is a health census of resident New Zealanders created through the linkage of data in the Ministry of Health's national collections and other data sources. It was established and is maintained by the Ministry of Health's Health and Disability Intelligence (HDI) unit. The NZHT has been used as the population data set for calculating rates and estimates of population burden in this work on low back pain. It has also been used to standardise the rates for any differences in population age structures over time and between DHBs.

Health outcomes: New Zealand Burden of Disease Study

Some prevalence and health outcome data for back conditions were obtained from the New Zealand Burden of Diseases, Injuries and Risk factors Study, 2006 – 2016 (NZBDS).[6] The NZBDS definition of back conditions included spondylosis, spinal stenosis, ankylosing hyperostosis and other spondylopathies (excluding those due to traumatic causes, fracture or collapsed vertebrae), cervical and intervertebral disc disorders, other dorsopathies and dorsalgia (including sciatica and other radiculopathy, low back pain). Spinal cord injury and spinal fracture were excluded. The mortality and disability-adjusted life year (DALY) figures from the NZBDS in this report are for the New Zealand population in 2006; these are the most recent data available from the NZBDS.

ACC claims data

ACC provided non-identifiable data of each claim, and associated payment and claimant that has had a mechanical low back problem as defined below. ACC records have been analysed to provide some insight both into the pathway of care of a patient with a low back injury ACC claim, as well as primary care usage generally.

Many people may have low back pain and access private primary care services, or publically funded private care services that we do not currently have easy access to data on, or algorithms for identifying whether someone is accessing the service for low back pain or something else.

We have simplified our analysis of the ACC data by limiting it to people who only have a lower back injury. This means we underestimate the ACC figures; however from the data we analysed it was otherwise unclear whether a client was accessing a service for their lower back injury, or another injury they sustained in the same ACC claim.

It is also very important to note that ACC patients usually have co-payments for GP visits, radiology, and physiotherapy. The GP visit co-payments are usually similar to those of non-ACC GP visits, however it is likely someone paying privately for physiotherapy would have to pay more than is estimated using the ACC data.

The analysis of the ACC data uses the provider that ACC has registered with the service the client has accessed. This can mean that a patient attends 'Osteopaths', but the provider is registered as a 'Rehabilitation Professional'.

For the purposes of our analysis Counsellor, Psychologist, Psychiatrist, and psychotherapist have been grouped into 'Mental health' – we acknowledge that the figures associated with this group are 'untidy', this is likely due to the grouping we have done. We have kept this in here as mental health is an important part of any pathway of care, however caution is advised when looking at these figures and further analysis should be done if mental health is a priority. We have grouped Rehabilitation Professional and Rehabilitation Medicine Specialist into 'Rehabilitation'. We have grouped Occupational Medicine Specialist and Occupational Therapist into 'Occupational'. 'Not specified' includes Undefined, Assessor, and Electronic Billing Provider, while all other providers including other types of specialists and surgeons that did not seem directly individually relevant to this work have been included as 'Other'.

Mechanical Low Back Problem Definition

Cherkin et al defined a mechanical low back problem using a combination of ICD-9 diagnosis and procedure codes, grouping these into eight categories, as well as whether they were surgical and non-surgical patients, and for those who were surgical, which of four types of surgery they had experienced[70].

Only adults 18 years and over were included as children have a different distribution of back pain causes to adults and are unlikely to be hospitalised.

We used both the Ministry of Health's mapping table[22], as well as clinical expertise to translate the ICD9 codes used in Cherkin et al's definitions into ICD-10 codes, as New Zealand's National Minimum Data Set (NMDS) uses ICD-10-AM for data post-2000 (Table 21 and Table 23). We also went through the ACC's READ code list[23] and identified codes that fitted this definition of mechanical low back problem (Table 21 and Table 23).

The general approach laid out in Cherkin[(70)] excludes infectious, malignant and inflammatory causes of low back pain, fracture is included but injury to spinal cord excluded (Table 22). Lumbar and sacral regions are included and cervical, thoracic and unspecified are excluded.

In selecting the READ codes and review of ICD 10 codes the above criteria have been applied. Specifically:

- open fracture are excluded
- spinal or nerve injury is excluded
- dislocation is excluded
- subluxation is included
- Neuropathic spondylopathy is excluded.

Table 21: Diagnostic categories used to define mechanical low back problem

Category	ICD-9 codes	ICD-10*	READ
Herniated disc	722.1 Displacement of thoracic or lumbar disc without myelopathy 722.10 Displacement of lumbar disc without myelopathy 722.2 Displacement of unspecified disc without myelopathy	M51.0 Lumbar and other intervertebral disc disorders with myelopathy M51.1 Lumbar and other intervertebral disc disorders with radiculopathy M51.2 Other specified intervertebral disc displacement	N122 Lumbar disc displacement N1293 Lumbar disc disorder with myelopathy N12B2 Lumbar disc prolapse with myelopathy N12C2 Lumbar disc prolapse with radiculopathy

[22] http://www.health.govt.nz/nz-health-statistics/data-references/mapping-tools/mapping-between-icd-10-and-icd-9

[23] http://www.acc.co.nz/for-providers/lodge-and-manage-claims/PRV00037

Category	ICD-9 codes	ICD-10*	READ
	722.70 Disc disorder with myelopathy, site unspecified 722.73 Lumbar disc disorder with myelopathy		Nyu73 [X]Lumbar other intervertebral disc disorders with myelopathy Nyu74[X]Lumbar other intervertebral disc disorders with radiculopathy
Probably degenerative changes	Lumbosacral spondylosis without myelopathy 721.5-8 Unique or unusual forms of spondylosis 721.90 Spondylosis of unspecified site without myelopathy 722.52 Degeneration of lumbar or lumbosacral disc 722.6 Degeneration of disc, site unspecified 722.90 Other and unspecified disc disorder, site unspecified 722.93 Other and unspecified lumbar disc disorder	M51.3Other specified intervertebral disc degeneration M51.8Other specified intervertebral disc disorders M47.2Other spondylosis with radiculopathy M47.8Other spondylosis M47.9Spondylosis, unspecified M48.2Kissing spine M48.3Traumatic spondylopathy M48.8Other specified spondylopathies	N114 Lumbosacral spondylosis without myelopathy N115 Lumbosacral spondylosis with myelopathy N11C Lumbosacral spondylosis with radiculopathy N127 Lumbar disc degeneration N128 Degenerative disc disease NOS N12z3 Other lumbar disc disorders N12zD Annular tear of lumbar disc N12zE Resorption of lumbar disc N12zF Calcification of lumbar disc
Spinal stenosis	721.42 Spondylogenic compression of lumbar spinal cord 721.91 Spondylogenic compression of spinal cord, not specified 724.00 Spinal stenosis, unspecified site (not cervical) 724.09 Spinal stenosis, other 724.02 lumbar stenosis	M47.1Other spondylosis with myelopathy M48.0Spinal stenosis	N1400 Spinal stenosis of unspecified region N1402 Lumbar spinal stenosis N1407 Idiopathic lumbar spinal stenosis N1408 Degenerative lumbar spinal stenosis N1409 Iatrogenic lumbar spinal stenosis N140z Spinal stenosis NOS

Category	ICD-9 codes	ICD-10*	READ
Probably instability	724.6 Disorders of sacrum (including lumbosacral joint instability) 738.4 Acquired spondylolisthesis 756.11 Spondylosis, lumbosacral region 756.12 Spondylolisthesis	M53.3Sacrococcygeal disorders, not elsewhere classified M53.2Spinal instabilities M43.0Spondylolysis M43.1Spondylolisthesis Q76.2Congenital spondylolisthesis	N1463 Lumbosacral instability N1464 Sacroiliac instability N1465 Sacral instability NOS N148C Lumbar spine instability S49A0 Closed subluxation lumbar spine S49Az Closed subluxation of thoracic and lumbar spine NOS S49C1 Closed subluxation of coccyx S49C2 Closed subluxation of sacrum
Fractures (closed, without spinal involvement)	805.4 Lumbar fracture 805.6 Sacral or coccygeal fracture 805.8 Vertebral fracture of unspecified site	S32Fracture of lumbar spine and pelvis S33.0Traumatic rupture of lumbar intervertebral disc	S104 Closed fracture lumbar vertebra S106 Closed fracture sacrum S10B1 Fracture of sacrum S10B2 Fracture of coccyx
Nonspecific backache	307.89 Psychogenic backache 724.2 Lumbago 724.5 Backache, unspecified 846.0-9 Sprains and strains, sacroiliac 847.2 Sprains and strains, lumbar 847.3 Sprains and strains, sacral 847.9 Sprains and strains, unspecified region	M54.4Lumbago with sciatica M54.5Low back pain M54.8Other dorsalgia M54.9Dorsalgia, unspecified F45.4Persistent somatoform pain disorder S33.5Sprain and strain of lumbar spine S33.6Sprain and strain of sacroiliac joint S33.7Sprain and strain of other and unspecified parts of lumbar spine and pelvis	N142 Pain in lumbar spine N145 Backache, unspecified S560 Sprain, lumbosacral ligament S562 Sprain, sacrospinous ligament S563 Sprain, sacrotuberous ligament S564 Sprain, iliolumbar ligament S572 Lumbar sprain S573 Sacrum sprain

Category	ICD-9 codes	ICD-10*	READ
			S574 Coccyx sprain S5y57 Complete tear, lumbosacral ligament
Sequelae to previous back surgery	722.80 Postlaminectomy syndrome, unspecified region 722.83 Postlaminectomy syndrome, lumbar 996.4 Mechanical complication of internal orthopaedic device, implant and graft	M96.1Postlaminectomy syndrome, not elsewhere classified T84.0Mechanical complication of internal joint prosthesis	N12A Postlaminectomy syndrome
Miscellaneous	722.30 Schmorl's nodes, unspecified region 722.32 Lumbar Schmorl's nodes 724.3 Sciatica 724.4 Thoracic or lumbosacral neuritis or radiculitis, unspecified 724.8 Other symptoms referable to back 724.9 Other unspecified back disorders 737.10-737.30 idiopathic scoliosis 738.5 Other acquired deformity of back or spine 739.3 Nonallopathic lesions, lumbar region 739.4 Nonallopathic lesions, sacral region 756.10 Anomaly of spine, unspecified 756.13-756.19 Various congenital anomalies	M41Scoliosis M54.1Radiculopathy M54.3Sciatica Q76.4Other congenital malformations of spine, not associated with scoliosis Q76.0Spina bifida occulta Q76.1Klippel-Feil syndrome M51.4Schmorl nodes M53.8Other specified dorsopathies M53.9Dorsopathy, unspecified M40.4Other lordosis M40.5Lordosis, unspecified M41.2Other idiopathic scoliosis M43.9Deforming dorsopathy, unspecified	N143 Sciatica N146z Disorders of the sacrum NOS N147 Disorders of the coccyx

Note, ICD-10 site codes 5-8 were included; these include the thoracolumbar, lumbar, lumbosacral, sacral and sacrococcygeal regions.

Source: 2015 NHC adaptation of Cherkin et al[70]

Table 22: Diagnostic codes used to exclude events from analysis of mechanical low back problems

	ICD-9	ICD-10	READ
Exclusions from both surgical and nonsurgical cases (codes in any position)	140-239.9 Neoplasms 630-676 Pregnancy E800-E849.9 Vehicular accidents 324.1 Intraspinal abscess 720.0-720.9 Inflammatory spondyloarthropathies 730-730.99 Osteomyelitis 806.0-806.9 Vertebral fractures with spinal cord injury 805.1, 805.3, 805.5, 805.7, 805.9Open vertebral fractures without spinal cord injury 839-839.59 Vertebral dislocations O3.2-O3.29 Chordotomy 81.01-81.03 Cervical and dorsal fusions	C00-D48 Neoplasms O except O90.8 Pregnancy, childbirth and the puerperium except Other complications of the puerperium, not elsewhere classified V01-V99 Transport accidents G061 Intraspinal abscess and granuloma M45Ankylosing spondylitis M46.0Spinal enthesopathy M46.9Inflammatory spondylopathy, unspecified M86Osteomyelitis T09.3Injury of spinal cord, level unspecified T08.1Fracture of spine, level unspecified S12.0Fracture of first cervical vertebra S12.1Fracture of second cervical vertebra S12.2Fracture of other specified cervical vertebra S12.7Multiple fractures of cervical spine S14.1Other and unspecified injuries of cervical spinal cord S24.1Other and unspecified injuries of thoracic spinal cord S34.1Other injury of lumbar	B Neoplasms L Complications of pregnancy childbirth and the puerperium ZV22. Normal pregnancy TN85 Injury ?accidental, by crashing of motor vehicle F041. Intraspinal abscess Fyu0B [X]Intracranial+intraspinal abscess+granuloma in diseases CE N10. Inflammatory spondylopathies Nyu61 [X]Other specified inflammatory spondylopathies N30. Osteomyelitis, periostitis, other infections affecting bone S11. Fracture of spine with spinal cord lesion S101. Open fracture of cervical spine S103. Open fracture thoracic vertebra S105. Open fracture lumbar vertebra S107. Open fracture sacrum S10y. Open fracture of

	ICD-9	ICD-10	READ
		spinal cord S34.3Injury of cauda equina S13.1Dislocation of cervical vertebra S13.3Multiple dislocations of neck S33.2Dislocation of sacroiliac and sacrococcygeal joint S32.1Fracture of sacrum S12.9Fracture of neck, part unspecified M89.6Osteopathy after poliomyelitis M90.2*Osteopathy in other infectious diseases classified elsewhere S23.10 Closed Dislocation of thoracic vertebra S22.0 Closed Fracture of thoracic vertebra 3912100Functional spinal stereotactic procedure 3912400Cordotomy	spine, unspecified, S490. Closed dislocation cervical spine S491. Open dislocation cervical spine S492. Closed dislocation of thoracic and lumbar spine S493. Open dislocation of thoracic and lumbar spine S494. Closed dislocation of other vertebra S495. Open dislocation of other vertebra
Exclusions from surgical cases only – primary or secondary diagnosis	733.1 Pathological fractures 805.0, 805.2, 805.4, 805.6, 805.8 Closed vertebral fractures without spinal cord injury	M8449 Pathological fracture, not elsewhere classified, site unspecified M8442 Pathological fracture, not elsewhere classified, upper arm M8443 Pathological fracture, not elsewhere classified, forearm M8448 Pathological fracture, not elsewhere classified, other site M8445 Pathological fracture, not elsewhere	

	ICD-9	ICD-10	READ
		classified, pelvic region and thigh M8446 Pathological fracture, not elsewhere classified, lower leg S32.0 Closed Fracture of lumbar vertebra	
Exclusions from surgical cases – Cervical and thoracic disorders – only if primary diagnosis	353.2 Cervical root lesions, NEC 353.3 Thoracic root lesions, NEC 721.0 Cervical spondylosis without myelopathy 721.1 Cervical spondylosis with myelopathy 721.41 Thoracic spondylosis with myelopathy 722.0 Displacement of cervical intervertebral disc without myelopathy 722.11 displacement of thoracic intervertebral disc without myelopathy 722.4 Degeneration of cervical intervertebral disc 722.71 Intervertebral disc disorder with myelopathy, cervical 722.72 Intervertebral disc disorder with myelopathy, thoracic 722.81 Postlaminectomy syndrome, cervical 722.82 Postlaminectomy syndrome, thoracic 722.91 other and unspecified disc disorder, cervical 722.92 Other and unspecified	G542 Cervical root disorders, not elsewhere classified G543 Thoracic root disorders, not elsewhere classified M502 Other cervical disc displacement M503 Other cervical disc degeneration M500 Cervical disc disorder with myelopathy M508 Other cervical disc disorders M47.8Other spondylosis M47.1Other spondylosis with myelopathy M48.0Spinal stenosis M54.1Radiculopathy	

	ICD-9	ICD-10	READ
	disc disorder, thoracic 723.0 Cervical spinal stenosis 723.4 Brachial neuritis or radiculitis 724.01 Spinal stenosis, thoracic 81.01 Atlas-axis spinal fusion 81.02 Other cervical spinal fusion 81.03 Dorsal spinal fusion		
Exclusions from nonsurgical cases only (in any procedure field)	O3.0-O3.1, O3.4-O3.8,O3.93, O3.94, O3.97, O3.98, 80.5-80.59, 81.00, 81.04-81.09 Back Surgery 78.59, 78.69 Possible back surgery	9001101 Other procedures on spinal canal or spinal cord structures 9000900 Postoperative re-opening of laminotomy or laminectomy site 4030302 Decompression for spinal stenosis, 1 level 4033000 Spinal rhizolysis 4030900 Removal of spinal extradural lesion 4010000 Repair of spinal meningocele 4010300 Repair of myelomeningocele 4769600 Closed reduction of fracture/dislocation of spine 9001102 Other repair on spinal canal or spinal cord structures 4033000 Spinal rhizolysis 4000600 Insertion of spinal shunt 1823000 Epidural injection of neurolytic agent 3913400 Subcutaneous	

	ICD-9	ICD-10	READ
		implantation of spinal neurostimulator device/receiver 3913300 Removal of spinal neurostimulator device 4000902 Revision of spinal shunt 4000905 Removal of spinal shunt 4030000 Discectomy, 1 level 4033600 Injection of chemonucleolytic agent into disc 4863600 Percutaneous lumbar discectomy 4866000 Anterior spinal fusion, 1 level 4864200 Posterior spinal fusion, 1 or 2 levels 4792100 Insertion of internal fixation device, not elsewhere classified 4892700 Removal of shoulder prosthesis	

Note: ICD-10 site regions specified for exclusion included: 2, 3 and 4, the cervical, cervicothoracic and thoracic regions.

Source: 2015 NHC adaptation of Cherkin et al[70]

Table 23: Procedure codes used to define mechanical low back problem surgical categories

	ICD-9	ICD-10
Laminectomy	O3.0 Exploration and decompression of spinal canal structures O3.09 Other exploration and decompression of spinal canal	4863000 Anterior decompression of spinal cord with resection of vertebrae, for scoliosis or kyphosis 4863001 Anterior decompression of spinal cord with resection of vertebrae, for scoliosis or kyphosis with spinal cord involvement 9002400 Decompression of lumbar spinal

	ICD-9	ICD-10
		cord, 1 level 9002401 Decompression of lumbar spinal cord, ³ 2 levels 4030302 Decompression for spinal stenosis, 1 level 4030600 Decompression for spinal stenosis, 2 or more levels 4035100 Anterior decompression of thoracolumbar spinal cord 4033001 Spinal rhizolysis with laminectomy 4865400 Posterior spinal fusion with laminectomy, 1 level 4865401 Posterolateral spinal fusion with laminectomy, 1 level 4865700 Posterior spinal fusion with laminectomy, 2 or more levels 4865701 Posterolateral spinal fusion with laminectomy, 2 or more levels 9001101 Other procedures on spinal canal or spinal cord structures
Discectomy	80.5 Excision or destruction of intervertebral disc 80.50 Excision or destruction of intervertebral disc, unspecified 80.51 Excision of intervertebral disc 80.52 Intervertebral chemonucleolysis 80.59 Other destruction of intervertebral disc	4030000 Discectomy, 1 level 4030001 Discectomy, 2 or more levels 4030300 Discectomy for recurrent disc lesion, 1 level 4030301 Discectomy for recurrent disc lesion, 2 or more levels 4863600 Percutaneous lumbar discectomy 4033600 Administration of chemonucleolytic agent into disc 9619200 Insertion of intervertebral disc prosthesis, 1 level 9619201 Insertion of intervertebral disc prosthesis, ³ 2 levels 9619202 Revision of intervertebral disc

	ICD-9	ICD-10
		prosthesis, 1 level 9619203 Revision of intervertebral disc prosthesis, ³ 2 levels 9619204 Removal of intervertebral disc prosthesis, 1 level 9619205 Removal of intervertebral disc prosthesis, ³ 2 levels
Fusion	81.00 Spinal fusion, not otherwise specified 81.06 Lumbar spinal fusion 81.07 Lumbosacral spinal fusion 81.08 Refusion of spine 81.09 Other spinal fusion	4860600 Posterior spinal fusion without internal fixation for scoliosis or kyphosis 4860900 Posterior spinal fusion with nonsegmental internal fixation for scoliosis or kyphosis 4861200 Posterior spinal fusion with segmental internal fixation for scoliosis or kyphosis 4861300 Anterior and posterior spinal fusion with segmental internal fixation for scoliosis or kyphosis 4862100 Anterior spinal fusion with segmental internal fixation for scoliosis or kyphosis, less than or equal to 4 levels 4862400 Anterior spinal fusion with segmental internal fixation for scoliosis or kyphosis, 5 levels or more 4862700 Posterior spinal fusion with segmental internal fixation extending to pelvis for scoliosis or kyphosis 4864000 Anterior and posterior spinal fusion with segmental internal fixation and resection of vertebra 4864200 Posterior spinal fusion, 1 or 2 levels 4864500 Posterior spinal fusion, 3 or more levels 4864800 Posterolateral spinal fusion, 1 or 2 levels 4865100 Posterolateral spinal fusion, 3 or more levels 4865400 Posterior spinal fusion with

	ICD-9	ICD-10
		laminectomy, 1 level 4865401 Posterolateral spinal fusion with laminectomy, 1 level 4865700 Posterior spinal fusion with laminectomy, 2 or more levels 4865701 Posterolateral spinal fusion with laminectomy, 2 or more levels 4866000 Anterior spinal fusion, 1 level 4866900 Anterior spinal fusion, 2 or more levels
Other	O3.02 Reopening of laminectomy site O3.6 Lysis of adhesions of cord or nerve root 78.69 Removal of internal fixation device (vertebral, pelvic, or phalangeal)	9000900 Postoperative re-opening of laminotomy or laminectomy site 4033000 Spinal rhizolysis

Source: 2015 NHC adaptation of Cherkin et al[70]

The analysis presented comprises of two main methods: 1) analysis of hospitalisation discharges, and 2) cohort/subpopulation analysis (Table 24). This means that the cohort populations do not necessarily add up to the discharge rates. NMDS data is set up in a way that means that patients often have multiple events for one 'discharge' as they are transferred around the system. Patients can also have multiple 'discharges' in one year, and across years. A patient may have been counted in 2011/12 although they had subsequent surgeries in 2012/13. This also means that a patient can be counted more than once across the various diagnostic categories, both because they can have more than one 'primary diagnosis' if they have transfers and because the surgical categories overlap (Table 23).

Table 24: Table of how mechanical low back problem patient subpopulations have been defined for analysis

Subpopulation	ACC	Non-ACC
Acute	Time from accident date to last payment date less than 180 days. Included if accident occurred in 2012/13	Five percent of New Zealand population 18 years and over minus the number of acute ACC patients identified.

Subpopulation	ACC	Non-ACC
Chronic	Time from accident date to last payment date 180 days or more. Included if any payment for service made in 2012/13	Nine percent of New Zealand population 18 years and over minus the number of chronic ACC patients identified, minus half the number of severe patients identified.
Severe non-surgical	Of claimants identified with an account or service description that includes "SURG","INPATIENT" or "HOSP", any that don't have "SURG".	Using the definition described above, those who have had a 'non-surgical' admission.
Severe surgical	Of claimants identified with an account or service description that includes "SURG","INPATIENT" or "HOSP", any that have "SURG".	Using the definition described above, those who have had a 'surgical' admission.

Source: 2015 NHC definitions

Hospital discharges

The National Minimum Data Set was used to measure hospital discharges from July 2006 to June 2014. Private hospitalisations are not consistently reported to the NMDS, and this part of the collection is often somewhat delayed, at the time of analysis we only have these data up to the end of 2012. Private hospital data have only been included from facilities that have reported for every year of analysis. Often a patient may have multiple entries in the NMDS for what they experienced as one hospital admission, these occur when patients are transferred for things like special procedures. Some effort has been made in this analysis to account for these multiple entries and only 'count' actual discharges, while still taking into account information in a patient's other entries. NMDS data were categorised into Private (codes: 06, Privately funded, 19, Overseas chargeable), ACC (A0, ACC – direct purchase, 17, Accredited employer) and Public (including two 'Other/not specified' records).

Acute subpopulation

For acute patients ACC clients were included based on the date of their injury, and their last service occurring within six months of the date of their injury. From the literature we have estimated that approximately five percent of people present with acute lower back pain each year. Using the New Zealand Health Tracker population of those aged 18+ years five percent equates to approximately 170,000 for 2012/13. The number of ACC clients in the 2012/13 acute cohort was 120,436 and it was estimated that approximately fifty percent of the severe surgical and non-surgical patients identified in the publically-funded data are acute cases. This leaves approximately 48,600 non-ACC acute

patients. The usage rate for each provider was calculated from the ACC cohort and used to estimate the non-ACC population. The median number of 'visits' is the median number of payments to each type of provider for each claim in the acute cohort. The median price is the median price of payments to each type of provider for each claim in the acute cohort. Due to the way the data are categorised the Mean was not necessarily appropriate as the distributions of the cost data are often quite skewed. It was decided that the median was more appropriate for our cost estimations. The 'per person cost' is the median price multiplied by the median number of 'visits'. The ACC cost is the 'per person cost' multiplied by the relevant number of patients. These are not the actual costs that ACC sustained for these claims.

Investigation of the ACC data showed that very few ACC clients have claimed for pharmaceuticals, it may be that people are unaware that they can claim for these. Given this, we have included the price of one 100 pack of paracetamol and one 30 pack of diclofenac sodium for 60% of acute patients, approximately two weeks of painkillers.

All the table figures have been rounded after the analysis.

Chronic subpopulation

While the origin of the analysis of the chronic patients is the same as that done for the acute patients there are some differences that are outlined here.

The New Zealand Health Survey is a population-representative survey of New Zealanders, in 2013/14 it surveyed 13,309 of adults aged 15 years and over[(53)] and asked them if they experience chronic pain (the intensity may vary) that is present almost every day and has, or is expected to last, for more than six months[24]. They were then asked the location of that pain. From this survey it has been estimated that approximately 9.1% of New Zealanders 18+ years suffer from chronic lower back pain.

For the 'chronic' analysis ACC patients were 'counted' for every year that their claim was active in as long as their claim lasted for six months or more. This means if a patient had their injury in 2010/11 and ACC paid for services related to their claim in 2011/12 and 2012/13 then they were included as prevalent in each of those three years.

[24] http://www.health.govt.nz/publication/questionnaires-and-content-guide-2013-14-new-zealand-health-survey

To inform our estimates some analysis of the survey data was done on those NZHS respondents who only suffer from chronic lower back pain, no other chronic pain (n=400). Respondents were asked if they had seen a GP in the past 12 months for their own health and if so, how many times, and how much they were charged for their last visit. They were also asked if they had seen a physiotherapist, chiropractor, osteopath, occupational therapist, or psychologist or counsellor in the past 12 months. Some respondents specified that they had seen an acupuncturist. Analysis of the responses to the GP-related questions was used to inform the price, median number of visits and usage rate for non-ACC chronic patients. Analysis of the other health provider questions listed above was used to ascertain usage rates for the relevant providers for non-ACC chronic patients.

We have included the price of one 100 pack of paracetamol and one 30 pack of diclofenac sodium for 42% of acute patients (this usage rate is based on data from the 2013/14 NZHS), approximately two weeks of painkillers 13 times in a year (approximately six months' worth).

Severe hospitalised subpopulation

The ACC and 'publically-funded' analyses have been presented separately.

ACC claim payments were searched to identify those that had any of the strings "SURG", "INPATIENT" or "HOSP" in the account or service descriptions. Those that had a payment with the "SURG" string were included in the severe surgical cohort for the earliest year this occurred in the 2009/10 to 2012/13. Otherwise they were included in the severe non-surgical cohort for the earliest year they had "INPATIENT" or "HOSP" activity.

Publically-funded severe surgical and non-surgical patients were identified from the NMDS; they were 'counted' based on the date of their first defined low back hospital admission in the 2008 to 2014 period. Each patient was then 'followed' up to one year prior and one year post this admission date. This 'following' of the patient involved linking up their hospital admission record to the Non-Admitted Patient Collection (NNPAC) and the Pharmaceutical Collection (Pharms). Table 25 lists the purchase units included in the analysis of NNPAC, Table 26 lists the pharmaceuticals that have been included.

Table 25: Purchase unit codes included in analysis of severe hospitalised subpopulation

Description	Code	Definition
Physiotherapy	AH01005	Physiotherapy services provided in an Outpatient or domiciliary setting to DSS, HOP and personal health clients. Includes post discharge services and other DHB referrals as well as community-referred clients.
Pain Medicine 1st Specialist Assessment	PC0001	First attendance to a Pain Medicine medical practitioner or medical officer at registrar level or above or Nurse Practitioner for specialist assessment.
Pain Medicine Assessment - Follow-up	PC0003	Follow Up attendance for a pain assessment to a Pain Medicine medical practitioner, medical officer at registrar level or above or Nurse Practitioner for specialist assessment.
Pain clinic - High cost procedure	PC0005	Intrathecal Drug Pumps, Spinal Cord Stimulation. Intrathecal Drug Pumps. Implantation of a specialized infusion pump as an inpatient procedure. In addition to the implantation regular refills are carried out. Spinal Cord Stimulation. Implantation of an electrical lead alongside the spinal cord. Follow-up programming is done in the procedure clinic. Equivalent to ACC codes IP13-24
Pain IDT Assessment	PC0007	Attendance for a pain assessment by at least three members of the Pain Interdisciplinary Team (IDT) to make recommendations for further treatment and management of persistent pain.
Pain Residential Management Programme	PC0009	A programme based on a cognitive/ behavioural model aiming to assist individuals with chronic pain to improve their level of functioning, decrease the dependence on the health care systems and increase individual coping skills and management of pain. The programme provides education on pain and lifestyle, physical exercise training and a range of techniques to assist the individual's management of pain conditions. Duration of the programme is for 3 weeks - 8 till 3 pm daily Monday to Friday Including a 1 hour pre programme application interview one week prior to the programme. Indicative event - Reports 30 minutes per patient on programme (Maximum 12 patients per programme). Equivalent to ACC PPP02, PPP03
Pain Psychosocial 1st assessment	PC0010	First attendance for assessment by a Clinical / Health Psychologist, Occupational Therapist or Nurse Practitioner trained in psychosocial assessments.
Pain Specialist and Psycho-social (dual) assessment	PC0012	First dual assessment by specialist(s). Includes psychosocial and medical factors of a client with chronic pain. The aim is to assess the client's suitability for a self-management approach. A comprehensive plan with recommendations for further treatment and management of chronic pain is developed in partnership with the client. Indicative event - 90 minutes per assessment plus 30 -35 minutes reports. Equivalent to ACC CPA 03 & CPA 05
Pain Management Programme - Follow up	PC0013	A 1/2 day follow-up session at 1 month, 6 months and 12 months after completion of the Pain management programme, reinforcing all features of the programme. Equivalent to ACC codes PPP06-07

Description	Code	Definition
Pain Interventional procedures - non Operating room	PC0014	A biomedical intervention performed by a Pain management medical practitioner in a procedure room, not requiring an operating room.
Pain Interventional procedures - operating room	PC0015	A biomedical intervention performed by a Pain Specialist; a medical practitioner trained in Pain Medicine in the operating room, requiring operating theatre and/or radiology assistance (for non-admitted patients only).
Pain Psychosocial - Follow up	PC0016	Follow up attendance to a Clinical / Health Psychologist, Occupational Therapist or Nurse Practitioner trained in psychosocial assessments.
Pain individual therapy session	PC0017	Attendance to individual pain therapy sessions with a member of the pain interdisciplinary team.
Pain Activity Focused Programme	PC0018	An integrated multi week programme provided by Medical practitioners trained in Pain Medicine, physiotherapy, psychologists and occupational therapists, Clinical Nurse Specialist, involving individual and group sessions. The programme is based on identifying current thinking and problematic behaviour, active participation, goal orientation and problem focus, education concerning self-management. Equivalent to ACC codes ABP 02-ABP 25
Orthopaedics - 1st attendance	S45002	First attendance to orthopaedic surgeon or medical officer at registrar level or above or nurse practitioner for specialist assessment. Excludes fracture clinic.
Orthopaedics - Subsequent attendance	S45003	Follow-up attendances to orthopaedic surgeon or medical officer at registrar level or above or nurse practitioner. Excludes fracture clinic.
Spinal - 1st attendance	S50005	First attendance to spinal injury specialist or medical officer at registrar level or above or nurse practitioner for specialist assessment.
Spinal - Subsequent attendance	S50006	Follow-up attendances to spinal injury specialist or medical officer at registrar level or above or nurse practitioner.
Spinal - Urodynamics	S50007	Patients treated for urodynamic procedures.

Source: 2015 NHC selection from relevant Nationwide Service Framework Library Purchase Unit Data Dictionaries relevant to 2008 to 2014, http://www.nsfl.health.govt.nz/apps/nsfla.nsf/pagesmh/230

Table 26: Pharmaceuticals included in analysis of severe hospitalised subpopulation

Type	Chemical name
Tricyclic antidepressants	Amitriptyline
	Dothiepin hydrochloride
	Doxepin hydrochloride
	Nortriptyline hydrochloride
Other antidepressants	Venlafaxine
Anti-convulsants	Gabapentin
	Gabapentin (Neurontin)
	Carbamazepine
	Topiramate
Opiates	Buprenorphine hydrochloride
	Codeine phosphate
	Dihydrocodeine tartrate
	Fentanyl
	Methadone hydrochloride
	Morphine hydrochloride
	Morphine sulphate
	Morphine tartrate
	Oxycodone hydrochloride
	Paracetamol with codeine
	Pethidine hydrochloride
	Tramadol hydrochloride
Non-steroidal Anti-inflammatory Drugs (NSAIDs)	Diclofenac sodium
	Ibuprofen
	Indomethacin
	Ketoprofen
	Mefenamic acid
	Meloxicam
	Naproxen
	Naproxen sodium
	Sulindac
	Tenoxicam
	Tiaprofenic acid

Source: 2015 NHC selection from the Pharmaceutical Collection

Coding changes

The data we are using is all ICD10-AM version 3. However the data from more recent years has been backward mapped from version 6 to version 3. An investigation of the backward mapping file provided by the Ministry of Health[25] shows that there are seven surgical procedure codes that may be affected by this coding change. Four of these would have no change on our analysis being mapped from one of our discectomy procedure codes to another of our discectomy codes, two of these codes may result in fewer discectomy discharges, and one of these may result in an increase in

[25] http://www.health.govt.nz/nz-health-statistics/data-references/mapping-tools/mapping-between-icd-10-am-3rd-and-6th-editions

laminectomy discharges (Table 27). These may have had a small impact on the data, however laminectomy discharges have decreased in recent years, and discectomy discharges are not high enough that this coding change would have affected the overall pattern of lower back discharges.

Table 27: Potential procedure code changes from ICD6 to ICD3 that may have affected surgical procedure trends

Resulting change	From procedure code	To procedure code
No change	9619200	4030000
	9619201	4030000
	9619202	4030000
	9619203	4030000
Fewer discectomy	9619204	9220200
	9619205	9220200
Increased laminectomy	9002700	9001101

Source: 2015 NHC interpretation of Ministry of Health mapping tables http://www.health.govt.nz/nz-health-statistics/data-references/mapping-tools/mapping-between-icd-10-am-3rd-and-6th-editions

Appendix 2: Glossary

Ankylosing spondylitis	A form of inflammatory arthritis that primarily affects the joints in the spine, although the sacroiliac (pelvis) and other joints can be involved. Ongoing inflammation around the vertebrae causes stiffness and chronic pain. In advanced cases, the spine and other joints may fuse in a fixed, immobile position.
Cauda equina syndrome	A rare disorder where the bundle of nerve roots (cauda equina) at the lower (lumbar) end of the spinal cord is compressed, cutting off sensation and movement. Symptoms include bladder and/or bowel dysfunction and altered sensation in the "saddle area" and feet. It is a surgical emergency. Left untreated, cauda equina can result in permanent paralysis, impaired bladder and/or bowel control, and sexual and other dysfunction.
Degenerative disc disease	Degeneration of intervertebral discs, often related to mechanical loading associated with age or trauma
Herniated disc	Rupture of the fibrocartilage of the disc between spinal vertebrae. Occurs most often in the lumbar region
Lumbago	Pain in the lower back (lumbar) region
Radiculopathy	Any pathological condition of the nerve roots. Often associated with pain caused by impingement on the nerve roots, often exhibited as leg-dominant pain
Sciatica	Sciatica refers to the symptoms caused by compression of the sciatic nerve, including pain that radiates along the path of the nerve branches from the lower back through the hips and buttocks and down the leg. Some people also experience numbness, tingling or muscle weakness. Sciatica is most commonly caused by a herniated disc in the spine or a bone spur on the vertebrae
Scoliosis	Sideways curvature of the spine. In severe cases this can be disabling and can reduce the amount of space within the chest, making it difficult for the lungs to function properly.
Spinal stenosis	Narrowing of the spaces in the spine that can put pressure on the spinal cord and nerves. Spinal stenosis can cause pain, numbness, muscle weakness, and bladder or bowel dysfunction. Usually caused by age-related "wear and tear". Can be associated with disc herniation or disc degeneration.
Spondylitis (spondyloarthritis)	A group of inflammatory disease affecting the joints of the vertebrae (c.f. spondylosis, which is degenerative)
Spondylosis	A general term for degenerative disease of the spine. Spondylosis can lead to herniated discs, degenerative disc disease and spinal stenosis. It is primarily age-related. (c.f. spondylitis, which is inflammatory)
Spondylolisthesis	Change in position of vertebrae relative to other vertebrae, e.g. displacement of a vertebra on the one beneath it. Can be due to degenerative disease or arthropathy.

References

1. Legg S, Widanarko B. Occupational Musculoskeletal Symptoms, Consequences and Risk Factors in New Zealand [Presentation]. 2012.
2. Niemelainen R, Videman T, Battie MC. Prevalence and Characteristics of Upper or Mid-Back Pain in Finnish Men. Spine (Phila Pa 1976). 2006;31(16):1846-9. doi: 10.1097/01.brs.0000226022.05420.1f.
3. Last AR, Hulbert K. Chronic Low Back Pain: Evaluation and Management. Am Fam Physician. 2009;79(12):1067-74.
4. Balague F, Mannion AF, Pellise F, Cedraschi C. Non-Specific Low Back Pain. Lancet. 2012;379(9814):482-91. doi: 10.1016/S0140-6736(11)60610-7.
5. Accident Compensation Corporation (ACC). New Zealand Acute Low Back Pain Guide. Wellington: ACC, 2004.
6. Ministry of Health. Health Loss in New Zealand: A Report from the New Zealand Burden of Diseases, Injuries and Risk Factors Study, 2006-2016. Wellington: Ministry of Health, 2013.
7. Institute for Health Metrics and Evaluation. Global Burden of Disease Study 2010 - New Zealand Results by Cause 1990-2010. In: Washington Uo, editor. Seattle (WA)2013.
8. Ministry of Health. New Zealand Burden of Diseases, Injuries and Risk Factors Study, 2006-2016 [Dataset]. In: Health Mo, editor. Wellington2013.
9. Hoy D, March L, Brooks P, Blyth F, Woolf A, Bain C, et al. The Global Burden of Low Back Pain: Estimates from the Global Burden of Disease 2010 Study. Annals of the Rheumatic Diseases. 2014;73(6):968-74. doi: 10.1136/annrheumdis-2013-204428.
10. Accident Compensation Corporation (ACC). Nursing Treatment Profiles. Wellington: ACC, 2008.
11. Guideline for the Evidence-Informed Primary Care Management of Low Back Pain: 2nd Edition. Edmonton, Alberta: Toward Optimized Practice. Intitute of Health Economics (Alberta), 2011.
12. National Institute for Health and Care Excellence (NICE). Early Management of Persistent Non-Specific Low Back Pain (Nice Clinical Guideline 88 and Quick Reference Guide). Manchester: NICE, 2009.
13. National Health Service - England. N.H.S. Standard Contract for Complex Spinal Surgery (All Ages). Schedule 2 – the Services – A. Service Specifications (D14/S/a). National Health Service - England, 2013.
14. British Orthopaedic Association. Commissioning Guide: Low Back Pain: Broad Principles of the Patient Pathway. Royal College of Surgeons of England: 2014. Available from: https://www.boa.ac.uk/wp-content/uploads/2014/08/CCG_Low-Back-pain-final.pdf.
15. Hill JC, Whitehurst DGT, Lewis M, Bryan S, Dunn KM, Foster NE, et al. Comparison of Stratified Primary Care Management for Low Back Pain with Current Best Practice (Start Back): A Randomised Controlled Trial. The Lancet.378(9802):1560-71. doi: http://dx.doi.org/10.1016/S0140-6736(11)60937-9.
16. American Association of Neurological Surgeons and Congress of Neurological Surgeons. Choosing Wisely 2014. Available from: http://www.choosingwisely.org/clinician-lists/american-association-neurological-surgeons-imaging-for-nonspecific-acute-low-back-pain/.
17. Choosing Wisely Canada. Spine: Five Things Patients and Physicians Should Question 2015. Available from: http://www.choosingwiselycanada.org/recommendations/spine/.
18. Hoffman MC, MacVicar J. Acute Low Back Pain Is Common and Often Relapsing.
19. Jarvik JG, Gold LS, Comstock BA, et al. Association of Early Imaging for Back Pain with Clinical Outcomes in Older Adults. JAMA. 2015;313(11):1143-53. doi: 10.1001/jama.2015.1871.
20. Kroenke K, Krebs EE, Bair MJ. Pharmacotherapy of Chronic Pain: A Synthesis of Recommendations from Systematic Reviews. Gen Hosp Psychiatry. 2009;31(3):206-19. doi: 10.1016/j.genhosppsych.2008.12.006.
21. Henschke N, Maher CG, Refshauge KM, Herbert RD, Cumming RG, Bleasel J, et al. Prognosis in Patients with Recent Onset Low Back Pain in Australian Primary Care: Inception Cohort Study2008 2008-07-07 11:08:23.
22. Pharmaceutical Management Agency (PHARMAC). New Zealand Pharmaceutical Schedule (April 2014). Wellington: PHARMAC; 2014.
23. Pharmaceutical Management Agency (PHARMAC). Annual Review. Wellington: PHARMAC, 2014.
24. Accident Compensation Corporation (ACC). Specified Treatment Providers' Costs (Acc1523). Wellington: ACC, 2014.

25. Gatchel RJ, Okifuji A. Evidence-Based Scientific Data Documenting the Treatment and Cost-Effectiveness of Comprehensive Pain Programs for Chronic Nonmalignant Pain. J Pain. 2006;7(11):779-93. doi: 10.1016/j.jpain.2006.08.005.
26. Turk DC. Clinical Effectiveness and Cost-Effectiveness of Treatments for Patients with Chronic Pain. Clin J Pain. 2002;18(6):355-65.
27. PainAustralia. National Pain Strategy: Pain Management for All Australians. Sydney (NSW): PainAustralia, 2010.
28. Genevay S, Atlas SJ. Lumbar Spinal Stenosis. Best Pract Res Clin Rheumatol. 2010;24(2):253-65. doi: 10.1016/j.berh.2009.11.001.
29. Sengupta DK, Herkowitz HN. Lumbar Spinal Stenosis. Treatment Strategies and Indications for Surgery. Orthop Clin North Am. 2003;34(2):281-95.
30. Katz JN, Harris MB. Clinical Practice. Lumbar Spinal Stenosis. N Engl J Med. 2008;358(8):818-25. doi: 10.1056/NEJMcp0708097.
31. Lurie JD, Tosteson TD, Tosteson AN, Zhao W, Morgan TS, Abdu WA, et al. Surgical Versus Nonoperative Treatment for Lumbar Disc Herniation: Eight-Year Results for the Spine Patient Outcomes Research Trial. Spine (Phila Pa 1976). 2014;39(1):3-16. doi: 10.1097/BRS.0000000000000088.
32. Deyo RA, Nachemson A, Mirza SK. Spinal-Fusion Surgery - the Case for Restraint. N Engl J Med. 2004;350(7):722-6. doi: 10.1056/NEJMsb031771.
33. International Society for the Advancement of Spine Surgery (ISASS). Policy Statement on Lumbar Spinal Fusion Surgery. Aurora (IL) ISASS.
34. Aebi M. Indication for Lumbar Spinal Fusion. Surgery for Low Back Pain: Springer; 2010. p. 109-22.
35. Weinstein JN, Lurie JD, Tosteson TD, Hanscom B, Tosteson AN, Blood EA, et al. Surgical Versus Nonsurgical Treatment for Lumbar Degenerative Spondylolisthesis. N Engl J Med. 2007;356(22):2257-70. doi: 10.1056/NEJMoa070302.
36. Phillips FM, Slosar PJ, Youssef JA, Andersson G, Papatheofanis F. Lumbar Spine Fusion for Chronic Low Back Pain Due to Degenerative Disc Disease: A Systematic Review. Spine (Phila Pa 1976). 2013;38(7):E409-22. doi: 10.1097/BRS.0b013e3182877f11.
37. Fairbank J, Frost H, Wilson-MacDonald J, Yu LM, Barker K, Collins R, et al. Randomised Controlled Trial to Compare Surgical Stabilisation of the Lumbar Spine with an Intensive Rehabilitation Programme for Patients with Chronic Low Back Pain: The Mrc Spine Stabilisation Trial. BMJ. 2005;330(7502):1233. doi: 10.1136/bmj.38441.620417.8F.
38. Chou R, Baisden J, Carragee EJ, Resnick DK, Shaffer WO, Loeser JD. Surgery for Low Back Pain: A Review of the Evidence for an American Pain Society Clinical Practice Guideline. Spine (Phila Pa 1976). 2009;34(10):1094-109. doi: 10.1097/BRS.0b013e3181a105fc.
39. Deyo RA, Mirza SK, Turner JA, Martin BI. Overtreating Chronic Back Pain: Time to Back Off? J Am Board Fam Med. 2009;22(1):62-8. doi: 10.3122/jabfm.2009.01.080102.
40. Chou R, Loeser JD, Owens DK, Rosenquist RW, Atlas SJ, Baisden J, et al. Interventional Therapies, Surgery, and Interdisciplinary Rehabilitation for Low Back Pain: An Evidence-Based Clinical Practice Guideline from the American Pain Society. Spine (Phila Pa 1976). 2009;34(10):1066-77. doi: 10.1097/BRS.0b013e3181a1390d.
41. Mirza SK, Deyo RA. Systematic Review of Randomized Trials Comparing Lumbar Fusion Surgery to Nonoperative Care for Treatment of Chronic Back Pain. Spine (Phila Pa 1976). 2007;32(7):816-23. doi: 10.1097/01.brs.0000259225.37454.38.
42. Willems PC, Staal JB, Walenkamp GH, de Bie RA. Spinal Fusion for Chronic Low Back Pain: Systematic Review on the Accuracy of Tests for Patient Selection. Spine J. 2013;13(2):99-109. doi: 10.1016/j.spinee.2012.10.001.
43. Deyo RA, Mirza SK, Martin BI, Kreuter W, Goodman DC, Jarvik JG. Trends, Major Medical Complications, and Charges Associated with Surgery for Lumbar Spinal Stenosis in Older Adults. JAMA. 2010;303(13):1259-65. doi: 10.1001/jama.2010.338.
44. Rajaee SS, Bae HW, Kanim LE, Delamarter RB. Spinal Fusion in the United States: Analysis of Trends from 1998 to 2008. Spine (Phila Pa 1976). 2012;37(1):67-76. doi: 10.1097/BRS.0b013e31820cccfb.
45. Thavaneswaran P, Vandepeer M. Lumbar Artificial Intervertebral Disc Replacement: A Systematic Review. ANZ J Surg. 2014;84(3):121-7. doi: 10.1111/ans.12315.

46. Jacobs WC, van der Gaag NA, Kruyt MC, Tuschel A, de Kleuver M, Peul WC, et al. Total Disc Replacement for Chronic Discogenic Low Back Pain: A Cochrane Review. Spine (Phila Pa 1976). 2013;38(1):24-36. doi: 10.1097/BRS.0b013e3182741b21.
47. The New Zealand Joint Registry. Fourteen-Year Report: January 1999 to December 2012. Wellington: New Zealand Orthopaedic Association, 2013.
48. Darlow B, Perry M, Stanley J, Mathieson F, Melloh M, Baxter GD, et al. Cross-Sectional Survey of Attitudes and Beliefs About Back Pain in New Zealand. BMJ Open. 2014;4(5):e004725. doi: 10.1136/bmjopen-2013-004725.
49. Darlow B, Dean S, Perry M, Mathieson F, Baxter GD, Dowell A. Acute Low Back Pain Management in General Practice: Uncertainty and Conflicting Certainties. Fam Pract. 2014;31(6):723-32. doi: 10.1093/fampra/cmu051.
50. Hoy D, Brooks P, Blyth F, Buchbinder R. The Epidemiology of Low Back Pain. Best Pract Res Clin Rheumatol. 2010;24(6):769-81. doi: 10.1016/j.berh.2010.10.002.
51. Ferreira P, Beckenkamp P, Maher C, Hopper J, Ferreira M. Nature or Nurture in Low Back Pain? Results of a Systematic Review of Studies Based on Twin Samples. European Journal of Pain. 2013;17(7):957-71.
52. Paulis W, Silva S, Koes B, Middelkoop M. Overweight and Obesity Are Associated with Musculoskeletal Complaints as Early as Childhood: A Systematic Review. Obesity Reviews. 2014;15(1):52-67.
53. Ministry of Health. New Zealand Health Survey: Annual Update of Key Findings 2013/14. Wellington: Ministry of Health,, 2014.
54. Zealand. NBACoN. National Strategic Plan of Action for Breastfeeding 2008–2012: National Breastfeeding Advisory Committee of New Zealand's Advice to the Director-General of Health. Wellington: Ministry of Health, 2009.
55. Ministry of Health. Actions to Encourage Healthy Weight and Healthy Lifestyles. Wellington: Ministry of Health., 2014.
56. Walsh K, Cruddas M, Coggon D. Low Back Pain in Eight Areas of Britain. J Epidemiol Community Health. 1992;46(3):227-30.
57. Hillman M, Wright A, Rajaratnam G, Tennant A, Chamberlain MA. Prevalence of Low Back Pain in the Community: Implications for Service Provision in Bradford, Uk. J Epidemiol Community Health. 1996;50(3):347-52.
58. Petrie KJ, Faasse K, Crichton F, Grey A. How Common Are Symptoms? Evidence from a New Zealand National Telephone Survey. BMJ Open. 2014;4(6). doi: 10.1136/bmjopen-2014-005374.
59. Widanarko B, Legg S, Stevenson M, Devereux J, Eng A, 't Mannetje A, et al. Prevalence of Musculoskeletal Symptoms in Relation to Gender, Age, and Occupational/Industrial Group. International Journal of Industrial Ergonomics. 2011;41(5):561-72.
60. Widanarko B, Legg S, Stevenson M, Devereux J, Eng A, t Mannetje A, et al. Prevalence and Work-Related Risk Factors for Reduced Activities and Absenteeism Due to Low Back Symptoms. Appl Ergon. 2012;43(4):727-37. doi: 10.1016/j.apergo.2011.11.004.
61. Croft PR, Macfarlane GJ, Papageorgiou AC, Thomas E, Silman AJ. Outcome of Low Back Pain in General Practice: A Prospective Study. BMJ. 1998;316(7141):1356-9.
62. Dey P, Simpson CW, Collins SI, Hodgson G, Dowrick CF, Simison AJ, et al. Implementation of Rcgp Guidelines for Acute Low Back Pain: A Cluster Randomised Controlled Trial. Br J Gen Pract. 2004;54(498):33-7.
63. Jordan KP, Kadam UT, Hayward R, Porcheret M, Young C, Croft P. Annual Consultation Prevalence of Regional Musculoskeletal Problems in Primary Care: An Observational Study. BMC Musculoskelet Disord. 2010;11:144. doi: 10.1186/1471-2474-11-144.
64. Maniadakis N, Gray A. The Economic Burden of Back Pain in the Uk. Pain. 2000;84(1):95-103.
65. Plénet A, Gourmelen J, Chastang JF, Ozguler A, Lanoë JL, Leclerc A. Seeking Care for Lower Back Pain in the French Population Aged from 30 to 69: The Results of the 2002–2003 Décennale Santé Survey. Annals of Physical and Rehabilitation Medicine. 2010;53(4):224-38. doi: http://dx.doi.org/10.1016/j.rehab.2010.03.006.
66. Hestbaek L, Leboeuf-Yde C, Manniche C. Low Back Pain: What Is the Long-Term Course? A Review of Studies of General Patient Populations. Eur Spine J. 2003;12(2):149-65. doi: 10.1007/s00586-002-0508-5.
67. Itz CJ, Geurts JW, van Kleef M, Nelemans P. Clinical Course of Non-Specific Low Back Pain: A Systematic Review of Prospective Cohort Studies Set in Primary Care. Eur J Pain. 2013;17(1):5-15. doi: 10.1002/j.1532-2149.2012.00170.x.

68. Donaldson L. Pain: Breaking through the Barrier. 150 years of the Annual Report of the Chief Medical Officer: On the state of Public Health. 2008:32-9.
69. Pain Management Services: Planning for the Future: Royal College of General General Practitioners; 2013. Available from: http://www.rcoa.ac.uk/document-store/pain-management-services-planning-the-future-guiding-clinicians-their-engagement.
70. Cherkin DC, Deyo RA, Volinn E, Loeser JD. Use of the International Classification of Diseases (Icd-9-Cm) to Identify Hospitalizations for Mechanical Low Back Problems in Administrative Databases. Spine (Phila Pa 1976). 1992;17(7):817-25.
71. Martin BI, Mirza SK, Comstock BA, Gray DT, Kreuter W, Deyo RA. Reoperation Rates Following Lumbar Spine Surgery and the Influence of Spinal Fusion Procedures. Spine (Phila Pa 1976). 2007;32(3):382-7.
72. Malter AD, McNeney B, Loeser JD, Deyo RA. 5-Year Reoperation Rates after Different Types of Lumbar Spine Surgery. Spine (Phila Pa 1976). 1998;23(7):814-20.
73. Fritzell P, Hägg O, Nordwall A. Complications in Lumbar Fusion Surgery for Chronic Low Back Pain: Comparison of Three Surgical Techniques Used in a Prospective Randomized Study. A Report from the Swedish Lumbar Spine Study Group. European Spine Journal. 2003;12(2):178-89.
74. Walker BF, Muller R, Grant WD. Low Back Pain in Australian Adults: The Economic Burden. Asia Pac J Public Health. 2003;15(2):79-87.
75. McBride D, Begg D, Herbison P, Buckingham K. Low Back Pain in Young New Zealanders. N Z Med J. 2004;117(1203):U1099.
76. Lindner R, Wu F, Oyomopito R, Khanal S, Heaney A, Zuo Y, et al. Financial Impact of a National Program to Influence Acute Low Back Pain Management in General Practice [Abstract]. First Preventing Overdiagnosis Conference; 10-12 September 2013; Hanover (NH)2013.

National Health Committee (NHC) and Executive

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