



Better outcomes through increased access to physiotherapy

Physiotherapy in transdisciplinary models of care to improve outcomes and equity for New Zealanders

NZIER report to Physiotherapy New Zealand

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Authorship

This paper was prepared at NZIER by Michael Bealing and Mieke Welvaert.

It was quality approved by Todd Kriebel.

Registered office: Level 13, Willeston House, 22–28 Willeston St | PO Box 3479, Wellington 6140
Auckland office: Ground Floor, 70 Shortland St, Auckland
Tel 0800 220 090 or +64 4 472 1880 | econ@nzier.org.nz | www.nzier.org.nz

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Key points

What we set out to understand

- How does physiotherapy fit with the future New Zealand health system?
- Is an increased level of physiotherapy cost-effective in addressing the burden of disease?

Physiotherapy sensitive risk factors and conditions dominate the health outlook

Current and projected burden of disease projections to 2040 are dominated by risk factors and conditions that are sensitive to physiotherapy-based interventions. Reducing disability and mitigating risk factors are part of physiotherapy's scope of practice.

Physiotherapy-strengthened models of care could contribute to the Triple Aim Framework – Quality, Equity and Value

Greater use of physiotherapy would contribute to New Zealand healthcare's Triple Aim Framework, which is focused on quality, equity and efficiency (Figure 1), by:

- reducing the overall cost of health system interventions through addressing lifestyle risk factors such as obesity
- empowering individuals to manage chronic long term conditions and risk factors
- contributing to the reduction in health system pressures associated with the burden of non-communicable diseases
- offering opportunities for advice and treatment that does not need to be funnelled via GP referrals.

Figure 1 The New Zealand Triple Aim Framework

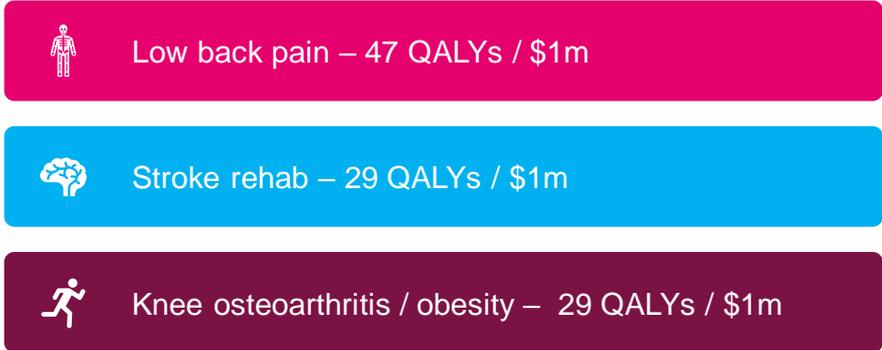


Source: Ministry of Health (2016a)

Three conditions were selected to show the value of physiotherapy: low back pain, stroke recovery and osteoarthritis linked to obesity

All three showed good returns from increased physiotherapy **and are above Pharmac’s ‘threshold’ for funding of 25 QALYs/\$1m.**

Figure 2 Returns from increased physiotherapy



Source: NZIER

Why is this compelling?

- Supports a primary care led system
- Access improves equity
- Provides value and addresses opportunity costs
- Provides non-health social and economic benefits.

Whose interests are served?

Table 1 Who benefits?

Interest	Stakeholder
Future proofed / primary care led health system	Health Review team Ministers New Zealanders
Equity	Ministers Maori Disadvantaged groups Rural
Value	Budget ministers Treasury DHB planners, service designers
Quality	Service users Health professionals
Social and economic benefits	ACC Service users

Source: NZIER

What next steps that should be considered?

The next steps in improving the deployment of physiotherapists in the management of long-term conditions are to review:

- Implications for models of care
- Transdisciplinary practice in professions
- Incentives to drive change

Cost-effective physiotherapy can improve health outcomes and reduce costs

This report considers the opportunity of greater use of physiotherapy to contribute to better health and economic outcomes for those with low pain back pain, stroke, and osteoarthritis. These three conditions were selected as leading examples of the potential that physiotherapy could address if the funding and health sector support was put in place. Each of these conditions ranks in the top 10 non-communicable causes of health quality loss in New Zealand.

More physiotherapy for low back pain would be cost effective in New Zealand

The prevalence of cases of low back pain in New Zealand has increased from more than 540,000 in 1990 to 827,000 in 2017. Low back pain was the highest ranked cause of disability, measured in years lived with disability from a non-communicable disease. Using physiotherapy to treat low back pain early, rather than taking a wait and see approach has been shown to improve health outcomes and reduce costs in the US. For New Zealand, the cost per QALY (quality adjusted life year) gained by treating low back pain with physiotherapy in New Zealand is estimated to be \$21,118. This is equivalent to 47 QALYs per \$1 million spent. It represents good value use of scarce health resources. This compares well with other cost utility analysis in health policy. For example, Pharmac has previously approved investments above 25 QALY per \$1 million spent (Metcalf et al., 2012).

More intensive physiotherapy for stroke patients in hospital could deliver better recoveries and significant cost savings

In 2017, the central estimate of the incidence of stroke in New Zealand was estimated at 5,837 (Institute for Health Metric and Evaluation, 2018). Applying high intensity physiotherapy in hospital following a stroke in New Zealand was estimated to deliver 29 QALYs per \$1 million spent. The cost savings from a shorter hospital stays due to more intensive hospital-based physiotherapy exceeds the costs of the additional physiotherapy and it represents good value in health resource allocation. Physiotherapy can assist in improving health outcomes and reducing the costs of hospital stays for people recovering a stroke. In New Zealand hospital-based rehabilitation has been shown to be lower in intensity than overseas and relatively more physiotherapist time is spent on non-therapy activities. A randomised controlled trial has shown that intensive and early physiotherapy can improve outcomes for stroke patients and reduce the length of stay in hospital (Chan, 2015).

Physiotherapy can address lifestyle risk factors and reduce pressure on the system

Physiotherapy can also be involved in early interventions aimed at reducing the burden of disease from musculoskeletal conditions associated with obesity, such as osteoarthritis. Evidence from Australia and the UK show that physio-delivered exercise therapy can



improve health outcomes and reduce healthcare costs. Early evidence from the Mobility Action Plan (Allen + Clarke, 2018) in New Zealand indicates that tailored interventions including diet and exercise improve health outcomes, reduce demand on other parts of the health system and improve work-related productivity. This represents good value, effectiveness and potential for improved equity for disadvantaged populations.

Increased physiotherapy supports a primary health focus

Primary care-led health systems provide better outcomes and in the New Zealand context, services located closer to service users is important for improved equity. More and more long-term conditions can be managed at home and in the community.

Transdisciplinary services produce better outcomes and equity

Research shows that overall, transdisciplinary health services that use allied health professionals can be a more efficient way to achieve good outcomes and to improve access for some populations. Physiotherapists as the community-based health professional most frequently visited by many health service users are at the frontline of the transdisciplinary approach.

Physiotherapy is a good workforce investment

The physiotherapy workforce is relatively young, with 65% aged 44 or younger (Reid and Dixon, 2018). In comparison, 32% of general practitioners are aged 44 or younger (The Royal College of General Practitioners, 2018). So, investment in a relatively young physiotherapy workforce could have long-lasting returns.

Physiotherapists have a broad scope of practice as frontline practitioners, compared to more expensive professions responding to demand for healthcare. Physiotherapists can be deployed cost effectively to respond to the significant workforce shortages across the healthcare professions.

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1 Untapped potential for physiotherapy in New Zealand

New Zealand's health system performs well when investments are compared to outcomes. Investment in the system is determined by the government, allowing the government to shape what is offered by the system (Ministry of Health, 2019).

This report investigates the untapped potential for physiotherapy in New Zealand. It explores ways that the burden of disease could be reduced by increased use of physiotherapy through case studies for three health areas:

- low back pain
- stroke recovery
- osteoarthritis and obesity-related joint problems.

Physiotherapy can play an important role in the performance of the health system based on the Triple Aim Framework shown in Figure 3.

Figure 3 The New Zealand Triple Aim Framework



Source: Ministry of Health (2016a)

This is because physiotherapists are especially well placed to support strengthening of primary and community care. The general scope of practice for a physiotherapist is described as:

“Physiotherapy provides services to individuals and populations to develop, maintain, restore and optimise health and function throughout the lifespan. This includes providing services to people compromised by ageing, injury, disease or environmental factors. Physiotherapy identifies and maximises quality of life and movement potential by using the principles of promotion, prevention, treatment/intervention, habilitation and rehabilitation. This encompasses physical, psychological, emotional, and social wellbeing.” (Physiotherapy Board of New Zealand, n.d.)

Healthcare systems worldwide are facing increased demand pressures from larger and longer-living populations. With people living for longer, and growing problems of obesity, more conditions are long-term and non-communicable diseases.

Primary and community care-led health systems tend to produce better outcomes in each of the triple aim objectives (Starfield, Shi, and Macinko, 2005) due to the following factors:

- early intervention
- health promotion and patient education
- help navigating the system
- less invasive patient management practices
- connection with social services
- ease of access.

Physiotherapy's scope of practice allows for all these opportunities. Increased physiotherapy, in response to rising demand, or in replacement of palliative or surgical treatments, can help reduce the burden of disease in New Zealand, as well as healthcare costs. Therefore, physiotherapy can help to reduce a wide range of the causes, risks and outcomes associated with burden of disease in New Zealand.

This report is intended to showcase some examples where there is unrealised potential for greater use of physiotherapy, as part of a transdisciplinary approach to healthcare. A transdisciplinary approach to healthcare is sharing knowledge, skills and decision making across disciplinary boundaries (Van Bower, 2017).

In the United Kingdom, 30% of a GP's caseload is made up of patients presenting with musculoskeletal complaints (NHS 2017, p.70). If the same is true in New Zealand, then there is clearly an opportunity to reduce cost and scheduling pressures through direct access to physiotherapy.

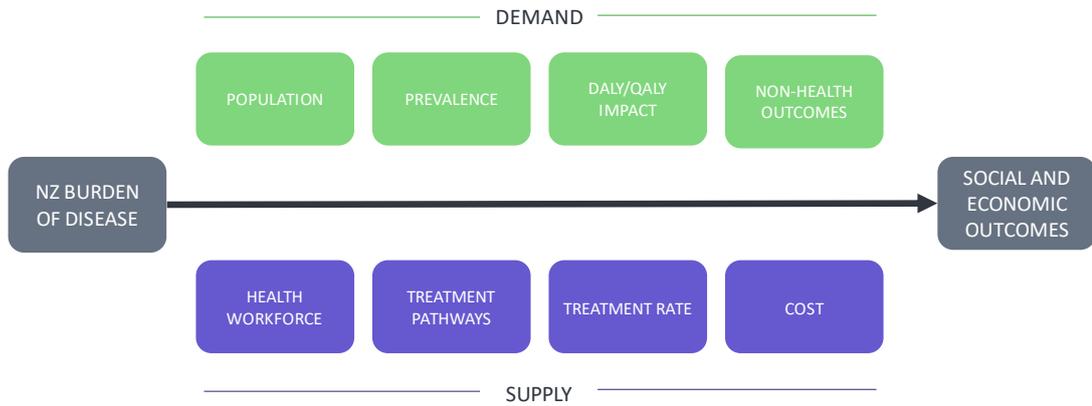
1.1 Our approach

We undertook a systematic evidence-driven approach to investigate the potential contribution physiotherapy in New Zealand could make to reduce the burden of disease and the pressures on the healthcare system. This included international and domestic information sources such as peer-reviewed literature. Where possible we drew on systematic reviews from the Cochrane Library.

We used a demand and supply framework to structure the analytical approach. Figure 4 outlines the demand and supply factors which influence New Zealand's burden of disease and resulting social and economic outcomes. Transdisciplinary healthcare addresses each of these demand and supply factors to improve social and economic outcomes, including wellbeing, for New Zealanders.



Figure 4 Healthcare demand and supply



Source: NZIER

Cost-utility analysis was used to structure the analysis so that it was consistent with health policy decision-making processes in New Zealand. This embeds a common bias into the analysis and allows the comparison of alternative opportunities in the context of budget constraints. This approach is consistent with that used by the Ministry of Health, Pharmac and amenable to the Treasury Budget process.

2 An ageing population and growing risk factors

In this section we discuss the ageing population and key risk factors for disease and disability in New Zealand.

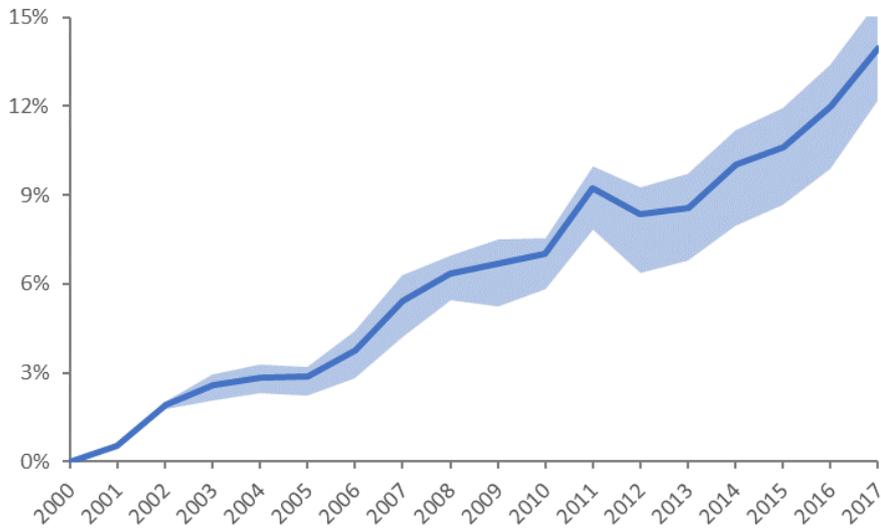
Demand pressures will continue to be a challenge – physiotherapy can reduce the burden

The demands on the health system have increased and will continue to grow.

Figure 5 shows the growth in disability adjusted life years (DALYs) since 2000. The unabated upwards trend indicates demand pressures in the health system have increased over the long term.

Figure 5 Growth in the burden of disease since 2000

The growth in disability adjusted life lost years since 2000

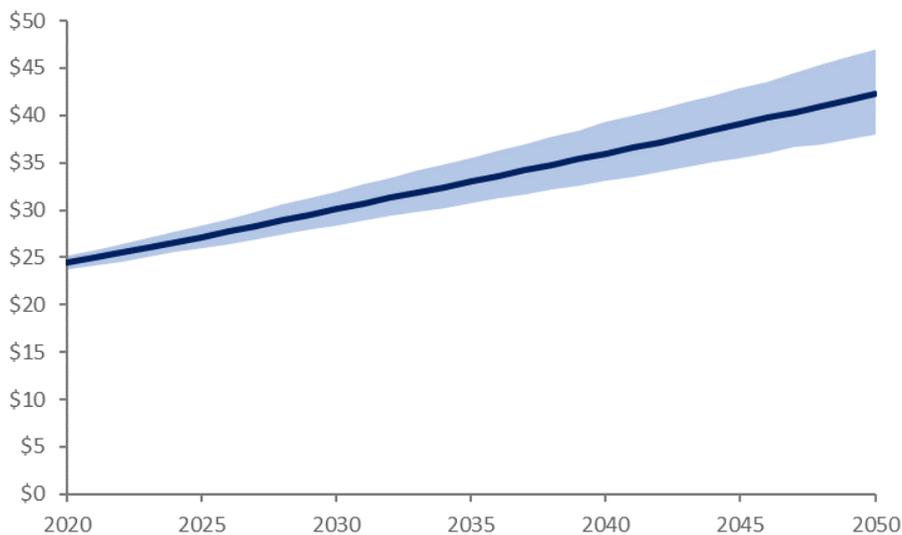


Source: The Institute for Health Metrics and Evaluation (IHME) (2018)

The long-term forecasts of government health expenditure also show the upwards pressure on the health budget in New Zealand (see Figure 6).

Figure 6 Government health expenditure forecasts

NZD (billions)

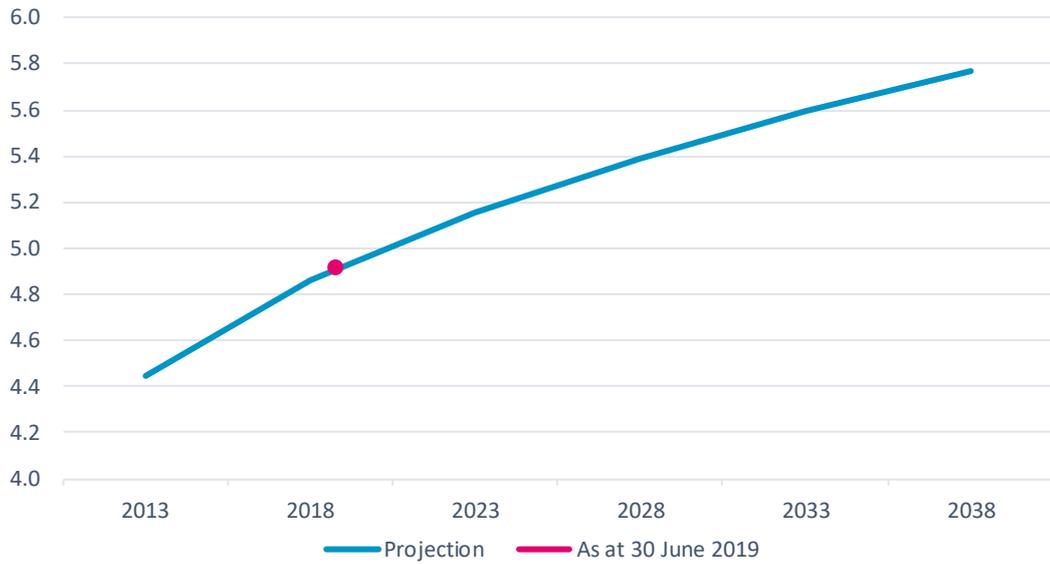


Source: IHME (2019), and OECD (n.d.)

2.1 A growing and ageing population

New Zealand’s population is both growing and ageing. Both factors increase demand for healthcare. Median projections by Statistics New Zealand indicate that New Zealand’s population will grow by almost a million people by 2038 (Statistics New Zealand, 2017).

Figure 7 New Zealand's population is projected to grow to 5.8 million by 2038
 Number of people, millions

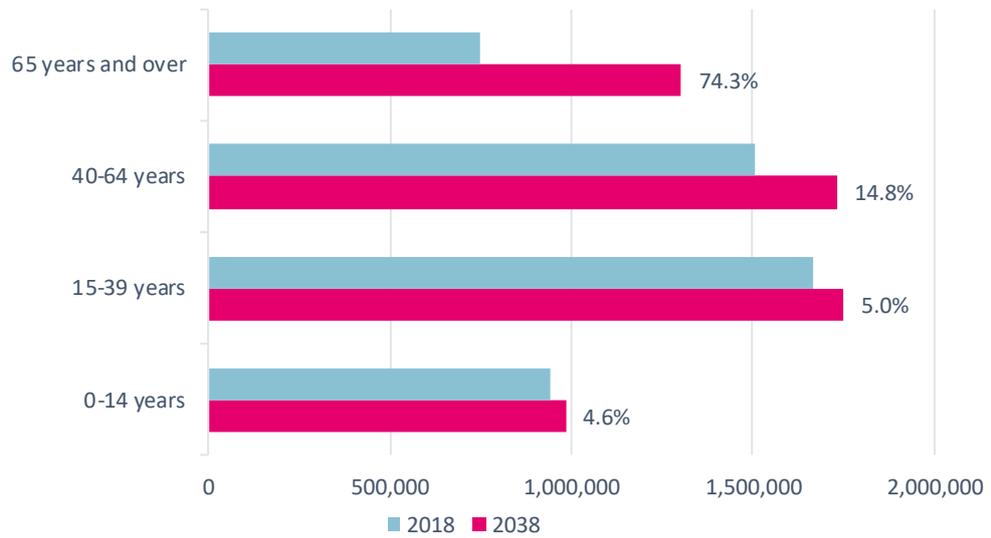


Source: NZIER

The largest growth will be in the over 65 age group, which will increase by 74% over the next 20 years (see Figure 8).

Figure 8 New Zealand's ageing population

Number of people, millions, and growth (percentages)



Source: NZIER

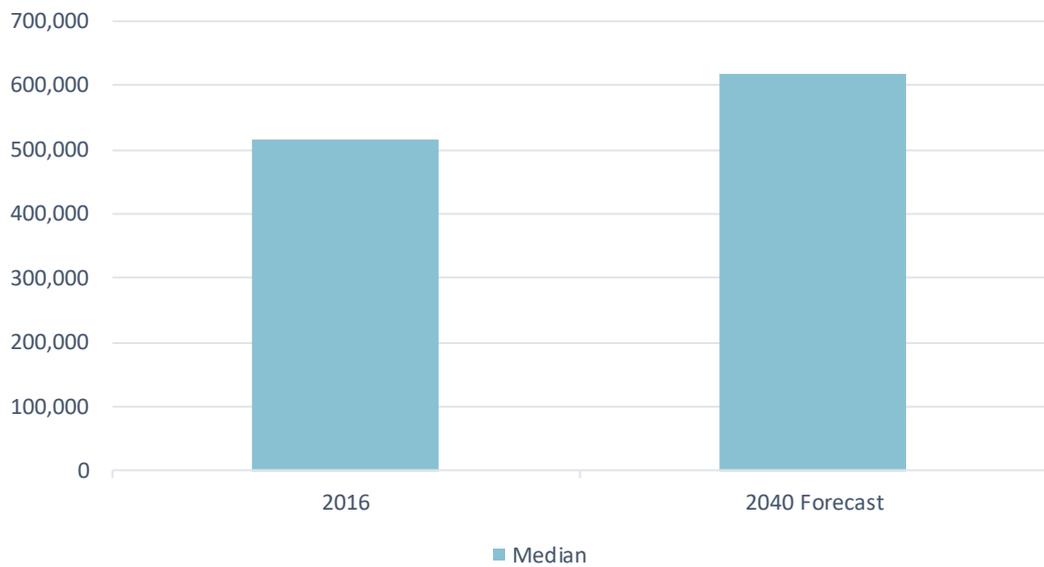
The Ministry of Health emphasises the impact that the ageing population will have on the healthcare system:

“Improving the health of future cohorts of older people will be critical. An ageing population will increase demand pressure on the health system, but the level of this impact will depend on how healthy future cohorts of older people are. As we progress through the epidemiological and disability transitions, it appears that an increasing proportion of frail older people will survive for longer with multi-morbidity and associated disability.” (Ministry of Health, 2016b)

The IHME expect New Zealand’s total disease burden to increase (see Figure 9).

Figure 9 Forecast years of life lost expected to increase in New Zealand

Years of life lost, actual counts

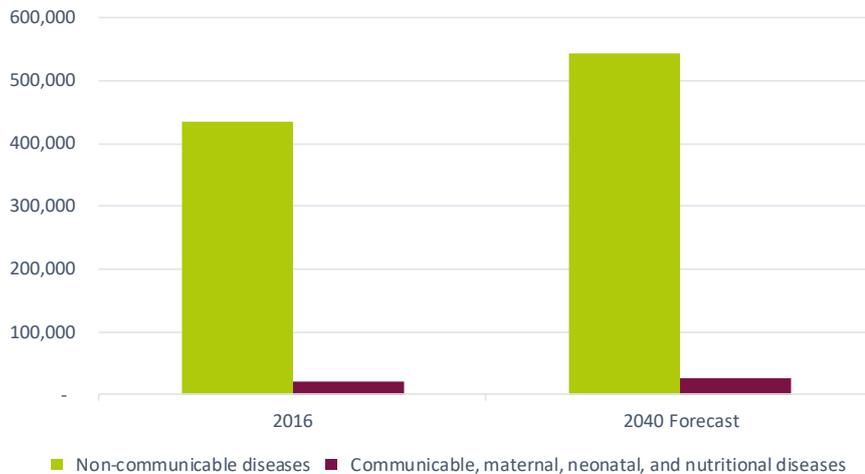


Source: IHME (2019)

The increasing number of people with non-communicable diseases drives the projected growth in years of life lost (see Figure 10).

Figure 10 Growth in years of life lost due to non-communicable diseases

Years of life lost, actual counts



Source: IHME (2019)

2.2 Long-term conditions are becoming more prominent in healthcare demand

Non-communicable diseases are often long-term health conditions. In New Zealand, “88% of health loss is now caused by non-communicable diseases (NCDs – i.e., long-term mental and physical conditions) and 8% is attributable to injuries” (Ministry of Health, 2016b). Eight out of the top ten causes of disease and disability in New Zealand are non-communicable diseases (IHME, 2019).

Figure 11 Top ten causes of death and disability combined in New Zealand

Non-communicable diseases in blue and injuries in green, measured in disability adjusted life years¹

2017 rank	Health problem	DALY % change (2007-2017)
1	Low back pain	12.4%
2	Ischemic heart disease	-3.6%
3	Falls	12.6%
4	Chronic obstructive pulmonary disease	13.1%
5	Stroke	5.8%
6	Lung cancer	11.1%
7	Headache disorders	5.4%
8	Anxiety disorders	2.1%
9	Road injuries	-12.2%
10	Alzheimer’s disease	26.2%

Source: IHME (2019)

¹ A unit of health loss. "One DALY represents the loss of one year lived in full health" (Ministry of Health, 2016b).

In the following sections we discuss how increased physiotherapy benefits two of these top ten causes of disease and disability: low back pain (Section 4) and stroke (Section 5).

2.3 Main risk factors are growing

The IHME also identify the top ten risk factors for disease and disability. The number of years lived with disability associated with these risk factors has increased for all except tobacco, which has steadily declined since 1983 (Health Promotion Agency, 2017), and high LDL cholesterol, which can be mitigated with cholesterol lowering medication (Chisholm, 2019a).

Figure 12 Top ten risk factors causing death and disability in New Zealand

2017 rank		Health problem	YLD % change (2007-2017)
1		Tobacco	-4.2%
2		Dietary risks	2.9%
3		High body-mass index	18.7%
4		High blood pressure	2.3%
5		High fasting plasma glucose	29.8%
6		Alcohol use	10.6%
7		Occupational risks	4.7%
8		High LDL cholesterol	-3.0%
9		Impaired kidney function	11.8%
10		Drug use	7.8%

Source: IHME (2019)

We discuss the impact of a high body mass index on osteoarthritis – a condition which physiotherapists are well placed to treat – in Section 6.



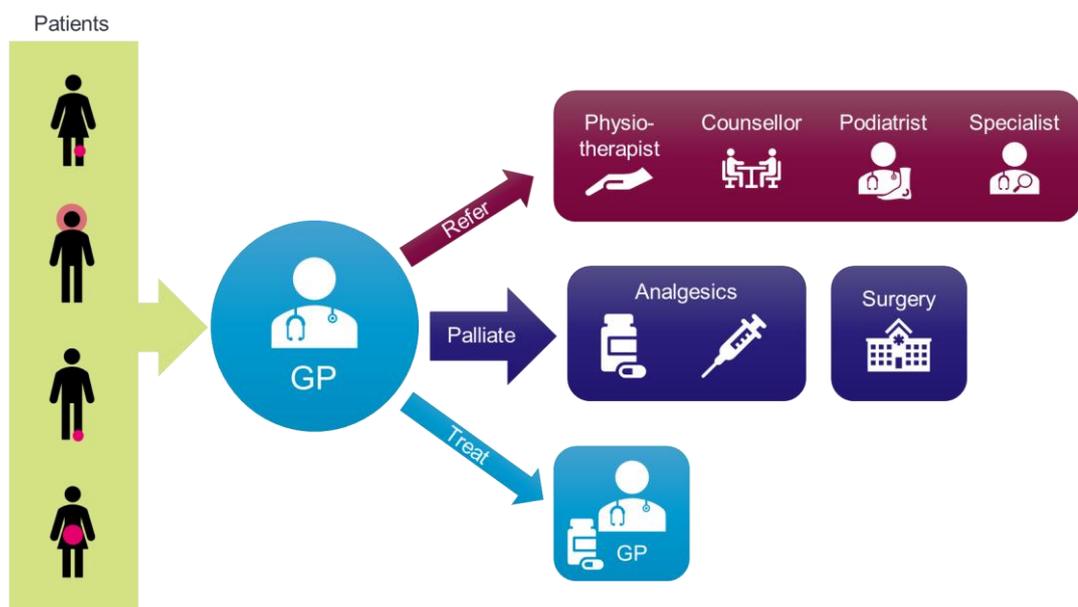
3 What is transdisciplinary healthcare and why do we need it?

Transdisciplinary healthcare is sharing knowledge, skills and decision making across disciplinary boundaries (Van Bower, 2017).

In practise, transdisciplinary healthcare means improving access for patients to the healthcare professional they need. Our non-emergency healthcare system relies on general practitioners (GPs) treating or referring patients that can otherwise be directly treated by other health professionals within the system. In the United Kingdom (UK), 27% of GP appointments are potentially avoidable (NHS, n.d.), with at least 16% of appointments that can be directly handled by other health professionals. A transdisciplinary system would redirect these appointments, reducing the burden on GPs.

Demand pressures force the health system to find ways to think about how to deal with the constrained supply of GPs as more of the workforce head into retirement. One survey found that 47% of New Zealand's GPs indicated that they are planning to retire within the next ten years (Chisholm, 2019b). Transdisciplinary healthcare is one way to redirect avoidable workload away from already busy GPs.

Figure 13 Current structure relies on GPs to triage



Source: NZIER

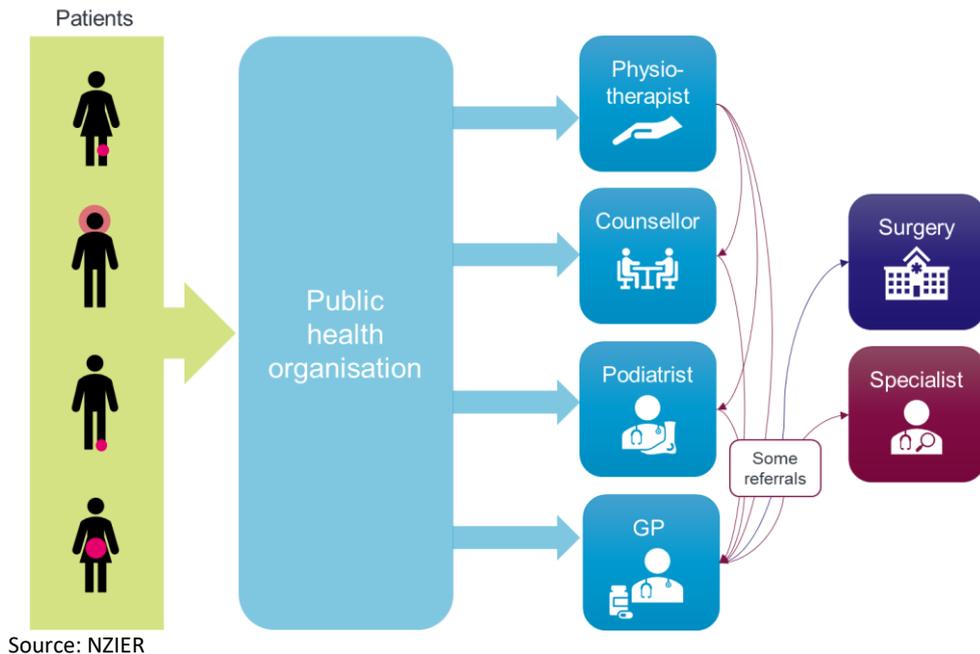
Transdisciplinary healthcare systems are a way to put patients on to less expensive, less resource intensive, and often also more efficient treatment pathways.

Transdisciplinary healthcare can include:

- Improved avenues for patients to directly access healthcare professionals
- Increased GP referrals to non-palliative options, particularly before considering surgery
- Patient education about where and when to seek treatment, and what they can do to help themselves.



Figure 14 Transdisciplinary systems redirect patients, reducing demand for GPs



One example of where transdisciplinary healthcare reduces costs and improves patient outcomes is directing musculoskeletal patients to physiotherapists and occupational therapists.

In the United Kingdom, 30% of a GP's caseload is made up of patients presenting with musculoskeletal complaints (NHS 2017, p.70).

Often GPs prescribe pain management such as analgesics for musculoskeletal complaints. If the pain is chronic and severe patients are put on waitlists for surgery. Transdisciplinary healthcare means directing musculoskeletal patients to physiotherapists and occupational therapists who then address most of the cases, referring those that they can't treat to GPs. Figure 15 shows one case study from the UK where extending the scope of a physiotherapist with a GP practice reduced follow-up appointments and prescriptions.



Figure 15 Extending the scope of a musculoskeletal physiotherapist in a GP practice

UK case study



Aim

To improve the pathway for patients through healthcare and to reduce load on GPs



Action

Allowing physiotherapists to "make radiological referrals, provide injection therapies, and refer patient directly to secondary care"



Result

- Most (64%) of cases managed with advice and guidance
- Fewer referrals for further physio (20% of cases, down from 30% for GPs)
- Fewer prescriptions (8% of cases, down from 40%)
- Fewer follow up appointments
- Same number of radiological referrals but "quicker access to diagnostics and direct surgical referrals with full diagnostic work up prior to referral (such as MRI)"
- High patient satisfaction

Source: NHS (2017, p.70–80)

Health Education England has developed an implementation plan for introducing a First Contact Practitioner (FCP) for musculoskeletal conditions. The FCP triages patients to determine whether they need to see a GP or a different healthcare practitioner. Evaluation for the FCP's show they deliver a positive return on investment (NHS, 2019).



4 Low back pain

In this section we discuss:

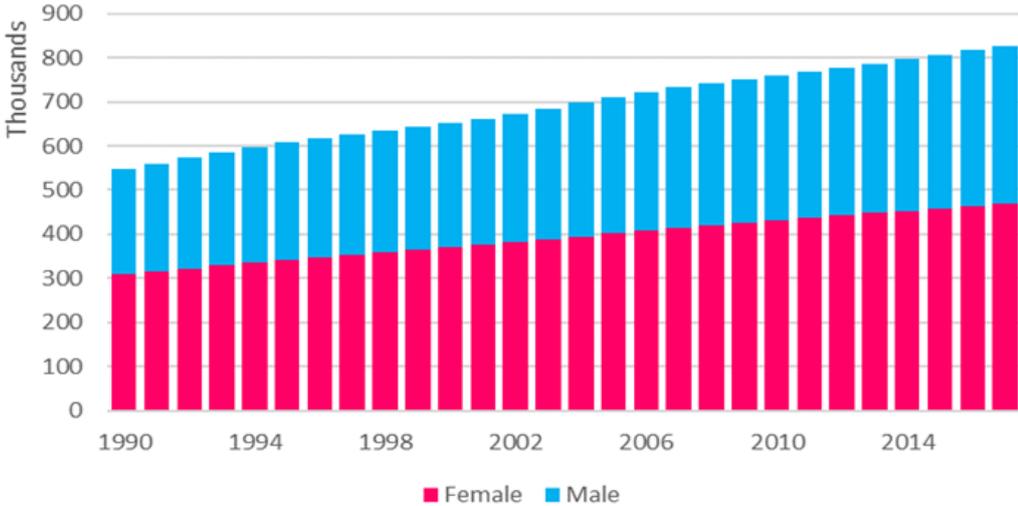
- The burden of low back pain on health outcomes in New Zealand.
- Opportunities for evidence-based physiotherapy to improve outcomes.

4.1 Low back pain is significant contributor to the burden of disease

Figure 16 shows the steady and consistent increase in the number of people experiencing low back pain in New Zealand over the past three decades. The number of cases of low back pain in New Zealand has increased from more than 540,000 in 1990 to 827,000 in 2017, i.e. there has been an almost 50% increase across the population.

Figure 16 The prevalence low back pain in New Zealand

Number of cases

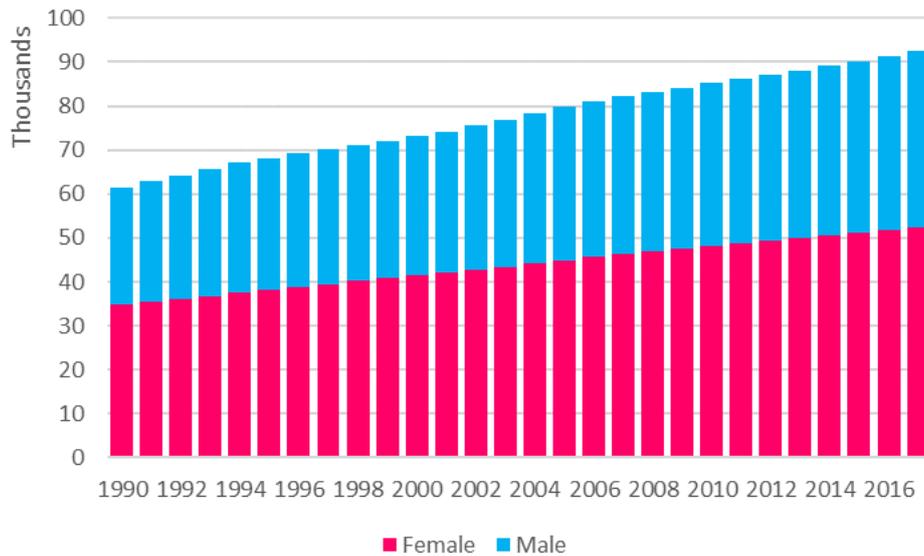


Source: IHME (2018)

The burden of disease from low back pain follows the prevalence pattern. The number of DALYs increased from 61,522 in 1990 to 92,449 in 2017. Figure 17 shows the long-term trend in the level of DALYs lost due to low back pain in New Zealand.

Figure 17 The burden of low back pain in New Zealand

Disability adjusted life years



Source: Institute for Health Metrics and Evaluation (2018)

In New Zealand, low back pain was the highest ranked cause of disability, measured in years lived with disability from non-communicable disease (IHME, 2018). This is not new. Low back pain was also ranked highest in 2007.

4.2 The burden of low back pain is not unique to New Zealand

Low back pain was also a significant contributor to the burden of disease in UK, US, Australia, Canada and Norway. In the US, low back pain accounted for 2–3% of all doctor consultations (Fritz et al., 2017). The medical costs associated with low back pain are rising faster than overall healthcare spending (Martin et al., 2008). This has raised concerns about the crowding out consequences of low back pain on other conditions. In Australia, 55% of middle-aged women surveyed self-reported experienced back pain (Broom et al., 2012).

A recent special briefing by *The Economist* on the treatment of low back pain highlighted that strong pain medication has been too readily prescribed and there is concern about the links to opioid addiction. The briefing suggests that more physical therapy and self-management through exercise would improve outcomes, and lower costs (The Economist, 2020).

4.3 Many people do not seek treatment or advice on how to reduce low back pain

Only one-third of middle-aged women that self-reported experiencing back pain in Australia sought help or advice (Broom et al., 2012), and that included conventional and alternative approaches. Two-thirds of New Zealanders with low back pain don't seek medical advice (Hoffman and MacVicar, 2009). Physiotherapy has been shown to be a low-cost and cost-effective option.

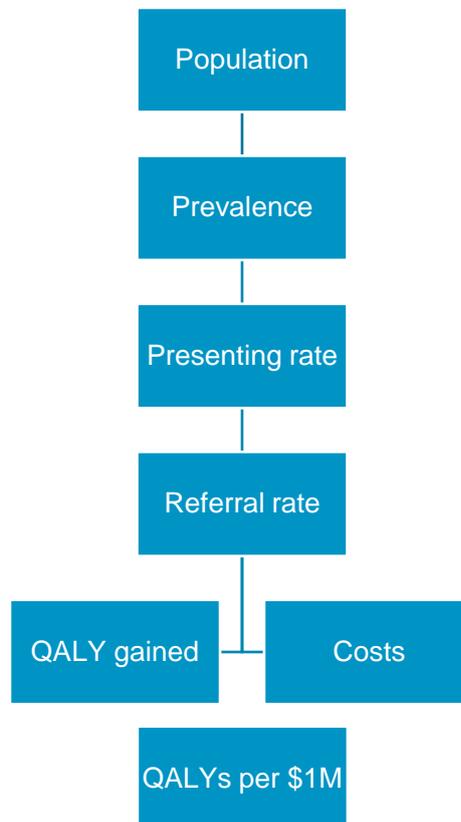


Fritz et al. (2017) used a randomised control trial to investigate the cost-effectiveness of early physical therapy for acute back pain in the US. The typical counterfactual was a four week wait and see approach. Fritz et al. found that early intervention was effective in improving health outcomes (QALYs) and early return to work. They also found early intervention was cost effective compared to the conventional approach. The improvements in health outcomes and the additional costs associated with early intervention were well within acceptable ranges in terms additional QALY per dollar spent.

4.4 Approach to cost utility analysis

Figure 18 shows the approach used to estimate the cost-effectiveness of increased access to physiotherapy for low back pain. The methodology is consistent with the cost utility analysis methodology applied by Pharmac and others (Grocott et al., 2013).

Figure 18 Approach to cost utility analysis



Source: NZIER

The approach begins with a population projection from Statistics New Zealand, which is disaggregated by sex and age group. Then prevalence rates per 100,000 people were applied to estimate the number of low back pain cases for each year from 2020 to 2040. The third step involves estimating the share of cases that present to the health system for advice or treatment. The fourth step applies a referral rate to estimate the number of cases that are referred to a physiotherapist from within the health system. Three referral scenarios were compared to the base case. The referral rate for the base case and the



scenarios are shown in Table 2. The presenting rate was held constant as the referral was increased. The penultimate steps involve estimating the additional QALYs gained and the additional costs from increasing the referral rate. Finally, the additional QALYs per \$1 million was derived.

Table 2 Low back pain scenarios

Scenario	Presenting rate	Referral rate	Physiotherapy treatment rate compared to prevalence
Base case	1/3	12%	4%
Scenario 1	1/3	24%	8%
Scenario 2	1/3	36%	12%
Scenario 3	1/3	48%	16%

Source: NZIER

Population

The medium population projections 2020-2038 were sourced from Statistics New Zealand, disaggregated by sex and 5-year age bands. Age and sex were important because the prevalence rate varies for different age groups and sex. The age group were aggregated to the following groups to match the prevalence data source from IHME:

- Under 5
- 5–14 years old
- 15–49 years old
- 50–69 years old
- 70+ years old.

The population for 2039 and 2040 was estimated by extrapolation.

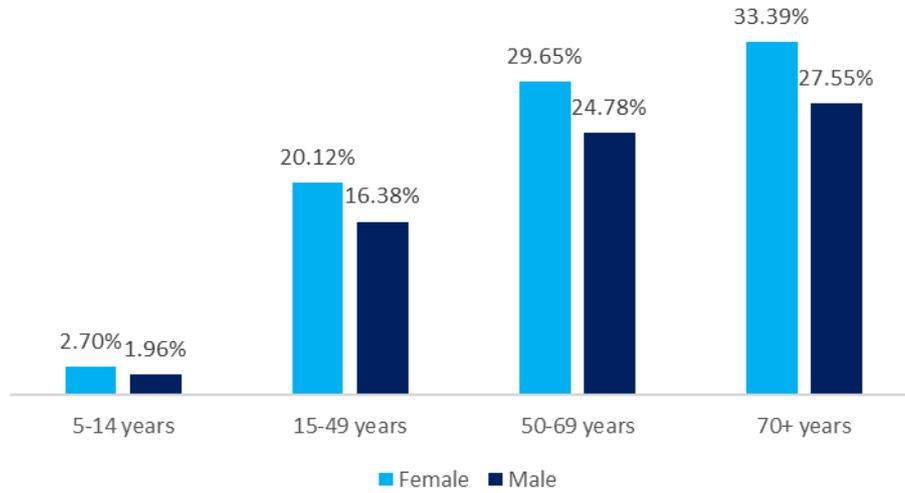
Prevalence

Prevalence rate per 100,000 for New Zealand were sourced from IHME (2019). The data is based on microdata from the New Zealand Health Survey. Annual prevalence rates from 1990 to 2017, the most recent year available was sourced by sex and age group. The average prevalence rate per 100,000 was calculated. Figure 19 shows the average prevalence rate over the period from 2008 to 2017, by sex and age group. The prevalence rate for under 5s was zero. The figure shows the prevalence rates – a percentage for ease of interpretation. The percentages indicate that low back pain:

- is common in adults
- prevalence increases with age
- is more prevalent in women than men.



Figure 19 The prevalence for low back pain in New Zealand

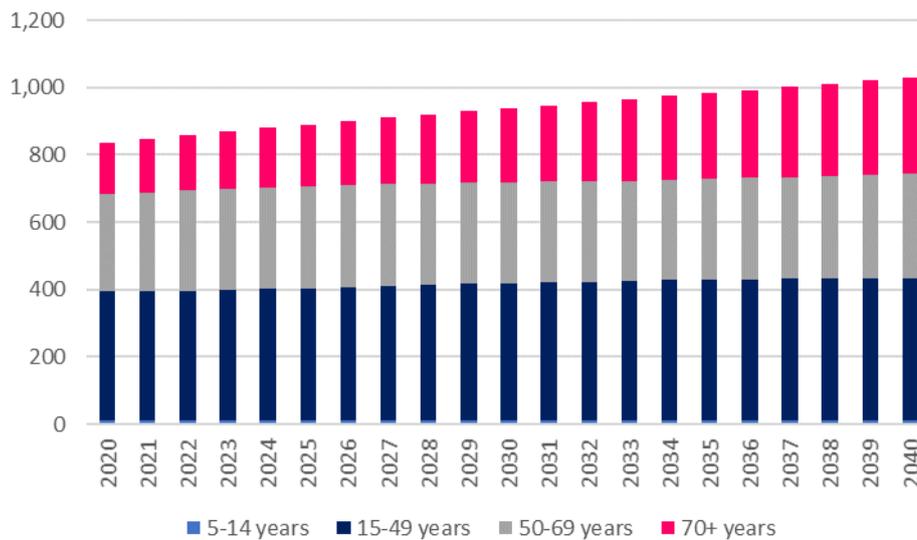


Source: NZIER calculations based on data from IHME (2018).

The average prevalence rates were applied to the population projections to estimate the number of cases for each year from 2020 to 2040. Figure 19 shows the projected number of low back pain cases in Zealand over the next 20 years.

Figure 20 The projected prevalence for low back pain in New Zealand

Cases (thousands)



Source: NZIER



Presenting and referral rates

Only one-third of people with low back pain seek advice or treatment (Hoffman and MacVicar, 2009) and 12% are referred to physiotherapists (National Health Committee, 2015). This indicates the potential to reduce the burden of disease from low back pain could be quite significant, given that currently around 4% of people are receiving physiotherapy for it. As outlined in Table 2 our scenarios estimate the benefit of increasing the referral rate. Further benefit may be released if more people who endure low back pain sought medical advice. They wouldn't necessarily need to seek a referral from a GP. Self-referral is an option. There was a paucity of information on self-referrals. In this report, the analysis is limited to GP referrals.

QALYs gained

In a randomised control trial that investigated the cost-effectiveness of early physical therapy for acute back pain compared to a four week wait and see approach (the counterfactual), Fritz et al. (2017) estimated that 0.02 QALYs were gained. The 95% confidence interval from 0.005 to 0.035, shows that there was always some improvement compared to the counterfactual of simply waiting to see if the pain dissipates without intervention. In New Zealand, this suggests that people could benefit from seeking more physiotherapy and earlier.

Costs

Fritz et al. (2017) found that the early access to physiotherapy was cost effective in the US. In this report we are interested in the potential cost savings that could be gained for New Zealand through early access to physiotherapy. Costs provided by Physiotherapy New Zealand indicated that the cost of an average consultation is \$52.80 ex. GST. The typical number of consultations per client with low back pain is eight, based on the National Health Committee's (2015) report into low back pain. Combining the number of consultations with average cost per consultation results in an average cost per person of \$422.36 ex. GST.

4.5 Overall results for low back pain

The cost per QALY gained by treating low back pain with physiotherapy in New Zealand is estimated to be \$21,118. This is equivalent to 47 QALYs per \$1 million spent. Which compares well with other cost utility analysis in health policy. For example, Pharmac has previously approved investments above 25 QALY per \$1 million spent (Metcalf et al., 2012).

Table 3 shows the results of the low back pain scenarios with increased referral rates over the period from 2020 to 2040 compared to the baseline. The QALYS gained per \$1 million invested stays constant at 47.35, but the number of people who benefit and the cost increases proportionally. It represents good value use of scarce health resources. This compares well with other cost utility analysis in health policy.



Table 3 Low back pain cost utility analysis results

Over the period 2020 to 2040, compared to baseline

Scenario	Referral rate	Additional referrals (thousands)	QALYS gained	Additional cost (undiscounted)
Scenario 1	24%	786.3	15726.9	\$ 332.1
Scenario 2	36%	1572.7	31453.8	\$ 664.2
Scenario 3	48%	2359.0	47180.7	\$ 996.4

Source: NZIER

Direct access to physiotherapy

Additional benefits could be released if those affected by low back pain could be triaged to a physiotherapy prior to seeing their GP and this treatment was subsidised for injury cases. The social cost of visiting a GP is \$88 according to the Treasury (The Treasury, 2019). If the need to visit a GP was eliminated for a referral for low back pain it would reduce the average cost of treatment by 21%. When this saving is included in the QALYs per million dollars, the potential additional QALYs gained per million dollar invested increases from 47.35 to 59.82, which is an additional 12.46 QALY per million.

5 Physiotherapy and stroke recovery

Stroke is the third highest cause of death in New Zealand and causes hundreds of premature deaths each year. Stroke is the eighth most important source of health loss. Better rehabilitation is achievable and could lead to benefits for work-related productivity among the working age population and it could lead to increased quality of life.

This section of the report presents an economic evaluation of increasing use of physiotherapy to improve the quality of life for people recovering from a stroke.

The risk factors for stroke include:

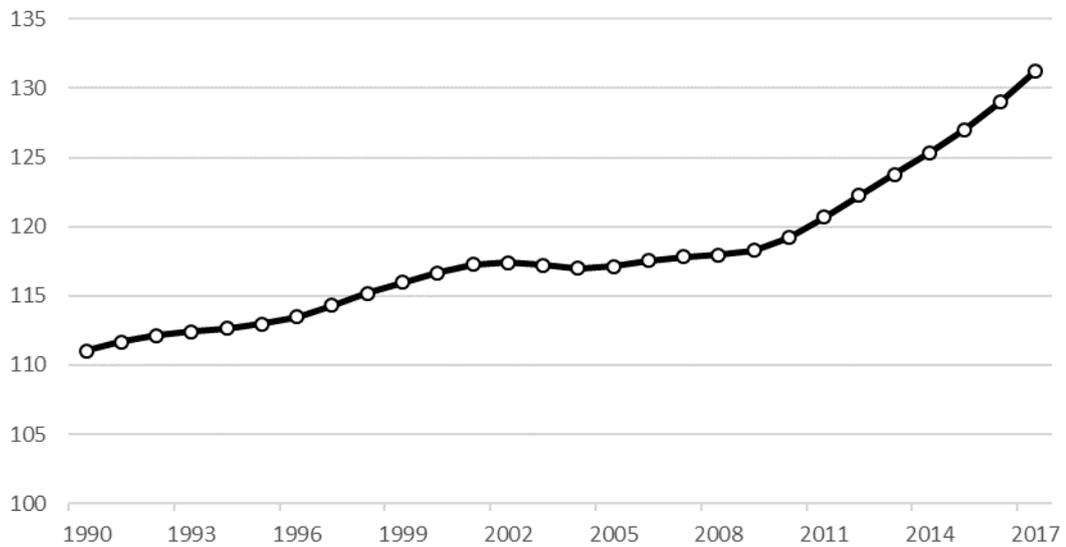
- high blood cholesterol level
- high blood pressure
- smoking
- diabetes
- a family history
- ageing.

The incidence of stroke has increased in recent years, which will only increase the health burden of stroke and its impact on the health system. Figure 21 Shows the incidence per 100,000 people between 1990 and 2017. The incidence rate of stroke has increased from 2009.



Figure 21 Incidence of stroke per 100,000 people in New Zealand

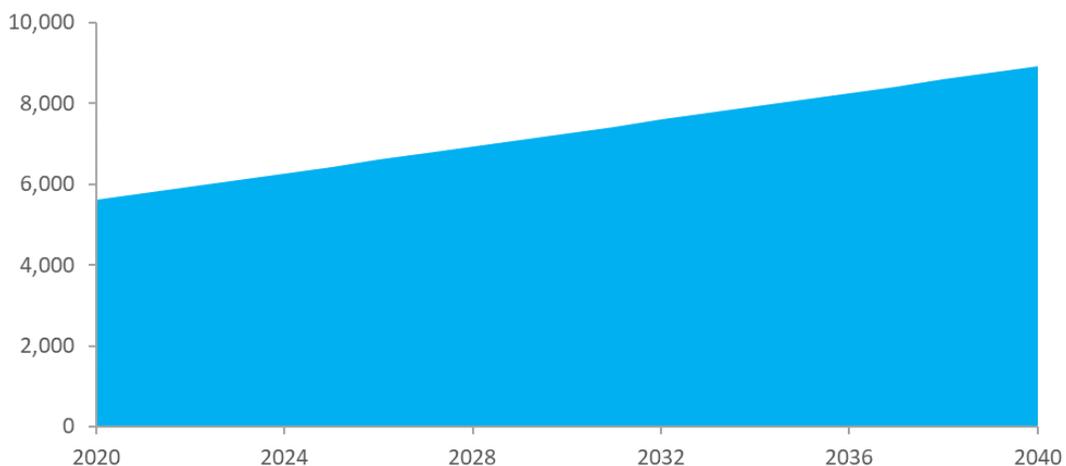
Incidence of stroke per 100,000 people



Source: IHME (2018)

Figure 22 shows the projected incidence of strokes in New Zealand from 2020 to 2040. The projection is based on the incidence rate per 100,000 since 2010 and adjusted from the growth in the incidence rate over that time. Incidence was applied to Statistics New Zealand’s population forecast over the period.

Figure 22 Projected number of strokes in New Zealand



Source: NZIER

5.1 In some cases, increasing the intensity of physiotherapy improves outcomes

There are many studies that show that more therapy and more intense therapy can produce better outcomes for individuals. More therapy is associated with improved quality of life, better recovery and low risk of readmission. There is also benefit for the healthcare



system from shorter hospital stays, low readmission rates and reduced need for long term support due to better recovery. The New Zealand-based evidence is sparse, but findings in the literature are consistent across a variety of healthcare systems including Canada, UK and US.

Scope for improvement in stroke rehabilitation in New Zealand

McNaughton et al. (2005) compared stroke rehabilitation practice and outcomes between New Zealand and the US. They found that stroke patients had more intensive input from physiotherapists and occupational therapists in the U.S. and patients had better outcomes than New Zealand patients, despite shorter hospital stays. US patients had better improvements in functional independences scores. Analysis of how therapists spent their time indicated that therapists in the US spent proportional more time on active therapy compared to those in New Zealand, who spent relatively more time on non-therapy tasks such as paperwork and organising equipment.

Other studies have shown that higher intensity therapy can improve outcome and lower the risk of readmission. Andrews, Li, and Freburger (2015) found that more intense physiotherapy, occupational therapy and speech therapy is associated with a lower probability of readmission in the first 30 days compared to patients that received low intensity therapy, even in the presence of more severe co-morbidities.² Research by McNaughton et al. (2014) showed that there had been improvements in hospital-based stroke rehabilitation between 2007 and 2013, but the intensity of therapy was below the recommended levels.

McNaughton et al. (2005) explored hospital-based and community-based resource use by ethnicity in New Zealand. They found non-Europeans had longer hospital stays than Europeans (median 36 days vs 18 days). They also found that community-based contact with rehabilitation professionals was low for all Europeans and non-Europeans alike. Spending on institutional care was around ten times higher than spending on community rehabilitation. The lack of on-going rehabilitation for people with stroke diminishes the chance of their best possible outcome (Saywell et al. 2012). Community-based physiotherapy is currently available in New Zealand, including home visit options.

Economic evaluation has shown higher intensity therapy can be cost effective

Chan (2015) reviewed three clinical studies on increasing the physiotherapy intensity in hospital immediately post stroke. On average, increased physiotherapy intensity meant patients receive 23 hours of therapy compared to an average of 9.2 hours over the average stay in hospital post stroke. On average 0.05 QALYs were gained (with a standard deviation of 0.86 which is a relatively large standard deviation). Chan completed an economic evaluation to explore the cost-effectiveness of increased physiotherapy in the Canadian health system. Chan concluded that the central results suggest it could be cost effective, but the wide standard deviation meant that cost-effectiveness results were quite sensitive to variation in the clinical studies. Chan considered the results supported the investigation of increasing intensity physiotherapy, but further research was warranted.

Investigating the potential of increased intensity physiotherapy in New Zealand

The literature reviewed in the preparation of this report suggested that there are many ways that increased access to more physiotherapy in New Zealand could improve outcomes

² Based on a retrospective cohort analysis of all acute care hospitals in Arkansas and Florida.



for people affected by stroke. There are numerous international studies investigating the outcomes. For example, the Cochrane Central Register of Controlled Trials has 1,269 studies with “stroke” and “physiotherapy” in the title, abstract or keyword. But only 50 (or 3.9%) of these studies referred to the cost-effectiveness of the health intervention. The absence of cost-effectiveness analysis means that a key piece of information required by policy makers dealing with budget constraints is missing, resulting in an implementation hurdle for adopting new approaches.

The resources available for this project were only enough to complete a preliminary cost-effectiveness of a single additional intervention. The cost-effectiveness of increasing the intensity of hospital-based stroke rehabilitation was used as an example to explore what could be potentially achieved in New Zealand.

Estimating the potential QALYs from intensive physiotherapy

The potential for better quality of health in New Zealand from the increased utilisation of physiotherapy following a stroke was explored by applying the central results from Chan (2015) to the situation in New Zealand. The variation in Chan’s results is an important consideration and its implications should be investigated further if this approach were to be adopted in New Zealand. In this report, Chan’s central results, which are cost effective, are used as an indication of the potential benefit that may be realised here.

The analysis was based on the projected population and incidence rates discussed above. It was assumed that 19% of strokes were fatal within the first 28 days, which is consistent with literature reviewed by Siddharth and Hogan (2018). Further research could explore the sensitivity of the results to different survival rate scenarios and different types of stroke. The variation in stroke outcomes is one explanation for the variation in Chan’s results. Stroke is complex and the impacts vary.

In 2020, the estimated number of strokes per year where the person survives the first 28 days was 5,623. This is projected to increase to 8,921 by 2040, based on the increasing population and the increasing incidence rate of stroke in New Zealand.

Applying the central results from Chan (2015) of an increase in QALY of 0.05 per stroke patient at a cost of \$1,457 per person to the projected incidence of stroke in New Zealand results in an estimated 29 additional QALYs gained per million dollars invested.

Chan (2015) also found that more intense physiotherapy was associated with a 14% reduction in the length of hospital stays. Siddharth and Hogan (2018) used Pharmac guidelines to estimate the cost of hospital stays following a stroke. They estimated the cost was \$27,733 based on a hospital stay of 22.5 days, which included acute care, medical ward care and rehabilitation ward care. The cost of acute care was \$10,000. In this report, the potential cost savings from a reduction in the length of the hospital stay was assumed to be related to a 14% reduction in the cost of medical and rehabilitation ward cost only, to be conservative. Therefore, the reduction in the length of stay could save \$2,483, which exceeds that cost of the additional 13.8 hours of intensive physiotherapy.

Overall, the analysis shows that increasing the intensity of physiotherapy in New Zealand for hospitalised stroke patients could improve health quality outcomes and the cost savings alone from a reduction in the length of a hospital stay would exceed the cost of the treatment.



6 The MAP evaluation, osteoarthritis and physiotherapy

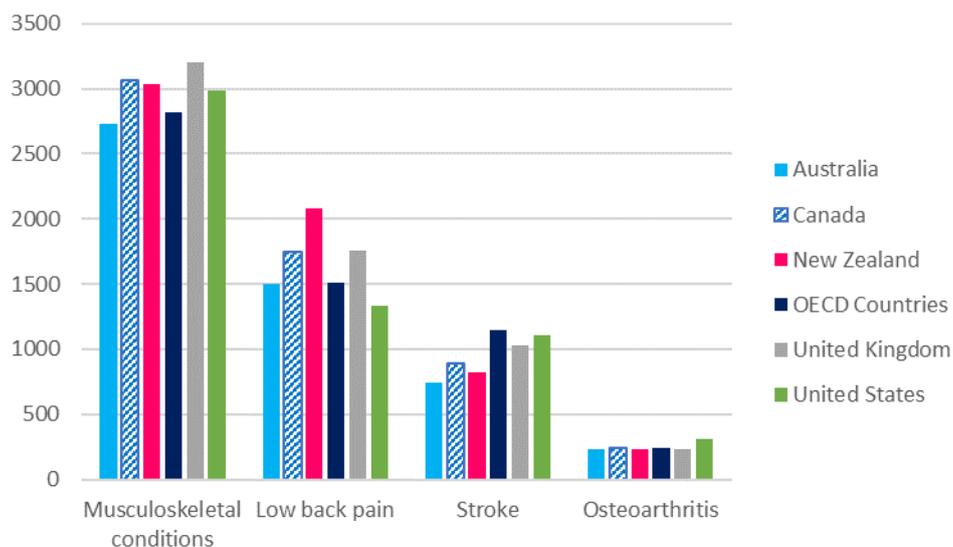
This section of the report discusses the role of physiotherapy and allied health interventions in supporting those with musculoskeletal conditions to gain improved outcomes. These interventions have been shown to be cost effective and generate cost savings by reducing the demand for surgery, specialists and GP consultants. The Mobility Action Programme (MAP) evaluation in New Zealand has found that targeted allied health interventions, which included physiotherapy, reduced the negative impact of musculoskeletal conditions on work productivity.

The burden of disease from musculoskeletal conditions

Musculoskeletal conditions in New Zealand are the leading contributor to the overall loss of health quality. As a group of conditions, they are more common than low back pain and stroke. Figure 23 shows the rate of conditions in New Zealand is similar to comparable countries and the OECD average.

Figure 23 Comparing DALYs from musculoskeletal conditions in New Zealand

DALYs per 100,000 people



Source: IHME (2018)

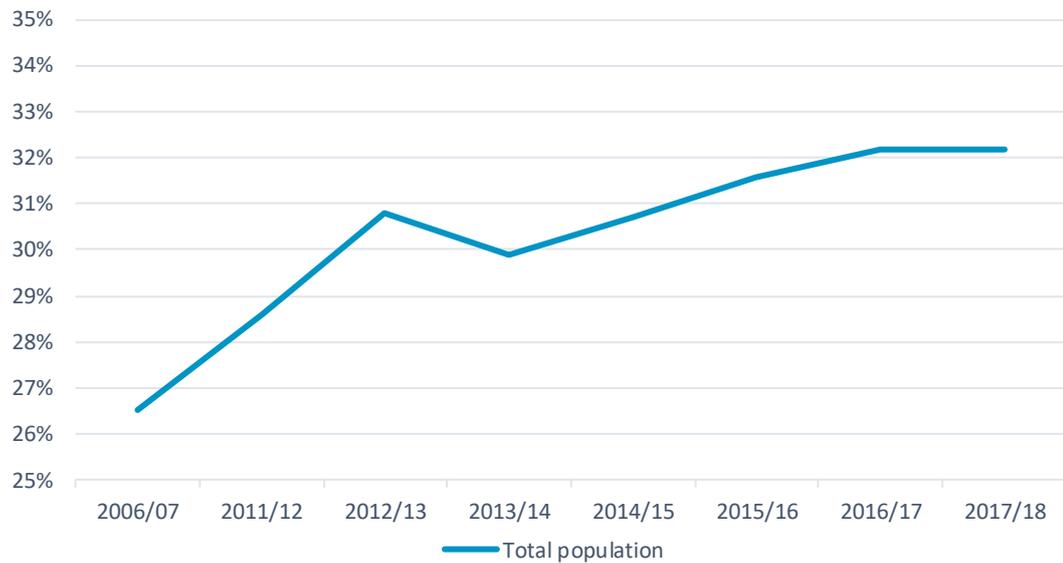
Increasing obesity is driving the burden from musculoskeletal conditions

Health loss from musculoskeletal disorders, including neck and lower back disorders and arthritis, is increasing – partly because of rising rates of obesity. “*Musculoskeletal disorders already account for 13% of all health loss*” (Ministry of Health, 2016b). In addition to being a major cause of health loss in New Zealand, the management and treatment of these conditions costs \$5.6 billion per year. Injury and obesity are the leading risk factors in osteoarthritis (Baldwin et al., 2017).



Figure 24 Obesity is increasing in New Zealand

% of people with a BMI >30



Source: Ministry of Health (2019)

Abbott et al. (2019) found that the healthcare costs of knee osteoarthritis in New Zealand were projected to increase from NZ\$199 million in 2013 to NZ\$370 million in 2038. Projected increases in population obesity rates accounted for 25% of the projected increase in per-capita healthcare costs.

Abbott et al. (2019) also investigated the benefit of additional exercise therapy for people with knee and hip osteoarthritis alongside the usual medical care. They found that physio-delivered tailored interventions were cost effective relative to a medical care only model. The physio-delivered intervention generated health quality improvements and health system savings relative to the usual medical care only model.

For Australia, Hunter (2019) reports that reducing obesity by 5% by 2050 would translate into 21,250 fewer Australians with osteoarthritis and potential savings of A\$356 million per year. Losina et al. (2019) found an intensive diet and exercise programme led to a mean 10.6 kg weight reduction, 51% pain reduction in patients with knee osteoarthritis. The programme was considered to be cost effective at 29.4 QALYs per \$1 million.

The increased utilisation of physiotherapy-style treatments has been shown to support a decrease in the demand of surgical intervention overseas. A reduction in the rate of surgical interventions can deliver cost savings in the tens of thousands once the costs of surgery, hospitalisation and rehabilitation are accounted for. In the UK, access to physiotherapy guidance in electronic form has been associated with a reduction in demand for surgery for musculoskeletal conditions. Hip and knee pathway exercise sessions emailed to patients have reduced joint operations by 20% (NHS, 2017).

Promising results are emerging from the MAP evaluation

MAP is an example of using targeted interventions from allied health specialists to improve health, economic, and social outcomes for people with musculoskeletal conditions. The MAP aims to help people fulfil their health potential and increase independence. This will



be achieved by improved access to high quality advice, assessment, diagnosis and treatment including education and rehabilitation.

The programme includes a range of practitioners including physicians, physiotherapists, nurses, psychologists and dietitians. Intervention is individually tailored and includes exercise and weight loss (Baldwin et al., 2017).

The MAP is multi-year programme made up many different tailored programmes geared toward the needs of the community in which they are located. Reducing health inequalities within the community is an important aim of the programme, especially for Māori and Pacific peoples.

As part of the MAP is a \$6 million investment by the Government in early intervention. The Government has also invested in evaluating the MAP. There are three cycles of evaluation planned.

The evaluation by Allen + Clarke for cycle 1 has been published by the Ministry of Health (Allen + Clarke 2018). The evaluation covered 3,484 participants. The majority:

- were female (68%)
- were aged between 50 and 74 (60%)
- identified as New Zealand European/Pākehā (73%; 14.4% identified as Māori and 9.9% identified as Pasifika)
- were enrolled due to osteoarthritis (81.5%)
- lived in neighbourhoods belonging to the upper half of the New Zealand Deprivation Index (56%; 26% lived in Quintile 5).

The evaluation of the MAP is ongoing. It is too early to complete the same style of assessment that was for done for low back pain and stroke in this report. Any preliminary assessment would be incomplete and not based on all the evidence. Therefore, it is wise to be patient and wait for all three cycles of the evaluation to be completed and published.

Nevertheless, the evaluation of cycle 1 has found some positive results such as:

- Health outcomes:
 - improvements in pain scores
 - increases in mobility and functionality
 - greater ability to self-manage conditions
 - some evidence of improved mental well-being
- Equality outcomes:
 - successful engagement with deprived communities who also experienced health improvements
- Economic outcomes:
 - demand for allied health professionals was greater than expected and high costs were associated with that, but the utilisation of allied health professionals contributed to the reduction in demand on other parts of the health system with high cost profiles



- reduction in GP visits, specialist referrals and specialist treatments
- MAP participants were less likely to report that their condition had led to negative impacts on the work-related productivity.

7 Next steps in increased access to physiotherapy

The next steps in improving the deployment of physiotherapists in the management of long-term conditions are to review:

- models of care in physiotherapy for long-term conditions such as low back pain, stroke and osteoarthritis, including the resourcing
- ensure that career pathways for workforce development are clear and designed for the future
- physiotherapy workforce projections
- opportunities to expand the roll-out of physiotherapy-based pilot programmes such as MAP through Budget 2021.



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