Bone Care 2020

A systematic approach to hip fracture care and prevention for New Zealand

OSTEOPOROSIS
NEW ZEALAND
Building a stronger future
Introduction
Osteoporotic fragility fractures exert a tremendous burden on older New Zealanders, the national economy and our health and social care system. In 2007, the total cost of osteoporosis was over NZ$1 Billion*, with hip fracture care alone costing NZ$105 Million. Every day, we spend NZ$325,000 treating fractures and have 312 people in hospital beds recovering from fractures.

Half of hip fracture sufferers will require long-term care and a quarter will suffer an early death. This burden will increase rapidly as New Zealand’s 1 million baby boomers retire and age.

Currently, New Zealand has no coordinated, nationwide strategy or systems to manage the increasing number of older New Zealanders at risk of fragility fractures.

The Problem
International research shows that half of hip fracture patients suffer a fragility fracture at another skeletal site prior to breaking their hip. Nationally representative audits show that people presenting to New Zealand hospitals with fragility fractures do not receive the globally endorsed standards of secondary preventive care to reduce future fracture risk.

Response overseas to this issue has been the successful implementation of Fracture Liaison Services (FLS), a coordinated service where patients presenting with a fragility fracture receive osteoporosis assessment and treatment where needed, and interventions to reduce falls risk. The outcome of FLS has been a significant reduction in fracture incidence and associated costs. FLS would ensure equitable access to PHARMAC subsidised treatments for osteoporosis throughout New Zealand.

While the emphasis in this paper is on post-fracture care for all fragility fracture sufferers, the Australian and New Zealand Society for Geriatric Medicine has published detailed guidance on best practice for Orthogeriatric Services, which have been shown to dramatically improve post-hip fracture care. A new National Hip Fracture Registry, which is in development, will provide an opportunity to benchmark care against professional standards.

Solutions
Osteoporosis New Zealand proposes to work with the Ministry of Health to develop a national strategy. The aim is to implement a systematic approach to hip fracture care and prevention.

An important component of that strategy will be the establishment of FLS throughout New Zealand, in addition to a National Hip Fracture Registry.

Benefits
To improve quality and consistency of care for all New Zealanders suffering fragility fractures at all skeletal sites.

Fracture Liaison Services and Orthogeriatric Services established by District Health Boards throughout New Zealand are likely to prevent up to 1,000 cases of hip fracture and save NZ$20 million dollars annually. Additional savings will be accrued by prevention of fragility fractures at other skeletal sites.

* The Burden of Osteoporosis in New Zealand: 2007-2020, The University of Auckland
The need for a national strategy

A national strategy to implement a systematic approach to hip fracture care and prevention is required because current care is fragmented.

Hip fractures exert a tremendous burden on older New Zealanders, the national economy and our health and social care system. During 2007, more than 3,800 people presented to our hospitals with a broken hip at a total cost of NZ$50 million. While all osteoporotic fractures are associated with significant pain and loss of quality of life, hip fracture suffers experience the most serious disabilities. Almost 50% will require long-term care and a quarter will suffer an early death. Half of hip fracture survivors require help with activities of daily living and during the first year after hip fracture, half of those who walked unaided prior to their fracture will no longer be able to walk independently.

Hip fracture is all too often the final destination of a 30-year journey fuelled by decreasing bone strength and increasing falls risk.

As New Zealand’s 1 million baby boomers began to retire in 2011, the impact of osteoporosis on our ageing population necessitates development of a national strategy with two key aims:

1. To improve the quality and consistency of care for those who break their hip, and
2. To make a determined effort to prevent as many hip fractures as possible.

In order to determine how best to devise and implement such a strategy, firstly we need to consider what happens in the years before people present to hospital with a hip fracture. The various patient experiences are illustrated in the ‘fragility fracture cycle’ in figure 1. A study based on records from the UK General Practice Research Database (GPRD) reported the lifetime risk of any fracture at age 50 as 53% for women and 21% for men. Thus, less than one half of women will be fracture free for life. The same study estimated lifetime risks of fracture by gender at age 50 as:

- **Women**: Hip 11.4%, Wrist 16.6%, Vertebra 3.1%
- **Men**: Hip 3.1%, Wrist 2.9%, Vertebra 1.2%

A crucial observation is that **fracture begets fracture**. Several studies have evaluated future fracture risk associated with fractures at various skeletal sites. Two major meta-analyses found that a prior fracture at any site is associated with a doubling of future fracture risk. From the obverse perspective, we have known since the 1980s that half of patients presenting with hip fractures today have experienced prior fragility fractures in the past.

Being able to identify patients that are at high risk of suffering hip fracture in the future is important, but perhaps a more pressing question is whether we can reduce that fracture risk with intervention. In short, we can. During the last two decades, a broad range of therapies have been assessed in large-scale randomised clinical trials which have demonstrated consistent fracture reduction efficacy. The principle agents licensed for the treatment of osteoporosis throughout the world have been shown to reduce the incidence of fractures by 30-50%. Fracture reduction efficacy of 50% has been observed for patients with a history of multiple fractures. In New Zealand, PHARMAC has approved osteoporosis medicines for the secondary prevention of fragility fractures.

Figure 1: The fragility fracture cycle

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Large scale epidemiological studies of older women from Australia and the UK provide us with an indication of the likely prevalence of fragility fracture i.e. what proportion of older women have already broken a bone as a result osteoporosis and, usually, a fall?

- **Australia**: The Australian BoneCare Study evaluated 70,000 women aged over 60 years from primary care physicians’ lists. Twenty nine percent of these women reported a fracture history; 66% reported 1 fracture, 12% reported 2 fractures and 12% reported 3-14 fractures.
- **United Kingdom**: A burden of disease model published in 2011 estimated the number of postmenopausal women in the UK with osteoporosis and fracture history for the period 2010 to 2021. In 2010, over 1.5 million women were likely to have suffered >1 fracture representing 13% of the postmenopausal population. Notably, 1380,000 of these women had suffered >2 fractures and 96,000 at least 3 fractures.

The ‘pyramid’ in figure 2 allows us to visualise these data and what they mean. A mid-range estimate, taken from a consensus guideline, of the proportion of the post-menopausal population that have suffered at least one fragility fracture is 16%. Given that 50% of hip fracture sufferers have fractured before, from 16% of the postmenopausal population will emanate 50% of future hip fracture cases. Individuals who suffer new fragility fractures will present to medical services, be it hospital emergency departments or community-based fracture units, and so provide an obvious opportunity for intervention.

A priority for the New Zealand healthcare system should be, in every case, to **respond to the first fracture to prevent the second**. Unfortunately, as will be discussed in the next section of this paper, the current usual standard of care for fracture patients in New Zealand is no care.
Figure 2. Fracture risk and ease of case-finding: Effective targeting of healthcare resources

The care of hip fracture sufferers

The need for effective orthopaedic-orthogeriatric co-care of patients admitted to hospital with hip fractures is well recognised in professional guidance, including that of the Australian and New Zealand Society for Geriatric Medicine. As a consequence, the subspecialty of orthogeriatric medicine is a rapidly growing professional group throughout the world and is becoming particularly well established in New Zealand. Several centres have published encouraging reports on rates of post-hip fracture osteoporosis treatment. However, we currently lack a means to benchmark standards of care across the country.

In late 2011, an Australian and New Zealand Hip Fracture Registry Steering Group (ANZ HFR) was formed by enthusiasts on both sides of the Tasman, with the express intention of developing Hip Fracture Registries in New Zealand and throughout Australia. This effort has been inspired by the establishment of the National Hip Fracture Database (NHFD) in the UK. The NHFD has become the largest audit of hip fracture care in the world. The 2011 NHFD Report described the care of >53,000 people who suffered a hip fracture between April 2010 and March 2011. In total, almost 190,000 cases are currently registered on the NHFD, with >16,000 cases having been registered in the first quarter of 2012. All hospitals in England, Wales and Northern Ireland are now registered with NHFD, and 98% of those registered are regularly submitting data. Taken together, this would suggest that information on the quality of care for almost 90% of hip fractures occurring in the three Nations served is being captured.

The UK NHFD is a collaborative venture backed by the British Orthopaedic Association and British Geriatrics Society which has been developed in partnership with other relevant professional organisations and patient societies. In a similar spirit, the ANZ HFR has sought engagement with all relevant professional organisations and patient societies. Osteoporosis New Zealand endorses the ANZ HFR and its aims and objectives, as does the ANZ Society for Geriatric Medicine, the ANZ Society for Bone and Mineral Research, the ANZ College of Anaesthetists and the Health Quality and Safety Commission New Zealand, in addition to analogous organisations in Australia.

During 2012, the groundwork to establish a National Hip Fracture Registry in New Zealand is underway and Osteoporosis New Zealand is committed to working with stakeholder organisations to maximise the impact of this important initiative. The ANZ HFR newsletter will feature on the Osteoporosis New Zealand website to update visitors on progress as it occurs.

"Any condition with a 1-year mortality rate approaching 20% and a very significant morbidity rate demands that we make every effort to reduce the impact of the condition on society."

Professor Geoffrey Horne, Wellington Hospital ‘Hip fracture management - we need to do better’ New Zealand Medical Journal, May 2007

Half of all hip fracture patients give us advance notice that they will present to an orthopaedic trauma unit!
The prevention of hip fracture

Given the scale of the challenge posed by osteoporosis and related fractures, the question for policy makers, health care professionals and patients, and the organisations representing them, is where to start? In light of the opportunity presented by secondary fracture prevention discussed previously in this paper, our priority is very clear:

For the period 2012-2015, Osteoporosis New Zealand will be dedicated to ensuring that every patient presenting to urgent care services in New Zealand with a fragility fracture receives appropriate osteoporosis management and falls assessment to reduce their future fracture risk.

Our rationale for taking this decision is as follows. National\(^{51-62}\), regional\(^{15, 63-69}\) and local\(^{14, 16, 70-97}\) audits conducted across the world have shown a secondary fracture prevention care gap to be ubiquitous. In the absence of a systematic approach to delivery of secondary preventive care, ‘usual care’ is no care. This is particularly acute for patients presenting with non-hip fragility fractures, described as ‘Herald Fractures’ by the Department of Health in England\(^{10}\) or ‘Signal Fractures’ by leading investigators in Australia\(^{2}\) for reasons now obvious; half of hip fracture patients suffer a prior fragility fracture before breaking their hip.

A multi-centre audit evaluated osteoporosis intervention by 8 New Zealand orthopaedic units for patients admitted to hospital with fragility fractures\(^{99, 100}\). Key findings included:

- 21% of fracture patients were taking some form of osteoporosis treatment on admission; >50% of these patients were not taking a bisphosphonate.
- 77% of patients that were not taking osteoporosis medication on admission.
- Of these, <3% had a DXA scan organised in response to their new fracture.
- 52% of patients were initiated on treatment, of which the majority was started by a visiting orthogeriatric service which was available at two of the hospitals; nearly all of these patients were hip fracture sufferers.
- Osteoporosis was mentioned in the discharge summaries for only 30% of the patients that were already taking osteoporosis treatment, and just 1% of the patients started on medication during their admission.

This study highlighted a near universal secondary prevention care gap for patients with non-hip fragility fractures. In the absence of an orthogeriatric service, the care gap is extended to hip fracture patients. Establishment of orthogeriatric services has resulted in dramatic improvements in post-hip fracture osteoporosis treatment at hospitals in Christchurch\(^{42, 44}\) and Auckland\(^{41, 45}\).

A 2012 publication described secondary prevention rates for patients admitted to Waitemata District Health Board with a primary or secondary diagnosis of vertebral fracture\(^{101}\). One third of patients were receiving the optimal combination of treatments advocated in evidence-based guidelines. The authors state that to their knowledge this study was the first published audit of the secondary prevention of vertebral fractures in New Zealand.

The current provision of secondary preventive care for patients presenting to New Zealand hospitals with fragility fractures has been described as follows:\(^{102}\):

- Hip fracture patients: Where orthogeriatric services are available, high quality osteoporosis care will be delivered.
- Vertebral fracture patients: Around a third of patients are being managed optimally according to professional guidance.
- Non-hip, non-vertebral fracture patients: Usual care is no care.

Orthogeriatric Services

Orthogeriatric Services (OGS) have been established to improve the quality and efficacy of care for patients presenting with hip fractures. The Australian and New Zealand Society for Geriatric Medicine\(^{39}\) Position Statement on Orthogeriatric Care provides detailed guidance on best practice throughout the pre-, peri- and post-operative phases of care for older fracture patients admitted to hospital. A key focus is the concept of early multidisciplinary coordinated care to reduce in-hospital mortality and medical complications, and to improve functional outcomes. An integrated approach to post-fracture osteoporosis management and falls interventions is advocated. As stated previously, delivery of effective orthogeriatric care has been shown to dramatically improve post-hip fracture rates of osteoporosis treatment at hospitals in Christchurch\(^{42, 44}\) and Auckland\(^{41, 45}\).

In the UK, the National Hip Fracture Database (NHFD) has provided a means to evaluate the provision of secondary preventive care for practically all hip fracture sufferers nationally. The NHFD 2011 Report indicated that 66% of the 153,000 patients evaluated were discharged on bone protection medication and 87% had received a falls assessment prior to discharge\(^{106}\). In due course, a National Hip Fracture Registry in New Zealand will be able to provide clinicians, administrators, the Health Quality and Safety Commission, the Ministry of Health and the Accident Compensation Corporation with accurate data for every hip fracture sufferer in New Zealand. For transparency amongst all stakeholder groups, crucially including the public, the UK NHFD presents data in a de-anonymised form i.e. performance at every hospital against professionally agreed standards of care is in the public domain. Osteoporosis New Zealand would strongly encourage similar transparency when our ‘NHFR’ becomes operational, as the patients we represent should be informed of the standards of care provided by their local hospital.

Fracture Liaison Services

Professional organisations\(^{34, 103-105}\), patient societies\(^{35, 105-107}\) and policymakers\(^{108-115}\) throughout the world have recognised the need for systematic approaches to secondary fracture prevention to close the care gap. Various terms have been used to describe exemplary service models, including ‘Fracture Liaison Services’ in Europe\(^{116-125}\) and Australia\(^{126-130}\), ‘Co-ordinator Programs’ in Canada\(^{131-134}\) and ‘Care Manager Programs’ in the United States\(^{135-137}\). For the purposes of this paper, we shall use the term Fracture Liaison Service (FLS). The following four case studies provide an illustration of how FLS operate and what they have achieved in terms of delivery of secondary preventive care, impact on secondary fracture rates and cost-effectiveness.

The Glasgow Fracture Liaison Service, UK

First developed in 1999, the Glasgow FLS is a system to ensure fracture risk assessment, and treatment where appropriate, is delivered to all patients with fragility fractures. The FLS is a ‘doctor light’ service and is primarily delivered by clinical nurse specialists, who work to pre-agreed protocols to case-find and assess fracture patients. Consultant Endocrinologists provide medical leadership for the Glasgow FLS. A critical success factor in development of the Glasgow FLS was establishment of a multidisciplinary stakeholder group from project outset, with representation from all relevant hospital specialities, local primary care and regional health authority and administrative groups.
New Fracture Presentation

During the first 18 months of operations:

- More than 4,600 patients with fractures of the hip, wrist, upper arm, ankle, foot, hand and other sites were seen by Fracture Liaison Nurse Specialists.

Nearly three-quarters were considered for BMD testing and treatment was recommended for approximately 20% of patients without the need for BMD testing.

- 82% of patients tested were found to be osteoporotic or osteopenotic at the hip or spine.

During the period 2000–2010, 50,000 consecutive fracture patients were assessed by the Glasgow FLS. During this period, hip fracture rates in Glasgow reduced by 7.3% versus a 17% increase in England, where only 37% of localities operated an FLS by late 2010. A Scottish national audit compared case ascertainment that the program saved more than US$30.8 million for Kaiser Permanente Southern California in the year 2006 (2,510 hip fractures were predicted by actuarial analysis, and 1,575 fractures were actually seen by Fracture Liaison Nurse Specialists). This corresponds to the prevention of 935 hip fractures in the year 2006 (2,510 hip fractures were predicted by actuarial analysis, and 1,575 fractures were actually observed). The cost of treating a hip fracture was approximately US$13,000. On that basis, it was estimated that the program saved more than US$10.8 million for Kaiser Permanente Southern California in the 2006.

In the late 1990s, Kaiser Permanente in Southern California resolved to close the secondary fracture prevention gap for patients presenting to hospital with hip fractures. Subsequently, the program was expanded to include all older patients presenting with fragility fractures at any site. As time and resources permitted, the Kaiser team undertook a systematic approach to delivering primary fracture prevention to patients at high risk of suffering their first fragility fracture. The Healthy Bones Program is underpinned by effective case-finding made possible by the state-of-the-art HealthConnect® electronic medical record. The program is primarily delivered by Care Managers and Nurse Practitioners, who serve as co-ordinators and disease managers.

In 2008, a 37% reduction in the expected hip fracture rate was reported for the population served by the Kaiser Permanente Southern California system. This corresponds to the prevention of 913 hip fractures in the year 2006 (2,500 hip fractures were predicted by actuarial analysis, and 1,575 fractures were actually observed). The cost of treating a hip fracture was approximately US$13,000. On that basis, it was estimated that the program saved more than US$10.8 million for Kaiser Permanente Southern California in the 2006.

During the first year of operations:

- 80 out-patients (16%) were treated for osteoporosis prior to assessment by the OEC. This was a reduction in unscheduled emergency admissions for fragility fractures. Every District Health Board in New Zealand should undertake an audit of current standards of secondary preventive care. In response to the findings of those audits, FLS should be established to close existing care gaps.
The Role of Primary Care

Management of long-term conditions is the forte of the primary care team. Osteoporosis is a chronic disease which affects sufferers over many decades, during which ‘acute exacerbations’ will come to clinical attention in the form of fragility fractures. As such, General Practitioners are crucial to delivery of long-term management plans to reduce fracture risk. GPs have transformed the secondary preventive care of patients experiencing myocardial infarctions, and are equally well placed to do the same for patients with fragility fractures.

In localities lacking Fracture Liaison Services, the majority of patients that have suffered fragility fractures in the past will not have received secondary preventive care. GPs in Australia and the UK have participated in large scale programs to evaluate osteoporosis assessment and treatment rates for patients with a history of fragility fracture. Alarmingly low rates were identified by both groups; however, one UK group transformed the quality of care. The new service model was delivered by a team comprised primarily of an osteoporosis nurse specialist reporting to a general practitioner with a specialist interest in osteoporosis. Prior to implementation of the programme, 9% of fragility fracture patients were managed according to national guidelines, which increased to 64% afterwards.

In March 2012, the journal of the Royal Australian College of General Practitioners, Australian Family Physician, was devoted to bone related matters and osteoporosis in particular. An editorial comment highlighted the ubiquitous nature of the secondary fracture prevention care gap.

An area of clarity around what we should do is secondary prevention after the first fracture, but here reality is often not the ideal. In part it is systems issues, in part human. Even if osteoporosis is detected and treated, there are very high rates of discontinuation of treatment - two-thirds discontinue treatment within 12 months.

While drug related side effects and dosing regimens might be addressed, I suggest there must be a more fundamental problem with the value our health system believes treatment offers and the value that the individual recipient believes it offers them.

In response to this, colleagues from Osteoporosis Australia and the Royal College of General Practitioners in the UK shared experience of new measures to improve secondary fracture prevention in UK general practice. From 1st April 2012, a component of UK GPs’ performance-related pay will be dependent upon creation of fragility fracture registries in GP practices and demonstration that patients are being treated for osteoporosis in accordance with national guidelines. To support UK GPs to deliver these new standards of care, the Royal College of General Practitioners and the UK National Osteoporosis Society developed a web-based resource - http://www.osteoporosis-resources.org.uk/. Osteoporosis New Zealand intends to explore opportunities for similar collaborative ventures with the Royal New Zealand College of General Practitioners.

Bone Care 2020: A strategy to improve quality and reduce costs

The strategy for implementation of a systematic approach to hip fracture care and prevention in New Zealand is depicted in the ‘pyramid’ in figure 4. High quality care of hip fracture patients is less expensive than the alternative. In England, the Department of Health has recognised this by introduction of a financial incentive linked to delivery of professionally agreed standards of care. The initial interest in the ANZ Hip Fracture Registry initiative suggests a similar appetite for change exists in New Zealand, with all relevant stakeholder organisations keen to endorse development of a National Hip Fracture Registry. Osteoporosis New Zealand is committed to work with all stakeholders to develop this tool that will enable benchmarking of care across the country.

Figure 4. A systematic approach to hip fracture care and prevention for New Zealand for 2012-2020

Objective 1: Improve outcomes and quality of care after hip fractures by delivering ANZ professional standards of care monitored by a new NZ National Hip Fracture Registry

Objective 2: Respond to the first fracture to prevent the second through universal access to Fracture Liaison Services in every District Health Board in New Zealand

Objective 3: GPs to stratify fracture risk within their practice population using fracture risk assessment tools supported by local access to axial bone densitometry

Objective 4: Consistent delivery of public health messages on preserving physical activity, healthy lifestyles and reducing environmental hazards

Maximise cost-effectiveness by stepwise delivery

Secondary fracture prevention provides a major opportunity to rapidly reduce the incidence of hip fractures in New Zealand.

In order to close current and historical care gaps in the provision of post-fracture care, during the period 2012 - 2015 we need:

- A Fracture Liaison Service in every hospital/DHB to case find all new fragility fracture patients
- A systematic approach to case-finding the last 5 years' fracture patients in every GP practice in NZ
- To drive public awareness that fracture begets fracture and that effective, safe treatments to prevent fractures are available as daily or weekly pills, or daily or annual injections

In order to establish this new national standard of care for fragility fracture prevention:

- Osteoporosis New Zealand invites all relevant professional organisations, policy groups and private sector partners to join a National Fragility Fracture Alliance to develop and implement this strategy for all older New Zealanders
- Osteoporosis New Zealand invites the Ministry of Health to work collaboratively towards new Ministerial Targets for hip fracture care and prevention
- Osteoporosis New Zealand invites the Royal New Zealand College of General Practitioners to collaboratively develop clinically and cost-effective programs for primary fracture prevention

During the period 2012-2015, the focus of efforts to implement the national strategy will be upon secondary fracture prevention. Closure of the current care gap is achievable nationwide by 2015. The focus of the period 2016-2020 will be to systematically identify patients at high risk of suffering their first fragility fracture in general, and hip fracture in particular, in a cost-effective way.

Comprehensive implementation of a secondary fracture prevention strategy has the potential to reduce the incidence of hip fracture by 20-25% versus the expected rate\(^1\). That would equate to up to 1,000 older New Zealanders every year avoiding a hip fracture, with a potential cost reduction of NZ$20 million per year\(^1\). Additional savings will be accrued by prevention of fragility fractures at other skeletal sites. Subsequent implementation of structured primary prevention programmes could result in up to 50% of fractures being prevented\(^1\). Given that half of hip fracture patients give us advance notice that they will break their hip in the future, older people and the country are currently paying far too high a price for the status quo to persist.

‘Whether at the level of a local general hospital or a national healthcare system, successful transformation of care relies upon consensus being achieved amongst all the players in the multi-disciplinary team who care for fracture patients. As many millions of patients present to hospitals worldwide with fragility fractures every year, the opportunity to improve outcomes is too good to miss.’\(^{135}\)
References


