OSTEOPOROSIS NEW ZEALAND
Better bones, fewer fractures

Stronger Together:
A Collaborative Strategy for Bone Health in New Zealand

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Foreword

As the global population ages, bone health has emerged as one of the defining health challenges of our century. Osteoporosis and fragility fractures already affect hundreds of millions of people worldwide, leading not only to pain and disability, but also to loss of independence and escalating pressure on health and aged care systems. Without decisive action, the costs to societies and economies will continue to rise sharply in the decades ahead. The international community has made clear that systematic, life-course approaches to bone health are essential to protect healthy longevity for future generations.

Against this backdrop, *Stronger Together: A Collaborative Strategy for Bone Health in New Zealand* represents an important contribution. It demonstrates how one nation can translate global evidence and best practice into a coherent, nationally owned strategy that responds to its unique demographic, cultural, and health system context. The life-course approach set out in this document — spanning hip fracture care, secondary and primary fracture prevention, maintenance of bone health in older and younger adults, youth, and maternal nutrition — illustrates how prevention and care can be integrated into a single, forward-looking framework.

From a New Zealand perspective, *Stronger Together* comes at a pivotal moment. The population is ageing rapidly, with the proportion of people aged 50 years or over set to approach half of the nation by 2075. Fragility fractures already impose a heavy burden on individuals, whānau, and the health system. Yet this burden is not inevitable. By harnessing the momentum of recent progress — including the establishment of registries, the development of national clinical standards, and the expansion of Fracture Liaison Services — New Zealand now has the opportunity to lead internationally in the delivery of systematic bone health care.

The title of this document, *Stronger Together*, is apt. No single sector, discipline, or organisation can achieve these ambitions alone. Success depends on collaboration across government, health services, communities, and international partners. By committing to this strategy, New Zealand is not only advancing the health of its own people but also contributing to the global effort to ensure that ageing populations everywhere are able to thrive.

We commend *Stronger Together* as both a national roadmap and an international exemplar. It reflects what can be achieved when science, policy, and community come together with a common purpose. We encourage all those with a stake in New Zealand's future — and in the future of healthy ageing globally — to take this Call to Action to heart.

Professor Nicholas C Harvey

PRESIDENT OF THE INTERNATIONAL OSTEOPOROSIS FOUNDATION

Professor Takeshi Sawaguchi

PRESIDENT OF THE FRAGILITY FRACTURE NETWORK

Osteoporosis New Zealand – Our people

OSTEOPOROSIS NEW ZEALAND
Better bones, fewer fractures

BONE HEALTH NEW ZEALAND
A strong skeleton for life

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Acknowledgements

At the heart of *Stronger Together: A Collaborative Strategy for Bone Health in New Zealand* are the people whose lives it seeks to improve - all New Zealanders - from the earliest stages of life through to older age. We especially acknowledge those who have sustained fragility fractures, and their families and whānau, whose courage, resilience, and engagement have inspired and informed this work. Their experiences highlight both the profound impact of fragility fractures and the powerful difference that timely, coordinated care can make.

We also acknowledge the thousands of healthcare and allied health professionals across the country who work tirelessly to give every New Zealander the best possible chance of achieving and maintaining strong, healthy bones. Their commitment, compassion, and professionalism have transformed fragility fracture care and established a nationwide network of world-class Fracture Liaison Services, laying the foundation for the progress described in these pages.

We further thank the staff, Board, and advisory group members – past and present – of Osteoporosis New Zealand, whose dedication, guidance, and sustained commitment have been instrumental in shaping and supporting this work. Their vision and perseverance have provided the organisational backbone that has enabled this strategy to take form.

We extend our sincere thanks to our government partners – including the Accident Compensation Corporation, Health New Zealand – Te Whatu Ora, and the Health Quality and Safety Commission New Zealand - for their leadership and support, and to our colleagues in Australia whose trans-Tasman collaboration has been pivotal in advancing clinical standards, registries, and quality improvement programmes.

We also acknowledge the many other individuals and organisations who helped advance the aspirations of *BoneCare 2020* - the predecessor to *Stronger Together* – and we thank in advance the many new colleagues who will help bring this strategy to life in clinical practice and public health. Realising its goals will require the dedication and collaboration of clinicians, researchers, educators, policymakers, community leaders, and the public.

This is a Call to Action for a truly "all of society" effort. Together, we can create a future in which every New Zealander – at every stage of life – is supported to achieve and maintain strong, healthy bones, reducing the human and economic toll of osteoporosis and fragility fractures for generations to come.

With gratitude, we offer these acknowledgments on behalf of all who contributed to the development of Stronger Together.

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Clinical Programme Director
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Adjunct Professor Paul Mitchell
Strategic Advisor to the Board and Management
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On behalf of the authorship group of Stronger Together: A Collaborative Strategy for Bone Health in New Zealand.

Contents

Endorsing organisations

We sincerely thank colleagues from the following organisations for undertaking a review of a previous draft of *Stronger Together*, offering their learned advice regarding how the document could be improved, and for subsequently offering their organisation's endorsement.

FFN Fragility Fracture Network

IOF International Osteoporosis Foundation

ANZFFR Australian & New Zealand Fragility Fracture Registry

ANZHFR Australian & New Zealand Hip Fracture Registry

HEALTHY BONES AUSTRALIA

Royal Osteoporosis Society
Better bone health for everybody

OSTEOPOROSIS

Executive summary

New Zealand is entering a new demographic era. By 2050, more than 40 percent of the population will be aged 50 years or over, the life stage when osteoporosis and fragility fractures are most prevalent.

Without systematic action, the personal and societal consequences of these fractures will grow substantially, placing strain on individuals and whānau, increasing demand on health and aged care services, and burdening the wider economy.

Fragility fractures, most often affecting the hip, spine, wrist, humerus, and pelvis, are life-altering injuries. They cause pain, disability, and loss of independence, with many patients never regaining their pre-fracture mobility. For families, the impact is profound, as caring responsibilities and financial pressures often follow. For the health system and the Accident Compensation Corporation, the costs already number in the hundreds of millions of dollars each year and are projected to escalate further.

Stronger Together sets out a national strategy to meet this challenge, building on the foundations of *BoneCare 2020* and aligning with international best practice. It takes a life-course approach, recognising that bone health is shaped from infancy to old age. The strategy is organised around seven objectives, beginning with the delivery of best clinical practice for people who sustain hip fractures, and extending through secondary and primary fracture prevention, the maintenance of bone health in older and younger adults, the achievement of peak bone mass in youth, and optimal maternal nutrition during pregnancy. Each objective is accompanied by evidence-based actions that, taken together, provide a coherent roadmap to improve outcomes across generations.

Significant progress has already been made in New Zealand. Clinical standards and registries for hip fracture care and secondary fracture prevention now provide the infrastructure to measure and improve quality. These efforts must continue, with Fracture Liaison Services recognised and funded as core health services, and with secure resourcing of the registries that underpin them. New opportunities are emerging, such as the use of intravenous bisphosphonates delivered in hospital to improve adherence, and the application of digital health and artificial intelligence to enhance case finding and streamline care.

Beyond the clinic, innovative public awareness campaigns are needed to promote prevention and encourage New Zealanders to take ownership of their bone health throughout life.

Implementing *Stronger Together* will require collaboration across government, health services, professional bodies, advocacy groups, and communities. It demands investment in workforce capability, mentorship, and continuous professional development. It also requires inclusive engagement, ensuring that New Zealand's diverse communities are central to the design and delivery of solutions.

The Call to Action is clear. Bone health is not the responsibility of any one sector or discipline. It is an "all of society" issue and addressing it will deliver benefits well beyond reducing fractures. By preventing avoidable harm, relieving pressure on hospitals and the aged care sector, and extending healthy life expectancy, *Stronger Together* offers a pathway to a stronger, healthier future for New Zealand.

Bone Health in New Zealand: The challenges and opportunities of a new demographic era

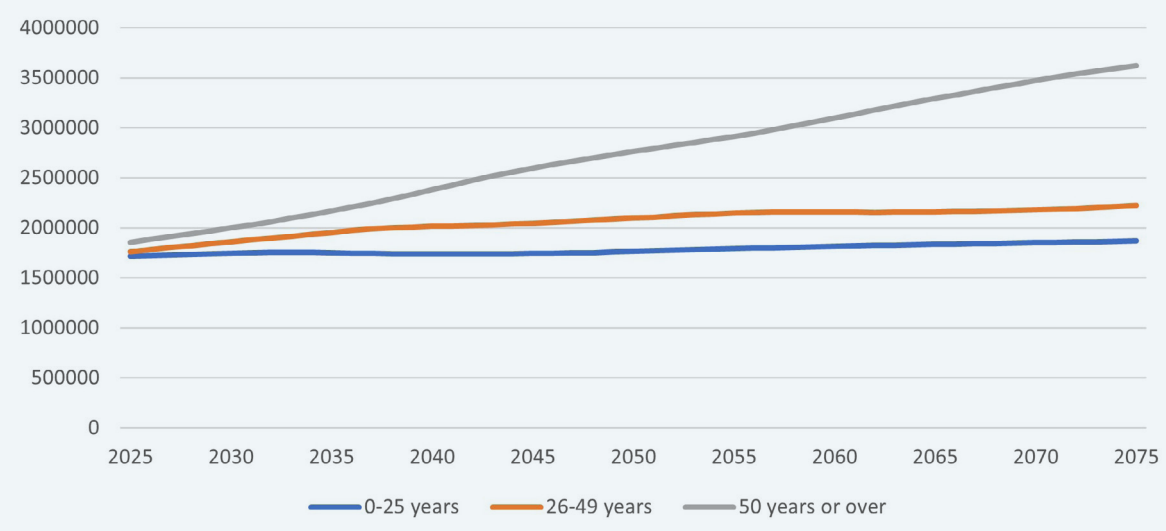
As we progress through the first half of the 21st century, we are on the cusp of a transformative shift in global demographics, heralding what colleagues from the Fragility Fracture Network[1] and the International Osteoporosis Foundation[2] have termed a new demographic era. This period is marked by profound changes in the age structure of the human population.

In the absence of systematic approaches to the prevention and management of long-term conditions that disproportionately affect older people, health care systems and national economies will be faced with burgeoning demand coincident with the ratio of working-age people to senior citizens reaching historic lows. To paraphrase Professor Peter Ebeling AO[3], *"Osteoporosis, falls and the fragility fractures that follow will be at the vanguard of this battle which is set to rage between quantity and quality of life."*

The extent and pace of the coming demographic shift in New Zealand is illustrated in **Figure 1** across the half century from 2025 to 2075[4]. The human skeleton's life cycle can be categorised into three distinct age phases, each with specific objectives for bone health. From birth to 25 years, the focus is on achieving a young person's genetic potential for peak bone mass. During the next quarter century, the goal shifts to maintaining this bone mass. From 50 years onward, the emphasis is on preventing osteoporosis and, if bone loss does occur, implementing early interventions to avert fragility fractures. It is self-evident that New Zealand's population growth will predominantly occur among individuals aged 50 years or over, a demographic where the incidence of osteoporosis and fragility fractures is most prevalent.

Significant progress has been made since the publication of *BoneCare 2020*[5] in 2012. To date, most of the progress relates to the care of individuals who have sustained hip or other fragility fractures, enabled by production of national clinical standards and registries to benchmark provision of care. During the remainder of the 2020s and into the 2030s, this critical work must be appropriately resourced and continuously improved. A pressing need exists to establish a national programme to identify and manage people at high risk of sustaining a first fragility fracture. In parallel to these clinically led initiatives, innovative and engaging public awareness campaigns are required to dramatically improve all New Zealanders' appreciation of the importance of bone health to enable them to lead healthy and independent lives.

Figure 1. New Zealand population projections by bone health age phases from 2025 to 2075[4]



BoneCare 2020: Significant progress during the last decade

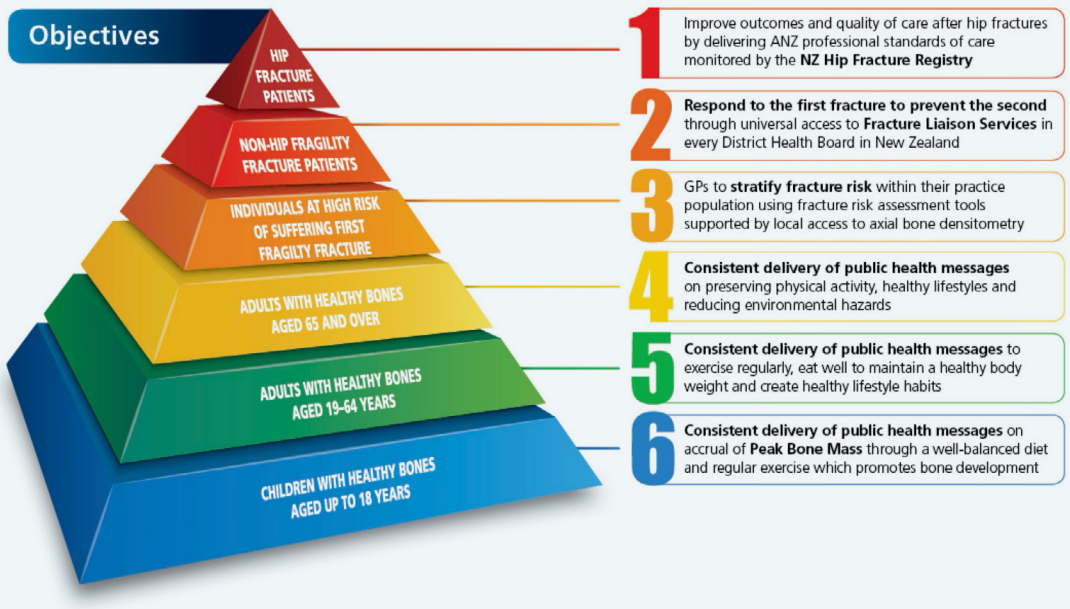
In December 2012, Osteoporosis New Zealand published *BoneCare 2020: A systematic approach to hip fracture care and prevention for New Zealand*[5]. Previously, New Zealand lacked a unified national strategy for preventing and managing fragility fractures. As illustrated in **Figure 2**, the initial four objectives of *BoneCare 2020* aligned to those advocated in the strategy to reduce the incidence of falls and fractures in England published by the Department of Health in 2009[6]. Later, following the International Osteoporosis Foundation's 2015 life-course approach to bone health[7, 8], *BoneCare 2020* expanded its focus beyond older adults to include New Zealanders of all ages, adding objectives five and six to address broader demographic needs.

The subsequent sections on Objectives 1 and 2 of *Stronger Together* provide detailed commentary on recent improvements in the care of hip and non-hip fragility fracture patients. Key milestones include:

- **Formation of a national alliance:** From 2012 to 2016, an informal group of organisations worked on the objectives of *BoneCare 2020*. In 2017, this collaboration was formalised as the *Live Stronger for Longer Programme*[9], with contributions from various organisations in New Zealand including the Accident Compensation Corporation, Ministry of Health, Health Quality and Safety Commission, Osteoporosis New Zealand, and others.
- **Improving hip fracture care:** The *Australian and New Zealand Guideline for Hip Fracture Care*[10] was published in 2014. In 2016, the trans-Tasman *Hip Fracture Care Clinical Care Standard*[11] was published, as was the first Patient Level Audit[12] from the Australian and New Zealand Hip Fracture Registry (ANZHFR)[13]. A second edition of the standard[14] was published in 2023.
- **Improving secondary fracture prevention:** The first and second editions of the *Clinical Standards for Fracture Liaison Services in New Zealand* were published in 2016[15] and 2021[16], respectively. The New Zealand arm[17] of the Australian and New Zealand Fragility Fracture Registry[17,18] (ANZFFR) was launched in 2022 and has published Annual Reports in March 2024[19] and March 2025[20].

As of November 2025, universal participation in both the ANZHFR and ANZFFR had been achieved.

Figure 2. *BoneCare 2020*: A systematic approach to hip fracture care and prevention for New Zealand[5]



Stronger Together Objective 1: Delivering best clinical practice for all New Zealanders who sustain a hip fragility fracture

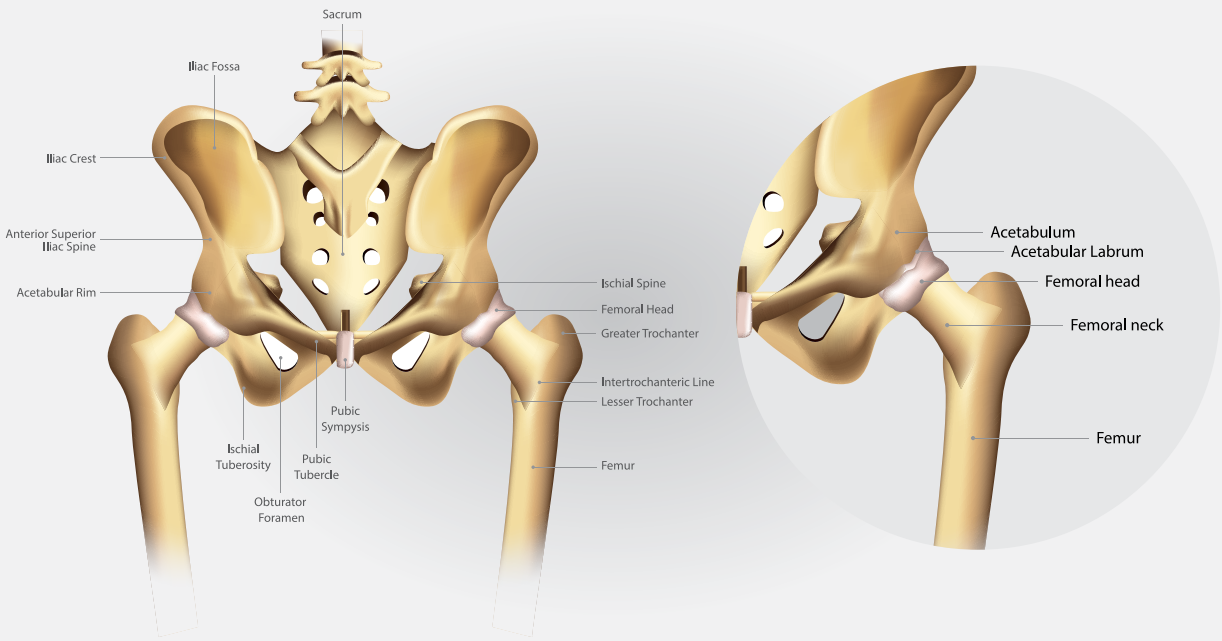
The anatomy of the hip and types of hip fracture

As illustrated in **Figure 3**, the hip is a "ball and socket" joint comprising the head of the femur (the upper part of the thigh bone i.e., the "ball") and the acetabulum (a part of the pelvis bone i.e., the "socket"). Most hip fractures occur in older people as a result of a fall from standing height. Hip fractures are categorised based on the location of injury within the *proximal femur* i.e., the upper part of the thigh bone, near to the hip:

- **Femoral neck:** A fracture of the bone immediately beneath the femoral head. Femoral neck fractures are a specific type of intracapsular hip fracture.
- **Intertrochanteric:** A fracture of the bone below the femoral neck and above the main shaft of the femur. This section is demarcated by two significant bony protrusions: the greater and lesser trochanters.
- **Subtrochanteric:** A fracture of the upper segment of the femoral shaft, situated directly below the trochanters.
- **Femoral head:** A fracture of the ball-shaped end of the femur which connects with the acetabulum.

Of these, the most common hip fractures occur in the intertrochanteric region and the femoral neck. Fractures of the femoral head are rare and typically result from high-trauma incidents, such as road traffic accidents.

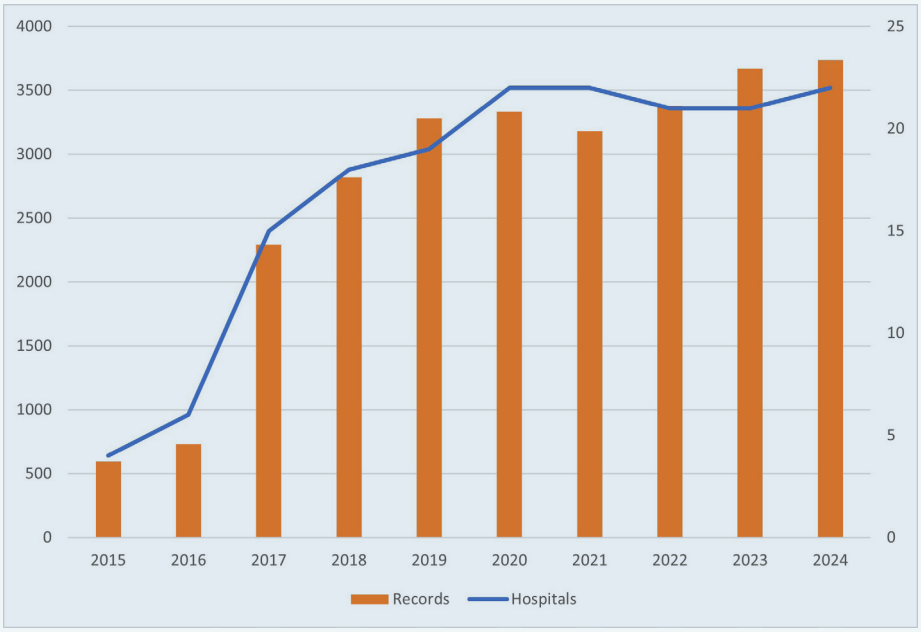
Figure 3. The anatomy of the hip and types of hip fracture



Epidemiology of hip fractures in New Zealand

Hip fractures represent one of the most serious and costly fragility fractures in New Zealand, with incidence rising in line with population ageing and carrying major implications for those who sustain them, their families and whānau, the Accident Compensation Corporation, the health system, and the economy. The Australian and New Zealand Hip Fracture Registry (ANZHFR) Annual Reports provide detailed demographic information on people presenting with hip fractures to hospitals in New Zealand[13]. As shown in **Figure 4**, the proportion of hospitals in New Zealand contributing data to the ANZHFR Annual Reports has increased substantially since the Patient Level Audit began in 2015. Case ascertainment in New Zealand can be determined through comparison with the discharge coding for hip fractures in the National Minimum Data Set (NMDS)[21], which has increased from 20% (n=594) in 2015 to 90% (n=3,737) in 2024[22].

Figure 4. Hip fracture patient records and participating hospitals in the New Zealand arm of the ANZHFR from 2015 to 2024[12, 22-30]



Demographic findings relating to hip fracture patients in New Zealand from the 2025 ANZHFR Annual Report[22] include:

- 68% of patients were female and 32% male.
- The average age of patients was 82 years and 24% of patients were aged 90 years or older.
- 26% of patients were admitted from aged residential care facilities.
- 37% of patients had pre-existing cognitive impairment or known dementia.
- Māori and Pacific Peoples made up 4% of the New Zealand reported data.

In 2021, a comprehensive national, population-based, retrospective study was undertaken to discern risk factors associated with injuries in older adults with complex needs in New Zealand[31]. The study's cohort included almost 75,500 community-dwelling individuals aged 65 years or older who had participated in an interRAI home care assessment[32] from June 2012 to June 2018.

The injuries considered in the analysis included fractures of the hip, distal radius (wrist), pelvis, proximal humerus (shoulder), and vertebrae (spine), as well as subarachnoid haemorrhage (bleeding into the space around the brain) and traumatic subdural haematoma (brain bleed under the skull from injury). Almost 10% of the cohort (n=7,414) experienced an injurious fall over the six-year study period. Of these, almost two-thirds were hip fractures (n=4,735). Risk factors that correlated with injury included female sex, being aged 75 years or older, living with Parkinson's disease, having a diagnosis of stroke or other cerebrovascular event, a history of one or more falls, daily tobacco consumption, and being underweight.

The impact of hip fractures

Hip fractures are frequently regarded as the most debilitating type of fragility fracture. The following data underscores the severity of its impact:

- Fewer than half of the individuals who sustain a hip fracture will subsequently walk without assistance[33], with a significant proportion never achieving their pre-fracture mobility levels[34].
- One year after hip fracture, approximately 60% of survivors require assistance with fundamental daily activities, such as feeding, dressing, or toileting, and 80% need support with shopping or driving[35].
- Within the year following the fracture, between 10 to 20% of those who sustain a hip fracture will subsequently be admitted to a long-term care facility[36-38].

Decreasing the time from fracture to surgery after hip fracture is associated with improved patient survival[39-41] and outcomes[42, 43]. In 2019, investigators from Waitematā District Health Board evaluated post-operative mortality rates for more than 2,800 patients who underwent surgery following a neck of femur fracture between 2009 and 2016[44]. Overall post-operative crude rates for inpatient, 30-day and one-year mortality were 3.7%, 7.2% and 23.8%, respectively. Notably, statistically significant decreases in mortality rates at inpatient, 30-day and one-year time periods were observed from 2009 to 2016. During this period, the mean time from admission with a hip fracture to surgery decreased from 41 hours to 31 hours. There was a statistically significant association between time-to-theatre and inpatient, 30-day, and one-year mortality adjusted for gender, age groups, and American Society of Anaesthesiologists (ASA) score[45]. The ASA score is a tool used to assess and communicate a patient's pre-anaesthesia medical co-morbidities, which in combination with other factors such as the type of surgery, presence of frailty, and level of deconditioning, can be useful to predict perioperative risks.

Joan was 94 when she tripped in her kitchen, breaking her hip. She spent three weeks in hospital. When talking about her care, Joan said "My operation was delayed but I'm glad my hip could be fixed". She praised staff for their care and was pleased she had treatment for osteoporosis. Despite her mother having osteoporosis, Joan did not think it would happen to her.

Four months down the track, Joan is frustrated that she is still using a walker. "My daughters insist" Joan said. She is having physiotherapy at home and doing her exercises. "I'm pleased to be back at my card and mahjong afternoons with friends".

This photo was taken at Joan's home, three weeks after her discharge from hospital.

Delivering best clinical practice for people who sustain hip fractures

"The basic point about patients presenting with fragility fractures, especially older patients with hip fractures, is that most of them are suffering from two separate issues. The first is the fragility of their bone, due to osteoporosis or osteopenia, which has allowed the fracture to occur with minimal trauma. The second is frailty - of their whole body, which … weakens their capacity to respond to stress and is associated with comorbidities. It is unfortunate that several languages use the same word to describe these two entities, since they are totally different; the first being a biomechanical issue, the second physiological.

Orthopaedic surgeons are trained to deal with the fragility; geriatricians are trained to address frailty (other medical disciplines can also learn to do so). The older patients with fragility fractures, therefore, need the application of both skillsets if they are to emerge from the experience with good health and function. That is the basic argument for orthogeriatric co-management. It is expanded by the need to include other disciplines in a multidisciplinary team, particularly anaesthetists, nurses, and physiotherapists."

Professor David Marsh *et al.*

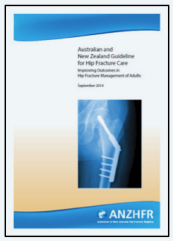
Orthogeriatrics: The Management of Older Patients with Fragility Fractures. 2020[46].

In 2021, the hip fracture audit special interest groups of the Asia Pacific Fragility Fracture Alliance (APFFA)[47] and the Fragility Fracture Network (FFN)[48] collaborated to produce a Hip Fracture Registry Toolbox[49]. The Toolbox identified essential components of high-quality healthcare delivery for people who sustain hip fractures:

"Essential components of national quality improvement programmes for hip fracture care include clinical guidelines, from which can be derived best practice clinical standards, which include quality indicators that enable quantification of performance. Clinically led hip fracture registries offer the technological infrastructure to transform patient-level data into information that can empower hospital teams to reflect upon the care that they provide, identify challenges and solutions, and continuously improve care."

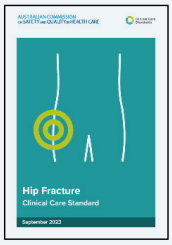
The inter-relationships between these essential components are illustrated in **Figure 5**.

Figure 5. The inter-relationships between clinical guidelines and standards, quality indicators, and hip fracture registries[10, 14, 22]



Clinical Guidelines
Statements that include recommendations, intended to optimise patient care, that are informed by a systematic review of evidence and an assessment of the benefits and harms of alternative care options - *Institute of Medicine*

From which are derived:



Clinical Standards[1]
A Clinical Care Standard is a small number of quality statements that describe the clinical care that a patient should be offered for a specific clinical condition - *Australian Commission on Safety and Quality in Health Care*

Which include:

Quality Indicators
Quality Indicators can be used by health services to monitor the implementation of the quality statements e.g. *Proportion of admitted patients with a hip fracture who received surgery within 36 hours of presentation to first hospital - Australian Commission on Safety and Quality in Health Care*

Which are reported by:

Hip Fracture Registries[2]
Clinician driven audit of hip fracture care which includes annual facilities level audit and continuous patient level audit from admission to 120 days after discharge – *Australian and New Zealand Hip Fracture Registry*

1. Reproduced with permission from https://www.safetyandquality.gov.au/publications-and-resources/resource-library/hip-fracture-clinical-care-standard-2023, developed by the Australian Commission on Safety and Quality in Health Care (ACSQHC). ACSQHC: Sydney 2023.
2. Reproduced with kind permission of the Australian and New Zealand Hip Fracture Registry.

Two additional essential components of high-quality healthcare delivery are care pathways and multidisciplinary models of care:

- **Care pathways** operationalise both guidelines and standards by outlining the specific steps and sequences in treatment for healthcare providers to follow. They provide a practical framework that can be applied in day-to-day clinical operations.
- **Multidisciplinary models of care** are often required to effectively implement clinical guidelines and associated standards, and care pathways, particularly for complex cases. These models ensure that various healthcare professionals work together, each bringing their specialised knowledge to patient care, thereby fostering an environment where guidelines, standards and care pathways are used optimally.

The Orthogeriatric Model of Care

In line with these principles, the orthogeriatric model of care for hip fracture patients encompasses a comprehensive hip fracture care pathway, delivered by a multidisciplinary clinical team. This pathway begins with an immediate and coordinated response to the injury, ensuring rapid assessment and stabilisation in the emergency department. An orthogeriatrician, along with the emergency team, evaluates the patient's medical condition, identifies comorbidities, and plans for surgical intervention. The pathway emphasises early surgical repair, typically within 36 to 48 hours, to reduce complications and enhance recovery prospects.

Post-surgery, the pathway continues with a focus on rehabilitation and secondary fracture prevention. Physical and occupational therapists play a crucial role in early mobilisation and functional recovery, tailoring rehabilitation plans to individual patient needs. Simultaneously, geriatricians and specialist nurses manage medical complications, optimise nutrition, and ensure effective pain management. Social workers and care coordinators facilitate the transition to post-acute care settings, ensuring the patient has a supportive environment for recovery. The multidisciplinary team meets regularly to discuss progress and adjust the care plan as needed, with the patient's goals and preferences at the forefront of decision-making. Participation in hip fracture registries enables the continuous evaluation and improvement of this care pathway, ensuring adherence to clinical standards and facilitating benchmarking to drive quality improvement.

The inpatient team should use the booklet "Recovering from a Hip Fracture"[50] (co-designed by the ANZHFR and hip fracture patients) to support the planning process and to clarify communication with the patient and their family. A clear management plan needs to be provided to the community care providers with a focus on secondary fracture prevention strategies including osteoporosis treatment and falls prevention.

Post-discharge care for hip fracture patients is a critical component of the comprehensive care pathway, aiming to ensure sustained recovery and prevent future fractures. Once the patient is discharged from the hospital, ongoing rehabilitation should be provided, tailored to the patient's functional status and living environment. Key components of rehabilitation include exercise programmes focusing on strength and balance, assessment of the need for equipment and advice on optimising nutrition.

Participation in the ANZHFR remains important post-discharge with data focused on longer term outcomes relevant to patients. This will help identify areas for improvement and ensures that the quality of care remains consistent and adheres to best practice standards.

Current standards of care for people who sustain hip fractures in New Zealand

In 2014, the *Australian and New Zealand Guideline for Hip Fracture Care: Improving Outcomes in Hip Fracture Management of Adults*[10] was published. The guideline was approved by the Australian National Health and Medical Research Council and was formally endorsed by the following professional bodies and organisations:

- Australasian College for Emergency Medicine
- Australasian Faculty of Rehabilitation Medicine
- Australian and New Zealand Orthopaedic Nurses Association
- Australian and New Zealand Society for Geriatric Medicine
- Australian Orthopaedic Association
- Carers NSW
- New Zealand Orthopaedic Association
- Osteoporosis Australia
- Osteoporosis New Zealand
- Royal Australasian College of Surgeons

In 2016, coincident with the publication of the first patient-level audit from the Australian and New Zealand Hip Fracture Registry (ANZHFR)[12], the first edition of the 'trans-Tasman' (i.e. Australian and New Zealand) *Hip Fracture Care Clinical Care Standard*[11] was launched. This standard represented the first joint Australian and New Zealand set of clinical care standards co-produced by the Australian Commission on Safety and Quality in Health Care[51] and the Health Quality and Safety Commission New Zealand[52]. A second edition of the standard[14] was published in 2023 and includes the following seven quality statements with associated quality indicators:

1. Care at presentation

A person presenting to hospital with a suspected hip fracture receives care that is guided by timely assessment and management of medical conditions, including cognition, pain, nutritional status, and frailty. Arrangements are made according to a locally endorsed hip fracture pathway.

2. Pain management

A person with a hip fracture is assessed for pain at the time of presentation to the emergency department and regularly throughout their acute admission. Pain management includes appropriate multimodal analgesia and nerve blocks, unless contraindicated.

3. Orthogeriatric model of care

A person with a hip fracture is offered treatment based on an orthogeriatric model of care as defined in the Australian and New Zealand Guideline for Hip Fracture Care. A coordinated multidisciplinary approach is used to identify and manage malnutrition, frailty, cognitive impairment, and delirium.

4. Timing of surgery

A person with a hip fracture receives surgery within 36 hours of their first presentation to hospital.

5. Mobilisation and weight bearing

A person with a hip fracture is mobilised without restrictions on weight bearing, starting the day of, or the day after, surgery, and at least once a day thereafter, according to their clinical condition and agreed goals of care.

6. Minimising risk of another fracture

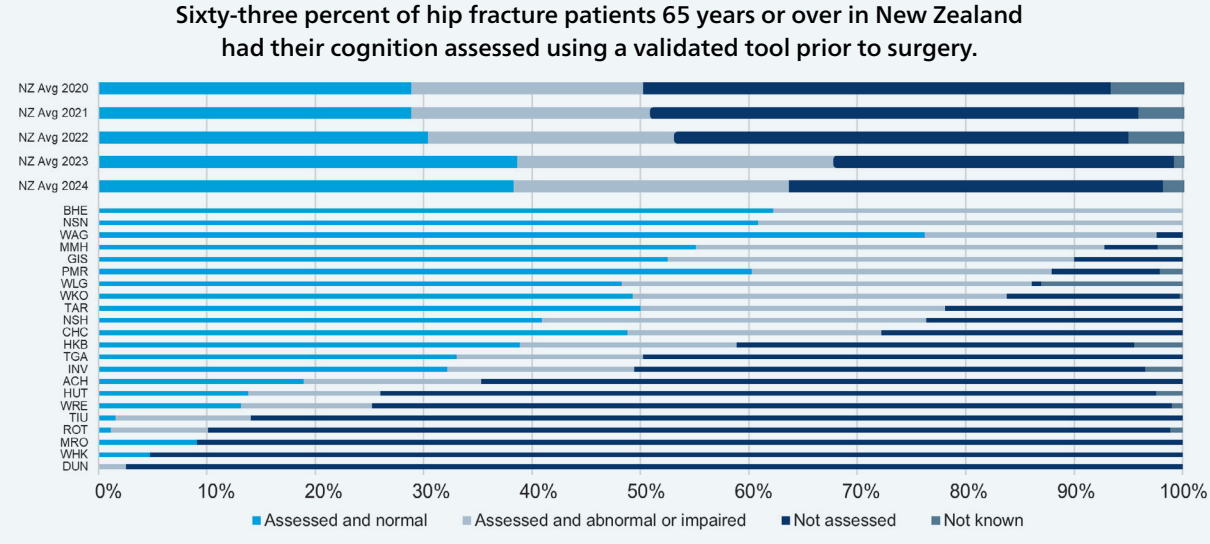
Before a person leaves hospital after a hip fracture, they receive a falls and bone health assessment and management plan, with appropriate referral for secondary fracture prevention.

7. Transition from hospital care

Before a person leaves hospital after a hip fracture, an individualised care plan is developed that describes their goals of care and ongoing care needs. This plan is developed in discussion with the person and their family or support people. The plan includes mobilisation activities and expected function post-injury, wound care, pain management, nutrition, fracture prevention strategies, changed or new medicines, and specific rehabilitation services and equipment. On discharge, the plan is provided to the person and communicated with their general practice and other clinicians and care providers.

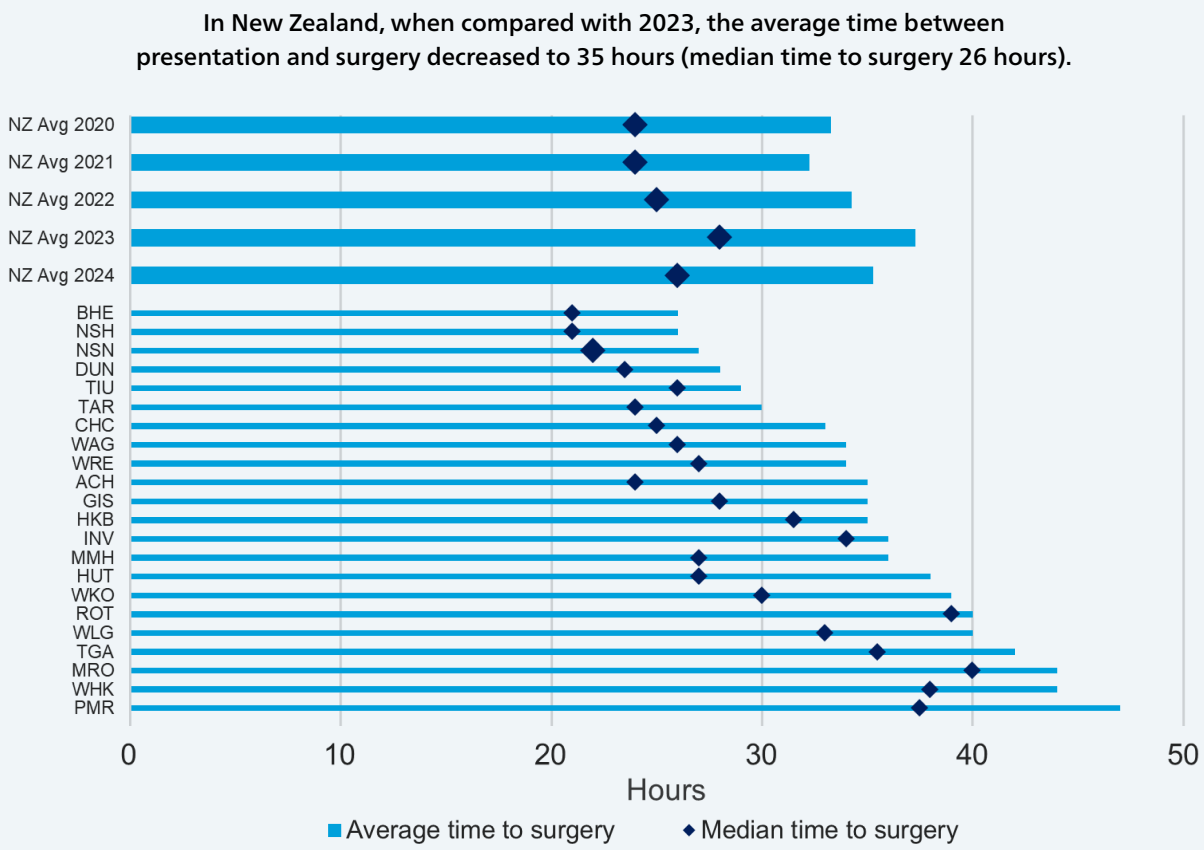
The 2025 ANZHFR Annual Report[22] included 19,124 patient records from 106 hospitals across Australia and New Zealand. In New Zealand, 3,737 patient records were entered by multidisciplinary clinical teams in 22 hospitals that provide care for hip fracture patients. As noted previously, comparison with the discharge coding for hip fractures in the National Minimum Data Set (NMDS)[21] suggests that case ascertainment has reached 90% in New Zealand. **Figures 6 to 10** are reproductions of several figures from the 2025 ANZHFR Annual Report[22]. Each hospital is designated with a three-letter code (i.e. BHE = Wairau Hospital, DUN = Dunedin Hospital, etc.). Real time feedback of this information provided to clinical teams through hospital-level dashboards in the ANZHFR underpins ongoing quality improvement efforts.

Figure 6. Preoperative cognitive assessment for people aged 65 years or over[22]



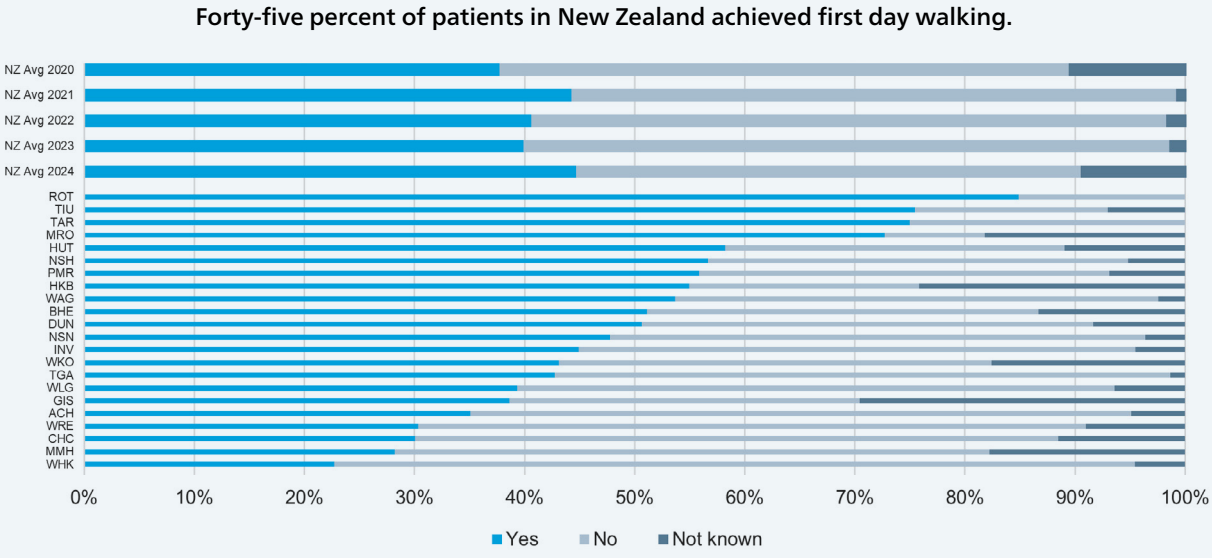
Reproduced with kind permission of the Australian and New Zealand Hip Fracture Registry

Figure 7. Average time to surgery excluding transferred patients[22]



Reproduced with kind permission of the Australian and New Zealand Hip Fracture Registry

Figure 8. First day walking[22]

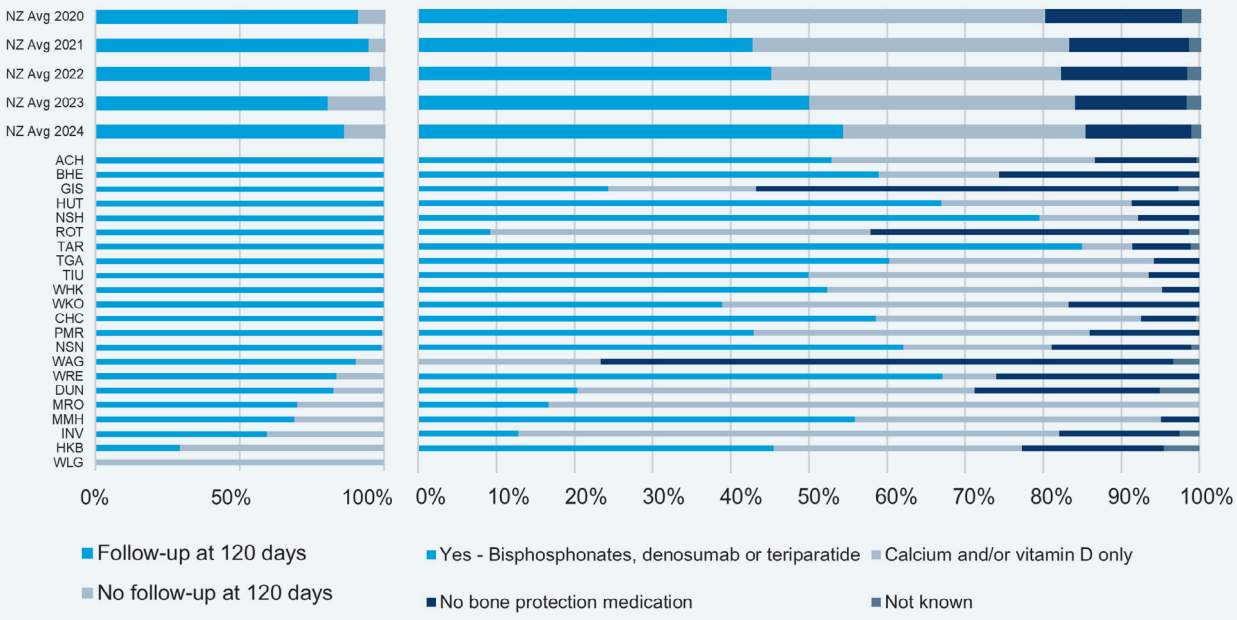


Reproduced with kind permission of the Australian and New Zealand Hip Fracture Registry

Of the people in New Zealand followed up at 120 days, 55% were on bone protection medication.

Figure 9. Follow-up at 120 days[22]

Figure 10. Bone protection medication at 120 days[22]



Reproduced with kind permission of the Australian and New Zealand Hip Fracture Registry

ANZHFR has also undertaken "Sprint Audits"[53], which involve additional questions or variables that are temporarily added to the routine registry data collection. Sprint Audits enable detailed evaluation of one aspect of care in a short period of time, and to date have focused on nutrition, bone protection medication, acute rehabilitation, preoperative fasting, and management of hip fracture for older adults taking direct oral anticoagulants.

In 2016, the Australian Commission on Safety and Quality in Health Care published an economic evaluation[54] of five clinical quality registries for prostate cancer, trauma, intensive care, dialysis and transplantation, and joint replacement. Two registries operated at the state level, one was national, and two were joint Australian and New Zealand registries. The study measured a range of condition-specific process and outcome measures and extrapolated the findings to estimate potential national benefits, revealing benefit-to-cost ratios from 4:1 to 12:1. Key conclusions included:

- Registries enhance healthcare value at a relatively low cost when properly funded and managed.
- Small financial investments in registries can be highly cost-effective.
- Timely, reliable feedback to clinical teams and involvement of health system managers and payers increase impact.

The UK National Hip Fracture Database (NHFD) offers insights into the costs of nationwide hip fracture registry participation[55]:

- The NHFD Implementation Group initially included seven members (Clinical Leads for geriatric medicine and orthopaedics, three project coordinators, and two information technologists).
- When supporting 200 clinical teams reporting on 60,000 cases annually, the central salary cost per case was approximately £5 (NZ$11).
- The local cost per case, based on a nurse spending one hour documenting care, was £32 (NZ$71).
- Combined central and local audit costs were about 0.5% of a hip fracture's total cost.

Currie noted in 2018[55]: *"If you think information's expensive, try ignorance."* Effective audits can make hip fracture care both better and cheaper, contrasting with the typical view that better care always requires more funding.

The future of hip fracture care in New Zealand

Objective: To ensure that all New Zealanders who sustain a hip fragility fracture receive best clinical practice in accordance with the seven quality statements articulated in the second edition of the *Hip Fracture Care Clinical Care Standard*[14].

Since the publication of the *Australian and New Zealand Guideline for Hip Fracture Care*[10] in 2014 and the launch of the Australian and New Zealand Hip Fracture Registry (ANZHFR)[13] in 2016, significant strides have been made in hip fracture management in New Zealand. However, national quality improvement is an ongoing process, and substantial work remains to ensure care consistently aligns with the *Hip Fracture Care Clinical Care Standard*[14].

The ANZHFR provides real-time feedback to clinicians, but the 2025 Annual Report[22] highlights concerning disparities in care across hospitals. Closing these gaps requires benchmarking against the best-performing sites and fostering a culture of continuous quality improvement nationwide. A structured forum for Lead Clinicians in Orthogeriatric Services would further enable sharing of best practice, supporting clinicians, health system managers, and policymakers.

Future progress also depends on strengthening patient partnership. Incorporating Patient Reported Outcome Measures (PROMs) and Experience Measures (PREMs) will ensure care remains centred on patients' needs and experiences. Likewise, patient involvement in guideline development, registry steering groups, and decision-making processes will enhance both relevance and accountability.

Innovation and transparency will also be critical. Local and national research initiatives should continue to be published in peer-reviewed journals, providing a transparent record of successes and areas for improvement. In addition, the integration of digital tools and artificial intelligence offers an emerging opportunity to transform how hip fracture care is delivered and evaluated and deserves focused investment.

Essential next steps for advancing hip fracture care in New Zealand

1. **Deliver best clinical practice:** Ensure all New Zealanders with hip fragility fractures receive care in line with the second edition of the Hip Fracture Care Clinical Care Standard[14].
2. **Benchmarking and quality improvement**: Continue to utilise information from the Australian and New Zealand Hip Fracture Registry (ANZHFR)[13], identify and emulate high-performing hospitals to foster a culture of continuous quality improvement throughout New Zealand, and undertake international comparisons with hip fracture registries in other countries.
3. **Collaborative clinical leadership:** Establish a forum for Lead Clinicians in Orthogeriatric Services to share best practices and drive uniform excellence in care.
4. **Patient-centred care:** Utilise Patient Reported Outcome Measures (PROMs) and Experience Measures (PREMs), and involve patients in clinical guideline development, registries, and decision-making processes.
5. **Secure and allocate resources:** Ensure ongoing funding and resource allocation for Orthogeriatric Services and related programmes from government agencies.
6. **Research and transparency:** Promote local and national research initiatives, publishing findings in medical journals to track progress and identify areas for improvement.

Stronger Together Objective 2: Delivering effective secondary fracture prevention for all New Zealanders who sustain a fragility fracture

Definition of a fragility fracture and relevant skeletal sites

"Fragility fractures are fractures that result from mechanical forces that would not ordinarily result in fracture, known as low-level (or 'low-energy') trauma.

Fragility fractures occur most commonly in the spine (vertebrae), hip (proximal femur) and wrist (distal radius). They may also occur in the arm (humerus), pelvis, ribs, and other bones."

National Institute for Health and Care Excellence, United Kingdom. Osteoporosis: assessing the risk of fragility fracture. Clinical guideline 146. 2017[56].

The previous section of *Stronger Together* described the anatomy and types of hip fracture. In **Figures 11** to **14** below, illustrations are provided of four of the most common other types of fragility fracture:

- **Wrist fractures:** A Colles fracture is a fragility fracture that affects the distal radius near the wrist, usually occurring from a fall onto an outstretched hand, bending the radius backwards. It often leads to a unique wrist deformity, similar to a dinner fork shape.
- **Proximal humerus fractures:** Occurring in the upper arm near the shoulder, this fracture is typically a result of a direct fall onto the shoulder or an outstretched arm. The way the bone shifts or moves can noticeably change the appearance of the shoulder and upper arm.
- **Vertebral compression fractures:** These fractures impact the vertebrae in the spine, often stemming from a collapse of the bone due to osteoporosis. They reduce the height of the vertebrae, causing back pain and potentially leading to changes in posture, such as a forward hunch.
- **Pelvis and sacrum fractures:** These fractures are commonly the result of a sideways or backwards fall and can cause significant pain and mobility issues. These fractures might also change the alignment and shape of the hip and pelvic area, depending on which bones are involved and the fracture's severity.

Figure 11. A Colles fracture of the distal forearm

Figure 12. A fracture of the proximal humerus

Figure 13. A vertebral compression fracture

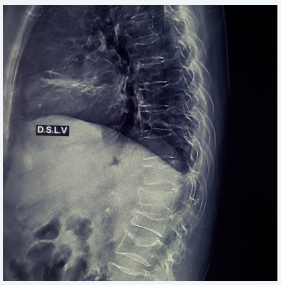


Figure 14. Pelvis and sacrum fragility fractures

Risk of refracture and falls after a fragility fracture

People who sustain fragility fractures represent a distinct group at high short-term risk for further fractures. Decades of research have shown that any prior fracture roughly doubles the risk of subsequent fractures[57, 58]. Importantly, the risk of refracture is greatest in the first two years following an initial fracture , underscoring the urgency of rapid assessment and timely initiation of secondary prevention interventions.

This phenomenon was first documented in 1980, when a Mayo Clinic study of 456 patients with hip fractures found that 68% of women and 59% of men had sustained at least one prior fracture[60]. Subsequent studies in Australia[61], Scotland[62], and the United States[63] throughout the 2000s consistently confirmed this "fracture-begets-fracture" pattern.

More recently, a 2020 Swedish study[64] reported markedly elevated refracture risk within two years of an initial fragility fracture in women aged 55-90 years, while a 2021 Canadian study[65] found that nearly one-fifth (17.8%) of adults over 65 years experienced a second fracture within only 1.5 years of their first.

In addition to this imminent secondary fracture risk, recent evidence demonstrates a concurrent imminent risk of falls in the first year after a fracture[66], with men having a threefold and women a twofold higher risk of falling compared to fracture-free controls. This dual risk of refracture and falls underscores the need for urgent, integrated secondary prevention that combines timely osteoporosis treatment with systematic falls risk assessment and intervention.

Epidemiology of fragility fractures in New Zealand and insights from other countries

Osteoporosis New Zealand estimates that 22,300 fragility fractures occur annually among New Zealanders aged 50 years or over, including approximately 3,900 hip fractures and 2,900 symptomatic (acute) spine fractures[67]. The New Zealand arm of the Australian and New Zealand Fragility Fracture Registry (ANZFFR)[17] was launched in March 2022 to standardise secondary preventive care for fragility fracture patients by benchmarking the performance of Fracture Liaison Services (FLS) against the second edition of New Zealand's Clinical Standards for FLS[16]. The first two ANZFFR Annual Reports, published in March 2024[19] and March 2025[20], provide valuable insights into current standards of care, a summary of which appears later in *Stronger Together*. From the mid-2020s onwards, ANZFFR will provide real-time, comprehensive data on the epidemiology of all fragility fractures in New Zealand. Notably, approximately one-third of patients enrolled in ANZFFR report having sustained at least one previous fracture before the index event.

The burden of secondary fractures is substantial, both for individuals and for health systems. In the United States, a 2021 analysis[68] estimated Medicare costs at US$5.7 billion (NZ$9.4 billion) for patients with subsequent fractures. Long-term projections from Japan[69] and Korea[70] similarly forecast billions of dollars in costs for secondary fractures through to 2040. Closer to home, a comprehensive longitudinal study[71] of refracture rates in individuals aged 50 years or older in New South Wales, Australia, highlighted the scale of the challenge. Applying these findings to the New Zealand population, it is estimated that, without a national systematic approach to secondary fracture prevention, the next decade could see approximately 182,000 refracture-related hospital admissions and emergency department presentations, along with 354,000 outpatient attendances, costing around NZ$1.5 billion.

These findings emphasise the critical need for New Zealand to implement effective secondary fracture prevention and management strategies at a national scale.

The impact of fragility fractures

In addition to the immense burden that fragility fractures impose on the health system, aged residential care sector, and the national economy, these fractures exact a tremendous toll on the people who sustain them and their families. As described previously, hip fractures are a life-altering injury and in the worst-case scenario can result in premature death. Summaries that describe the impact of fragility fractures at other skeletal sites follow.

"It was a total surprise to be walking one moment and to then suddenly find myself thrown to the ground on our driveway. It was an even greater surprise when I looked at my right wrist which I had fallen onto as I went down. However, the biggest shock was the results of a bone density scan – I didn't see a diagnosis of osteoporosis coming! Although I suffered a comminuted intra-articular fracture with the joint block in at least 3 fragments my radius healed well without surgery and following 6 weeks in a cast my orthopaedic consultant said I was good to go. But what about hand therapy/ rehab I asked and was told to just start using my arm. What about my bone density – should I be getting this checked out? The reply was no need. With a background as an occupational therapist, I had a few ideas as to what I needed to do to regain movement and strength. I also referred myself to a hand therapy clinic where I got great advice, exercises and support (including a splint for my wrist!).

I am very grateful that I also received a phone call from our local Fracture Liaison Service who somehow knew about me, even though no one had told me that this service was available to me. Going through the check list criteria I was on the borderline for referral for a DEXA and was pleased when this was approved. As the technician said, it would be good to get a baseline at my age! Actually, too late for a 'baseline' but at least I am now getting treatment.

I feel fortunate that I have had a good outcome following my fall and know this is not everyone's experience. I am aware that I have knowledge of the health system and confidence to be assertive to ask for what I need/know is available. I worry for those who are trying to recover without this knowledge or support. A key reason I have recently agreed to be a consumer representative on the ANZFFR is to advocate for service delivery where all people get access to services that enables their recovery."

Janet from Māpua, Tasman

Wrist fractures

In 2022, researchers from the United Kingdom undertook a comprehensive review of published studies to evaluate the long-term clinical and socio-economic outcomes following wrist fracture[72]. A total of 78 studies were considered which included a total of more than 688,000 patients. Key findings included:

- Persistent moderate to severe pain and functional limitations were reported by patients up to a year or more following a wrist fracture, with pain levels varying between 7.5% to 62% and functional limitations between 5.5% to 78%.
- Scores generated from two self-administered, patient-specific questionnaires (the Patient-Rated Wrist Evaluation [PRWE][73] and the Disabilities of the Arm, Shoulder, and Hand [DASH][74] scores) provided significant insights:
  - The PRWE score (where no pain = 0 and maximum pain = 50), with an average of 15.2 over 6 months to 13 years, indicated that many patients continued to experience pain and functional challenges well after their wrist fracture.
  - The DASH score (where no disability = 0 and severe disability = 100), averaging 13.8 in 6 to 17 months, similarly reflected ongoing difficulties with arm, shoulder, and hand activities.
- A 10 to 20% increase in healthcare encounters in the first 12-months after fracture was observed.

Humerus fractures

In 2018, Australian researchers assessed the incidence and outcomes of humerus fractures in older adults[75]. They found that the incidence of these fractures increased with age, reaching a peak of 670 per 100,000 persons per year in individuals over 85 years of age. The in-hospital mortality rate for humerus fractures was 3.6%. Gender was a significant predictor of in-hospital mortality, with males being six times more likely to die in the hospital compared to females. A significant outcome of humerus fractures in the elderly is the rate of new nursing home admissions, with almost one fifth (17.8%) of patients being admitted to nursing homes post-fracture.

Vertebral fractures

Vertebral fractures have been associated with several profound impacts on those affected. These include back pain, height loss, deformity, decreased mobility, and more frequent bed rest[76, 77]. Additionally, they often lead to a diminished quality of life due to factors including lowered self-esteem, altered body image, and depression[78-81]. Furthermore, these fractures adversely affect everyday activities, significantly hindering daily living tasks[82, 83]. Around a fifth of women who sustain a vertebral fracture will have another vertebral fracture within a year of the first fracture[84].

Pelvis and acetabulum fractures

A comprehensive review published in 2023 examined the prevalence, causes, and treatment outcomes of acetabulum fractures (the socket of the hip bone, into which the head of the femur fits) in the elderly[85]. Key findings included:

- Acetabulum fractures in older adults, often resulting from minor trauma, account for approximately 1.5% to 3% of all skeletal injuries and have increased 2.4-fold over the past three decades.
- The one-year mortality rate associated with these fractures ranges from 14% to 25%.
- Management options vary greatly and include nonoperative and operative methods (surgical fixation and acute total hip arthroplasty), each presenting specific risks for this age group.

There is ongoing debate about the most effective management strategy for optimal function and health-related quality of life outcomes. The review emphasised the growing concern about fragility fractures of the pelvis and acetabulum in the elderly, which can be life-threatening.

Delivering best clinical practice for people who sustain a fragility fracture

"Approximately 50% of people with one osteoporotic fracture will have another, with the risk of new fractures rising exponentially with each fracture. The majority of fragility fracture patients never learn what caused their fracture to happen or receive treatment to prevent it from happening again. Evidently, this is a missed opportunity to identify and treat those at greatest risk of disabling and costly secondary fractures.

'Capture the Fracture®' is a global campaign developed to facilitate the implementation of coordinator-based, post-fracture models of care for secondary fracture prevention.

The International Osteoporosis Foundation (IOF) believes this is the single most important thing that can be done to directly improve patient care and reduce spiraling fracture related healthcare costs worldwide."

Professor Cyrus Cooper
OBE, IOF President.

Capture the Fracture®. World Osteoporosis Day Thematic Report. 2012[86]. www.capturethefacture.org

The post-fragility fracture care gap

In 2017, a review by scientists from the International Osteoporosis Foundation offered a comprehensive global view on strategies to prevent fragility fractures[87]. This review compiled data from a wide range of studies conducted at international, national, regional, and local levels. It revealed that a significant majority of patients with fragility fractures did not receive osteoporosis-specific treatment to prevent secondary fractures. Despite this review being published eight years ago, ongoing research from various countries consistently highlights a persistent and widespread gap in post-fracture care[88-90].

In 2014, Osteoporosis New Zealand published a Fracture Liaison Service Resource Pack[91], that included a review of studies that evaluated the post-fracture care gap in New Zealand. Further evidence of this significant care disparity was provided by studies from Auckland in 2017[92] and the ANZHFR in 2022[93]. The ANZHFR study[93] included an evaluation of osteoporosis treatment of 43,166 Australian and 12,452 New Zealand hip fracture patients who sustained their fractures between 1st January 2016 and 31st December 2020. Additional information was provided by a "Sprint Audit" conducted among 18 facilities in Australia (involving 359 patients) and 8 facilities in New Zealand (involving 97 patients) during November 2021. Key findings included:

- Among the ANZHFR cohort from 2016 to 2020:
  - On hospital admission, less than 8.9% of hip fracture patients in Australia and 9.1% of patients in New Zealand were taking osteoporosis-specific treatment.
  - On discharge, this increased to 22.4% in Australia and 27.8% in New Zealand.
- Among the Sprint Audit patients in November 2021:
  - 71.3% in Australia and 54.6% in New Zealand were not administered osteoporosis-specific treatment as an inpatient.
  - 46.2% in Australia and 39.2% in New Zealand did not have osteoporosis-specific treatment included in their discharge prescription.

Fracture Liaison Services: A systematic approach to close the care gap

In the late 1990s and 2000s, investigators from Australia[94], Canada[95], Switzerland[96], the United Kingdom[97] and the United States of America[98] were among the first to develop a model of care that would become known as a Fracture Liaison Service (FLS), which has been described as follows[99]:

"The purpose of a FLS is to ensure that all patients aged 50 years or over, who present to urgent care services with a fragility fracture, undergo fracture risk assessment and receive treatment in accordance with prevailing national clinical guidelines for osteoporosis. The FLS also ensures that falls risk is addressed among older patients through referral to appropriate local falls prevention services."

Other terms used to describe models of care intended to deliver secondary fracture prevention in a reliable fashion include Secondary Fracture Prevention Programmes and Post-Fracture Care Programmes. In 2022, a narrative review[100] provided detailed analysis of literature trends relating to such programmes.

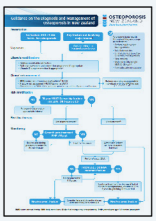
Systematic literature reviews and meta-analyses have demonstrated the clinical effectiveness of Fracture Liaison Services to deliver optimal secondary fracture prevention[101-105], including mortality reduction[102, 105]. Cost-effectiveness analyses have demonstrated benefits for this approach in Asia[106], Europe[107, 108], North America[109-114] and Oceania[115-117]. A systematic review and meta-analysis of FLS published in 2021 reported an overall pooled result of a 30% reduction in secondary fracture rates across all studies[105]. Among the sub-set of studies that undertook follow-up to ascertain secondary fracture rates for at least two years after the initial fracture managed by the FLS, a statistically significant 43% reduction in secondary fractures was evident.

In 2022, a case study[118] in multi-disciplinary, multi-sector collaboration described quality improvement efforts, advocacy, and government agency engagement to transform the management of people who sustain fragility fractures in New Zealand during the period 2012 to 2022. This study documented the establishment of the first FLS in New Zealand that began in 2012 through to a major ongoing national FLS quality improvement programme.

National quality improvement programme for Fracture Liaison Services in New Zealand

The approach previously outlined for improving care for hip fracture patients has been adapted, as shown in **Figure 15.** Essential components of care have been developed to enable FLS to continually improve their delivery of secondary fracture prevention for individuals with fragility fractures at any skeletal site.

Figure 15. Essential components of care to support improvement of Fracture Liaison Services in New Zealand[16, 20, 119]



Clinical Guidelines
Statements that include recommendations, intended to optimise patient care, that are informed by a systematic review of evidence and an assessment of the benefits and harms of alternative care options - *Institute of Medicine*

From which are derived:

Clinical Standards *
A Clinical Care Standard is a small number of quality statements that describe the clinical care that a patient should be offered for a specific clinical condition - *Australian Commission on Safety and Quality in Health Care*

Which include:

Key Performance Indicators
Key Performance Indicators (aka Quality Indicators) can be used by health services to monitor the implementation of the quality statements, and to identify and address areas that require improvement e.g. *Proportion of people with a fragility fracture with a recommendation to treat with osteoporosis specific treatment, within 12 weeks of the index/sentinel fracture – Osteoporosis New Zealand*

Which are reported by:

Fragility Fracture Registries
Clinician driven audit of secondary fracture prevention which includes annual facilities level audit and continuous patient level audit from admission to 12 months after discharge – *Australian and New Zealand Fragility Fracture Registry*

Reproduced with kind permission of the Australian and New Zealand Fragility Fracture Registry and Osteoporosis New Zealand

* This image 'Clinical Standards for Fracture Liaison Services in New Zealand' was developed by Osteoporosis New Zealand. Osteoporosis New Zealand: Wellington (2021)

Current standards of care for people who sustain a fragility fracture in New Zealand

The national quality improvement programme is founded upon benchmarking of the performance of FLS in New Zealand against both national and international standards.

National benchmarking of Fracture Liaison Services in New Zealand

National clinical standards and/or key performance indicators (KPIs) for FLS are available in Canada[120], Egypt[121], Japan[122], New Zealand[16] and the UK[123]. National registries that enable FLS to benchmark their performance have been established in Australia[18], Canada[124], Egypt[121], Ireland[125], New Zealand[17], UK[126] and the United States of America[127].

The second edition of the FLS clinical standards for New Zealand[16] were informed by the approach taken to develop the UK clinical standards[123] and incorporate the KPI set developed by IOF, the Fragility Fracture Network and the Bone Health and Osteoporosis Foundation in the United States[128], plus several additional KPIs. The New Zealand standards are structured according to the **"5IQ"** approach, that defines which patients should be **Identified**, how and when they should be **Investigated**, what **Information** should be provided to patients to engage them in their care, what **Interventions** should be offered to reduce future fracture risk, how **Integration** can be achieved across the primary and secondary care sectors, and what **Quality** metrics should be in place.

Figures 16 to 18 below illustrate the national and local dashboards available in the New Zealand arm of the Australian and New Zealand Fragility Fracture Registry (ANZFFR) and the KPIs as they relate to each of the 5IQ clinical standards. The development of the "Refracture Tracker" in the ANZFFR provides FLS Teams with real time information on their patients who have sustained a fracture that has resulted in a second fracture episode being recorded in the registry, and a prompt to review provision of preventive care to avoid further fractures.

Figure 16. ANZ Fragility Fracture Registry Dashboards: National and Local Patient Flows[17]

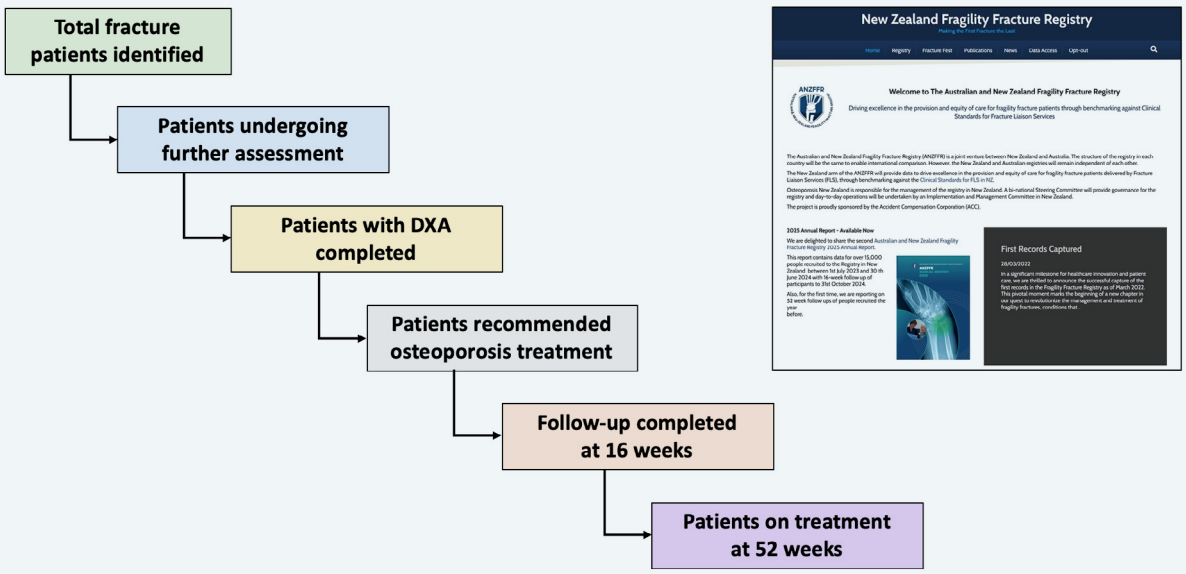


Figure 17. National Counts, Clinical Standards 1-3, and Key Performance Indicators 1-7

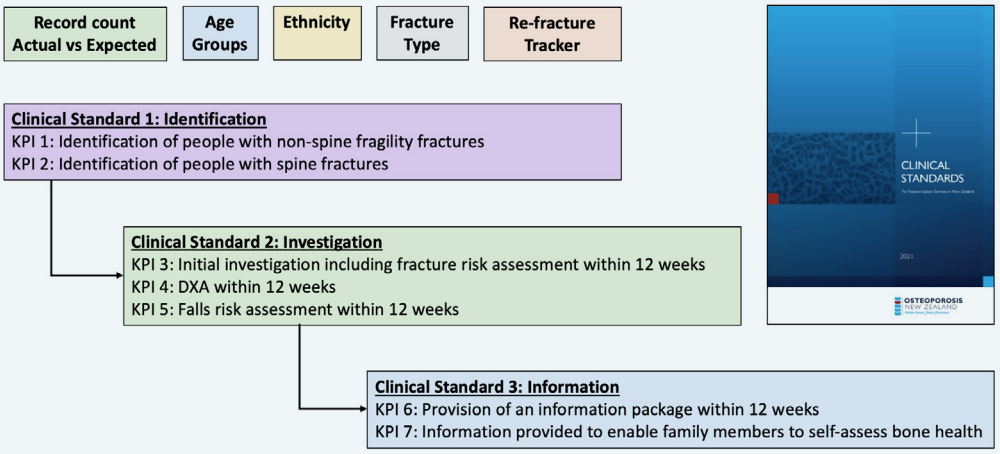
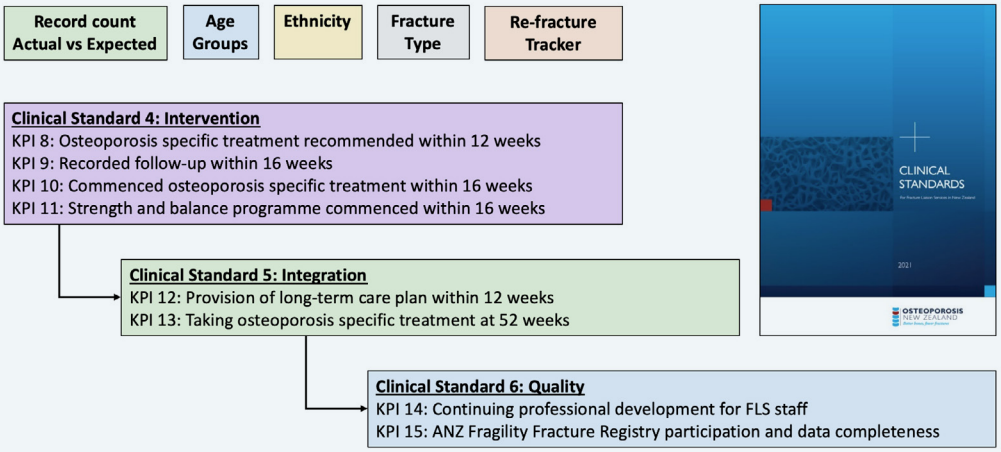
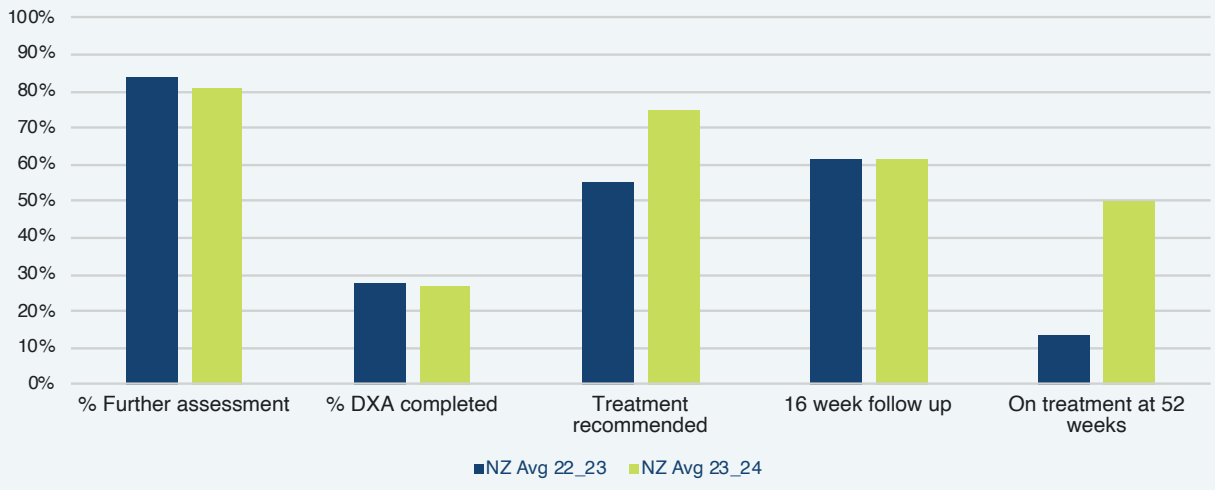


Figure 18. National Counts, Clinical Standards 4-6, and Key Performance Indicators 8-15



The second Annual Report of the Australian and New Zealand Fragility Fracture Registry (ANZFFR)[20], published in March 2025, included data from 15,026 patients who sustained a total of 15,939 fragility fractures between 1st July 2023 and 30th June 2024. The report captured care delivered by 20 Fracture FLS teams operating across 18 of the 19 Health NZ – Te Whatu Ora districts, covering 98% of the New Zealand population. **Figure 19** compares the proportion of patients progressing through key stages of the FLS care pathway, as reported in the first and second annual reports.

Figure 19. National comparison of patient progression through key stages of the FLS care pathway: First vs. Second ANZFFR Annual Reports[19, 20]



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Figures 20 to 23 are reproductions of several other figures from the 2025 ANZFFR Annual Report[20]. Each FLS is identified by the name of its associated hospital (e.g., Auckland City Hospital) or by the Primary Health Organisation (PHO) for WellSouth. Real time feedback of this information to FLS Teams through local dashboards in the ANZFFR underpins ongoing quality improvement efforts.

Figure 20. A summary of the patient flow for each Fracture Liaison Service in New Zealand[20]

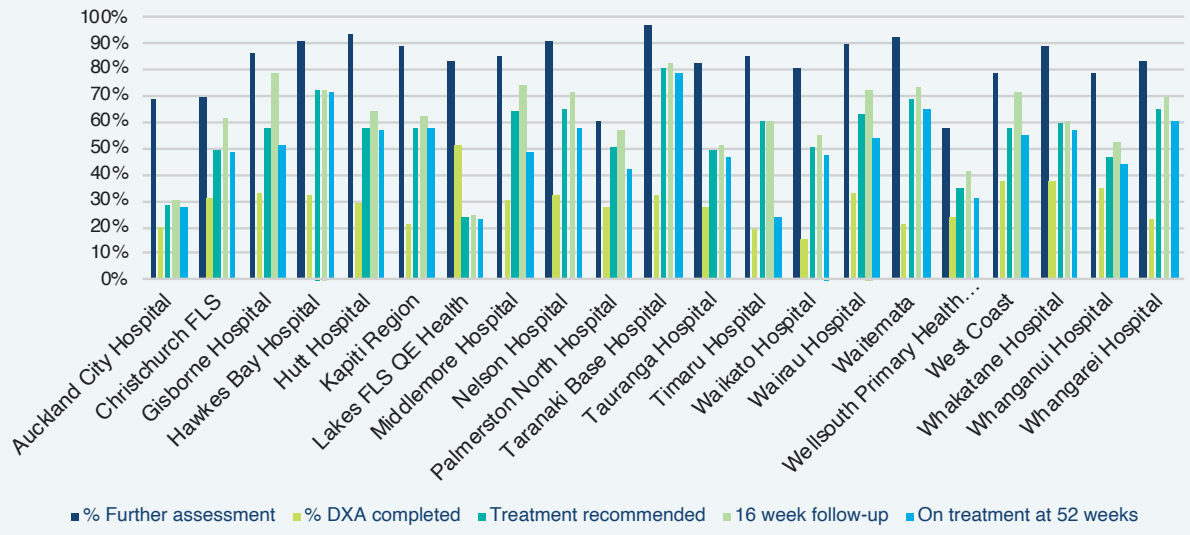

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Figure 21. Reported previous fragility fractures[20]

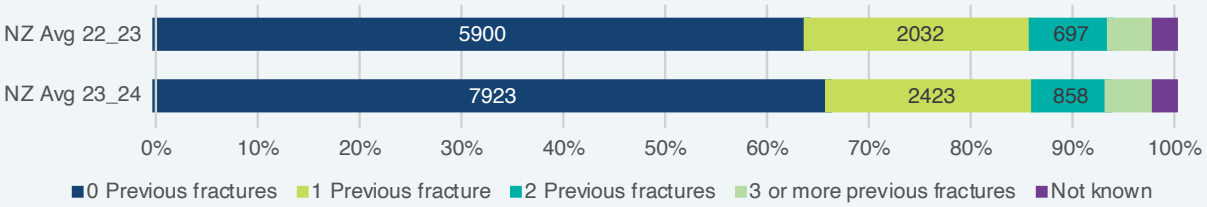

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Figure 22. Osteoporosis specific treatments at 16 weeks[20]

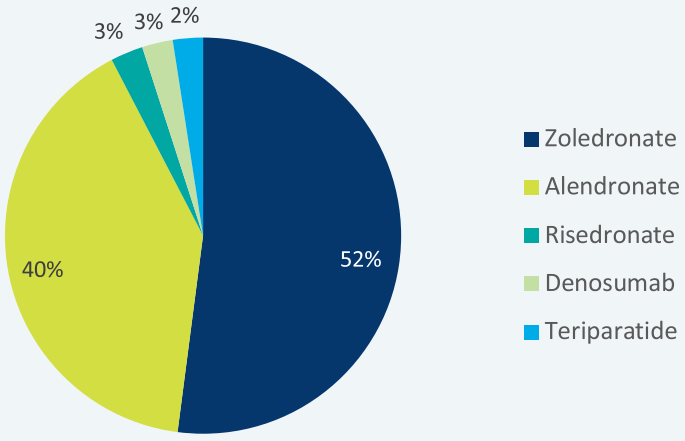

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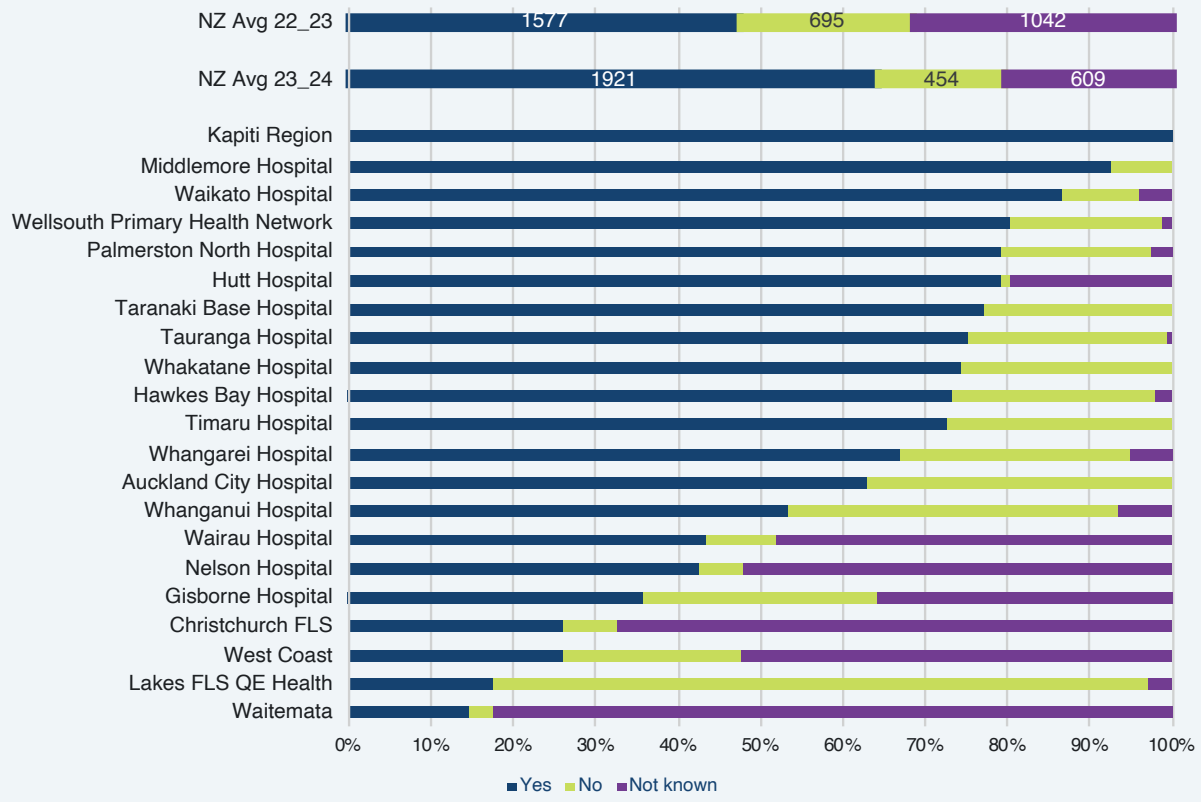
Figure 23. Strength and balance started at 16 weeks[20]



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At the national level, the refracture rate serves as a key indicator of the overall effectiveness of the FLS network. While systematic monitoring of refracture rates remains in its early stages in New Zealand as of late 2025, initial findings are encouraging, with only 3.3% of patients sustaining at least one refracture between July 2023 and June 2024[20]. For context, a 2020 study[64] involving more than 35,000 Swedish women aged 55 to 90 years who sustained an initial fracture in 2013 reported subsequent fracture rates of 6.6% at one year and 11.3% at two years. A similar U.S. study[129] involving more than 300,000 managed care enrolees aged 50 years or older who sustained an initial fragility fracture examined how many went on to experience a second fracture. The findings closely mirrored those of the Swedish study[64], with estimated cumulative second-fracture rates of 6.6% at one year, 12.3% at two years, 16.9% at three years, and 20.9% at four years following the initial fracture.

As FLS teams in New Zealand move closer to achieving universal identification of all individuals presenting with fragility fractures, the Refracture Tracker offers real-time, population-wide insights into the burden of secondary fractures. This will support continuous quality improvement efforts and strengthen the foundation for secondary fracture prevention nationwide.

International benchmarking of Fracture Liaison Services in New Zealand

In 2012, the International Osteoporosis Foundation (IOF) launched the Capture the Fracture® Programme[130] which has become a flagship initiative for IOF during the subsequent decade. The initial stated aims of Capture the Fracture® were:

1. To be the global voice for secondary fracture prevention
2. To drive national and international policy
3. To ensure quality and provide support for FLS implementation, including getting started, improving, and becoming sustainable.

In 2013, the Best Practice Framework[131] was published to serve as the measurement tool for IOF to award "Capture the Fracture® Best Practice Recognition". As of October 2025, 1,235 FLS from 62 countries featured on the Capture the Fracture® "Map of Best Practice". As illustrated in **Figure 24**, 19 FLS from New Zealand featured on the Map, collectively serving more than 98% of the population aged 50 years or over. The national FLS quality improvement programme is on track to achieve the aspiration that there will be universal access to IOF-accredited FLS in New Zealand in 2026.

Figure 24. The International Osteoporosis Foundation Capture the Fracture® Map of Best Practice[132]

Reproduced with kind permission of the International Osteoporosis Foundation

Impact of Fracture Liaison Services on hospital bed days in New Zealand

The Live Stronger for Longer programme website[9] included a Falls and Fractures Outcomes Dashboard. For calendar year 2022, the Dashboard attributed the following number of hospital bed days to falls and fragility fractures among New Zealanders aged 50 years or over:

- **Hip fractures:** 77,928 bed days
- **Fragility fractures at other skeletal sites:** 113,641 bed days
- **Injurious falls not involving fracture:** 116,081 bed days

To put these numbers into perspective, imagine a hypothetical "Fragility Fractures Hospital" where all fragility fracture patients in New Zealand are treated. This hospital would require 525 beds, making it the **sixth largest hospital** in the country. Similarly, a "Fragility Fractures and Falls Hospital" accommodating all such patients would need 843 beds, ranking as the **third largest hospital** in the nation.

An analysis commissioned by ACC in 2024 sought to estimate the number of hospital bed days that could be saved over a five-year period through universal access to world-class FLS across New Zealand[133]. Based on conservative assumptions, the analysis suggested that a national FLS network would save 57,764 bed days over five years. Also in 2024, colleagues at the Royal Osteoporosis Society in the UK undertook an analysis to estimate potential bed day savings attributable to FLS in the UK[134]. Their analysis concluded that 750,000 hospital bed days would be saved by universal access to FLS in the UK over five years. On a per capita basis this figure is within 0.7% of the estimate of 57,764 bed days saved in New Zealand over the same period. This close alignment serves as an independent validation of the modelling undertaken in New Zealand.

The estimate of 57,764 hospital bed days saved over five years reflects a cumulative benefit that increases progressively as the impact of secondary fracture prevention becomes more substantial. In the early years of implementation, FLS prevent a relatively modest number of re-fractures. However, as more patients are systematically identified and treated, the number of fractures and associated hospitalisations prevented grows year on year. By the fifth year of the model, the annual number of bed days saved reaches approximately 17,000. This upward trajectory illustrates the compounding effect of secondary fracture prevention and highlights the substantial long-term efficiency gains achievable through sustained investment in FLS.

To place the 17,000 bed days saved in the fifth year into practical context, Osteoporosis New Zealand reviewed published literature and official sources to identify the average length of stay (LoS) for hospital admissions in New Zealand, across all conditions and age groups[135]. While LoS varies depending on the nature of the admission, the review found that the average stay is approximately 2.5 days when both day-stay and overnight admissions are included. When considering only admissions involving at least one overnight stay, the average increases to around 5 days. Based on this range, saving 17,000 bed days in a single year equates to freeing up between 3,400 and 6,800 "episodes of hospital care". This framing underscores the broader system-wide benefits of secondary fracture prevention, not only by improving outcomes for individuals but also by relieving pressure on hospital capacity and enhancing the efficiency of the health system as a whole.

The future of secondary fracture prevention in New Zealand

Objective: To ensure that all New Zealanders who sustain a fragility fracture receive best clinical practice in accordance with the six clinical standards articulated in the second edition of the Clinical Standards for Fracture Liaison Services in New Zealand[16].

Fracture Liaison Services (FLS) are the cornerstone of secondary fracture prevention, providing the infrastructure needed to ensure that all people who sustain fragility fractures receive systematic post-fracture care. Recent trials have also demonstrated the feasibility and effectiveness of initiating intravenous bisphosphonate therapy, such as zoledronic acid, during the index hospital admission for hip and other major fragility fractures[136-138]. This strategy not only reduces subsequent fracture risk but also helps overcome challenges with long-term adherence to oral therapy. Embedding such in-hospital treatment options within FLS and orthogeriatric pathways represents a significant evolution in secondary fracture prevention.

To achieve nationwide consistency, FLS must be formally recognised as core health services with secure, long-term funding. While ACC has been the primary funder to date, Health New Zealand – Te Whatu Ora will need to assume a leading role in sustaining and expanding these services to ensure equitable access across the country.

The 2025 Annual Report[20] of the Australian and New Zealand Fragility Fracture Registry (ANZFFR) documents care for 15,939 fractures (72% of the estimated national caseload) sustained by 15,026 people, highlighting strong progress in secondary prevention: over 96% of patients received bone health assessments and 99% had falls risk assessments within 12 weeks, with three-quarters receiving or already on treatment. These results demonstrate the effectiveness of FLS but also reveal areas for improvement, such as equitable access to DXA scanning. To maintain these gains, the long-term financial sustainability of the registry itself must also be secured.

Future progress depends on strengthening clinical leadership, professional development, and collaboration across services. The national mentorship programme led by Osteoporosis New Zealand already provides essential peer support and continuous learning opportunities. Equally important is ensuring that clinical standards and guidelines remain up to date and aligned with global frameworks such as IOF's Capture the Fracture® Programme, positioning New Zealand FLS at the forefront of international best practice.

Sustaining excellence also requires embedding a culture of continuous quality improvement, encouraging local and national research, and publishing findings transparently. Finally, investment in digital health and artificial intelligence offers an important opportunity to futureproof services, for example, by enabling earlier identification of vertebral fractures on imaging through AI algorithms, supporting faster and more effective intervention.

Essential next steps for improving secondary fracture prevention in New Zealand

1. **Standardise and benchmark clinical practices:** Implement uniform clinical practices by all FLS in New Zealand based on real time feedback from the Australian and New Zealand Fragility Fracture Registry[17].
2. **Align with global best practices:** Regularly update national clinical guidance and standards and align with international frameworks including IOF's Capture the Fracture® Programme[130].
3. **Foster professional development and collaboration:** Strengthen mentorship programmes and professional networks for continuous skill enhancement.
4. **Patient-centred care:** Utilise Patient Reported Outcome Measures (PROMs) and Experience Measures (PREMs), and involve patients in clinical guideline development, registries, and decision-making processes.
5. **Secure and allocate resources:** Ensure ongoing funding and resource allocation for FLS and related programmes from government agencies.
6. **Encourage research and ensure transparency:** Support both local and national research efforts and disseminate the results in medical journals.

Stronger Together Objective 3: Delivering effective primary fracture prevention for all New Zealanders at risk of sustaining a first fragility fracture

Individuals at risk of sustaining a first fragility fracture

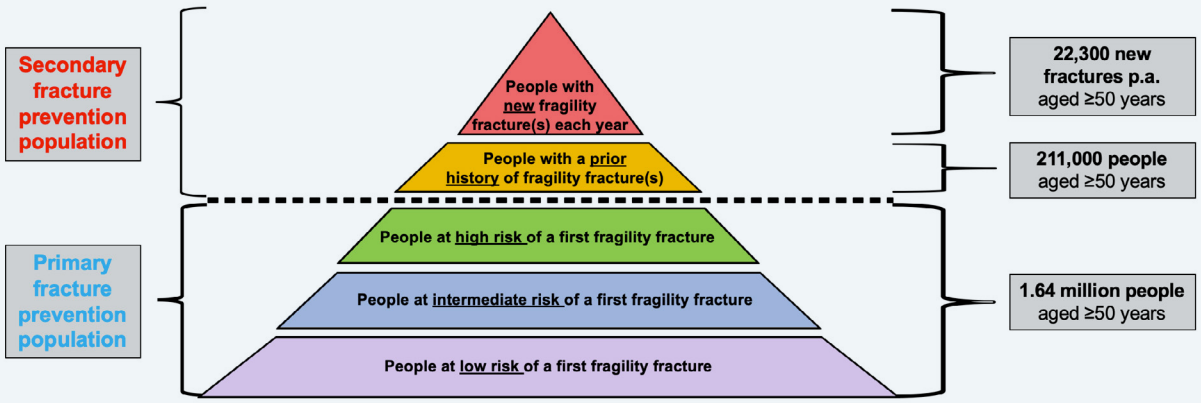
The two previous sections of *Stronger Together* focused on improving care for individuals over 50 years of age who have experienced at least one fragility fracture[87, 139]. The focus of this section is the challenge to devise a systematic, clinically effective, and economically viable strategy for preventing first fragility fractures, a strategy known as primary fracture prevention.

As illustrated in **Figure 25** below, the scale of this challenge is significant, because of the size of the population that needs to be assessed. In New Zealand, of the 1.85 million people currently aged 50 years or over, estimates suggest that 1.64 million **do not** have a prior history of fragility fracture[140]. Accordingly, clinician led assessment of fracture risk for the entirety of this large population would likely over burden the health system and not be cost-effective.

A stepwise, risk-stratified approach is needed.

In addition to strategies targeting the prevention of "classic" fragility fractures, this section also considers newer concepts such as Bone Health Optimisation (BHO) for patients undergoing elective orthopaedic surgery. While BHO differs from "traditional" primary preventive approaches, it similarly aims to prevent first adverse skeletal events - in this case complications such as periprosthetic fractures - and therefore can be viewed as an important extension of primary fracture prevention.

Figure 25. Primary and secondary fracture prevention populations aged ≥50 years in New Zealand[4, 20, 140]



In 2016 and 2017, IOF scientists sought to address this challenge in the 2016 IOF World Osteoporosis Day thematic report[141] and an associated peer-reviewed publication in the journal *Osteoporosis International* in early 2017[87]. The authors proposed a pragmatic approach to delivering primary fracture prevention in a systematic fashion:

"Equipped with knowledge of which medicines induce osteoporosis, which other diseases have osteoporosis as a common co-morbidity and online access to absolute fracture risk calculators to stratify fracture risk in the population, the necessary case-finding tools are now available to develop effective models of care to prevent the first fracture."

Osteoporosis induced by medicines

Many classes of drugs have been shown to adversely affect bone mineral density and/or elevate fracture risk, including:

- Androgen deprivation therapy
- Anticoagulants
- Anticonvulsants
- Aromatase inhibitors
- Calcineurin inhibitors
- Glucocorticoids
- Medroxyprogesterone acetate
- Proton pump inhibitors
- Selective serotonin reuptake inhibitors
- Thiazolidinediones

While links have not been proven to be causal in every case, these drug classes have all been associated with fracture outcomes. An analysis of these associations is provided in detail in the 2017 *Osteoporosis International* publication[87].

"My main reason for retiring to Nelson in 1999 was its wonderful natural environment, especially the backcountry. Three National Parks and a Forest Park on your doorstep – which track to do next, which mountain to climb? But it seemed we had hardly settled here when I was hit by a weird autoimmune disease, Temporal Arteritis. Partial loss of vision was only one of the nasty symptoms. The treatment was large doses of Prednisone steroid, which would suppress my misbehaving immune system. This battle went on for many unpleasant months, extending into years. A friend suggested I should have a bone density scan because he knew of the side effect of prednisone use on bone health. The scan showed serious loss of bone density in both my lower back and my hip. Later scans have confirmed osteoporosis.
Meanwhile, my overall health was improving and I signed up to the "use-it-or-lose-it" team, doing pest trapping in Kahurangi National Park, creating a small native bush reserve and tramping in the hills. I suffered the odd bone fracture but nothing major. I really believed the osteoporosis was a thing I could live with. From time to time I took Fosamax and even had the odd Aclasta infusion. Then early this year I was yanking out some tall sweetcorn plants in hard ground and heard – and felt - a crack in my lower back. It turned out to be a compression fracture of a lumbar vertebra – a sure sign that the osteoporosis was still around. Understanding that I was not ready to change my life style, my GP prescribed Teriparatide, which helps your bones recover. My wife calls it "the elixir of youth," (wishful thinking I'm afraid.) It requires a daily injection under the skin - not painful, just a new part of the daily routine, but for 18 months. I'm nearly half way there now. Almost all the pain in my lower back has now gone and every day I am sure I can feel my bones getting stronger."

Chris Potter's story

Diseases associated with osteoporosis

Many diseases predispose an individual to develop osteoporosis and/or sustain fragility fractures. These comprise a broad array of disorders including autoimmune, gastrointestinal, endocrine and hormonal, haematological, neurological, cancer, and AIDS/HIV. Several common diseases include chronic obstructive pulmonary disease, dementia, diabetes, diseases of malabsorption such as celiac disease, Crohn's disease and ulcerative colitis, and rheumatoid arthritis. Again, an analysis of these associations is provided in detail in the 2017 *Osteoporosis International* publication[87].

National Screening Programmes for patients at high risk of fragility fracture

In 2022, IOF scientists published a Position Paper on the potential role of population screening for high hip fracture risk against well-established criteria[142, 143]. The approach to development of a screening programme advocated by the UK National Steering Committee was employed. The authors concluded *"… that evidence supports the proposal that screening for high fracture risk in primary care should strongly be considered for incorporation into many health care systems to reduce the burden of fractures, particularly hip fractures. The key remaining hurdles to overcome are engagement with primary care healthcare professionals, and the implementation of systems that facilitate and maintain the screening program."*

Delivering best clinical practice for people at risk of sustaining a first fragility fracture

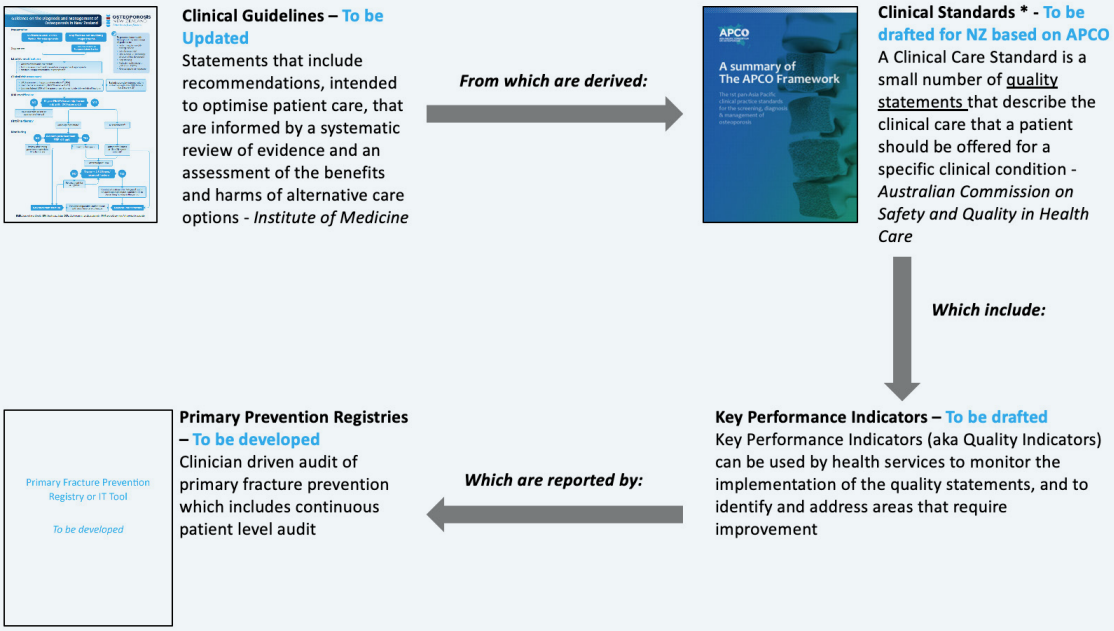
In 2021, the Asia Pacific Consortium on Osteoporosis (APCO) published the APCO Framework[144]. The APCO Framework is intended to support national osteoporosis clinical practice guideline development groups to draft new, or revise existing, guidelines to be consistent with a set of clear, concise, relevant, and pragmatic clinical standards. As has been done previously in the development of national clinical standards for Fracture Liaison Services[16, 122, 123], the 16 APCO clinical standards are organised in accordance with "5IQ" approach:

- **Identification:** Statements relating to which individuals should be identified.
- **Investigation:** Description of the types of investigations that should be undertaken.
- **Information:** Description of the types of information to be provided to patients and families.
- **Intervention:** Description of pharmacological interventions and falls prevention.
- **Integration:** Statements on the need for integration between primary and secondary care.
- **Quality:** Description of professional development, audit, and peer-review activities.

In addition to addressing secondary fracture prevention in the first APCO clinical standard relating to individuals who sustain fragility fractures, three other APCO clinical standards recommend identification of the primary fracture prevention population. This includes men and women who take medicines that are associated with bone loss and/or increased fracture risk, those who have conditions associated with bone loss and/or increased fracture risk, and those with other common risk factors for osteoporosis. APCO has developed comprehensive modules to support peer-to-peer education relating to each of the 16 clinical standards and published the APCO Bone Health Quality Improvement (QI) Toolkit, which focuses on seven selected standards from the APCO Framework that are applicable to the clinical setting. All these resources are freely available from the APCO website at www.apcobonehealth.org

In a fashion analogous to the approach described previously to improve the care of people who sustain hip and other fragility fractures, as indicated in **Figure 26**, essential components of care need to be developed to enable delivery of a consistent, systematic, nationwide approach to primary fracture prevention in New Zealand.

Figure 26. Essential components of care to be developed to enable consistent delivery of primary fracture prevention in New Zealand[119, 145]



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* This image 'A summary of THE APCO Framework' was developed by the Asia Pacific Consortium on Osteoporosis (APCO). APCO: Singapore (2021)

Bone Health Optimisation (BHO) for elective orthopaedic surgery patients

Although Bone Health Optimisation (BHO) does not focus on preventing "classic" fragility fractures, it is best understood as a primary preventive activity. The goal of BHO is to identify and manage poor bone health in patients scheduled for elective orthopaedic surgery, thereby reducing the risk of first complications such as periprosthetic fractures and implant failure. In this way, BHO extends the principles of primary fracture prevention into the surgical setting, complementing wider public health and clinical strategies aimed at preserving bone health across the life course.

The concept of BHO was formally introduced by Anderson et al. in 2019 as part of the American Orthopaedic Association (AOA) Critical Issues series[146]. Their work highlighted a critical gap in orthopaedic practice: although poor bone quality often influences implant selection and surgical outcomes, osteoporosis testing and treatment prior to elective joint replacement were rarely performed[147]. By calling for systematic pre-operative bone health assessment, the AOA brought international attention to the need for structured BHO protocols.

Trends in elective orthopaedic surgery in New Zealand

The 2025 New Zealand Joint Registry (NZJR) Report[148] provides comprehensive data on elective arthroplasties and other orthopaedic surgeries over a 25-year period from January 1999 to December 2023. By the end of 2023, 422,699 arthroplasties had been performed on 280,783 patients, with a considerable number of these procedures being primary hip and knee replacements. The 27,238 joint procedures registered in 2023 represents a record high yet remains consistent with the steady year-on-year growth seen over the past decade, apart from periods of significant COVID-related disruption.

Key statistics from the NZJR include:

- **Total Hip Arthroplasties (THA):** 184,157 primary THAs with a peak of 10,548 in 2023.
- **Total Knee Arthroplasties (TKA):** 152,786 primary TKAs with a peak of 10,982 in 2023.
- **Revision Procedures:** 24,709 hip revisions and 10,571 knee revisions, with significant reasons for revisions including component loosening, periprosthetic fractures, dislocation, and infections.

Bone health issues among elective orthopaedic surgery patients

Studies have highlighted significant gaps in the screening and management of bone health among elective surgery patients. A systematic review by Xiao et al. in 2022 revealed that 24.8% of patients undergoing total knee and hip arthroplasty had osteoporosis, and 38.5% had osteopenia[149]. However, the treatment rate for osteoporosis in these patients was only 32.9%. Another study by Bernatz et al.[150] found that while 59.5% of hip and knee arthroplasty patients were eligible for DXA testing, only 17.6% were tested, and 33% of those tested had osteoporosis. These findings underscore the need for standardised BHO protocols.

Clinical Standards for Bone Health Optimisation in New Zealand

Building on the successful "5IQ" approach implemented for Fracture Liaison Services (FLS), the development of Clinical Standards for BHO in New Zealand could offer a structured, evidence-based framework to improve outcomes for elective orthopaedic surgery patients with compromised bone health. In 2024, the Malaysian Bone Health Optimization Network (MyBONe) published a BHO Framework for Malaysia[151], which included a proposed set of 5IQ-based Clinical Standards for BHO. This framework could serve as a valuable reference for developing similar standards tailored to New Zealand's needs.

To effectively benchmark and monitor the implementation of BHO protocols, a dedicated registry is essential. Ideally, this benchmarking could be integrated into an existing registry, such as the Australian and New Zealand Fragility Fracture Registry, rather than creating a new standalone BHO registry. This integration would streamline data collection and analysis, providing a robust platform for continuous quality improvement.

Such integration requires engagement and collaboration with the leadership of all relevant stakeholder organisations. A collaborative approach would ensure broad-based support and commitment, facilitating the standardisation of BHO protocols across New Zealand. By leveraging existing infrastructure, the focus can remain on enhancing patient outcomes through effective pre-operative, intra-operative, and post-operative bone health management.

The future of primary fracture prevention in New Zealand

Objective: As New Zealand looks towards the future of primary fracture prevention, it becomes imperative to develop a cohesive, nationwide strategy. This strategy must be informed by the latest research, technology, and collaboration with relevant stakeholders, ensuring it is both effective and sustainable. Importantly, this includes emerging approaches such as Bone Health Optimisation (BHO) for patients undergoing elective orthopaedic surgery, which extends the principles of primary prevention into the surgical setting.

Broad stakeholder engagement is essential to build a strategy that is inclusive, responsive to diverse needs, and supported by the groups who will implement and benefit from it. An initial scoping exercise by Osteoporosis New Zealand, the Royal New Zealand College of General Practitioners, ACC, Health New Zealand – Te Whatu Ora, Hato Hone St John and the Ministry of Health would establish the foundation for this work.

Clear and consistent national clinical standards, guided by frameworks such as those published by Asia Pacific Consortium on Osteoporosis (APCO)[144], are also needed. These should be embedded in updated national guidance for osteoporosis management, offering actionable benchmarks for clinicians across the system.

A robust model of care will underpin delivery. This model must integrate risk assessment, prevention strategies, treatment options, and patient education, and be adaptable as evidence evolves. Alongside "classic" primary fracture prevention, the strategy should also incorporate Bone Health Optimisation (BHO) for patients undergoing elective orthopaedic surgery, ensuring that poor bone health does not compromise surgical outcomes.

Success will depend on strong networks and professional development. Mentorship programmes and national communities of practice can foster shared learning, while ongoing CPD ensures healthcare professionals stay current with emerging science and therapies.

Technology and research will drive continuous improvement. Digital health systems that enable benchmarking and feedback will promote quality, while a national publication plan will ensure that New Zealand's experience contributes to the international body of evidence.

Essential next steps for improving primary fracture prevention in New Zealand

1. **Nationwide strategy development:** Develop a cohesive, countrywide strategy for primary fracture prevention, informed by the latest research, technology, and stakeholder collaboration to ensure effectiveness and sustainability.
2. **Broad stakeholder engagement:** Foster a culture of inclusion by engaging a wide spectrum of stakeholders, including healthcare professionals, patients, advocacy groups, and policymakers, to ensure strategies are comprehensive and widely supported for successful execution.
3. **Standards and guidance integration:** Incorporate clinical standards for primary fracture prevention in updated national guidance for osteoporosis management, ensuring care consistency and quality across the healthcare system, guided by authoritative frameworks like those published by APCO.
4. **Comprehensive model of care:** Devise and implement a multidisciplinary model of care that addresses risk assessment, prevention strategies, treatment options, and patient education.
5. **Incorporate Bone Health Optimisation (BHO):** Develop clinical standards for BHO in elective orthopaedic surgery, integrating these into national registries and quality improvement frameworks.
6. **Mentorship and networks:** Establish mentorship programmes and national networks to support, exchange knowledge, encourage collaboration, and cultivate a community of practice essential for the initiative's success.
7. **Embrace technology and research:** Leverage technology for benchmarking and improvement and commit to ongoing research and publications to enhance and share New Zealand's primary fracture prevention efforts.

Stronger Together Objective 4: Maintaining bone health for older adult New Zealanders

Older adult New Zealanders: The population aged 50 years or over

Projections from Statistics New Zealand (Stats NZ)[4] for the ensuing five decades indicate that the population of New Zealand exceeded 5.3 million in 2025, including more than 1.8 million older adults i.e. those aged 50 years or over. This represents 35% of the population in 2025, which is set to increase to more than 2.7 million (42%) by 2050 and more than 3.6 million (47%) by 2075.

Bone health throughout the life course

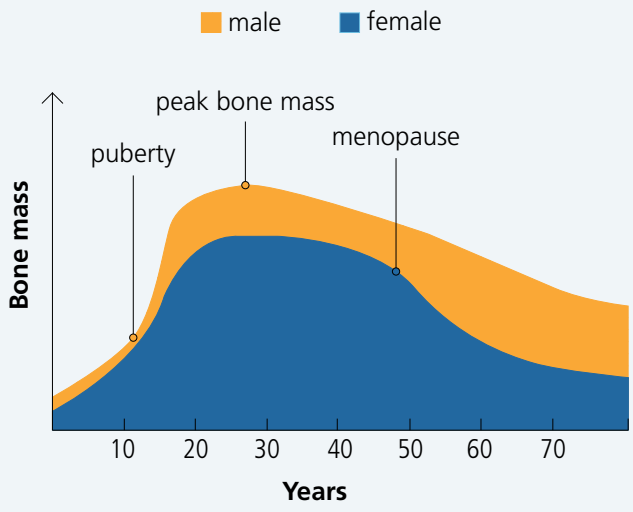
It is never too early or late to think about bone health

For women

The 2013 IOF World Osteoporosis Day thematic report[152] provided a detailed analysis of bone health of postmenopausal women. Oestrogen is crucial in managing bone metabolism throughout a woman's life. The skeletal system is constantly refreshed through the formation of new bone by cells called osteoblasts and the resorption of old bone by cells called osteoclasts, ensuring structural integrity. During the first half of adulthood, bone formation and resorption are in balance, preserving bone mass. Yet, with the cessation of menstruation and the resultant oestrogen deficiency, this balance is disrupted, leading to a net loss of bone. The most pronounced bone loss occurs when ovarian function halts abruptly, whether through surgical intervention or the use of aromatase inhibitors in treating cancer patients.

Among women of European descent, menopause typically occurs during the early fifties, while in Latin American and Asian populations, it may occur from the early forties[153]. As illustrated in **Figure 27**, bone mass reaches its peak in a woman's mid-twenties, maintaining stability until menopause begins, at which point a marked decrease in bone mass is observed.

Figure 27. Bone mass throughout the life cycle for women and men



For men

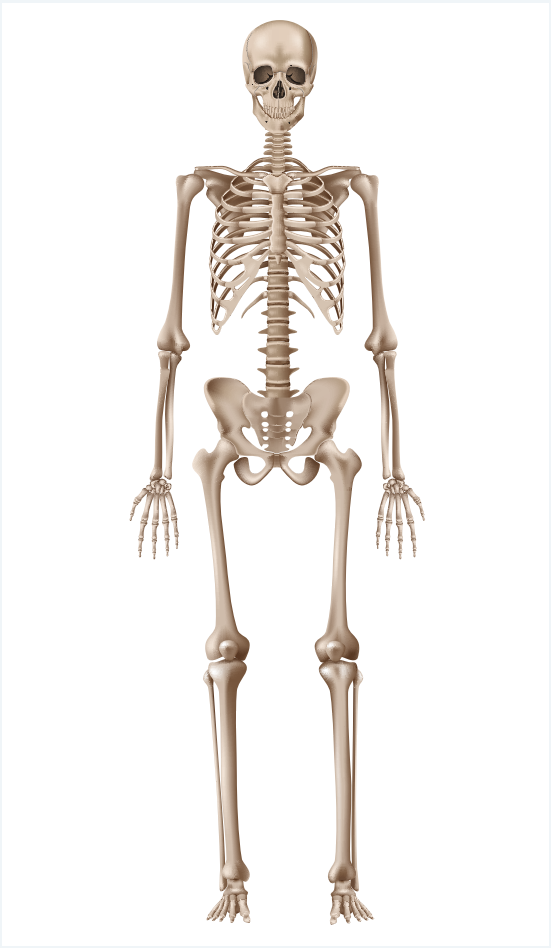
The 2014 IOF World Osteoporosis Day thematic report[3] focused on osteoporosis in men, and noted:

"Longitudinal studies suggest that the rate of bone loss accelerates after age 70 years in men[154, 155]. As ageing progresses, bone loss in the marrow cavity is not compensated by bone deposition on the periosteum (a dense layer of vascular connective tissue enveloping bones), which results in loss of cortical bone (the strong and compact type of bone found on the outer layer of the long bones)[156]. A systematic review established that men aged over 70 years were 50% more likely to suffer a fragility fracture than younger men[157]."

The thematic report also noted that almost one-third of hip fractures globally occur in men, and that mortality after hip fracture is markedly higher among men compared to women.

- 206 bones
- A dynamic tissue
- On average, the whole human skeleton is replaced every 8-10 years no matter your age

Figure 28. The human skeleton



Actions to maintain the bone health of older adult New Zealanders

There are several actions that older adult New Zealanders can take to reduce the risk of developing osteoporosis, and to be proactive in managing their bone health. These include:

- Maintaining a healthy body weight (i.e., a Body Mass Index of 20-25)
- Doing regular weight bearing exercise
- Avoiding or stopping smoking
- Having no more than two standard alcoholic drinks per day
- Eating a balanced diet including adequate protein and calcium intake
- Getting 15 to 20 minutes of sun exposure each day to maintain vitamin D levels
- Completing the online risk assessment tool Know Your Bones™ to determine one's risk of developing or having osteoporosis:
  - The tool is freely available at www.knowyourbones.org.nz
  - The tool provides users with a personalised report that can be discussed with their GP
- Encourage intergenerational discussions within families about bone health, emphasising the importance of understanding osteoporosis and its genetic factors

Initiatives to promote healthy bones for older adult New Zealanders

To improve the bone health of all older adult New Zealanders, a novel and relatable initiative needs to be developed. This programme should aim to harness the insights and experiences of older adults, some of whom have been directly impacted by osteoporosis or have sustained fragility fractures. Their invaluable perspectives would guide the creation and implementation of the following key strategies designed to elevate public understanding and proactive management of bone health:

- Conduct comprehensive surveys to gauge current levels of awareness regarding the importance of bone health to older adults. These surveys should also seek to understand the community's perceptions and knowledge about preventing bone loss and fragility fractures.
- Following the surveys, develop dynamic and engaging, evidence-based, and easily understood public awareness campaigns. These campaigns should inform and motivate older New Zealanders, highlighting practical steps they can take to safeguard their bone health. Recognising the diverse media consumption habits of this demographic, these campaigns should leverage various platforms, including social media, traditional media, and community outreach and support programmes, to ensure widespread reach and engagement.
- A particularly innovative aspect of these campaigns could be the promotion of "cascade screening." This approach acknowledges the genetic component of osteoporosis and should encourage relatives of individuals diagnosed with osteoporosis or those who have had a fragility fracture to assess their own bone health. Online fracture risk assessment tools - such as Know Your Bones™[158] - can play a crucial role in this process, providing an accessible means for individuals to evaluate their risk and take necessary preventative measures.

The ultimate objective is to empower older adult New Zealanders to take charge of their bone health, reducing the incidence of osteoporosis and fragility fractures and enhancing overall quality of life.

Empower older adult New Zealanders to manage their bone health

1. **Initiative development:** Create a novel initiative to improve the bone health of older adult New Zealanders, utilising the insights and experiences of those affected by osteoporosis or fragility fractures.
2. **Conduct surveys:** Gauge current awareness and perceptions of bone health among older adults to identify knowledge gaps.
3. **Develop public awareness campaigns:** Launch relatable and engaging campaigns to inform and motivate older adult New Zealanders on maintaining bone health, utilising various media platforms for broad reach.
4. **Promote cascade screening:** Introduce cascade screening to encourage family members of individuals with osteoporosis to assess their bone health, supported by tools like Know Your Bones™.

Stronger Together Objective 5: Maintaining bone health for younger adult New Zealanders

Younger adult New Zealanders: The population aged 26 to 49 years

As noted in the previous section of *Stronger Together*, the Stats NZ population projections[4] indicate a swift and significant increase in New Zealanders aged 50 years or older in future decades, while the younger adult segment, those aged 26 to 49 years, is poised for a steadier expansion. In 2025, the younger adult group surpassed 1.7 million, accounting for 33% of the population. This number is expected to grow to almost 2.1 million (32%) by 2050 and will exceed 2.2 million (29%) of the population by 2075, suggesting a minor decline in their proportion of the overall population.

While osteoporosis is often associated with older age, the foundation for bone health is laid much earlier in life. For younger adults in New Zealand maintaining their bone health is crucial for minimising the risk of osteoporosis and fragility fractures in later life. This age group is at a pivotal point where lifestyle choices can significantly influence bone density and overall bone health, for better or worse. Younger adults have the opportunity to maintain their peak bone mass, setting a strong foundation for the future.

Actions to maintain the bone health of younger adult New Zealanders

For younger adult New Zealanders, maintaining bone health is crucial to prevent osteoporosis and other bone-related issues later in life. The foundation for strong bones is built early, and maintaining this through younger adulthood is essential. Here are several proactive steps that can be taken:

- **Maintain a balanced body weight:** Aim for a healthy Body Mass Index (BMI) within the 20-25 range. Both underweight and overweight conditions can negatively affect bone health.
- **Engage in regular physical activity:** Incorporate weight-bearing and strength-training exercises into their routine. Activities like brisk walking, running, yoga, and resistance exercises are beneficial for bone strength.
- **Avoid or stop smoking:** Smoking can decrease bone density and increase the risk of fractures, so it is advisable to avoid this habit altogether. Moderate alcohol consumption: Limit alcohol intake to no more than two standard drinks per day to protect their bones.
- **A balanced diet:** Eating a well-balanced diet that provides adequate amounts of protein and calcium. Good sources of protein include lean meats, poultry, fish, eggs, legumes, nuts, and seeds, while calcium can be obtained from dairy products, leafy green vegetables, and calcium-fortified foods.
- **Maintain vitamin D levels:** Ensure adequate vitamin D levels by getting 10 to 15 minutes of sun exposure daily (taking into account skin cancer prevention measures) or through dietary sources. Vitamin D is crucial for calcium absorption.

By adopting these lifestyle and dietary practices, younger adult New Zealanders can significantly contribute to their long-term bone health, reducing the risk of osteoporosis and fragility fractures in later life.

Initiatives to promote healthy bones for younger adult New Zealanders

To address and enhance bone health among younger adult New Zealanders, a forward-thinking initiative should be developed and launched. This programme should draw upon the insights of younger adults, including those who have engaged in lifestyle practices conducive to good bone health or have a professional background in physical health, nutrition, or sports science. Their experiences and knowledge would be instrumental in shaping and driving the following strategic approaches aimed at boosting awareness and proactive maintenance of good bone health among this demographic:

- Conduct detailed surveys to understand the current awareness levels and attitudes towards bone health among younger adults. These surveys should aim to uncover perceptions, behaviours, and the prevailing knowledge about bone health maintenance strategies.
- Leverage the insights gained from the surveys to develop and roll out relatable and appealing public awareness campaigns. These campaigns should concentrate on educating younger adults about the critical steps for maintaining good bone health, emphasising diet, exercise, and the impact of lifestyle choices. Given the varied media consumption preferences within this age group, the campaigns should utilise a mix of digital platforms, social media, influencers, and community events to achieve broad and effective outreach.
- A key feature of these campaigns should be to encourage preventive screening and risk assessment of younger adults, which could include utilising fracture risk assessment tools. This strategy should be designed to resonate with younger adults by emphasising the importance of early prevention and the availability of resources to assess and manage their risk factors effectively.

The overarching objective is to empower younger adult New Zealanders with the knowledge and tools needed to proactively manage their bone health, setting a strong foundation for a healthier future, and mitigating the risk of bone-related issues as they age.

Encourage younger adult New Zealanders to maintain their bone health

1. **Initiative development:** Create a novel initiative to maintain good bone health for younger adult New Zealanders, incorporating insights from health-conscious young adults and professionals in health, nutrition, and sports science.
2. **Conduct surveys:** Conduct detailed surveys to gauge awareness, attitudes, and behaviours towards bone health in younger adults.
3. **Develop public awareness campaigns:** Utilise insights from the surveys to create engaging and relatable campaigns that educate younger adult New Zealanders on the importance of maintaining good bone health, using various media channels to achieve broad reach.
4. **Promote preventive screening:** Highlight the importance of preventive screening and risk assessment, utilising fracture risk assessment tools, to emphasise early prevention and risk management.

Stronger Together Objective 6: Ensuring that New Zealand youth achieve their genetic potential for peak bone mass

New Zealand youth: The population aged 0 to 25 years

In 2025, Stats NZ[4] estimated there were more than 1.7 million New Zealanders aged 25 years or less accounting for 32% of the current population, a demographic which is set to remain constant throughout the ensuing five decades. Accordingly, New Zealand youth will decline to 27% and 24% of the total population by 2050 and 2075, respectively.

In a previous projections published in 2022[159], Stats NZ stated that *"One in three children in Aotearoa are likely to identify as tamariki Māori by the early 2040s, as the country's population becomes increasingly ethnically diverse".*

Population growth among the youngest segments (0 to 14 years) of both Māori and wider Pacific communities is anticipated to outpace that of the overall population. It is expected that the proportion of children identifying as Māori will rise from 27% in 2018 to 33% by 2043. Meanwhile, the entirety of the Māori population is estimated to increase from 17% to 21% of New Zealand's total populace within the same timeframe. For those within the Pacific community, the percentage of children was forecast to grow from 14% in 2018 to 19% by 2043, with the overall Pacific population set to expand from 8% to 11% of New Zealand's overall demographic.

Definition of peak bone mass

In 2016, a position statement[160] from the National Osteoporosis Foundation in the United States (now the Bone Health and Osteoporosis Foundation) included the following commentary pertaining to a definition for peak bone mass:

"Peak bone mass is generally thought of as the amount of bone gained by the time a stable skeletal state has been attained during young adulthood. The concept of peak bone mass more broadly captures peak bone strength, which is characterised by mass, density, microarchitecture, microrepair mechanisms, and the geometric properties that provide structural strength."

The importance of achieving peak bone mass

Osteoporosis: a paediatric disease with geriatric consequences[161]

In 2015, IOF scientists published a detailed narrative review[8] of a life-course approach to nutrition and noted the following:

"Achieving an individual's genetic potential for peak bone mass is the primary objective relating to bone health during childhood and adolescence. A theoretical analysis published in 2003 considered the relative influences of peak BMD, age-related bone loss and menopause on the development of osteoporosis in women[162]. Variation of peak bone mineral density had by far the greatest influence on the average age at which a T-score of less than 2.5 standard deviations below the young adult mean was projected to be reached (i.e. the clinical definition of osteoporosis). ***Development of osteoporosis would occur 13 years later if the peak BMD was increased by 10%.*** *By comparison, a 10% change in the age at menopause or the rate of non-menopausal bone loss would delay the onset of osteoporosis by just two years."*

Accordingly, a strategic focus on the bone health of New Zealand youth represents a critical investment in the nation's future, promising a stronger, healthier generation poised to thrive well into their later years.

Actions for New Zealand youth to achieve their genetic potential for peak bone mass

To ensure that New Zealand youth achieve their genetic potential for peak bone mass, targeted actions that cater to their developmental stages and lifestyle are paramount. The following proactive steps are tailored for the youth population in New Zealand:

- **Prioritise a nutrient-rich diet:** Encourage a balanced diet rich in protein and calcium from a young age to support bone development. Protein sources include lean meats, fish, eggs, legumes, nuts, and seeds, while calcium can be obtained from dairy products, leafy greens, and fortified foods.
- **Engage in regular physical activity:** Promote age-appropriate, weight-bearing exercises such as jumping, running, and playing sports, as well as activities that improve balance and muscle strength. These activities are essential for bone growth and strength, however, over training can hinder optimal bone development and peak bone mass achievement.
- **Limit screen time and sedentary behaviour:** Encourage active play and participation in sports over prolonged periods of screen time to ensure adequate physical activity levels are maintained, supporting bone health.
- **Ensure proper sun exposure:** Advocate for safe sun exposure practices to maintain vitamin D levels, critical for calcium absorption. This involves brief periods of sun exposure while balancing skin cancer prevention with vitamin D synthesis.
- **Promote healthy weight maintenance:** Encourage maintaining a healthy weight for height and age to support bone health. Both underweight and overweight conditions can hinder optimal bone development and peak bone mass achievement.
- **Educate on the risks of substance abuse:** Teach about the negative impacts of smoking, alcohol, and other substance abuse on bone health from an early age to encourage healthy lifestyle choices.
- **Monitor and support during growth spurts:** Recognise periods of rapid growth during puberty as critical times for bone development. Ensure nutritional needs are met, particularly for protein and calcium, to support this rapid growth.

By implementing these strategies, New Zealand youth can be supported to achieve their genetic potential for peak bone mass, laying a solid foundation for bone health that will benefit them throughout their lives.

Initiatives to promote healthy bones for New Zealand youth

To foster and enhance bone health among New Zealand youth, a proactive and innovative initiative is essential. This initiative should incorporate the perspectives of young individuals, and professionals with expertise in paediatric health, nutrition, or youth sports coaching. Their combined insights and expertise will play a crucial role in informing and driving the strategic approaches aimed at raising awareness and encouraging proactive engagement in bone health among the youth.

The overarching objective is to empower New Zealand youth with the knowledge, skills, and resources needed to actively engage in their bone health. By laying a strong foundation during these formative years, we can work towards a future where New Zealand's younger generation is healthier, with reduced risks of bone-related diseases as they age.

Support New Zealand youth to achieve their genetic potential for peak bone mass

1. **Conduct youth-focused surveys:** Carry out comprehensive surveys to assess current levels of awareness, attitudes, and behaviours towards bone health among New Zealand youth. These surveys should aim to identify gaps in knowledge, misconceptions, and the existing awareness about the importance of bone health and strategies for its maintenance from an early age.
2. **Develop targeted educational programmes:** Utilise the insights obtained from the surveys to craft and implement age-appropriate educational programmes. These programmes should aim to educate New Zealand youth on essential bone health practices, focusing on the importance of a balanced diet rich in protein and calcium, regular physical activity, and the avoidance of negative lifestyle choices. Campaigns should be tailored to appeal to the youth demographic, employing a variety of channels such as educational content in schools, social media platforms, youth influencers, and interactive community events to ensure widespread engagement.
3. **Introduce bone health education in schools:** Partner with the Ministry of Education, academic educationalists, schools, and colleges to integrate bone health into the curriculum. This should involve developing resources and workshops for students, teachers, and parents that emphasise the critical nature of bone health from a young age, including how to achieve and maintain peak bone mass through nutrition, exercise, and healthy lifestyle habits.
4. **Promote physical activity programmes:** Collaborate with sports clubs, community centres, and youth organisations to develop programmes and activities that encourage physical exercise among youth. These programmes should highlight weight-bearing and muscle-strengthening activities that are known to benefit bone health, making them accessible and enjoyable for children and adolescents.
5. **Encourage family involvement:** Implement initiatives that involve families and caregivers in promoting bone health, recognising that habits formed in childhood are often influenced by the home environment. Provide resources and information to families about how they can support healthy bone development in children, including meal planning guides for protein and calcium-rich diets, and tips for active family outings.

Stronger Together Objective 7: Ensuring optimal maternal nutrition during pregnancy to lay the foundation for bone health of infants

"The majority of bone development in the human foetus occurs during the third trimester, requiring a total of 30 g of calcium[163]. Intestinal absorption of calcium increases in the mother during pregnancy, and very low maternal intake may be a risk factor for lower bone mass in neonates, particularly in areas where dietary calcium content is chronically poor[164]. Although the general pattern of maternal diet during gestation appears related to offspring bone development, with more healthy maternal diets associated with greater offspring bone mass[165], the gestational micronutrient that has been most strongly associated with offspring bone development is vitamin D."

Professor Cyrus Cooper
OBE, IOF President et al.

Healthy Nutrition, Healthy Bones. World Osteoporosis Day Thematic Report. 2015[7].

National nutrition guidelines for New Zealand adults

In November 2020, the Ministry of Health published an updated version of the Eating and Activity Guidelines for New Zealand Adults[166]. In the foreword to the guidelines, Deputy Director-General Deborah Woodley noted:

"In this edition, the Guidelines have been refreshed and updated to include advice for pregnant and breastfeeding women. This is an important addition, because factors such as a mother's diet, activity levels and weight gain throughout her pregnancy have a bearing on the wellbeing of the mother and baby. Therefore, pregnancy offers a window of opportunity to positively influence the lifelong health of a child."

Recommendations of relevance to infant bone health include:

Eating Statement 1: Enjoy a variety of nutritious foods every day including: some milk and milk products, mostly low and reduced fat.

Acknowledging the dietary preferences and restrictions of individuals, it is important to highlight that for those who opt not to consume milk and milk products, exploring alternative sources of calcium is essential. These alternatives can include fortified plant-based beverages, leafy green vegetables, nuts, seeds, and legumes, which can all contribute to maintaining adequate calcium intake.

The recommended number of daily servings from each of the food groups is provided in **Table 1**, including additional servings for pregnant and breastfeeding women.

Table 1. Recommended number of servings per day from each of the food groups for adults*[166]

Reproduced from *Ministry of Health. 2020. Eating and Activity Guidelines for New Zealand Adults: Updated 2020. Wellington: Ministry of Health. First published in October 2015. Updated in November 2020 to include advice for pregnant and breastfeeding women by the Ministry of Health. Table A1, Page 143.* This work is licensed under the Creative Commons Attribution 4.0 International licence (https://creativecommons.org/licenses/by/4.0/deed.en).

		Vegetables	Fruit	Grain foods	Legumes, nuts, seeds, fish and other seafood, eggs, poultry or red meat with fat removed	Milk and milk products	Approximate number of additional servings from the five food groups**
MEN	19–50	●●●●●●	●●	●●●●●●	●●●	●●◖	0–3
	51–70	●●●●●◖	●●	●●●●●●	●●◖	●●◖	0–2.5
	70+	●●●●●	●●	●●●●◖	●●◖	●●●◖	0–2.5
WOMEN	19–50	●●●●●	●●	●●●●●●	●●◖	●●◖	0–2.5
	51–70	●●●●●	●●	●●●●	●●	●●●●	0–2.5
	70+	●●●●●	●●	●●●	●●	●●●●	0–2
PREGNANT		●●●●●	●●	●●●●● ●●●◖	●●●◖	●●◖	0–2.5
LACTATING		●●●●● ●●◖	●●	●●●●● ●●●●	●●◖	●●◖	0–2.5

● one serving ◖ half serving

* Includes an allowance for unsaturated spreads or oils, nuts or seeds (4 servings [28–40g] per day for men less than 70 years of age; 2 servings [14–20g] per day for women and older men)

** Additional servings may be needed for taller or more active men and women

Source: NHMRC (2013)

The *Growing Up in New Zealand* longitudinal study[167] recruited over 6,500 women in pregnancy in late 2008 to 2009 from Auckland, Counties Manukau, and Waikato District Health Boards. At the time of data collection, the recommended intake of milk or milk products for pregnant women was at least three servings each day. Notably, only 58% of participants reported this level of intake, and Pacific and Asian women were less likely to have the recommended number of servings of milk and milk products.

The guidelines also noted that pregnant and breastfeeding women who follow strict vegetarian or vegan diets may need extra information and/or support to meet protein, iron, vitamin B12 and calcium requirements. In addition, recommendations were made regarding how women can be safely and comfortably physically active during pregnancy.

Recommendation on Vitamin D: Pregnant and breastfeeding women who are at high risk of vitamin D deficiency should consult their doctor, midwife, or dietitian for advice on vitamin D supplementation.

The guidelines noted that woman may be at higher risk of being deficient in vitamin D when they:

- Have darker skin.
- Completely avoid sun exposure for religious, personal, or medical reasons, including by applying sunscreen to exposed skin every day.
- Have liver or kidney disease, or are on certain medications (e.g., some anticonvulsants) that affect vitamin D levels.
- Live in an area south of Nelson-Marlborough in winter.

Actions to implement national nutrition guidelines

To address the objective of ensuring optimal maternal nutrition during pregnancy for the foundational bone health of infants, a collaborative initiative is needed that brings together key stakeholders and leverages the existing national guidelines. Key stakeholders are likely to include, but are not limited to:

1. **Osteoporosis New Zealand:** To provide expertise on bone health and facilitate public awareness campaigns.
2. **Royal Australian and New Zealand College of Obstetricians and Gynaecologists (New Zealand representatives):** To offer clinical guidance and support the integration of nutritional advice into prenatal care.
3. **New Zealand College of Midwives:** To ensure midwives are equipped with the knowledge and tools to advise and support pregnant women effectively.
4. **Ministry of Health:** For policy support and integration into national health guidelines and programmes.
5. **Dietitians NZ:** To provide specialised nutritional advice and support for pregnant and breastfeeding women, including those on vegetarian or vegan diets.
6. **Plunket Society:** To support community engagement and education for new parents.

Initiatives to implement national nutrition guidelines

The key stakeholders need to develop an initiative that aligns with the Ministry of Health's updated *Eating and Activity Guidelines for New Zealand Adults*[166], emphasising the importance of a variety of nutritious foods, including milk and milk products, for pregnant and breastfeeding women. It also addresses the need for extra support for women on vegetarian or vegan diets and those at high risk of vitamin D deficiency.

By leveraging the expertise and reach of the key stakeholders, the initiative should aim to create a supportive ecosystem that promotes optimal maternal nutrition, setting the stage for healthier future generations with strong bone health from infancy.

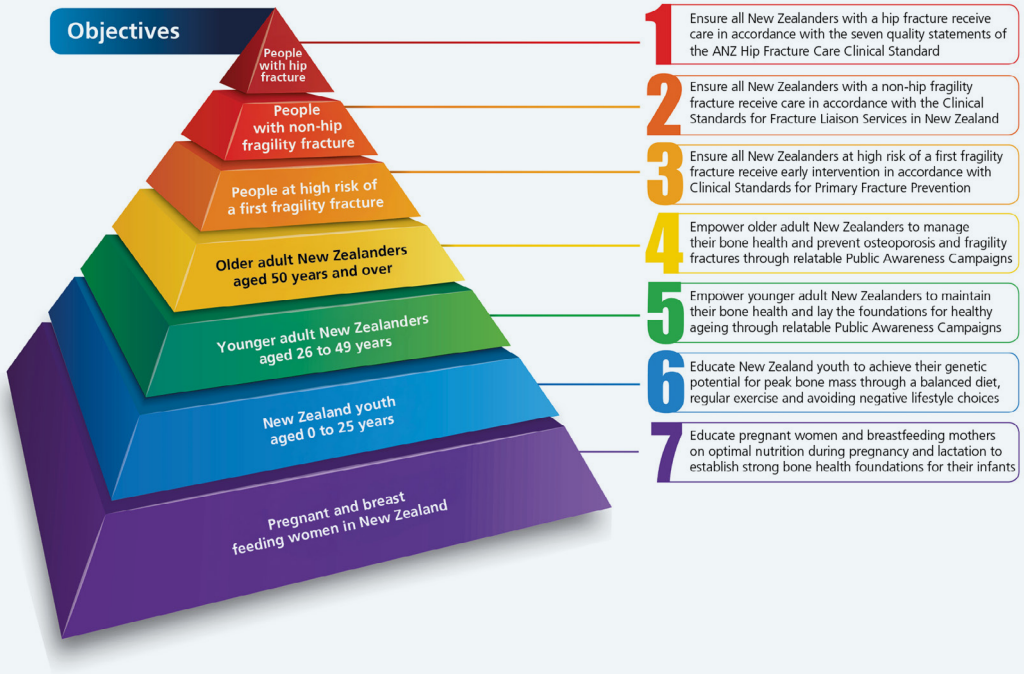
Components of the key stakeholder-led collaborative initiative

1. **Education and training:** Develop comprehensive training programmes for healthcare providers, including obstetricians, midwives, and dietitians, on the latest evidence-based nutritional guidelines for pregnant and breastfeeding women. Create culturally sensitive educational materials that are accessible to diverse communities, focusing on the importance of nutrition for infant bone health.
2. **Community engagement:** Launch public awareness campaigns that highlight the significance of maternal nutrition on infant bone health, utilising social media, community events, and partnerships with local organisations. Implement support groups for pregnant and breastfeeding women, especially targeting communities with high risks of vitamin D deficiency and low intake of recommended food groups.
3. **Support and resources:** Provide tailored nutritional counselling for pregnant and breastfeeding women, with a focus on those following strict vegetarian or vegan diets, to ensure adequate intake of protein, iron, vitamin B12, and calcium. Offer vitamin D supplementation guidance for women at high risk of deficiency, as outlined in the national guidelines.
4. **Research and monitoring:** Collaborate with academic institutions to conduct research on the impact of maternal nutrition on infant bone health. Monitor and evaluate the effectiveness of the initiative through feedback from participants and healthcare providers, adjusting strategies as necessary.
5. **Policy advocacy:** Advocate for the inclusion of comprehensive maternal nutrition advice in national health policies and guidelines. Work with the Ministry of Health to address barriers to accessing nutritious foods for pregnant and breastfeeding women.

Stronger Together: A Collaborative Strategy for Bone Health in New Zealand

Implementing the strategies summarised in the *Stronger Together* pyramid in **Figure 29** below across New Zealand represents a formidable yet vital undertaking. Each of the seven strata delineates a critical juncture in bone health management, charting a path from immediate post-fracture care to the foundational health of the next generation. The challenges are as diverse as the populations they target, ranging from integrating sophisticated clinical care protocols for hip fracture patients to encouraging optimal maternal nutrition during pregnancy. However, within these challenges lie opportunities to fundamentally reshape the landscape of bone health and reduce the burden that osteoporosis and fragility fractures impose on New Zealanders, ACC, the healthcare system, and the economy.

Figure 29. *Stronger Together:* A Collaborative Strategy for Bone Health in New Zealand



National implementation of the pyramid's objectives demands a robust, collaborative effort that transcends traditional sector boundaries. It calls for harmonised action among healthcare professionals, innovative public health campaigns, supportive policies, and community-based initiatives. Stratum 4 and Stratum 5, for example, are not only about clinical care but also about societal engagement in health promotion and education. Such widespread engagement will necessitate resource allocation, education, and continuous evaluation to adapt and refine strategies as they unfold in real-time across diverse communities.

To surmount these challenges and seize the attendant opportunities, New Zealand must embrace an "all of society" response. This concerted approach is imperative to ensure that every individual - irrespective of age, gender, or socioeconomic status - is supported to achieve optimal bone health. Our collective endeavour is to not only meet but exceed the ambitious objectives set forth by *Stronger Together*.

Let this be New Zealand's Call to Action: To unite, to innovate, and to commit to a future where the strength of our nation is reflected in the health and resilience of its people. By acting together now, we can build a framework for bone health that is as enduring and vital as the skeleton it seeks to protect.

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