1 Care map information

Quick info:

Scope:
Patient over the age of 50 years at risk of falling

Out of scope:
Patients under the care of ACC

Definition: (WHO)
An event that results in a person coming to rest inadvertently on the ground or other lower levels.

References:
See Provenance Certificate for full list of references.

2 Information resources for patients and carers

Quick info:
Print or email the resources list for patient, families/carers.

Osteoporosis information:
- Osteoporosis New Zealand
- Ministry of Health - Osteoporosis
- The National Osteoporosis Society
- Patient Info - Osteoporosis
- Livestronger
- Osteoporosis Guidelines

Zoledronic acid information:
- patient checklist
- patient information

WDHB article
- WDHB to push Live Stronger for Longer programme

3 Information resources for healthcare workers

Quick info:

Useful websites and resources:
- Bone Care 2020
- Guideline for the diagnosis and management of osteoporosis
- NICE - Osteoporosis: primary prevention
- International Osteoporosis Foundation
- Publication of Clinical Standards for Fracture Liaison Services in New Zealand

Zoledronic acid information - clinical:
- aclasta important information
- clinical procedure pre IV
- patient consent form

Zoledronic acid information - patient:
- patient checklist
- patient information

Referral
- Falls Prevention Single Point of Contact for all Falls Referrals
4 Updates to this care map

Quick info:
Date of draft publication: .
Interim update:
This care map has been updated in line with consideration to evidenced based guidelines.
For further information on contributors and references please see the care map's Provenance.
NB: This information appears on each page of this care map.

5 Hauora Maori

Quick info:
As a practitioner you will work with Maori whanau/families. Each Maori whanau is diverse with their own set of values and beliefs, inherited, practised and passed down from generation to generation.
There are some important things that you should be mindful of when working with Maori individuals and their whanau from a holistic approach to working in a Whanau ora or family / whanau centred way.
Key enablers that you should be aware of when working with Maori whanau/families are:
  • building relationships and gaining trust
  • effective communication with whanau /families
  • understanding and involving whanau/ families in the treatment planning and care management
  • practical things to be mindful of when working with Maori whanau so that you do not breech Tikanga/Principles and practices that are important in Te Ao Maori/the Maori world
Common terms and definitions are noted here.

6 Pacific

Quick info:
Our pasifika community:
  • is a diverse and dynamic population
  • more than 22 nations represented in New Zealand
  • each with their own unique culture, language, history, and health status
  • share many similarities which we have shared with you here in order to help you work with pasifika patients more effectively
The main Pacific nations in New Zealand are
  • Samoa, Cook Islands, Fiji, Tonga, Niue, Tokelau and Tuvalu
Acknowledging The FonoFale Model (pasifika mode of health) when working with pasifika peoples and families.
Acknowledging general pacific guidelines when working with pasifika peoples and families:
  • cultural protocols and greetings
  • building relationships with your pacific patients
  • involving family support, involving religion, during assessments and in the hospital
  • home visits
  • pasifika phrasebook

7 No fracture AND >= risk factors for osteoporosis

Quick info:
Risk factors:
  • Age >65 years (in women)Weight <60 kg (in women)Family history of osteoporosisSmoking (current)Glucocorticoid use (current)>2 alcoholic drinks dailyHistory of falls
8 Fragility Fracture

Quick info:
The most common osteoporotic fractures are those of the vertebrae, proximal femur, distal forearm and humerus; however, any recent fracture at a major skeletal site in older adults should prompt further assessment for osteoporosis. Exceptions are fractures of the digits, face and skull.

Fragility fracture defined as:
- following a fall from a standing height or less – hip and wrist fractures almost always follow a fall
- spontaneously – vertebral fractures
- due to routine activities, eg bending or lifting – vertebral fractures

Osteoporosis often remains undiagnosed until a fragility fracture occurs [4]. Fragility fractures [4]:
- common sites include the wrist, spine, and hip – may occur in the arm, pelvis, ribs, and other bones
- mechanism of fracture:
  - following a fall from a standing height or less – hip and wrist fractures almost always follow a fall
  - spontaneously – vertebral fractures
  - due to routine activities, eg bending or lifting – vertebral fractures
- vertebral fractures:
  - often unrecognized and may be diagnosed later on X-ray
  - a minority present with acute, severe pain, at the fracture site
  - may cause back pain, loss of height, and kyphosis [2]

9 Refer to fracture Liaison Service

Quick info:
Fracture Liaison Service (FLS) The FLS systematically identifies individuals who have sustained a fragility fracture, with the intention of preventing subsequent fractures. Fragility fracture sufferers will be offered an assessment for future fracture risk including bone health (i.e. osteoporosis) and falls risk.

The FLS works with the fragility fracture sufferer and their GP to develop a long-term plan aimed at reducing risk of falls and fractures, and promoting long-term management.

Any individual with an age-related low impact (or non-traumatic) fracture involving the proximal femur, wrist, humerus, vertebrae, ankle, rib or pelvis is considered appropriate for FLS assessment.

Clinical standards for FLS in New Zealand are available that detail the evidence-based standards of post-fracture care that health professionals and patients should expect.

10 Lifestyle Modifications

Quick info:
Recommended resources for clinicians and patients:
- Wanganui Osteoporosis Support Group
- Osteoporosis New Zealand:
  - resources
  - ‘All about Osteoporosis’ pamphlet - Osteoporosis NZ
  - Preventing osteoporosis - looking after your bones
  - National Osteoporosis Society - What is osteoporosis

Modifiable risk factors
- limiting alcohol to no more than 2 standard drinks per day, with at least 2 alcohol free days per week
- Maintaining a body mass index 20-25kg/m2
- Stopping smoking
- Regular exercise, including 30 mins weight bearing physical activity each day.
Falls risk assessment and prevention programme (Ask, Assess, Act) is an initiative of the Health Quality and Safety Commission of New Zealand. It requires the health practitioner to:

- **ASK** the person three simple screening questions:
  - Have you slipped, tripped or fallen in the last year?
  - Can you get out of a chair without using your hands?
  - Have you avoided some activities because you are afraid you might lose your balance?

- **ASSESS** the person to identify their particular falls risk

- **ACT** by putting individualised intervention and supports in place

**Vitamin D:**

- anyone in a rest home unless there is a reason:
  - i.e. terminally ill or advanced dementia
- early menopause - from a younger age consider Vitamin D
- consider Vitamin D supplements if >65 years or not getting exposure to the sun

Review every 1-2 years or if new fracture.

Consider repeating initial investigations and re-stratify risk.

**Vitamin D**

- there is low utility in repeating DEXA scanning in intervals of less than 5 years. Exceptions are:
  - multiple fractures while on bisphosphonates
  - initiated long term steroid therapy

**Calcium**

Calcium is an important component of bone. Therefore, it is important that we eat sufficient calcium to maintain our skeletons, but there is no evidence that taking more than this is helpful. There is controversy regarding what is an adequate intake, recent evidence suggesting that as little as 500 mg/day (two servings of dairy products) is sufficient in adults, though some experts still recommend 1000 mg/day, or more. Many older people find it difficult to take 1000 mg/day in their diets, so use supplements. However, there are now several safety concerns related to calcium supplements, and the consensus is that calcium from the diet is to be preferred. People ingesting at least two servings of dairy products daily are likely to be receiving enough calcium.

**Vitamin D**

*Vitamin D* is a substance made in the skin as a result of sunlight exposure. It facilitates absorption of calcium from the diet. When vitamin D levels are very low, mineralisation of bone is impaired. Individuals who never go outside e.g. frail elderly, those who are veiled, and those who have dark skin are at risk of vitamin D deficiency, so might benefit from a vitamin D supplement. The use of supplements by those who are not deficient does not improve bone health. Most healthy European New Zealand adults living independently do not require vitamin D supplements.

If bisphosphonates are contraindicated or not tolerated consider other agents.

**Lifestyle management:**

- encourage healthy diet
- body mass index (BMI) less than 19kg/m2 is a strong risk factor for osteoporosis
- regular exercise including weight bearing exercise and avoid immobilisation
- physical activity to gain health benefits and ways to incorporate incidental physical activity into everyday life
- encourage smoking cessation
- discourage excessive alcohol intake

Falls prevention - consider factors such as:

- home environment hazards
- medicines
- decreased visual Acuity
- mobility problems and need for gait aids
- falls prevention information
- hypotension
- atrial fibrillation
11 Specialist Referral

Quick info:

Specialist Referral if:

- history of low trauma fracture in young patients < 50 years involving hip, vertebra, ulna and ribs
- suspected secondary cause of osteoporosis
- abnormal serum calcium without recognised cause
- younger patients with a T score < 2.0 without readily identifiable risk factor
- very low BMD e.g. T score < -4

Exclude secondary osteoporosis in individuals with low BMD for age.

Referral

- Falls Prevention Single Point of Contact for all Falls Referrals

12 Clinical Risk Assessment

Quick info:

Clinical history, physical examination and clinical tests aim to:

- exclude diseases that mimic osteoporosis, e.g. Osteomalacia, Myeloma
- identify the cause of osteoporosis and contributory factors

Consider:

- falls
- clinical risk factors:
  - age
  - sex
  - low body mass index (BMI) - 19kg/m2 or less
  - previous fragility fractures- particularly of the wrist, hip, spine including vertebral fracture
  - parental history hip fracture
  - family history osteoporosis
  - current glucocorticoid treatment - oral administration of any dose for 3 months or longer
  - current smoker
  - alcohol intake less than 2 standard drinks per day and 2 alcohol free days per week

NB: Patients with causes of secondary osteoporosis could be considered for proactive case-finding [11]. Complete a falls assessment [6]. Perform a full medical examination [7]:

- to measure patient’s BMI
- to elicit signs of possible secondary causes of osteoporosis
- to elicit any visual deficits, kyphosis, gait, balance, proprioceptive, or muscle strength deficits

Secondary osteoporosis

- Chronic inflammatory disease (e.g. inflammatory bowel disease, rheumatoid arthritis, chronic obstructive pulmonary disease, inflammatory connective tissue disease/arthropathy, coeliac disease) cystic fibrosis
- Iatrogenic glucocorticoid excess or Cushing’s disease
- Hypogonadism or premature menopause (<45 years)
- Excess alcohol use or smoking
- Other conditions associated with low BMD include: type 1 diabetes mellitus, osteogenesis imperfecta in adults, untreated longstanding hyperthyroidism, hyperparathyroidism, chronic malnutrition or malabsorption, bariatric surgery and chronic liver disease.

Secondary causes:

- social history and lifestyle factors - low body weight, low bmd for age (ie z score < -2)
- prolonged immobility/ inactivity
- diet deficient in calcium
• risk of Vitamin D deficiency e.g: low sunlight exposure in bed bound, house bound and some dark skin people
• medications that may reduce bone density
  • anticonvulsants, i.e. phenytoin, carbamazepine, valproate
  • unfractionated heparin
  • proton pump inhibitors
  • depo-provera
  • lithium
• aromatase inhibitors, such as anastrozole, letrozole, exemestane, being used increasingly in hormone-sensitive cancers
• gonadotropin releasing hormone (GnRH) analogues i.e. zoladex
• excessive hormone replacement
• serotonin reuptake inhibitors (SSRIs)

Respiratory Disease:
• haematological disorders:
  • multiple myeloma
  • sickle cell disease
  • thalassaemia
• metabolic:
  • homocystinuria
• organ transplantation
• rheumatological conditions
• chronic renal disease

13 Clinical Investigations

Quick info:
Initial Investigations for anyone with a suspicion of osteoporosis or a fragility fracture:
• Search for contributory factors as appropriate through a clinical history and examination and through measurement of:
  • Serum calcium
  • Serum phosphate
  • Alkaline phosphatase
  • Cortisol
  • Thyroid-stimulating hormone
  • Coeliac screen
  • Liver and renal function tests
  • Protein electrophoresis
  • Full blood count
  • C-reactive protein
• In men aged <75 years with a Z-score <-2 and fractures, consider evaluating testosterone levels. Note that a detailed screen for secondary causes of osteoporosis is not indicated in individuals with a BMD in the appropriate range for age (i.e. a Z-score ≥ -2).

Treatment
Patients with any of the following characteristics should be offered treatment:
• 10-year FRAX®/Garvan hip fracture risk of ≥3%
• T-score ≤ -2.5 (or ≤ -1.5 for individuals on long-term glucocorticoid therapy)
• First-line Secondary Osteoporosis
Consider the following tests where clinically indicated:
• parathyroid hormone (PTH) if calcium abnormal
• sex hormone profile in men under 60 years:
• testosterone - early morning (9am):
  • if testosterone is low normal, test for sex-hormone binding globulin (SHBG)
• follicle-stimulating hormone (FSH)
• luteinising hormone (LH)
• hypogonadism screen in women:
  • testosterone
  • oestradiol
  • LH and FSH
  • if testosterone/oestradiol level low, or if patient has amenorrhoea or galactorrhoea, perform serum prolactin
• test for coeliac antibodies
• myeloma screen:
  • serum protein electrophoresis and serum free light chains
• 24 hour urinary cortisol if Cushings suspected

Hospital admissions - check bloods are completed during admission.
Primary health patients - check with GP bloods are completed within the last 3 months, if not done to be requested through GP practice nurse.

14 Specialist Referral

Quick info:
Specialist Referral if:
• history of low trauma fracture in young patients < 50 years involving hip, vertebra, ulna and ribs
• suspected secondary cause of osteoporosis
• abnormal serum calcium without recognised cause
• younger patients with a T score < 2.0 without readily identifiable risk factor
• very low BMD e.g. T score < -4

Exclude secondary osteoporosis in individuals with low BMD for age.

Referral
• Falls Prevention Single Point of Contact for all Falls Referrals

15 Assess bone mineral density (BMD)

Quick info:
BMD is one predictor of fracture risk and should be measured using dual energy x-ray absorptiology (DXA) performed at two sites, preferably anteroposterior spine and hip.

With advancing age, degenerative changes in the spine may result in falsely elevated BMD levels at that site; therefore, DXA of the hip is more reliable. BMD results are reported as a T-score (number of standard deviations that BMD is above or below the mean of healthy young adults) or a Z-score (number of standard deviations that BMD is above or below the mean of normal controls matched for age).

The World Health Organization defines osteoporosis as a T-score ≤ -2.5 and osteopenia as a T-score between -1 and -2.5. BMD should be assessed in individuals with suspicion of osteoporosis to establish a baseline reading that can be used to inform future management.

Indications for BMD assessment include:
• Minimal trauma fracture
• Women aged <65 years with risk factors for osteoporosis
• Women aged ≥65 years and men aged ≥75 years considering specific measures to prevent osteoporosis
• All users of glucocorticoids for >6 months

However, fracture risk assessment and anti-osteoporotic treatment must not be withheld if DXA scanning is unavailable. It is acceptable to assess fracture risk with FRAX/R/Garvan calculators without a BMD value if DXA is unavailable.

Also DEXA not needed:
• If had 2 Fragility fractures
• 1 fragility fracture and >75 years age
• Technically or logistically difficult to arrange

Accident Compensation Corporation (ACC) can fund DXA scans in relation to an accepted ACC claim for a fragility fracture if the referral has been made by a vocationally-registered specialist. The request is subject to approval and must meet the following criteria:

• There is an accepted ACC claim for a fracture AND
• The fracture is likely to be a fragility fracture (fracture resulting from a fall from standing height or less) AND
• The person is <75 years old and considered to be at reasonable risk of further fractures OR is between 50–75 years old and is receiving systemic glucocorticoid therapy (≥ 5 mg/day prednisone equivalent) for ≥3 months AND
• The person has not had a DXA scan previously and is not known to be on bisphosphonates or other osteoporosis medication AND
• The request for DXA must be part of an assessment in a comprehensive and integrated pathway to minimise harm from falls and fractures.

Consider medications for osteoporosis if:

• FRAX or other fracture risk calculator indicating > 3% 10-year risk of hip fracture with bone density
• T-score < -3.0 in absence of fractures
• T-score < -2.5 with one fracture
• T-score < -1.5 with multiple fragility fractures
• History of one osteoporotic fracture seen on X-ray, and the patient is elderly (usually > 75 years) and major logistical, technical or pathophysiological reasons as to why a DEXA cannot be obtained
• FRAX assesses the 10 year probability of a major osteoporotic fracture (spine, hip, forearm, or humerus) and is the preferred tool

FRAX tool - FRAX score will determine level of risk

Garvan or OFracture can also be used.

Do not routinely assess fracture risk in people under age 50 years unless they have major risk factors as there is little evidence for treatment in younger people and their overall fracture risk is low.

Tools may underestimate fracture risk in certain circumstances e.g: having a history of multiple fractures.

DEXA scan information:

Referral is through completing a radiology form in secondary care and through completing an outbox radiology request form (Medtech32) in primary care. The form is sent to the Radiology Department WDHB, then is forwarded onto Cortex Medical Imaging in Whanganui Ultrasound, Whanganui. A private DEXA scan will cost $180.00 if criteria is not met for a funded scan.

Note: Where a patient presents to accident and medical services with a fracture that meets the criteria a referral will be requested for a DEXA scan with the patient informed to follow up with their general practitioner within 1 week.

The following information is required on the radiology request form:

• request for bone density or DEXA scan (not just a bone density)
• family history of osteoporosis/hip fracture in parents
• rheumatoid arthritis or polymyalgia
• on steroids:
  • prednisone
• any fragility or minimal trauma fracture
• any malabsorption:
  • calcium absorption
• coeliac disease
• diabetes type 1
• on Losec medication
• women with premature menopause
• post-menopausal women with low trauma injury
• taking an aromatase inhibitor

Follow up scans
Osteoporosis and Fragility Fracture

Osteoporosis:
- at 4-5 years post oral (3yrs IV) treatment to check response
- at 5yrs oral/3yrs IV if considering a break treatment
- 2-5yrs after stopping treatment if likely to need further treatment

Osteopenia:
- after 3-5yrs

Major risk factors:
- 1-2 year interval initially then 3-5 years

16 Risk Stratification

Quick info:
The National Osteoporosis Guideline Group (NOGG) recommend the following [5]:
- assess fracture risk using FRAX® in postmenopausal women, and men age 50 years or older, when:
  - assessment would influence management; and
  - risk factors are present – see the clinical risk factors section of ‘History and examination’ above
- fracture risk need not be assessed in postmenopausal women with a prior fragility fracture [5]:
  - classified as high risk
  - should be considered for treatment without the need for further risk assessment
- bone mineral density (BMD) measurements may, however, be appropriate in younger postmenopausal women
- FRAX® assesses the 10 year probability of a major osteoporotic fracture (spine, hip, forearm, or humerus)

The National Institute for Health and Care Excellence (NICE) recommend the following [11]:
- assessing fracture risk using FRAX® or QFracture® in all patients at risk of osteoporosis fracture, including the following:
  - all women age 65 years and older
  - all men age 75 years and older
  - women under age 65 years, and men under age 75 years, if risk factors are present, such as:
    - previous fragility fracture
    - current use or frequent recent use of oral or systemic glucocorticoids
    - history of falls
    - family history of hip fracture
    - other causes of secondary osteoporosis
    - body mass index (BMI) less than 18.5kg/m2
    - smoker
    - alcohol intake of more than 14 units per week for women, and more than 21 units per week for men
- do not routinely assess fracture risk in people under age 50 years unless they have major risk factors:
  - there is little evidence for treatment in younger people and their overall fracture risk is low [14]
  - examples of major risk factors include [11]:
    - current or frequent use of oral or systemic glucocorticoids
    - untreated premature menopause
    - previous fragility fracture

Consider the following when stratifying fracture risk:
- all patients above the upper age limits, as defined by FRAX® (age 90 years) or QFracture® (age 99 years), should be classified as high risk of fractures [11]
- other factors that these tools may not include, eg care home residency, taking drugs that impair bone metabolism, such as anticonvulsants [11], or falls [14]
- tools may underestimate fracture risk in certain circumstances, eg having a history of multiple fractures
• fracture risk is exaggerated in younger age range [14]

NB: Biochemical markers should not be used in the evaluation of fracture risks [1].

17 If >3% Re-assess fracture risk in 3-5 years.

Quick info:
Re-assess fracture risk in 3-5 years or risk factors change.

18 First Line Therapy Oral 4-5 yrs

Quick info:
Oral or IV bisphosphonates.

**Bisphosphonates criteria:**
- two fragility fractures and/or one fragility fracture and DEXA scan and/or one fragility fracture and >75 years

**Prescription medicines:**
If a prescription medicine is considered appropriate, then there are a number of options available in New Zealand that can be used to preserve or even increase your bone mass.

The most commonly prescribed drugs to treat osteoporosis are the bisphosphonates. In New Zealand, four bisphosphonate drugs are licensed: alendronate, etidronate, risedronate and zoledronate. The first three are taken as tablets and zoledronate is given as an infusion which may be repeated after 12 months or longer. Other available treatments include menopausal hormone replacement therapy, raloxifene and teriparatide. **No special authority required for risedronate.**

The Medsafe website provides information on the regulation of medicines and medical devices in New Zealand and the safe use of medicines. The link leads to medicine information on medications used in New Zealand. Some of these medications require special authority to take and can only be prescribed if you meet certain criteria. Made up of 2 groups medications bisphosphonates and menopausal hormonal therapy.

Management is primarily with bisphosphonates.

**Zoledronate:** funded cost is approximately $150.00 per infusion.
- Zoledronic acid strengthens bones and prevents fractures in people with osteoporosis
- Zoledronic acid is given by an intravenous infusion (into a vein in the arm via a “drip”) over about 30 minutes

**Bisphosphonates should be avoided:**
- when - use cockcroft gault <35ml/min or EgFR <35ml/min
- in patients with active upper gastrointestinal symptoms
- where cognitive impairment may affect administration
- if patients are bedbound or unable to sit upright for 30 minutes'
- if life expectancy is less than 12 months
- links to special authority (SA) forms **RSS Feed for Special Authority forms:**
  - Alendronate
  - Zoledronic Acid
  - Raloxifene
  - Teriparatide
  - Risedronate
  - **SA1039 – Alendronate Tab 70 mg - with or without Cholecalciferol**
  - **SA1138 – Raloxifene**
  - **SA1139 – Teriparatide**
  - **SA1187 – Zoledronic acid inj 0.05 mg per ml, 100 ml**

**Alendronate** and risedronate are oral bisphosphonates shown to reduce the risk of hip, vertebral and non-vertebral fractures.[6]
- Risedronate is available for general prescription in New Zealand without Special Authority approval.
- Contraindications to oral bisphosphonates include: abnormalities of the oesophagus that delay oesophageal emptying such as stricture or achalasia; inability to stand/sit upright for ≥30 minutes; and hypocalcaemia.
• The most common side effect of oral bisphosphonates is upper gastrointestinal irritation, which affects 20–30% of users. Patients should be advised to take their oral bisphosphonate on an empty stomach. They should swallow their oral bisphosphonate tablet with a full glass of water and stand/sit upright for ≥30 minutes and until after their first food of the day.

• There is scant clinical evidence regarding use of oral bisphosphonates in patients with severe renal insufficiency. Consider a reduced dosing frequency in patients with estimated glomerular filtration rate (eGFR) ≤35 mL/min.

• Atypical femoral fractures (AFFs) initially develop as stress fractures in the lateral cortex of the femoral shaft and can spontaneously progress to transverse fractures. The incidence of AFFs appears to increase steeply with duration of bisphosphonate use and drops dramatically in the 1–2 years after bisphosphonate discontinuation. For this reason, it is important to periodically review the need for continued bisphosphonate therapy and provide drug holidays for patients requiring therapy for >5 years.

• Osteonecrosis of the jaw (ONJ) manifests as an area of exposed bone in the mouth that does not heal within 8 weeks. While ONJ has been associated with bisphosphonate use for the treatment of bone metastases, it is rarely seen in patients treated with oral or

• IV bisphosphonates for osteoporosis and appears to have an incidence similar to that found in patients with osteoporosis not treated with bisphosphonates.

Oestrogen therapy

• In women with osteoporosis and within 10 years of menopause, oestrogen therapy may be an appropriate first-line intervention.

• Risks and benefits of therapy should be explored with the patient. Referral to a secondary care colleague may be helpful to help frame a long-term plan for the patient’s osteoporosis management.

• Contraindications to oestrogen therapy include: past or acute myocardial infarction or stroke, breast cancer or sex steroid hormone responsive tumours, liver tumours, past venous thromboembolic events (or a hereditary or acquired predisposition to venous thrombosis) and severe hepatic disease.

• Common side effects of oestrogen therapy include: vaginal bleeding, fluid retention, breast tenderness, headaches and nausea.

19 Consideration for Bisphosphonate Prescribing

Quick info:
Considerations:

• bisphosphonates are poorly absorbed – optimal absorption requires ingestion on an empty stomach [1]

• poor compliance increases the risk of fracture, especially non-vertebral fractures [13]

• bisphosphonates are inappropriate for patients unlikely to comply with treatment regimens [1]

Calcium and vitamin D supplementation is advocated as an adjunct to other osteoporosis treatments [14].

Adverse effects of bisphosphonate therapy include:

• oesophageal problems specifically with oral formulations [19]:
  • oesophagitis, and oesophageal ulcers, strictures, and erosions can occur
  • for patients with oesophageal abnormalities or factors which delay oesophageal emptying, eg stricture or achalasia:
    • alendronate or oral ibandronate should not be given
    • risedronate should be used with caution
  • for patients with active or recent upper gastrointestinal problems:
    • alendronate, ibandronate and risedronate should be used with caution
  • for patients with Barrett's oesophagus:
    • consider the benefits and potential risks of prescribing alendronate and risedronate on an individual basis
    • oral ibandronate should be used with caution
  • advise patients on the importance of adhering to dosage instructions:
    • swallow tablets whole with at least 200mL of water on an empty stomach immediately after getting up in the morning
    • stay fully upright for at least 30 minutes or 1 hour after taking the tablet, and before taking any food, drink or other medication
  • oesophageal cancer [19]:
    • there is possibly a small increas in the risk of oesophageal cancer associated with bisphosphonates
    • caution should be used when considering nitrogen-containing bisphosphonates for oral use in patients with known Barrett's oesophagus:
• carefully consider the risks and benefits for alendronate, ibandronate and risendronate for these patients
• NB: advise patients to report any signs of oesophageal irritation to a doctor [19]
• hypocalcaemia [33]:
  • bisphosphonates are contraindicated in women with hypocalcaemia
• osteonecrosis of the jaw [19]:
  • all patients receiving intravenous bisphosphonates should have a dental check-up before treatment
  • patients who start oral bisphosphonates and have poor dental health should have a dental check-up
  • encourage patients to:
    • maintain good oral hygiene
    • receive routine dental check-ups
  • report any oral symptoms, eg dental mobility, pain or swelling
• atypical femoral fractures [19]:
  • have been reported rarely with bisphosphonate therapy, mainly in patients receiving long-term treatment for osteoporosis
  • consider discontinuation of bisphosphonates in patients suspected to have an atypical femoral fracture while they are evaluated – consider benefits and risks of treatment
  • advise patients to report any thigh, hip or groin pain
• osteonecrosis of the external auditory canal [35]:
  • is reported very rarely
  • consider if patients taking bisphosphonates present with ear symptoms
  • risk factors may include steroid use and chemotherapy
  • advise patients to report any ear pain, discharge or infection
• renal toxicity [19]:
  • renal impairment may contraindicate the use of bisphosphonates [33]

Consider the risks and benefits of a bisphosphonate drug holiday (12 months duration) after 5 years of bisphosphonate treatment [14]:
• then reassess bone mineral density (BMD) and consider the restart of treatment under certain circumstances

20 First Line Therapy IV 3 doses at 18 - 24 month intervals

Quick info:
Intravenous bisphosphonate
• Zoledronate is an IV bisphosphonate that reduces risk of hip, vertebral and non-vertebral fractures. In the pivotal clinical trials, zoledronate was administered annually for three years. However, zoledronate’s duration of action is considerably longer than one year; therefore, it is common practice to administer the three initial doses at intervals of 18 or 24 months.
• Contraindications to zoledronate include: creatinine clearance or eGFR <35 mL/min; marked vitamin D deficiency; and hypocalcaemia.
• The most common side effect of zoledronate is post-dose flu-like symptoms (affecting approximately 30% of patients), the majority of which occur within the first 3 days following zoledronate administration and resolve within 3 days. The incidence of these symptoms can be reduced with administration of paracetamol or ibuprofen shortly after the zoledronate dose. These symptoms decrease markedly with subsequent doses of zoledronate (incidence of 1–2%). Ensure adequate hydration.
• Vitamin D deficiency should be corrected before the administration of zoledronate. In patients with suspicion of vitamin D deficiency, give oral supplementation (2 x cholecalciferol 50,000 IU) before infusion.
• Consider a dose reduction (e.g. to 2.5 or 1 mg7) or slower infusion rate (e.g. to 30 to 60 mins) in patients with eGFR 35–50 mL/min.

21 Treatment for Steroid Induced Osteoporosis

Quick info:
Bone-protective therapy should be considered for patients in whom glucocorticoid therapy is being considered for 3 months or longer [33]:

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• are women age 70 years or older; or
• have had a previous fragility fracture; or
• have been assessed as high risk following fracture risk assessment (exceed the intervention threshold); or
• are taking high doses of glucocorticoids:
  • Scottish Intercollegiate Guidelines Network (SIGN) recommend that treatment should be considered if taking prednisolone at a dose of 7.5mg or above (or the equivalent dose of glucocorticoids) daily for 3 months or more [1]
NB: FRAX does not take into account steroid dosage, and may under estimate a patient's fracture risk [33].

Treatment options – postmenopausal women, and men age 50 years and older [33]:
• alendronate or risedronate are first-line options in the majority of cases [33]:
  • NB: the use of risedronate in men for the treatment of steroid-induced osteoporosis is outside of its marketing authorisation (product licence) in the UK [9]
  • in those who are intolerant or contraindicated to alendronate or risedronate, consider etidronate and zoledronic acid [33]
  • therapy should be started at the onset of glucocorticoid therapy, and continued throughout treatment [33]
  • explain that treatment is usually given for 3-5 years, and that it reduces, but does not eliminate the risk of an osteoporotic fracture [4]
  • see the 'prescribing considerations for bisphosphonates' care points for further information on prescribing these medications

Bone protective therapy may be appropriate in some premenopausal women and younger men [33]:
• referral to secondary care is recommended
• caution is advised when using bisphosphonates in women of childbearing age

Calcium and vitamin D [33]:
• adequate calcium intake should be achieved through dietary intake if possible
• calcium and/or vitamin D supplements may be used if necessary

22 Monitoring P1NP six months

Quick info:
Serum procollagen type I N-terminal propeptide (PINP) measurement:
• Bisphosphonates reduce bone turnover, which can be assessed by measuring serum PINP. With effective bisphosphonate therapy, PINP levels will decrease to <35 µg/L.
• If PINP levels remain ≥35 µg/L after 6 months of oral bisphosphonate treatment, this indicates suboptimal adherence to the bisphosphonate or poor absorption of the bisphosphonate. Switching to an IV bisphosphonate should be considered.
• PINP measurement can be organised through the local laboratory, with no time-of-day restrictions for obtaining blood samples.
• PINP levels do not usually need to be assessed in patients treated with IV bisphosphonate.

Repeat clinical risk assessment:
• Follow-up bone densitometry is not recommended at intervals of less than 3 years in most patients. In addition to reproducibility errors in results, a repeat scan in the first few years of therapy will not generally alter management. Repeat BMD assessment should be undertaken 4 to 5 years after initiating bisphosphonate treatment to determine whether treatment should continue.

Duration of treatment and drug holidays
• Clinical trials have shown that after 3 to 5 years of bisphosphonate therapy, patients whose femoral T-score has risen above -2.5 and who have not had new fractures are able to discontinue bisphosphonate treatment for up to 5 years without an increase in their future fracture risk. Therefore, remaining off treatment for 4 to 5 years is appropriate for patients meeting these criteria.
• Patients with a femoral T-score ≤-2.5 or with new/recurrent fractures should continue on treatment for a second 5-year period. However, there is concern that continuous, long-term bisphosphonate therapy progressively increases the risk of atypical femoral fractures, potentially neutralizing the benefit of ongoing treatment. To address this concern, many clinicians recommend a 1- to 2-year drug holiday at some time between years 5 and 10. Risedronate has a shorter duration of action than other bisphosphonates, so a 1-year break is likely appropriate for that medication.[9],[10]

RNZCGP believes that use of PINP in monitoring osteoporosis treatment is not yet proven in clinical practice.

23 P1NP >35 µg/L
Quick info:
Review oral dosing practices or switch to IV bisphosphonate

24 P1NP <35 ug/L
Quick info:
Treat 4 to 5 years

27 Repeat DEXA / Reassess Fracture Risk
Quick info:
Re-calculate fracture risk using FRAX with the bone mineral density (BMD) value to determine whether an individual’s risk lies above or below the intervention threshold.

Future recalculation of fracture risk is recommended by National Institute for Health and Care Excellence (NICE):
- when risk factors change

Men and women with re-stratified risks above the intervention threshold should be treated.

New fractures:
- explore cause:
  - poor medication adherence
  - modified lifestyle factors
- consider changing from oral to IV bisphosphonates
- consider specialist referral/ advice

Annual review:
- medication adherence/tolerance
- renal function
- review lifestyle factors
- falls

Review need for bisphosphonate treatment:
- review Risedronate and Alendronate after 5 years and Zoledronic Acid after 3 years
- consider discontinuing bisphosphonates if there is a low to moderate risk, as the benefits of treatment in this group beyond the 3 - 5 years are limited, and reassess the risk every 2 years
- continue if high risk, but re-review annually, high risk factors
- prior hip or multiple vertebral fractures
- age > 75 years
- continued fragility fractures on treatment
- total hip or femoral neck BMD T-Score <-2.5 at time of treatment review
- recurrent falls
- other risk factors including secondary osteoporosis, co-morbidities, oral glucocorticoids
- after total 10 years for Residronate and Alendronate and 6 years for Zolendronic Acid, stop bisphosphonates but continue on adjunctive therapies e.g. Vitamin D, dietary advice, falls prevention
- when treatment is discontinued, fracture risk should be assessed every 2 years or after a new fracture regardless of when this occurs
- treatment review is essential as there may be an increased incidence of rare adverse effects (osteocrosis of the jaw and atypical femoral fractures) with long term bisphosphonate use

Drug holiday should be 1 year for risedronate, 2 years for alendronate and 3 years for zoledronate.

31 New Fracture Refer to Secondary Care for 2nd line treatment
Quick info:

**Teriparatide**

Teriparatide is a fragment of parathyroid hormone, administered by once-daily subcutaneous injection, that may be used inpatients with established osteoporosis and recurrent fracture and following at least 12 months of antiresorptive therapy.

**Denosumab**

Denosumab is a monoclonal antibody directed against RANK-ligand, administered by subcutaneous injection every 6 months, for treatment of osteoporosis. Denosumab is not yet reimbursed in New Zealand.

**Other treatments:**

Selective estrogen receptor modulators (SERMS)

- SERMS (e.g. raloxifene) could be considered as an alternative to oestrogen therapy in postmenopausal women, although raloxifene does not prevent hip or other non-vertebral fractures.

**Strontium ranelate**

Strontium ranelate is not recommended because of its adverse cardiovascular profile.

**Referral**

- Falls Prevention Single Point of Contact for all Falls Referrals
Overview
This document describes the provenance of the Whanganui district Osteoporosis and Fragility Fracture Pathway.

The purpose of implementing the CCP Programme in our District is to:
- Enhance accuracy of referrals
- Use best practice guidelines
- Have all information found in one place
- Enhance partnerships and collaboration across services
- Improve patient outcomes through seamless care across primary and secondary care

To cite this pathway, use the following format:

Editorial methodology
This care map has been based on a Map of Medicine Care Map developed according to the Map of Medicine editorial methodology. The content of the Map of Medicine care map is based on high quality guidelines and practice-based knowledge provided by contributors with front-line clinical experience (see contributors section of this document). This localised version of the evidence-based, practice informed care map has been peer-reviewed by the WDHB and WRHN Collaborative Clinical Directors and Leaders Forum and with stakeholder groups.

Consumer engagement
Development of the Whanganui Collaborative Clinical Pathways focuses on person-centred care and an experience based co-design approach where consumers are invited to consult with the Health Promoter / Community Developer (who sits on each pathway working group). Consumers are asked prior if possible, or if not at the very start of the pathway process to share their experiences to assist in designing services that work for them and their families, critiquing and feeding back on suitable consumer information and resources which can then be incorporated into the pathways. Feedback obtained ensures we address consumer challenges and needs within the pathway and provide suitable services, information and resources for consumers. Additional information on patient centred care is provided by following this link and experience based co-design of health care services at http://www.kingsfund.org.uk/projects/ebcd.

References


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Disclaimers
CCP Leadership Team, Whanganui

It is not the function of the CCP Leadership Team to substitute for the role of the clinician, but to support the clinician in enabling access to know-how and knowledge. Users of the Map of Medicine are therefore urged to use their own professional judgement to ensure that the patient receives the best possible care. Whilst reasonable efforts have been made to ensure the accuracy of the information on this online clinical knowledge resource, we cannot guarantee its correctness and completeness. The information on the Map of Medicine is subject to change and we cannot guarantee that it is up-to-date.