

# Indicator 2: Falls and fall-related fractures

## Objective

To monitor the proportion of falls and fall-related fractures and trends.

## Recommended reference ranges

### Falls and fall-related fractures per 1,000 occupied bed days

Measures	Lower target rate	Upper limit rate
Falls	3.3	11
Falls resulting in fractures	0	0

## Why monitoring falls and fall-related fractures is important

Falls can be prevented. However up to 50 per cent of older people living in residential aged care services fall every year, with 40 per cent experiencing recurrent falls.

Residents are also up to five times more likely to fall than those who live in the community. The proportion of residents with a diagnosis of dementia who fall has been reported as even higher.

Approximately 20–32 per cent of older people who fall will experience a fall-related fracture. Adverse clinical events that can occur as a result of falls include:

- death
- fracture
- decreased independence
- increased functional decline
- anxiety and fear of falling.

## Key facts

84.8 per cent of fall-related deaths occur in people who are aged 70 years and over.

Dementia, stroke, diabetes and Parkinson's disease are common conditions associated with high risk of falls.

The hip is the most common site of fall-related fracture.

People aged 80 years or more are at the highest risk of falls and fractures. This age group represents the highest proportion of residents in aged care.

## How to collect and report this indicator

### Data collection

- There are two measures to be collected by auditing resident records and incident reports every quarter.
- If a resident is found on the floor or ground, assume they have fallen (unless they are cognitively unimpaired and indicate that they put themselves there on purpose).
- If a fall resulted in more than one fracture, record all fractures.

### Comments

To include on the data recording sheet:

- Include comments if the number of falls or fractures is heavily influenced by one or two individuals or by a specific incident.

### Exclusions

- Falls and fractures that occur while the resident is away from a residential aged care facility and is not under direct supervision of residential aged care staff.
- Make sure you **include** respite residents.

### Quick tips for data accuracy

- Look beyond RiskMan incident reports to ensure your data is accurate.
- Complete a quick review of each resident's progress notes over the quarter and look for any entries that could indicate the occurrence of a fall – check these correlate with RiskMan entries. This could be done monthly to make the process easier to manage at the end of the quarter.
- Fractures may be identified after a fall has already been reported. Review the progress notes of each resident who has had a fall within the quarter to make sure that all fractures have been captured and recorded.

### Definition of key data elements

A **fall** is an event that results in a person coming to rest inadvertently on the ground or floor or other lower level (World Health Organization, and Safety and Quality Council *Guidelines for preventing falls and harm from falls in older people*.)

A **fracture** is traumatic injury to a bone in which the continuity of the bone tissue is broken (Mosby's *Medical nursing and allied health dictionary*, 2002, 6th edition).

Note that a fall-related fracture can be located on any area of the individual's body, and is not exclusive to areas traditionally associated with falls such as the hip.

## Data recording sheet

Name of service:
Reporting quarter end date:
Audit date:

### Measure 1 and 2: Falls and fall-related fractures

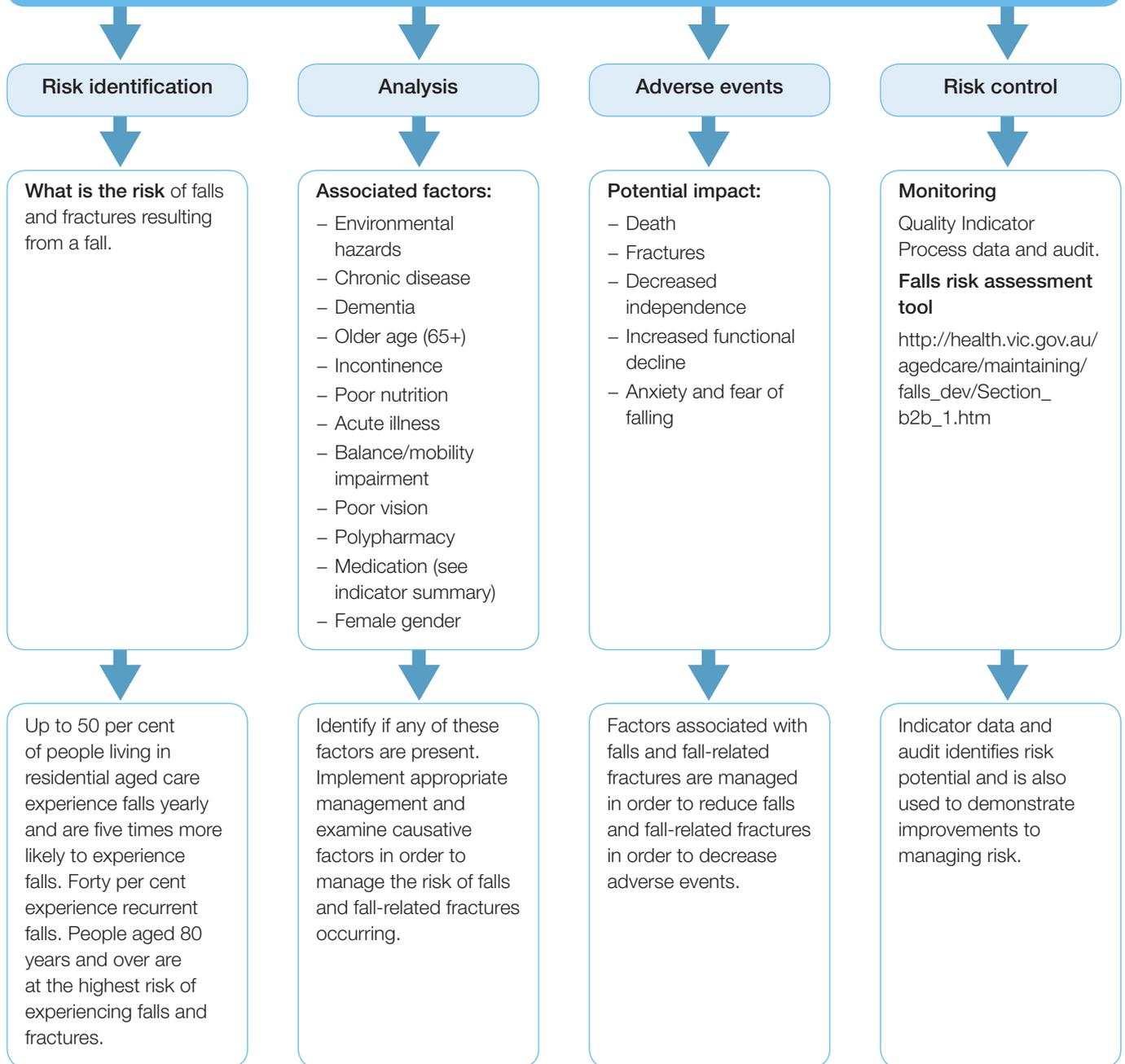
Total number of falls	Number of fractures resulting from falls

#### Comments

- **Required** if applicable – note if number of falls or fractures is heavily influenced by one or two individuals or a specific incident, for example one resident fell 13 times with two fractures.
- **Optional** – any other comments.

# Falls and fall-related fractures

## Risk management framework



## Treatment

There are a range of resources and information available to assist residential aged care services introduce a falls prevention program or reduce the harm related to falls.

## Resources

A range of resources and information are available to assist residential aged care services to introduce a falls prevention program or reduce the harm related to falls and the fear of falling.

Australian Council on Safety and Quality in Health Care, especially *Preventing falls and harm from falls in older people: best practice guidelines for Australian residential aged care facilities* (2009):

[www.safetyandquality.gov.au/our-work/falls-prevention/falls-prevention-rac](http://www.safetyandquality.gov.au/our-work/falls-prevention/falls-prevention-rac)

Department of Health, Victorian Falls Prevention Program:

[health.vic.gov.au/agedcare/maintaining/falls\\_dev/index.htm](http://health.vic.gov.au/agedcare/maintaining/falls_dev/index.htm)

See also associated resources for residential aged care facilities:

[www.health.vic.gov.au/agedcare/maintaining/falls\\_dev/Section\\_a2.htm](http://www.health.vic.gov.au/agedcare/maintaining/falls_dev/Section_a2.htm) and the Falls Risk Assessment Tool (FRAT):

[www.health.vic.gov.au/agedcare/maintaining/falls\\_dev/Section\\_b2b\\_1.htm](http://www.health.vic.gov.au/agedcare/maintaining/falls_dev/Section_b2b_1.htm)

Department of Health, *Minimising the risk of falls and fall-related injuries: guidelines for acute, subacute and residential care settings*:

[www.health.vic.gov.au/qualitycouncil/fallsprevention](http://www.health.vic.gov.au/qualitycouncil/fallsprevention)

National Ageing Research Institute, especially the Victorian Falls Clinic Coalition:

[www.mednwh.unimelb.edu.au/vic\\_falls/vic\\_falls\\_home.htm](http://www.mednwh.unimelb.edu.au/vic_falls/vic_falls_home.htm)

Scott V, Higginson A, Sum A and Metcalfe S 2010, *Falls and related injuries in residential care: a framework and toolkit for prevention*, Centre of Excellence for Mobility, Fall Prevention and Injury in Ageing, Centre for Hip Health and Mobility, Vancouver:

[www.injuryresearch.bc.ca/wp-content/uploads/2012/03/3\\_20110811\\_100931Residential-Care-Framework\\_Aug-10\\_2011.pdf](http://www.injuryresearch.bc.ca/wp-content/uploads/2012/03/3_20110811_100931Residential-Care-Framework_Aug-10_2011.pdf)

## Evidence to support this quality indicator

This indicator highlights falls and falls-related fractures as a major issue for older people.

There is substantial evidence and research that demonstrates falls and falls-related fractures are significant among older people living in residential aged care.

### Defining falls and fall-related fractures

According to the World Health Organization (WHO), the commonly accepted definition of a fall is 'inadvertently coming to rest on the ground, floor or other lower level, excluding intentional change in position to rest on furniture, wall or other objects' (2007, p. 1).

A fracture is defined as a traumatic injury to a bone in which the continuity of the bone tissue is broken (Mosby 2002).

Dandy and Edwards (2004) note that there are eight common signs that can be associated with a fracture:

- abnormal limb movement caused by movement at the site of fracture
- 'grating' sound between bone ends
- an obvious deformity that can be felt or seen
- bruising at the site of fracture
- tenderness at the site of fracture
- pain when the fracture site is stressed by bending
- reduced function of fracture site
- swelling at the site of fracture.

An individual with a fracture may exhibit some or all of these signs of fracture. However, the authors note that presence of either of the first two of these signs definitely indicates a fracture.

### Defining falls and fall-related fractures in aged care

WHO (2007) states that the frequency of falls increases with age and frailty.

Thirty to fifty per cent of people living in residential aged care experience a fall every year, with 40 per cent or more experiencing recurrent falls (Nitz et al. 2012). Falls rates are even higher for people with dementia living in residential aged care (Erikson et al. 2008).

The incidence of falls is threefold among older people living in residential aged care compared with those who live in the community (Nurmi and L  thje 2002).

The rate of falling continues to increase with age. Older people aged over 80 years experience the highest rate of falls (Department of Human Services 2007; Fisher et al. 2005; Larsson and Ramamurthy 2000).

This age group also represents the highest proportion of older people living in residential aged care in Victoria, at 76.7 per cent (AIHW 2010).

In 2009 of all deaths reported resulting from a fall, 84.8 per cent were of people aged 70 years or more (Australian Bureau of Statistics 2009).

Although the incidence of falls among older people living in residential aged care is higher, it should be noted that living in residential aged care is in itself not an independent risk factor for falls (Fisher et al. 2005).

Data about the incidence of fall-related injuries and fractures varies, with the variance likely to be related to different resident mix, acuity and proportion of residents with dementia and comparisons between residential care between countries.

However, injuries are common from falls in residential care settings. One Australian study of nine residential aged care facilities reported that 44 per cent of 545 falls resulted in physical injury, including two deaths, eight hip fractures, two elbow fractures, one nose fracture and two ankle fractures.

These falls also involved 63 ambulance transportations, 32 emergency department presentations, and a total of 226 days in hospital (Haines et al. 2012). Twenty-two per cent of older people hospitalised due to falls in Australia are due to resident falls in residential care settings (AIHW 2013).

There are a number of intrinsic falls risk factors (related to the individual) that contribute to an increased risk of falls among older people living in aged care.

Some of these risk factors are not modifiable, such as advanced age and previous history of falls, and are important to note.

Others risk factors include malnutrition, the presence of chronic disease, increased functional decline, polypharmacy, cognitive impairment and dementia, neurological conditions such as stroke and Parkinson's disease, diabetes, vision impairment and acute illness.

## Adverse clinical events and falls and fall-related fractures

The most prominent adverse event discussed in current literature and research surrounding falls and fall-related fractures among older people is an increased risk of mortality.

In 2009, 84.8 per cent of fall-related deaths were of people aged 70 years or more. Rubenstein et al. (1994) state that falls account for two-thirds of accidental deaths among older people. Fuller (2000) points out that older people are eight times more likely to die as the result of a fall compared with younger people.

Fractures are an adverse clinical consequence of falls. Fractures resulting from a fall may occur anywhere on the body, but most commonly occur at the hip in older people (Hindmarsh et al. 2009). Between 25–50 per cent of older people who suffer a hip fracture die in the subsequent 12 months (SIGN 2009; Shahar et al. 2009; Hindmarsh et al. 2009; Jacobson et al. 2008; Diemer 2006).

This increased risk of mortality is due to a number of issues such as surgical complications, the presence and development of comorbidities, gender, age, physical function prior to the fracture occurring, and frailty (Hindmarsh et al. 2009; WHO 2007).

Hindmarsh et al. (2009) point out that 91 per cent of hip fractures occur in older people, with the majority of these fractures caused by a fall. This is supported by Chen et al. (2008), Carter et al. (2001), Härlein et al. (2009) and Nazarko (2009).

Another adverse event relating to falls is post-fall anxiety syndrome, also called fear of falling (Jensen et al. 2002; Harding and Gardner 2009; Nazarko 2008). More than 50 per cent of older people living in residential care report fear of falling (Lach 2013). Zidén et al. (2010) state that after a fall, older people often develop a fear of repeat falls, which leads to a restriction of activities of daily living. Stern and Jayasekara add that falls ‘impact on a patient’s well-being, and can result in serious physical and emotional injury’ (2009, p. 243).

Hindmarsh et al. (2009) discuss the negative impact a fall can have on older people in reducing their mobility and level of independence. Shumway-Cook et al. (2009) add that a fall can lead to a cascade of negative outcomes for the older person such as fear, inactivity, balance issues, reduced agility and a decrease in strength.

Harding and Gardner (2009) point out that a fear of falling may actually increase the risk of repeat falls due to loss of confidence in physical abilities and increased anxiety. The authors also note that risk factors for falls align with risk factors for the fear of falling. This places older people with post-fall anxiety at a greater risk of repeat falls.

There is some evidence to suggest that falling can increase symptoms of depression post-fall, but research is limited in this area.

Research undertaken by Chung et al. (2008) discussing fall-related post-traumatic stress disorder (PTSD) in older people hospitalised after a fall revealed that six months post-fall, just over one-quarter (27.4 per cent) of participants were experiencing partial chronic PTSD.

## Causes of falls

Throughout the literature, the majority of authors categorise falls risk factors as intrinsic or extrinsic. Intrinsic refers to risk factors relating to the health of the individual, and extrinsic refers to risk factors that are external to the individual such as the physical environment (VQC 2004).

The causes of falls in older people are multifaceted and complex, and falls-related hospitalisations among older people have continued to rise over the past decade (AIHW 2013). Given that the Australian population is ageing (AIHW 2011), it is highly likely that the risk of falls will also continue to increase (Carter et al. 2001; WHO 2007).

The increase in falls risk as a result of an ageing population is attributed to physiological age-associated changes that place older people at greater risk of falling, such as an increased incidence of chronic diseases, dementia, reduced physical function and polypharmacy. Note that these issues are not an inevitable part of ageing but are more prevalent in older people.

Evidence shows an association between dementia and increasing risk of falls. This is a significant issue for residential aged care services. The AIHW (2011) publication *Dementia among aged care residents: first information from the Aged Care Funding Instrument*, highlighted that 53 per cent of older people who live in residential aged care have a diagnosis of dementia.

Dementia is a significant risk factor for falls among older people (Härlein et al. 2009, Rubenstein et al. 1994, Sheridan and Hausdorff 2007; Marchetti and Whitney 2006; Kobayashi et al. 2009; van Doorn et al. 2003; Vassallo et al. 2009).

van Doorn et al. (2003) identify that aged care residents with dementia are approximately twice as likely to fall as residents without dementia. Marchetti and Whitney (2006) suggest that this increased rate of falls is due to perceptual and motor changes that occur as a result of dementia.

These changes include visual disturbances such as poor contrast and acuity, spatial deficits and binocular vision. Motor changes include poor limb coordination equilibrium, which leads to slow movement and gait disturbances, and an increased incidence of extrapyramidal symptoms such as rigidity, bradykinesia (abnormally slow movement) and impaired reflexes. In addition, behavioural risk factors such as agitation and wandering may also contribute to increased risk of falling (Shaw 2007).

Female gender is cited throughout the evidence as a significant risk factor for the occurrence of falls. Again this is a trend that is common internationally. The rate of falls among older people is highest in women (WHO 2007).

This phenomenon is largely due to the higher population of older women compared with older men (Larsson and Ramamurthy 2000), and the fact that the majority of residents in aged care are women (AIHW 2009). Research conducted by Kobayashi and colleagues (2009) revealed that 73 per cent of fallers in residential aged care are women.

The presence of chronic disease (excluding dementia, discussed above) among older people also contributes to their risk of falls. Research undertaken by Lee et al. (2009) examining the presence of chronic disease among 11,113 older people reveals that those with one or more chronic diseases are more likely to experience falls. This point is supported by Lawlor et al. (2003).

Chronic diseases commonly associated with falls or multiple falls in the literature include stroke, incontinence, rheumatic diseases, diabetes and Parkinson's disease (Deandrea et al. 2010).

Polypharmacy or multiple medication use is also a risk factor for falls among older people. Nazarko (2009) states that older people are more vulnerable to the side-effects of medications and any medication that causes sedation or confusion, reduces blood pressure or causes dehydration increases the risk of falls.

Woolcott et al. (2009) conducted a meta-analysis to review the effect of nine different medication classes on falls risk. When considering those studies with good medication and falls data methods, five medication groups were shown to be associated with increased risk of falls:

- sedatives and hypnotics
- neuroleptics and antipsychotics
- antidepressants
- benzodiazepines
- non-steroidal anti-inflammatory drugs.

Four of the high falls-risk medication groups (sedatives and hypnotics, neuroleptics and antipsychotics, antidepressants, and benzodiazepines) are considered under the broad classification of psychotropic medications. These medications are commonly prescribed for older people (approximately 20 per cent of older people living in the community, and up to 80 per cent of people in residential care) are taking one or more of these medication types (Hill and Wee 2012).

Where possible, consider alternatives to these medications. If these medications are needed, a strong focus should be placed on strategies to minimise the risk of falls (Hill and Wee 2012; Boyle et al. 2010).

One of the interventions with the greatest effect on reducing falls in community-dwelling older people involved weaning people off the use of psychotropic medications (Campbell et al. 1999).

There is also a special relationship between falls and other more general age-associated issues and health concerns. The following table lists some of the more common issues identified in available literature, and their relationship to falls.

Issue	Relevance to falls and residential aged care
<b>Incontinence</b>	Residents who experience incontinence may rush to reach the bathroom and inadvertently fall. Residents may also slip on urine and fall.
<b>Nocturia</b>	Residents may rush to reach the bathroom at night in darkness and with poor lighting, without waiting for assistance or identifying environmental hazards that may increase falls risk.
<b>Reduced vision</b>	Residents may not be able to visually identify environmental hazards (for example furniture, pets, rugs, spillages, other residents) that may increase risk of falls.
<b>Use of mobility aid</b>	Incorrect use of mobility aids and inappropriate aids increase the resident's risk of falls.
<b>Decreased mobility</b>	Residents may overestimate their ability to mobilise, use inappropriate and unstable 'props' to mobilise (for example furniture, chairs), or 'collapse' unexpectedly while mobilising.
<b>Reduced lower-limb strength</b>	Residents may not be able to stand or mobilise for extended periods of time and may fall, or fall when trying to stand up.
<b>Decreased balance</b>	Residents may lose their balance while standing, walking, turning or reaching, and experience a fall.
<b>Decreased physical activity</b>	Decreased physical activity leads to a decrease in muscle strength and balance, reducing the resident's ability to stand, walk, turn and reach safely.
<b>Decreased hearing</b>	Residents may not be able to hear risks that could cause a fall, or hear warnings to avoid a risk.
<b>Episode of acute illness</b>	Episodes of acute illness (such as urinary tract infection) may affect a resident's cognition, balance, and mobility. Additional medications used to treat the illness may increase the risk of falls.
<b>Poor nutrition and hydration</b>	Poor nutrition and hydration are associated with loss of muscle, reduced function and gait abnormalities. Malnutrition and reduced hydration may increase an older person's risk of falls.

Adapted from: Stoltz et al. (2002), Bauer et al. (2007), Vivanti et al. (2009), Nazarko (2008), Nazarko (2009), Larsson and Ramamurthy (2000), Shahar et al. (2009), Vassallo et al. (2009), Jacobson et al. (2008), Kin and Hood (2001), Fuller (2000), Carter et al. (2001), Chen et al. (2008), Jensen et al. (2002), Rubenstein et al. (1994) and Olsson et al. (2005).

Falls are also often associated with environmental hazards. According to the Victorian Quality Council (2004) between 10–50 per cent of falls in the hospital and aged care environment are a result of an environmental hazard.

Modification of the physical environment can contribute to a reduction in falls among older people, particularly repeat fallers (DHS 2007). The physical environment in residential aged care services should be assessed and modified to reduce the risk of falls amongst residents.

Fuller (2000) discusses basic environmental modifications to all living areas, bathrooms and outdoor areas accessed by residents to reduce the risk of falls. Some of these modifications include removing clutter, removing unnecessary furniture, installation of raised toilet seats, repairing cracks in pathways, and installing adequate lighting.

Audit tools can assist in intermittent review of the environment to minimise environmental hazards that may contribute to falls.

### Fall-related fractures

Fractures as a result of falls are an adverse clinical event (of falls). Several factors increase the risk of fall-related fractures among older people.

The relationship between vitamin D deficiency among older people and fall-related fractures is discussed widely in the literature. Vitamin D is responsible for increasing intestinal calcium absorption, and as a result assists in maintaining calcium levels in the body (Dam et al. 2009). Vitamin D is vital for maintaining bone strength and density, and also skeletal muscle strength (Martini and Nath 2009). It is obtained from external sources, primarily sunlight, although small amounts are also available in some foods (Peters and Adams 2010).

Decreased calcium levels relating to a reduction in vitamin D are a normal age-related change that is exacerbated by some medical conditions and reduced sunlight exposure. This causes the bones to become thinner and weaker (osteopenia), leaving older people at greater risk of falls relating to decreased muscle strength, and of more concern fractures as a result of decreased bone strength and density.

The risk of fractures continues to increase when osteoporosis progresses in the older person. Osteoporosis is described by Elliot (2011) as a chronic condition characterised by deteriorating bone tissue that increases the risk of fracture.

Inderjeeth and Poland (2010) expand on this, describing osteoporosis as deterioration to the structure of the bone that leads to increased bone fragility and an increased risk of fractures as a result of this.

The AIHW (2011) cites the following information regarding osteoporosis in Australia:

- 692,000 Australians have a diagnosis of osteoporosis.
- Osteoporosis commonly occurs in people aged 55 years and over (84 per cent).
- The majority of osteoporosis sufferers are aged 75 years and over.
- Eight out of ten osteoporosis sufferers are female.
- In 2007–08 there were 52,730 hospital admissions resulting from an osteoporotic fracture. The majority of these fractures occurred at the hip (43 per cent).

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