Indicator 5: Unplanned weight loss

Objective

To monitor the proportion of residents with unplanned weight loss and trends.

Recommended reference ranges

Unplanned weight loss per 1,000 occupied bed-days

Measure	Lower target rate	Upper limit rate
Significant weight loss	0.2	1.0
Consecutive weight loss	0	1.0

Why monitoring unplanned weight loss is important

Between 13–31 per cent of residents in aged care experience unplanned weight loss. There are many adverse clinical events that can occur as a result of unplanned weight loss including:

- death
- increased risk of hip fractures
- pressure injury development
- poor wound healing
- malnutrition.

Unplanned weight loss occurs among older people for a number of reasons, including:

- dementia
- behaviours linked to dementia such as pacing, wandering, inability to recognise food, forgetting to eat, forgetting how to eat, inability to feed self, loss of communication skills and paranoia regarding food
- polypharmacy
- protein energy malnutrition
- aged-related changes, sometimes called the 'anorexia of ageing', for example loss of taste, smell, sight, changes to the digestive system, and swallowing difficulties
- depression
- chronic disease
- poor dentition such as poorly fitting dentures and dental prosthesis, missing and decayed teeth
- social isolation
- physical and organisational environment.

Key facts

Reported prevalence of malnutrition in the residential aged care setting ranges from 40–70 per cent.

Several studies indicate the presence of dementia is linked to unplanned weight loss.

Issues related to the quality of, and access to food choices that meet residents' cultural, religious and personal food preferences should be considered.

How to collect and report this indicator

Data collection

- There are two measures to be collected by auditing the monthly weight records of all residents.

Measure 1: Significant unplanned weight loss

- If over the three-month period a resident shows unplanned weight loss equal to or greater than **three** kilograms, record this change. This result is determined by comparing weight at the last weigh this quarter with weight at the last weigh last quarter. Both these weights need to be available to provide this result.

Measure 2: Consecutive unplanned weight loss

- If a resident shows an unplanned weight loss of any amount **every** month over the three consecutive months of the quarter, record this. This can only be determined if the resident is weighed on all three occasions.

Comments

To include on the data recording sheet:

- Residents may choose not to participate in this audit, so provide an explanation if residents are not included, that is if there is a difference between total residents and the number of residents weighed.
- Indicate if any residents were included in both measures, that is if they lost three kilograms or more **and** lost weight every month for three months.

Exclusions

- Residents who are absent, for example, in hospital.
- A resident receiving end-of-life palliative care.
- **Exclude** respite residents.

Quick tips for data accuracy

It is important for monitoring of unplanned weight loss to note the following:

- Regularly calibrate weighing devices.
- Weigh residents at around the same date and time as the previous month on the same weighing device.
- Weigh residents in clothing of a similar weight each month and deduct this from the total weight to arrive at a result.
- Ensure summing of weight loss from month to month is accurate.

If a resident has unplanned weight loss or gain, consider weighing the resident again the next day to check if this is just a normal daily fluctuation and to confirm accuracy.

Definition of key data elements

- Unplanned weight loss is beyond the control of the individual.
- It is weight loss where there is no written strategy and ongoing record relating to planned weight loss for the individual resident.
- **Significant weight loss** is defined as unplanned weight loss equal to or greater than three kilograms over a three-month period.
- **Consecutive weight loss** is defined as unplanned weight loss of any amount every month for a three-month period.

Counting rules

- You do not need to weigh all residents on a single day. You can weigh a number of people on each day of the month. For example, if your facility has 40 residents and there are 20 weekdays in a month, you may decide to weigh two residents each day.
- Each resident, however, must be weighed at monthly intervals and as close as possible to the same day of each month.
- Only residents who are included in all three weighs for the quarter can be evaluated against this indicator.
- Do not weigh residents if this causes them pain or distress. Using alternative weighing equipment may address this issue.

Important note

- You should investigate an individual resident's unplanned weight loss promptly, and put in place strategies to address this as quickly as possible.
- If a resident cannot be weighed, it is still good practice to monitor them using alternative means such as mid-arm or calf circumference. This ensures changes are identified and appropriate strategies put in place.

Data recording sheet

Name of service:
Reporting quarter end date:

Measure 1: Significant unplanned weight loss

Number of residents whose weight was monitored	Number of residents who experienced total unplanned weight loss equal to or greater than three kilograms

Comments

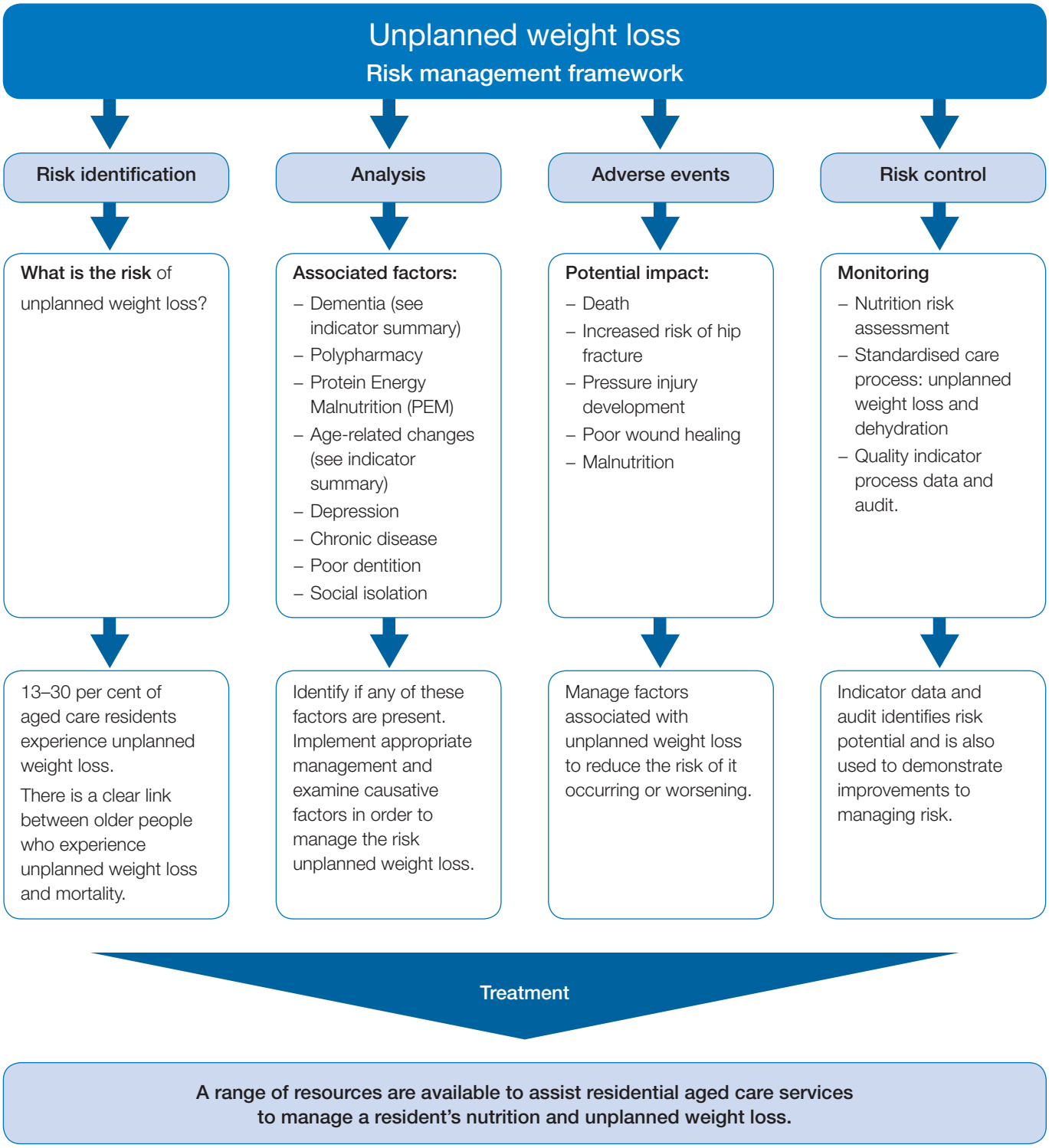
- **Required** if applicable – explain any difference between total residents and number of residents weighed, for example, 'Two residents died, one in hospital on second weigh day'.
- **Required** if applicable – indicate the number of residents who appeared in both parts of the indicator, that is they lost more than three kilograms and lost weight for three consecutive months, for example, 'Four residents lost more than three kilograms **and** lost weight every month'.
- **Optional** – any other comments.

Measure 2: Consecutive weight loss

Number of residents whose weight was monitored	Number of residents who experienced an unplanned weight loss over three consecutive months

Comments

- **Required** if applicable – explain any difference between total residents and number of residents weighed, for example, 'Two residents died, one in hospital on second weigh day'.
- **Required** if applicable – indicate the number of residents who appeared in both parts of the indicator, that is they lost more than three kilograms and lost weight for three consecutive months, for example, 'Four residents lost more than three kilograms **and** lost weight every month'.
- **Optional** – any other comments.


Unplanned weight loss
Risk management framework
Risk identification
Analysis
Adverse events
Risk control
What is the risk of unplanned weight loss?
Associated factors:
– Dementia (see indicator summary)
– Polypharmacy
– Protein Energy Malnutrition (PEM)
– Age-related changes (see indicator summary)
– Depression
– Chronic disease
– Poor dentition
– Social isolation
Potential impact:
– Death
– Increased risk of hip fracture
– Pressure injury development
– Poor wound healing
– Malnutrition
Monitoring
– Nutrition risk assessment
– Standardised care process: unplanned weight loss and dehydration
– Quality indicator process data and audit.
13–30 per cent of aged care residents experience unplanned weight loss.
There is a clear link between older people who experience unplanned weight loss and mortality.
Identify if any of these factors are present. Implement appropriate management and examine causative factors in order to manage the risk unplanned weight loss.
Manage factors associated with unplanned weight loss to reduce the risk of it occurring or worsening.
Indicator data and audit identifies risk potential and is also used to demonstrate improvements to managing risk.
Treatment
A range of resources are available to assist residential aged care services to manage a resident's nutrition and unplanned weight loss.

Resources

A range of resources are available to assist residential aged care services to manage a resident's nutrition and unplanned weight loss.

- Department of Health, *Standardised care process: unplanned weight loss,* State Government of Victoria, Melbourne:
  www.health.vic.gov.au/agedcare/downloads/score/weightloss_scp.pdf

- Department of Health, *Standardised care process: dehydration*, State Government of Victoria, Melbourne:
  www.health.vic.gov.au/agedcare/downloads/score/dehydration_scp.pdf

- Department of Health, *Well for life: improving nutrition and physical activity for residents of aged care facilities*, State Government of Victoria, Melbourne:
  www.health.vic.gov.au/agedcare/maintaining/wellforlife_pubs.htm

- Dieticians Association of Australia 2009, 'Evidence-based guidelines for nutritional management of malnutrition in adult patients across the continuum of care', *Nutrition & Dietetics*, vol. 66, suppl. 3, S1–S34:
  www.clinicalguidelines.gov.au/browse.php?treePath=&pageType=2&fldglrID=1617&

Evidence to support this quality indicator

This indicator highlights unplanned weight loss as a major issue among older people.

There is substantial evidence and research that demonstrates unplanned weight loss is significant among older people living in residential aged care.

Defining unplanned weight loss

A review of evidence-based literature reveals that unplanned weight loss is generally referred to as unintentional weight loss. However, for the purpose of this publication, the term unplanned weight loss will be used to ensure alignment with this quality indicator.

Unplanned weight loss is generally defined as weight loss that occurs involuntarily over a period of time, that is, weight loss that occurs as a result of circumstances beyond the voluntary control of the individual (Alibhai, Greenwood and Payette et al. 2005; Hartford Institute for Geriatric Nursing 2006; Miyamoto, Higashino, Mochizuki, Goda and Koyama 2011).

Unplanned weight loss is both a symptom and consequence of disease. It remains one of the best indications of nutritional risk in residential aged care (American Dietetics Association 2010; Hartford Institute for Geriatric Nursing 2006; Moreley, Anker and Evans 2009).

Unplanned weight loss is generally a clinical symptom of another disease process or syndrome including:

- protein-energy malnutrition
- anorexia of ageing
- sarcopenia
- illness and/or disease severity
- polypharmacy – medication side effects and interactions.

There is a particularly close correlation between unplanned weight loss and protein-energy malnutrition. Prevalence of malnutrition in the residential aged care setting ranges from 40–70 per cent (Watterson et al. 2009).

Two key Australian studies have concurred that the prevalence of malnutrition in residential aged care is approximately 50 per cent (Banks, Ash, Bauer and Gaskill 2007; Gaskill et al. 2008). In addition to this, those most at risk are residents over the age of 90 and/or those with high-level care needs (Banks et al. 2007; Gaskill et al. 2008; Watterson et al. 2009).

Normal weight loss for the older person can be expected to be only 0.1–0.2 kg a year (Wallace and Schwartz 2002).

The Dieticians Association of Australia (Watterson et al. 2009) has identified that measuring weight loss over time can predict malnutrition.

However, there is some variation regarding the definition of clinically significant weight loss in relation to malnutrition.

The ICD-10AM criteria for the diagnosis of malnutrition is as follows:

Severe: BMI less than 18.5 kg/m^2 **or** unintended weight loss of more than 10 per cent

Mild and moderate: BMI less than 18.5 kg/m^2 **or** unintended weight loss of more than 5–9 per cent.

The National Institute for Health and Care Excellence (NICE) in the UK provides three options for defining malnutrition:

- BMI less than 18.5 kg/m^2
- unintentional weight loss of more than 10 per cent in the last three to six months
- BMI less than 20kg/m^2 **and** unintentional weight loss of more than 5–9 per cent.

The minimum dataset used in the United States defines unintentional weight loss as a decrease of more than 5 lbs (2.3 kg) in one month, or more than 10 lbs (4.5 kg) in six months.

Unplanned weight loss in aged care

Unplanned weight loss is highlighted in the literature as a significant health issue among older people, particularly those living in aged care facilities. Statistics regarding its prevalence vary.

Study data from Alibhai et al. (2005), Ruscin et al. (2005) and Payette et al. (2000) report the range of unplanned weight loss in adults over the age of 65 as 13–27 per cent. Whereas an older study by Finch et al. (1998) has indicated that the prevalence is 31 per cent for those over the age of 65 in long term care.

Unplanned weight loss should not be dismissed as natural age-related change (McMinn et al. 2011). Many causes of weight loss can be addressed if detected early (Dyke 2011). Nurses and other members of the care team play an important role in screening residents at risk of malnutrition or where there is clinical concern, and ensure they receive adequate nutritional care (Chen et al. 2007; Hickson 2006; Merrell 2012; Watterson et al. 2009).

In the United States, weight loss is a key indicator of care provision in the long-term care environment (Morley et al.

2004). The Centers for Medicare and Medicaid Services (CMS) define unplanned weight loss in terms of avoidable and unavoidable. The focus is on the care provider's standards of practice in the identification, implementation, monitoring and evaluation of weight loss issues.

Avoidable weight loss is identified when it is evident that the care provider has failed to maintain standards of practice in nutritional management. Unavoidable weight loss is established when it is clear that despite adherence to practice standards, the resident continues to lose weight.

Adverse clinical events and unplanned weight loss

There are a number of adverse events that may occur as a result of unplanned weight loss in the elderly. These issues have a significant effect on the quality of life of older people in aged care (American Dietetic Association 2010; Banks et al. 2010; Beatty et al. 2014; Courtney et al. 2009; Dyke 2011; Metadaladis et al. 2008; Watterson et al. 2009).

Although it should be noted that for 10–36 per cent of older people, the aetiology of weight loss is unknown (Hartford Institute for Geriatric Nursing 2006).

Evaluated evidence suggests that unplanned weight loss among older people has a direct correlation with an increased risk of mortality (ADA 2010; Australian and New Zealand Society for Geriatric Medicine 2007; Beatty et al. 2014; Challa 2007; Tamura et al. 2013) within one year (Thomas et al. 2013).

This point is also supported by the British Geriatrics Society (2011), who state: 'a number of studies have now shown that the relative risk of death is consistently highest in those underweight than those overweight and in older people this may be even higher than those who are obese' (p. 2).

This risk is further increased when unplanned weight loss is classified as clinically significant.

Unplanned weight loss increases the rate of bone loss, particularly in the hip (McMinn et al. 2011; Reynaud-Simon 2009). Where weight loss is five per cent or more from baseline weight, it will double the risk of falls and hip fractures among older people (Australian and New Zealand Society for Geriatric Medicine 2007; Watterson et al. 2009). Evidence also links unplanned weight loss to the development of pressure injuries (ADA 2010; Australian and New Zealand Society for Geriatric Medicine 2007; Challa 2007; Iizaka et al. 2010; Reynaud-Simon 2009).

Wound healing is also impaired by poor nutritional intake, especially a poor intake of protein (Challa, 2007; BAPEN, 2012; Gaillard et al. 2008; Reynaud-Simon 2009). Inactivity or becoming bed bound can occur due to functional decline, loss of strength and mobility (BAPEN 2012; Challa 2007). In turn this can increase the risk of pressure injury development and poor recovery from chest infection (BAPEN 2012; National Collaborating Centre for Acute Care UK 2006).

Causes of unplanned weight loss

There are a number of reasons why unplanned weight loss may occur in older people living in residential aged care.

Unplanned weight loss in the elderly is a highly complex and multifaceted health concern that can involve social, environmental, emotional, psychiatric and physiological issues (Crogan and Evans 2009; Hartford Institute for Geriatric Nursing 2006; Dyke 2011; Strajkovic et al. 2011; Van Lanker et al. 2012).

Pain, illness, chronic, malignant and neurological disease can all contribute to weight changes in the older person (ADA 2010; McMinn et al. 2011; SCIE 2009).

But it is the growing prevalence of dementia and its link to weight loss that raises concern. Several studies indicate that the presence of dementia is linked to unplanned weight loss.

The current evidence is described in the report on Nutrition and Dementia published by Alzheimer's Disease International (Prince et al. 2014). Dementia certainly affects the areas of the brain responsible for the control of appetite and energy (Prince et al. 2014).

Weight loss can commence long before the symptoms of cognitive decline appear and increase as the disease progresses (Albanese et al. 2013; Kurrle et al. 2012; Miyamoto et al. 2011).

According to the Australian Institute if Health and Welfare (2012), 53 per cent of nursing home residents (nationally) have a diagnosis of dementia. A study by Irving (2003) found that residents with dementia exhibit a much lower body mass index compared with residents without dementia.

When considering the relationship between unplanned weight loss and dementia, take into account the behavioural and other characteristics of dementia that could result in unplanned weight loss. Authors such as Prince et al. (2014), Kurrle (2012), Aselage et al. (2010), Chang and Roberts (2008), Miyamoto et al. (2011), Gaskill et al. (2008) and Smith and Greenwood (2008) have explored these issues.

They include factors such as:

- pacing and wandering resulting in untreated increased caloric intake needs
- inability to feed self
- no longer knowing how to eat (apraxia)
- decline in communication skills
- inability to recognise food as food (agnosia)
- paranoia and mistrust regarding food
- forgetting to eat.

Some of these behaviours are described as aversive. Gillette-Guyonette et al. (2007) describe aversive feeding behaviours as:

- dyspraxia and agnosia – unable to use utensils properly or recognise food
- resistance – avoiding food, refusing to open mouth, spitting out the food, and aggression towards the person assisting them
- propharyngeal dysphagia – problems with control with mouth, tongue and swallowing
- changed behaviours and food preferences – wandering, refusal to eat requested food, altered preferences for taste or texture of food.

Many studies discuss the presence of protein energy malnutrition (PEM) among residents in aged care. PEM is the loss of lean body mass and adipose tissue that occurs as a result of low consumption of energy and protein (Reynaud-Smith 2009; Suominen et al. 2009; Australian and New Zealand Society for Geriatric Medicine 2007). Unplanned weight loss is a symptom of PEM (Miyamoto et al. 2011).

Another concept explored in the literature is physiological age-related changes. While weight loss and malnutrition are not an inevitable consequence of ageing, the physiological changes that occur in older adults can increase the risk of it occurring (Hickson 2006).

These changes include:

- decreased senses of taste and smell
- changes to dentition (i.e. loss/damage of teeth, poorly fitting dental prosthesis, poor oral health)
- early satiety (feeling fuller quicker)
- reduced appetite
- changes in the gastrointestinal tract that lead to poor nutrient absorption
- reduction in cellular capacity to store water
- increased frailty
- swallowing difficulties
- reduced eye sight.

These changes all contribute to unplanned weight loss (ADA 2010; Australian and New Zealand Society for Geriatric Medicine 2007; Benelam 2009; Dyke 2011; Gaskill et al. 2008; Tamura et al. 2013).

This process of age-related physiological change is sometimes called ‘anorexia of ageing’ (ADA 2010; Australian and New Zealand Society for Geriatric Medicine 2007; Reynaud-Smith 2009; Smith and Greenwood, 2008).

There is also a correlation between unplanned weight loss in the elderly and polypharmacy, medication side effects and interactions (ADA 2010; Beatty et al. 2014, Hartford Institute for Geriatric Nursing 2006; Strjkovic et al. 2011).

Polypharmacy is a significant health issue among older people. It can cause nausea, vomiting, diarrhoea, anorexia and dysgeusia (distortion of taste) (Alibhai et al. 2005; McMinn et al. 2011; SCIE 2009). These are all factors that can lead to unplanned weight loss. Research conducted by Agostini and colleagues (2004) demonstrated that the risk of weight loss among older people increased with the more medicines they consumed.

Limited research has been conducted regarding the relationship between the ‘eating environment’ in residential aged care and unplanned weight loss by authors such as Nijs et al. (2006).

A more recent study by Ulrich et al. (2014) identified that protected meal times and proactive nutritional support overseen by nurses are necessary components to the management of unplanned weight loss and malnutrition in residential facilities.

Staffing issues can also affect unplanned weight loss in residents, including:

- resourcing and failure to prioritise staff duties to provide adequate assistance at meal times (Chubb et al.; Dyke 2011; 2006; SCIE 2009; Taumra et al. 2013; Ulrich et al. 2014)
- poor staff knowledge and/or training in nutritional care (Chubb et al. 2006; SCIE 2009)
- systems and practices that either fail to identify the nutritional needs of residents or fail to communicate these needs to staff (Chubb et al. 2006; SCIE 2009)
- inadequate support, particularly for residents who are unable to communicate their nutritional needs, choices and preferences verbally (Carrieret al. 2007; SCIE 2009; Ulrich et al. 2014).

Issues related to the quality of, and access to, food choices that meet residents' cultural, religious and personal food preferences should be considered (Crogan and Evans 2009; Dyke 2011; SCIE 2009).

Authors such as Brush and Calkins (2008) and Smith and Greenwood (2008) discuss the value of adjusting the eating environment to improve eating among residents, especially those with dementia.

Adjustment strategies include:

- reduction of visual and auditory stimulation
- limiting courses of food to one at a time (to limit confusion over choice)
- use of appropriate lighting
- increasing visual contrast between table linen and crockery (for example, if both table linen and crockery are white, residents may not be able to distinguish the location of food).

Depression and other psychological factors can also cause unplanned weight loss (ADA 2010; Chen et al. 2007; Crogan and Evans 2009; Hartford Institute for Geriatric Nursing 2006; McMinn et al. 2011; SCIE 2009; Tamura et al. 2013). In fact, Dyke (2007, 2011) has indicated that the risk of weight loss in residents with depression is three times higher than those without depression.

Depression among older people in Australia is a growing concern (Dow et al. 2011). A recent systematic review of prevalence data relating to psychological issues in residential aged care facilities found that 4–82 per cent of older people have depression to some degree (Seitz et al. 2010). McMinn et al. (2011) state that older people with depression may experience unplanned weight loss due to loss of appetite and a reduced motivation to eat.

This leads to discussion about the nature of weight loss and functional decline. Age-related physiological changes also involve the loss of muscle mass and strength, a condition called sarcopenia (ADA 2010; Miller and Wolfe 2008; Morley et al. 2006). This can impair residents' functional ability by 30–50 per cent, as well as compromise the person's ability to eat independently (Paddon-Jones et al. 2008; Ullrich et al. 2014).

Functional decline associated with chronic disease can also lead to unplanned weight loss.

The American Dietetics Association (2010) states that chronic disease may lead to prescribed or self-imposed dietary restrictions and food intake that limits food variety and the intake of nutrients. For example an individual with heart disease may limit or eliminate all fats and foods containing fats. Where possible, restrictive diets should be avoided (ADA 2010).

The practical physical limitations that occur as a result of chronic disease should also be considered. For example an individual with chronic obstructive pulmonary disease (COPD) may find it too difficult to prepare meals due to shortness of breath or may become short of breath while eating, and as result may only eat partial amounts of meals. Similarly a person with Parkinson's disease may be unable to prepare meals due to reduced dexterity as a result of tremors, and may require partial or full assistance with eating, leading to similar outcomes to those individuals with COPD.

There are other broader issues that can contribute to unplanned weight loss among older people.

These issues can be best explained using the mnemonic MEALSONWHEELS (Morley et al. 1995). This mnemonic is used by a number of authors such as Australian and New Zealand Society for Geriatric Medicine (2007) and McMinn et al. (2011) to provide broad explanations of unplanned weight loss in older people.

M	**M**edication effects
E	**E**motion and depression
A	**A**lcoholism
L	**L**ate-life paranoia
S	**S**wallowing disorders
O	**O**ral factors such as poor dentition
N	**N**o money (to buy food)
W	**W**andering and other dementia-related behaviours
H	**H**yperthyroidism and hypothyroidism
E	**E**nteric problems (malabsorption)
E	**E**ating problems (inability to feed self)
L	**L**ow salt, low cholesterol diet
S	**S**ocial problems such as isolation, difficulty accessing food

References

American Dietetic Association 2010, 'Position of the American Dietetic Association: Individualized nutrition approaches for older adults in health care communities', *Journal of the American Dietetic Association*, vol. 110, pp. 1549–53.

Agostini JV, Han L and Tinetti ME 2004, 'The relationship between number of medications and weight or impaired balance in older adults', *Journal of the American Geriatrics Society*, vol. 52, pp. 1719–23.

Albanese E, Taylor C, Siervo M, Stewart R, Prince MJ and Acosta D 2013, 'Dementia severity and weight loss: a comparison across eight cohorts – the 10/66 study', *Alzheimer's & Dementia*, vol. 9, pp. 649–56.

Alibhai SM, Greenwood C and Payette H 2005, 'An approach to the management of unintentional weight loss in elderly people', *Canadian Medical Association Journa*l, vol. 172, pp. 773–80.

Aselage MB, Amella EJ and Watson R 2011, 'State of the science: alleviating mealtime difficulties in nursing home residents with dementia', *Nursing Outlook*, vol. 59, pp. 210–214.

Australian Institute of Health and Welfare 2012, *Dementia in Australia*, cat. no. AGE 70, AIHW, Canberra.

Australian and New Zealand Society for Geriatric Medicine 2007, *Position statement no. 6: Under-nutrition and the older person*, ANZSGM, Sydney.

Banks M, Ash S, Bauer J and Gaskill D 2007, 'Prevalence of malnutrition in adults in Queensland public hospitals and residential aged care facilities', *Nutr Diet*, vol. 64, pp. 172–78.

Banks M, Bauer J, Graves N and Ash S 2010, 'Malnutrition and pressure ulcer risk in adults in Australian health care facilities', Nutrition, vol. 26, pp. 896–901.

British Association for Parenteral and Enteral Nutrition 2012, *Combating malnutrition: recommendations for action*, retrieved from <hwww.bapen.org.uk>.

Beattie E, O'Reilly M, Strange E, Franklin S and Isenring E 2014, 'How much do residential aged care staff members know about the nutritional needs of residents?' *International Journal of Older People Nursing*, vol. 9, pp. 54–64.

Benelam B 2009, 'Satiety and the anorexia of ageing', *British Journal of Community Nursing*, vo. 14, 332–35.

British Geriatrics Society 2011, *Best practice guide: healthy eating for older people*, BGS, London.

Brush JA and Calkins MP 2008, 'Environmental interventions and dementia: enhancing mealtimes in group dining rooms', *ASHA Leader*, vol. 13, pp. 24–25.

Carrier N, Ouellet D and West G 2007, 'Nursing home food services: linked with risk of malnutrition', *Canadian Journal of Dietetic Practice and Research*, vol. 68, pp. 14–20.

Challa S, Sharkey JR, Chen M and Phillips CD 2007, 'Association of resident, facility, and geographic characteristics with chronic undernutrition in a nationally represented sample of older residents in U.S. nursing homes', *The Journal of Nutrition, Health and Aging*, vol. 11, pp. 179–84.

Chang CC and Roberts BL 2008, 'Feeding difficulty in older adults with dementia', *Journal of Clinical Nursing*, vol. 17, pp. 2266–74.

Chen LK, Lin MH, Hwang SJ and Chwang LC 2007, 'Nutritional status and clinical outcomes among institutionalised elderly Chinese in Taiwan', *Archive of Gerontology and Geriatrics*, vol. 44, 315–23.

Chubb P, Mann N, Coleman Y and Sibbel A 2006, 'The nutritional status of residents of aged care facilities: risk factors for a poor nutritional status and nutritional assessments', *Geriaction*, vol. 24, pp. 26–32.

Courtney M, O'Reilly M, Edwards H and Hassall S 2009, 'The relationship between clinical outcomes and quality of life for residents of aged care facilities, *Australian Journal of Advanced Nursing*, vol. 26, pp. 49–57.

Crogan NL and Evans BC 2009, 'Utilizing predictive resident-focused problems to improve nutritional outcomes in nursing homes', European Journal of Clin*ical Nutrition*, vol. 63, pp. 913–15.

Doherty TJ 2003. 'Invited review: aging and sarcopenia', *Journal of Applied Physiology*, vol. 95, 1717–27.

Dyck MJ and Schumacher JR 2011, 'Evidence-based practices for the prevention of weight loss in nursing home residents', *Journal of Gerontological Nursing*, vol. 37, pp. 22–33.

Finch S, Doyle W, Lowe C, Bates CJ, Prentice A, Smithers G and Clarke PC 1998, *National diet and nutrition survey: people aged 65 years and over, volume 1: report of the Diet and Nutrition Survey*, The Stationary Office, London.

Gaillard C, Alix E, Boirie Y, Berrut G and Ritz P 2008, 'Are elderly hospitalized patients getting enough protein?' *Journal of the American Geriatrics Society*, vol. 56, pp. 1045–49.

Gaskill D, Black LJ, Isenring EA, Hassall S, Sanders F and Bauer JD 2008, 'Malnutrition prevalence and nutrition issues in residential aged care facilities', *Australasian Journal on Ageing*, vol. 27, pp. 189–94.

Gillette Guyonnet S, Abellan Van Kan G, Alix E, Andrieu S, Belmin J, Berrut G, Bonnefoy M, Brocker P, Constans T, Ferry M, Ghisolfi-Marque A, Girard L, Gonthier R, Guerin O, Hervy MP, Jouanny P, Laurain MC, Lechowski L, Nourhashemi F, Raynaud-Simon A, Ritz P, Roche J, Rolland Y, Salva T and Vellas B; International Academy on Nutrition and Aging Expert Group 2007, 'IANA Expert Group: weight loss and Alzheimer's disease', *The Journal of Nutrition Health & Aging*, vol. 11, pp. 38–48.

Hartford Institute of Geriatric Nursing 2006, *Nutrition in the elderly*, retrieved from <http://consultgerirn.org/topics/nutrition_in_the_elderly>.

Hickson M 2006, 'Malnutrition and ageing', *Postgraduate Medical Journal*, vol. 82, pp. 2–8.

Iizaka S, Okuwa M, Sugama J and Sanada H 2010, 'The impact of malnutrition and nutrition-related factors on the development and severity of pressure ulcers in older patients receiving home care', *Clinical Nutrition*, vol. 29, pp. 47–53.

Irving GF 2003, 'Nutrition and cognitive function in the elderly', *Scandinavian Journal of Nutrition*, vol. 47, pp. 139–42.

Koritsas S, Davidson S, Clarke D and O'Connor D 2006, 'Diagnosing and treating depression in nursing home residents: challenges for GPs', *Australian Journal of Primary Health*, vol. 12, 104–08.

Kurrle S, Brodaty H and Hogarth R 2012, *Physical comorbidities of dementia*, Cambridge University Press, UK.

McMinn J, Steel C and Bowman A 2011, 'Investigation and management of unintentional weight loss in older adults', *British Medical Journal*, vol. 342, pp. 754–59.

Merrell J, Philpin S, Warring J, Hobby D and Gregory V 2012, 'Addressing the nutritional needs of older people in residential care homes', *Health and Social Care in the Community*, vol. 20, pp. 208–15.

Metalidis C, Knockaert DC, Bobbaers H and Vanderschueren S 2008, 'Involuntary weight loss: does a negative baseline evaluation provide adequate reassurance?', *European Journal of Internal Medicine*, vol. 19, pp. 345–49.

Miller SL and Wolfe RR 2008, 'The danger of weight loss in the elderly', *The Journal of Nutritional Health and Aging*, vol. 12, pp. 487–91.

Miyamoto K, Higashino S, Mochizuki K, Goda T and Koyama H 2011, 'Evaluation of weight loss in the community-dwelling elderly with dementia as assessed by eating behaviour and mental status', *Asia Pacific Journal of Clinical Nutrition*, vol. 20, pp. 9–13.

Morley JE, Anker SD and Evans WJ 2009, 'Cachexia and aging: an update based on the Fourth International Cachexia Meeting', *The Journal of Nutrition, Health and Aging*, vol. 13, pp. 47–55.

Morley JE, Thomas DR and Wilson MMG 2006, 'Cachexia: pathophysiology and clinical relevance', *American Journal of Clinical Nutrition*, vol. 83, pp. 735–43.

Morley JE, Thomas DR and Kamel HK 2004, 'Nutritional deficiencies in long-term care', *Ann Long Term Care*, vol. 2, suppl., S1–S5.

Morley JE and Silver AJ 1995, 'Nutritional issues in nursing home care', *Ann Intern Med*, vol. 123, pp. 850–59.

National Centre for Classification in Health 2008, *Australian coding standards for I.C.D.-10-AM*, National Centre for Classification in Health, Sydney.

National Collaborating Centre for Acute Care 2006, *Nutrition support for adults oral nutrition support, enteral tube feeding and parenteral nutrition*, NCCAC, London.

Nijs K, de Graaf C, Kok F J and van Staveren WA 2006, 'Effect of family style mealtimes on quality of life, physical performance and body weight of nursing home residents: cluster RCT', *British Medical Journal*, vol. 332, pp. 1180–84.

Paddon-Jones D, Short KR, Campbell WW, Garlick PJ, Volpi E and Wolfe RR 2008, 'Role of Dietary protein in the sarcopenia of ageing', *American Journal of Clinical Nutrition*, vol. 87, 1562s–66s.

Payette H, Coulombe C, Boutier V and Gray-Donald K 2000, 'Nutrition factors for institutionalisation in a free-living functionally dependent elderly population', *Journal of Clinical Epidemiology*, vol. 53, pp. 579–87.

Prince M, Albanese E, Guerchet M and Prina M 2014, *Nutrition and dementia: a review of available research'*, Alzheimer's Disease International, London.

Raynaud-Smith A 2009, 'Virtual clinical nutrition university: malnutrition in the elderly, epidemiology and consequences', *E-SPEN, the European e-Journal of Clinical Nutrition and Metabolism*, vol. 4, e86–e89.

Ruscin JM, Page RL, Yeager BF et al. 2005. 'Tumor necrosis factoralpha and involuntary weight loss in elderly, community dwelling adults', *Pharmacotherapy*, vol. 25, pp. 313–19.

Social Care Institute for Excellence 2009, *SCIE guide 15: dignity in care – nutritional care and hydration*, SCIE, London.

Seitz D, Purandare N and Conn D 2010, 'Prevalence of psychiatric disorders among older adults in long-term care homes: a systematic review', *International Psychogeriatrics*, vol. 22, pp. 1025–39.

Smith KL and Greenwood CE 2008, 'Weight loss and nutritional considerations in Alzheimer's disease', *Journal of Nutrition for the Elderly*, vol. 27, pp. 381–403.

Stajkovic S, Aitken EM and Holroyd-Leduc 2011, 'Unintentional weight loss in older adults', *CMAJ,* vol. 183, pp. 443–49.

Suominen MH, Sandelin E, Soini H and Pitkala KH 2009, 'How well do nurses recognize malnutrition in elderly patients?' *European Journal of Clinical Nutrition*, vol. 63, pp. 292–96.

Tamura BK, Bell CL, Masaki KH and Amellia EJ 2013, 'Factors associated with weight loss, low BMI, and malnutrition among nursing home patients: a systematic review of the literature', *Journal of the American Medical Directors Association*, vol. 14, pp. 649–55.

The Centers for Medicare and Medicaid Services (CMS) 2008, *CMS Manual System*, pub 100–07, retrieved from <www.cms.gov/Regulations-and-Guidance/Guidance/Manuals/Internet-Only-Manuals-IOMs-Items/CMS1201984.html>.

Thomas JM, Cooney LM and Fried TR 2013, 'Systematic review: Health-related characteristics of elderly hospitalised adults and nursing home residents associated with short-term mortality', *Journal of the American Geriatrics Society*, vol. 61, pp. 902–11.

Ullrich S, McCutcheon H and Parker B 2014, 'Nursing practice in nutritional care: a comparison between a residential aged care setting and a hospital setting', *Journal of Advanced Nursing*, vol. 70, pp. 1845–55.

Van Lanke A, Verhaeghe S, Van Heck A, Vanderwee K, Goossens J and Dimitri B 2012, 'The association between malnutrition and oral health status in elderly in long-term care facilities: a systematic review', *International Journal of Nursing Studies*, vol. 49, pp. 1568–81.

Wallace JI and Schwartz RS 2002, 'Epidemiology of weight loss in humans with special reference to wasting in the elderly', *International Journal of Cardiology*, vol. 85, pp. 15–21.

Watterson C, Fraser A, Banks M, Isenring A, Miller M, Silvester C, Hoevenaars R, Bauer J, Vivanti A and Fergusen A 2009, 'Evidence-based guidelines for nutritional management of malnutrition in adult patients across the continuum of care', *Nutrition & Dietetics*, vol. 66, suppl. 3, S1–S34.

World Health Organisation 2014, *Global database on body mass index*, retrieved from <http://apps.who.int/bmi/index.jsp?introPage=intro_3.html>.