



**Australian and New Zealand Society for Geriatric Medicine**

**Position Statement No 6**

**Under-Nutrition and the Older Person**

**Revised 2007**

1. Under-nutrition in older people is common and the prevalence increases with increasing frailty.
2. Under-nutrition in older people is associated with poor health outcomes and increased health care costs.
3. There are physiological reasons (reduced smell and taste) for decreased appetite and weight loss in older people.
4. There are many non-physiological factors such as poverty, depression and isolation. These need to be identified and managed.
5. Screening and assessment tools exist for use in clinical practice.
6. There is no gold standard for the diagnosis of under-nutrition.
7. Non-pharmacological measures to manage under-nutrition may require input from the inter-disciplinary team. In long term care settings, this may include assistance with feeding, dining in company and attention to the choice of food.
8. Nutritional supplementation has been shown to be beneficial in older, unwell (hospitalized) and under-nourished older people.
9. Orexigenic and anabolic agents can not be recommended for routine use due to their adverse effects and lack of convincing evidence about their benefits in treating under-nutrition in older people.
10. Percutaneous Endoscopic Gastrostomy (PEG) feeding in advanced dementia has not been shown to prolong survival, improve nutrition, maintain skin integrity, prevent aspiration or improve quality of life. There has been no randomized control trial comparing the benefits of PEG feeding to hand feeding. With PEG feeding there may be increased use of physical restraints. In reaching a decision, the risk-benefit ratio, advanced directives, cultural and religious viewpoints need to be taken into account. PEG feeding should be considered, perhaps as a temporary measure, in older under-nourished people who may benefit in terms of quality of life and physical function.
11. Under-nutrition and the older person is an area of major research interest and robust studies are required to ascertain if there are benefits from nutritional supplementation in community and long term care settings. New pharmacological treatment measures targeting physiological factors may also be of benefit.

*This position statement represents the views of the Australian and New Zealand Society for Geriatric Medicine. This paper was revised by Dr Renuka Visvanathan and was approved by the Federal Council of the ANZSGM on 7 September 2007.*

## **Background Paper**

There is increasing awareness about the adverse health consequences of over-nutrition or obesity. Similarly, the health needs of older people with under-nutrition must be addressed. In advocating for healthy weight, care is required to ensure that older people are provided with sound advice: eat well and exercise to achieve a healthy weight. This background paper specifically reviews aspects of the literature pertaining to under-nutrition in older people.

### **Definitions**

**Malnutrition** includes: 1) under-nutrition resulting from reduced food intake; 2) over-nutrition from excess food intake; 3) selective nutrient deficiencies and 4) imbalances because of disproportionate intake [1].

**Protein-Energy Under-nutrition (PEU)** is a clinical syndrome characterised by weight loss associated with significant depletion of fat stores and muscle mass. There is a continuing spectrum of under-nutrition from mild PEU to that of visceral organ failure resulting in gross peripheral oedema. PEU is a metabolic response to stress that results in a significant increase in protein and energy requirements to maintain homeostasis [2]. Inadequate nutrient supply primarily affects organ systems with rapid cellular turnover and can develop within 2 or 3 days of inadequate intake. Acute confusional states are often seen in PEU and are related to dehydration. Multiple vitamin and trace element deficiencies may also occur. There is no agreed gold standard definition for PEU but there are physiological and non-physiological factors that contribute to the development of PEU.

### **Physiological Factors Associated With Weight Loss**

The term 'anorexia of ageing' refers to the decline in energy intake and appetite that can occur with progressive ageing [3,4]. This reduction in energy intake often exceeds the decrease in energy expenditure, so body weight is unintentionally lost [5]. When body weight decreases in older people, lean body tissue is thought to be lost disproportionately (sarcopenia) [5,6]. The anorexia of ageing is

said to be associated with not only a reduction in sense of taste and smell but also changes to hormonal (eg. cholecystokinin) and neurotransmitter (nitric oxide) control of food intake [4]. Physical inactivity, motor unit remodelling, decreased hormone levels (eg. testosterone), production of catabolic cytokines and reduced protein synthesis are said to contribute to the development of sarcopenia [7].

### **Non-physiological Factors Associated With Weight Loss**

More importantly and frequently missed are the non-physiological factors associated with PEU. Very often, this is where intervention is likely to be successful. 'MealsOnWheels' is a mnemonic for common treatable causes of under-nutrition in older people [8,9].

M-medication effects, E-emotion, depression, A-alcoholism, L-late life paranoia, S-swallowing disorders, O-oral factors such as dentition, ulcers, N-no money, W-wandering and other dementia related behaviour, H-hyperthyroidism, hypothyroidism, hyperparathyroidism, hypoadrenalism, E-enteric problem (malabsorption), E-eating problems (inability to feed self), L-low salt, low cholesterol diet, S-social problems.

### **The Prevalence of Under-nutrition**

There is no agreed upon 'gold standard' definition for under-nutrition. For this reason, reported prevalence figures vary widely. To enable meaningful comparison across care settings, Table 1 quotes prevalence figures based on the Mini Nutritional Assessment (MNA-discussed later). A large proportion of community dwelling older people are at-risk of under-nutrition (44%) [10]. With increasing frailty there is an increasing prevalence of under-nutrition and risk of under-nutrition.

**Table 1 Prevalence of malnutrition by the level of care**

Clinical Setting	Under-nourished	At-risk of Undernutrition	Total
	(MNA<17)	(MNA 17-23.5)	
<i>Community</i>			
European community (healthy) <sup>[10]</sup>	1	44	45
Elderly home-care rural Finland <sup>[11]</sup>	3	48	51
<i>Hospitals: Acute</i>			
Australian acute hospital <sup>[12]</sup>	20	30	50
Swiss acute hospital <sup>[13]</sup>	18.6	60	78.6
Swedish acute geriatric unit <sup>[14]</sup>	26.5	55.9	82.4
<i>Hospitals: Sub-acute</i>			
American sub-acute care <sup>[15]</sup>	28.8	62.5	91.3
<i>Low Level Care</i>			
Swedish Old People's Home (Hostel) <sup>[16]</sup>	33	51	84
<i>High Level Care</i>			
Group Living with Dementia- Sweden <sup>[16]</sup>	38	57	95
Swedish Nursing Home <sup>[16]</sup>	71	29	100
MNA < 17- malnourished MNA 17-23.5- at-risk of malnutrition			

### **Consequences of Under-nutrition**

Under-nutrition is associated with poor health outcomes which significantly affect quality of life and is costly to individuals, families and the community. It has been reported that the cost to the United Kingdom from malnutrition is in excess of £7.3 billion per year [17]. The examples below use the MNA as a means of classifying nutritional status but many other studies using other measure to define under-nutrition have also shown similar associations.

**Increased Mortality-** In a study looking at older hospitalized patients (age 75+), patients who died (14.9±5.2) had lower MNA scores that those that survived (18.5±5.5, P<0.001) [18].

**Prolonged Hospitalisation-** Older patients with MNA scores ≥24 (28.3±27.6 days) spent less time in hospital compared to older people with MNA scores <17 (59.9±77.0 days, P<0.001) [18].

**Increased Frequency of Hospitalization-** Under-nourished community dwelling older

people (MNA<24) are more likely to have 2 or more emergency hospital admissions over a 12 month period than nourished older people (RR 2.96 95%CI 1.15-7.59) [19].

**Institutional Placement-** In one study of individuals with Alzheimer's Disease, multivariate analysis revealed that a MNA score of less than 25.5 and overeating behavioural problems were associated with being placed [20].

**Falls-** Community dwelling older people who are under-nourished (MNA<24) are more likely to report falling over a 12 month period than nourished older people (RR 1.65; 95%CI 1.13-2.41) [19].

**Increased risk of Osteoporosis-** A MNA score < 27 was associated with an increased risk of having osteoporosis in the femoral neck and/or hip in community dwelling older people (OR2.09, 95%CI 1.14-3.83) [21].

**Increased Fracture Risk-** In one study looking at elderly hospitalized patients with fractured neck of femur, 56% of patients were found to be at-risk of under-nutrition and sadly 2-3 weeks later 68% were at-risk [22].

**Pressure Sores-** In a nursing home study looking at older people with pressure sores, only 17% of those with pressure sores were nourished whilst 29% were at-risk of malnutrition (MNA 17-23.5) and 54% were malnourished (MNA<17) [23].

### **Screening and Assessment of Under-nutrition**

It is important to distinguish between screening and assessment processes. The British Dietetics Association (briefing paper) has defined nutrition screening as: 'A simple and rapid process of identifying clinical characteristics known to be associated with malnutrition. The screening process is intended to identify those individuals at risk of becoming malnourished who require referral to a trained dietitian for comprehensive nutrition assessment. It also defined nutrition assessment as: 'A comprehensive process of identifying and evaluating the nutritional status of an individual using appropriate measurable methods.' Therefore, practically one has to firstly screen to detect risk of under-nutrition and then carry out a more detailed assessment to determine if it is present or not. Some commonly used screening tools are discussed below.

#### ***The Australian Nutrition Screening Initiative***

This is a screening checklist that can be self-administered or used by health professionals as an alert to identify those older people living independently in the community who may be at risk from under-nutrition [24]. It acknowledges that the risk factors for nutritional risk are multi-factorial therefore inter-disciplinary interventions such as social services, oral and mental health services and medication review services may be required in addition to nutritional counselling and support.

#### ***The Malnutrition Universal Screening Tool (MUST)***

This screening tool is widely used in the United Kingdom and is said to be able to screen for nutrition risk in all adult patients across all health care settings [25]. An overall risk of under-nutrition is assessed by totalling scores for a low body mass index (BMI), the presence of weight loss, the presence of acute illness and the likelihood of experiencing reduced oral

intake of more than 5 days. MUST is linked to a generic care plan.

#### ***Simplified Nutritional Assessment Questionnaire (SNAQ)***

This is a very simple 4-item appetite assessment tool [26]. It is aimed at detecting risk of poor nutritional health prior to weight loss. The SNAQ was derived from the Council of Nutrition appetite questionnaire which was developed using the Delphi technique [26]. In a group of long term care residents, the SNAQ was shown to have sensitivities and specificities for 5% and 10% weight loss of 81.3 and 76.4 and 88.2 and 83.5 respectively [26]. There 4 questions ask about appetite, satiety, taste and quantity. The maximum score is 20 and a score  $\geq 14$  indicates risk of at least 5% weight loss within 6 months.

#### ***Rapid Screen***

In a study of sub-acute care patients, the rapid screen was developed and recommended because of it's simplicity [27]. An individual is classified as under-nourished if their BMI score was less than 22kg/m<sup>2</sup> and/or they experienced a >7.5% weight loss over the preceding 3 month period. When compared to in-depth assessment, the rapid screen had an acceptable sensitivity of 78% and an excellent specificity of 97%. Therefore, where resources are very limited and targeted referrals to the clinical dietitian are a must, the rapid screen may be beneficial.

#### ***The Mini Nutritional Assessment (MNA)***

The Mini Nutritional Assessment is said to consist of 2 sections- the screening (MNA-short form [MNA-SF] and the assessment section [28],[29]. The MNA-SF consists of 6 questions including BMI estimation and questions about weight loss, appetite, emotion, mobility and acute illness. The assessment section is completed if a score of 11 or less is obtained on the MNA. The remainder of the assessment includes some simple anthropometry measurements (mid arm and calf circumference), a subjective assessment of nutritional health and questions about dietary intake, medication use and dependence. The questionnaire can also be completed by a proxy and the MNA can take up to 15-20 minutes to complete. The maximum score is 30. A total score  $\geq 24$  indicates no nutritional risk whilst a score between 17-23.5 indicates that the individual is at-risk of malnutrition and a score <17 suggests that the individual is malnourished. In an Australian study of sub-acute care patients, when

compared to a more in-depth assessment, subjects who were malnourished according to the MNA were likely to be classified as under-nourished by the in-depth assessment but this was not necessarily true for those classified as at-risk of malnutrition (unpublished data). For this reason, some authors argue that the MNA should be used as a screening tool to assess risk rather than as an assessment tool to determine nutritional status [30]. Where individuals are found to be at-risk of malnutrition, a more in-depth assessment may need to occur to determine the need for intervention [27]. Nevertheless, all individuals identified as at-risk should have reversible non-physiological factors addressed.

### ***Subjective Global Assessment***

This assessment tool aids in the diagnosis of under-nutrition and requires the clinician to identify in the history the presence of gastrointestinal symptoms, impaired physical function, weight loss, illness and change in dietary habit [31,32]. Loss of subcutaneous fat and muscle and the presence of oedema and ascites is determined through physical examination. Swallowing is assessed via a water test but there are no laboratory investigations performed. From this information, the patient is classified as well-nourished, moderately malnourished or severely malnourished.

### ***In-depth Assessment of Nutritional Status***

As discussed earlier, there is no accepted gold standard for the assessment of nutritional status. In clinical settings, this is most often performed by trained clinical dietitians. In some ways not unlike many other aspects of medicine, it is a clinical judgment based on clinical experience and supported through evidence gained from any combination of the following:

1. History determining non-physiological risk factors, illness and reduced oral intake;
2. Physical examination;
3. Bed side anthropometric measurements (may include BMI, weight loss, skinfold thickness assessment);
4. Haematology and biochemical assessment (the presence of hypoalbuminemia, anemia, hypocholesterolemia, low lymphocyte counts);

5. Dietary assessment (food diaries, food charts); and
6. Body composition measurements (bio-electrical impedance, DEXA).

## **Interventions**

### ***Non-pharmacological***

There are many simple non-pharmacological intervention measures that can make a beneficial difference to the nutritional health of older people. Intervention strategies to manage under-nutrition often requires the skills of the multi-disciplinary team. A dietitian review to provide appropriate advice to family or individuals is often of benefit. Where dysphagia exists, then a speech therapist assessment and food modification may also be required. In such instances both the speech therapist and the dietitian can collaborate to provide individuals and families with suggestions about appropriate meal preparation. At times, an occupational therapist may also need to be involved where home modification and equipment is required to enable food preparation and feeding. Social work input may be required where there are financial constraints or isolation. Psychologists may be of help when depression is a contributing factor. Attention to oral health is a must and this is frequently overlooked. The team members (including the doctor and the nurse) must identify non-physiological factors and intervene appropriately. Community service providers may also need to be involved in meal preparation and supervision. Simple dietary advice can be found on various governmental websites: [www.nhmrc.health.gov.au](http://www.nhmrc.health.gov.au) and [www.MyPyramid.gov](http://www.MyPyramid.gov). Education of family members or carers is a vital part of ensuring improved nutritional health. For example, some families may choose to eat with their parents on weekends to ensure good oral intake.

Consumption of alcohol with meals may improve appetite and stimulate food intake [33]. Similarly, taste and smell intensification of food may also improve oral intake [34]. Eating in a communal setting as opposed to eating alone can also result in better nutritional intake [35]. In one recent study, when family style dining which included the right ambiance in the dining hall, residents being able to choose their meal and a member of staff eating with residents at the table was compared to the control group who chose their food 2 weeks before, had

their medications dispensed during meals and had a choice of either eating in their room or to assigned seats, residents in the intervention arm maintained body weight (decreased in control group) and energy intake (decreased in control group) when compared to the control group [36,37]. Restrictive diets should not be prescribed to long term care residents unless absolutely necessary. Liberalizing diets as opposed to the prescription of restrictive diets has been shown to enhance quality of life and food intake [38]. In view of physiological changes that result in early satiety, smaller frequent meals may be a preferred option compared to large main meals. In one study smaller meals which were protein enriched resulted in increased oral intake compared to the standard hospital meals [39].

Knowledge and overall community nutritional health status may be improved through action taken by primary healthcare providers, governmental and non-governmental organizations. The benefits of healthy eating and healthy physical activity should not be under-estimated. An integrated nutrition and exercise program for older Americans recently reported that post-intervention, 75% of participants showed positive improvement in nutritional and exercise stages of change [40]. Satisfaction with the program was 99% and 24% of participants reported improved health status. In a study examining the effect of exercise training and nutritional supplementation of frail older people, increased oral intake was noted in the group that were receiving nutritional supplementation and exercising [41].

The provision of meals through programmes such as 'Meals on Wheels' can also result in improved nutrient intake and weight in frail older people [42]. It is important to note that 'Meals on Wheels' can only supplement food intake and is not a meal replacement service.

## **Pharmacological**

### Nutritional Supplements

Nutritional supplements are products that can be taken in addition to food (eg. drinks, puddings etc.) or added to food (eg. powder). They are often rich in macro-(eg. protein) and micro-nutrients (eg. vitamins). It has been widely recommended that nutritional

supplements should be taken between meals as it may suppress normal meal intake if taken at meal times [43]. Two more recent studies in elderly patients have contradicted this notion by reporting that the provision of nutritional supplements with or just before meals does not necessarily suppress meal intake in older patients [44]. Therefore, in circumstances where compliance with between meal regimens may be difficult, then it may be best to recommend the consumption of nutritional supplements with meals. For instance, a recent study in residential care facilities found that staff were more likely to spend more time encouraging supplement intake at meal times compared to between meal times [45].

A meta-analysis of trials showed that nutritional supplement reduced mortality in older people (Peto odds ratio 0.86, CI 0.74-1.00) [46]. Sub-analysis revealed that reduced mortality was associated with nutritional supplementation in undernourished, older ( $\geq 75$  years), unwell or when people were offered more than 1674kJ per day [46]. No beneficial effect on mortality has been seen in community and long term care settings. Hospitalized patients provided nutritional supplementation experienced fewer complications (eg. infective, pressure sores, poorly healing ulcers) compared to those who were not supplemented (Peto odds ratio 0.72, CI 0.53-0.97) [46]. Following hip fractures, oral multi-nutrient feeds (supplementation) was shown to reduce unfavourable outcomes (RR 0.52, 95% CI 0.32 to 0.84) but not reduce mortality (RR 0.89, 95% CI 0.47-1.68) in comparison to no supplementation [47]. In the same patient population, nasogastric multi-nutrient feeding on the other hand was poorly tolerated and did not result in a reduction of mortality [47]. There was a trend that nutritional supplementation reduced length of hospitalization (weighted mean difference -3.30 vs. -0.8 days) [46]. No benefits have been reported in terms of functional outcome and quality of life from nutritional supplementation [46]. In the FOOD trial, there was a trend that early enteral feeding in older people with dysphagia resulted in a reduction of risk of death (5.8% 95%CI -0.8-12.5;  $P=0.09$ ) compared to delayed feeding ( $>7$  days) [48]. Nasogastric feeding was the preferred method compared to PEG feeding in the management of stroke with dysphagia [48]. Therefore, there may be some benefits to in-hospital supplementation of at-risk older people but the evidence for use in community and long term care settings is lacking. Quality studies, specifically targeting older under-nourished people in the

community and long term care facilities are required to evaluate possible benefits.

#### Multivitamin and mineral supplementation

There has been interest in the benefits of micronutrients and minerals in reducing the risk of infections. In one study looking at older people in residential care facilities, micronutrient and mineral supplementation did not result in reduced infection rates [49]. It has been suggested micronutrient supplementation in under-nourished older people for greater than 6 months may reduce the risk of infections but studies are required to confirm this [50].

#### Others

Orexigenic and anabolic agents can not be recommended for routine clinical use due to the lack of supporting evidence for its use in the management of under-nutrition in older people. It has many adverse effects. The use of megestrol acetate for period less than 3 months has been reported to be of benefit in promoting appetite but it is associated with the development adrenal insufficiency and deep vein thrombosis [51,52,53]. Megestrol acetates has been shown to improve appetite and weight gain in patients with cancer [54]. Cannabinoids have been used to stimulate appetite in AIDS related cachexia [55]. It has been suggested that Dronabinol which is a cannabinoid may be useful in stimulating appetite in older people with severe malnutrition which may be terminal [51]. However, it is associated with adverse effects such as sedation, tachycardia, hypotension and seizures (product information). Weight gain can be seen with Mirtazapine (an anti-depressant) and may be the anti-depressant of choice when patients are depressed [56]. Growth hormone has been shown to have some beneficial effects on lean mass but is associated with adverse effects such as the development of diabetes, gynecomastia and athralgia [57]. A very recent randomized control trial in elderly subjects showed that neither Dehydroepiandrosterone (men and women) nor testosterone (men only, low level testosterone) supplementation was associated with benefits in body composition, quality of life and physical performance [58]. In contrast another study showed that testosterone supplementation in older men with low normal

or low levels of testosterone was associated with improved physical function and strength over 36 months [59]. Also, testosterone replacement in older men was associated with higher detection of prostate events (prostate cancer, PSA > 4ng/ml) and of hematocrit >50% compared to control [60].

#### Percutaneous Endoscopic Gastrostomy

Swallowing difficulties are common in advanced dementia. Advanced directives or a delegate (medical power of attorney or enduring power of guardianship) may guide management. But where there is no clear directive, then families need to discuss the pros and cons of treatment with treating clinicians. The goal of any treatment should be to improve quality of life and not merely to prolong life without quality. It is known that the majority of older people with PEG placement do not survive beyond one year [61]. At least five cohort studies in nursing home residents have shown no benefits to survival with PEG feeding [61]. Only one cohort study in a group of patients with amyotrophic lateral sclerosis has shown a survival benefit [61]. Therefore, where there is the potential to improve functional health and quality of life and the benefits outweigh the risks, PEG feeding should be recommended. However, failure to eat or thrive is often due to the older person entering into the terminal phase of an illness (eg. advanced dementia) [62]. In such cases, the recommendation for PEG feeding may actually reduce quality of life. In many cases, the institution of PEG feeding may be associated with denial of oral intake and this may negatively impact quality of life as being able to taste food is one of life's pleasure. A qualitative study of adults revealed that oral intake of food and fluid was missed with PEG feeding [63]. Physical restraints may sometimes be required to prevent the older person from pulling the PEG out and surely this would have a major detrimental effect on quality of life [64]. There is also some evidence that PEG feeding is associated with an increased risk of pressure ulcer formation [64]. Interestingly, although most often recommended for these reasons, PEG feeding has not been shown to maintain skin integrity, prevent malnutrition and reduce aspiration risk [64]. There has been no randomized trial comparing the benefits of PEG feeding to hand feeding. Therefore, a realistic discussion with regards to the limited benefits and possible discomforts should occur with families to enable them to make an informed decision. Cultural and religious beliefs should also be taken into consideration in reaching a decision [64].

## **Conclusion**

Under-nutrition in older people is common and is associated with costly adverse health outcomes. Screening and assessment tools exist to identify older people at-risk of under-nutrition. This needs to occur across all settings: community service providers intake assessments, general practice, acute settings and intake assessments of long term care facilities. Although, there may be physiological reasons for weight loss in the older person, there are often many other non-physiological factors that may be amenable to intervention and these need to be identified and improved.

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