

# Guideline

## Screening and treatment of malnutrition

Translation of the Dutch guideline Screening and treatment of malnutrition, version June 2011

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## Introduction

This guideline ‘Screening and treatment of malnutrition’ gives an overview of current perspectives on the early recognition and treatment of malnutrition in Dutch healthcare. It concerns hospitalized children and adults, adults treated in outpatient clinics, patients living in nursing and care homes and high-risk groups in general practice and homecare. Palliative care is not covered in this guideline. Rehabilitation, care for mentally disabled persons and mental healthcare are also not yet covered in this guideline. In the future specific screening tools and treatment for malnutrition in these sectors will be developed. Many of the currently developed materials and guidelines can be applied to these sectors until these specific tools are available. We recommend referring to a dietitian specialising in these specific patient groups.

The guideline is developed by an editorial group and approved by the Dutch Steering Group on Malnutrition ([www.fightmalnutrition.eu](http://www.fightmalnutrition.eu)) and DON (Dietitians Malnutrition Netherlands), a collaboration of dietitians involved in all the relevant Dutch dietetic associations. This guideline ‘screening and treatment of malnutrition’ will be updated annually by a member of the editorial group and will, when significant changes are made, again be approved by the Dutch Steering Group on Malnutrition and the DON.

Amsterdam, June 2011

# Chapter 1. Malnutrition

## 1.1 Definition and prevalence

Malnutrition is an acute or chronic condition where a deficiency or imbalance of energy, protein and other nutrients cause measurable and adverse effects on body composition, function and clinical outcomes.

[1, 2] The problem of disease related malnutrition has been recognised for years and, since 2004, its prevalence is measured as part of the Dutch Annual Measurement of Care Initiative (LPZ).

The prevalence of mild and severe malnutrition in all sectors of the Dutch healthcare is high. On average one out of four to five patients in hospitals, nursing homes and homecare suffers from severe malnutrition.

[3, 4]

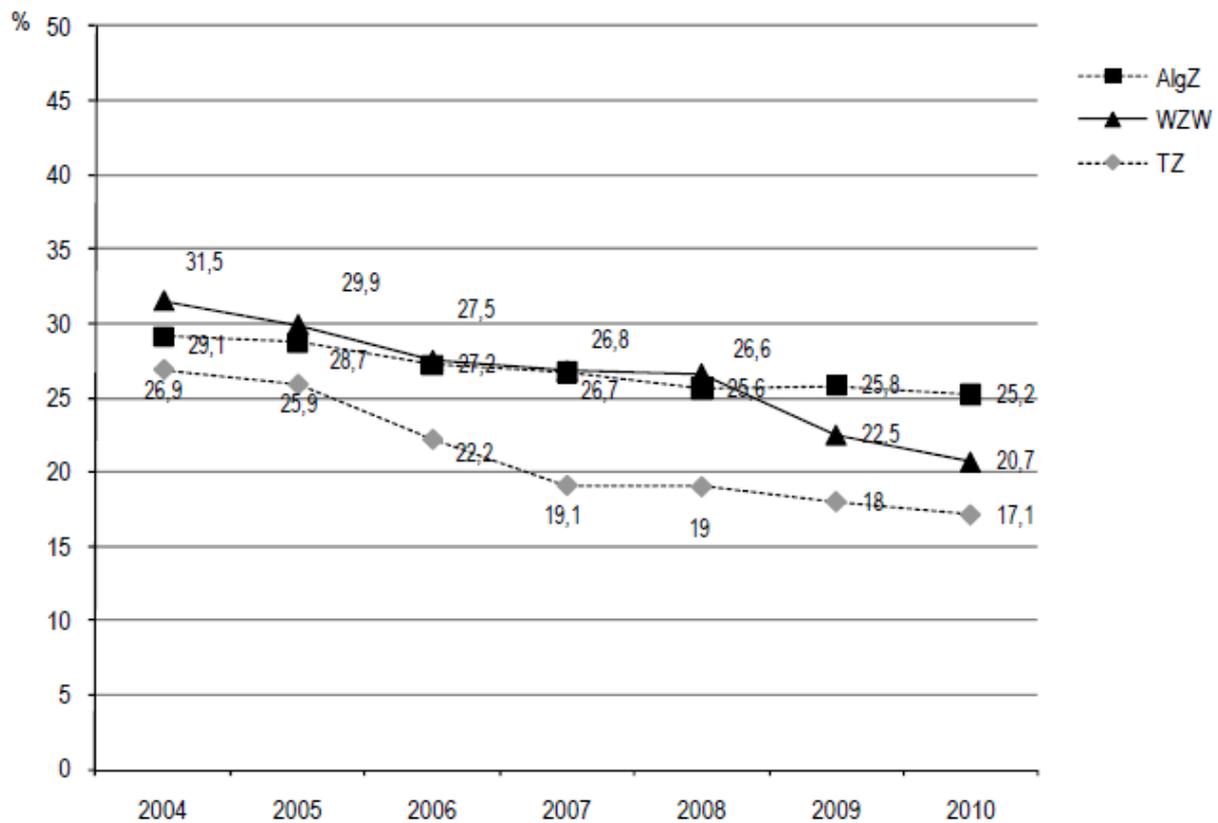


Figure 1 Prevalence of malnutrition in the Netherlands 2004-2010, LPZ [3]  
 Alg= General hospitals; WZW = nursing homes and assisted care houses, TZ = home care

## 1.2 Causes

Groups specifically at risk of malnutrition are the elderly, patients suffering from chronic illness, oncology patients, patients undergoing major surgery and patients with severe trauma.

The causes of malnutrition can be based in physical, psychological, medical and social factors. Physical factors include impaired taste, smell, mobility, anorexia, diminished feelings of hunger or satiety, malabsorption, pain and fatigue. Psychological factors include anxiety, depression, isolation, distress and

changes in life circumstances. Medical factors include health problems such as infection and / or inflammation, problems involving chewing and swallowing, dementia, adverse effects of medication and addiction. Social factors include impaired ability to shop for and prepare food, isolation, bereavement and poverty. Knowing the cause of malnutrition makes it possible to identify the presence of cachexia, sarcopenia and wasting [5,6]. This will be further discussed in Chapter 4.

### 1.3 Adverse consequences

Malnutrition has severe consequences for the health of a patient. It has been shown, in many studies, that malnutrition leads to reduced functional recovery as well as severe consequences during illness. Malnutrition reduces functioning of the immune system, wound healing, increases the chance of developing pressure sores, impairs the quality of life and increases mortality [7-12]. These complications of malnutrition lead to increased length of stay in hospital with increased use of medication, leading to increased healthcare costs[13-15]. Additionally, inactivity causes loss of muscle mass leading to decreased heart and lung capacity.

In children malnutrition not only has direct consequences, but, because a child is developing, it also causes long-term effects such as lower IQ and stunted growth[16,17]. Recent studies in Dutch hospitals showed that children suffering from malnutrition stay significantly longer in hospital than children who are not malnourished[18].

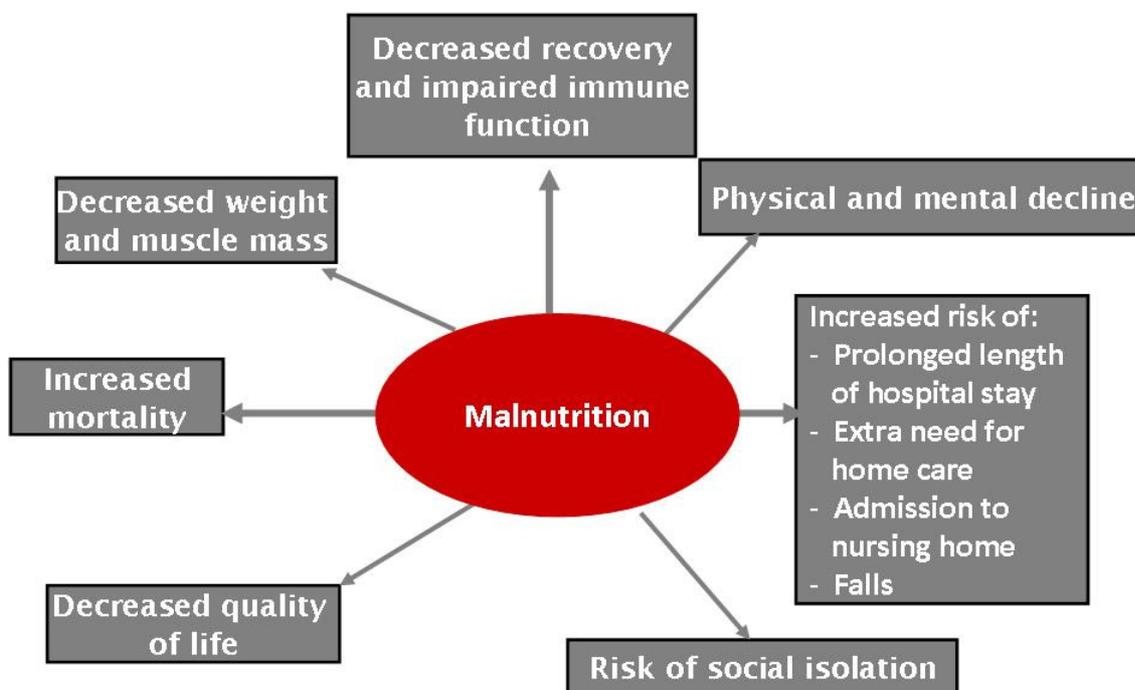


Figure 2 The adverse consequences of malnutrition

#### 1.4 The effectiveness of early recognition and treatment of malnutrition

In multiple studies on the effects of screening and early treatment of malnutrition it has been shown that timely treatment of malnutrition may reduce length of stay and complications such as infections and pressure sores. Early recognition and treatment of malnutrition have also been shown to be cost effective.

Early recognition of malnutrition means that treatment can be started sooner. Early treatment leads to improved nutritional intake, stabilisation or increase of weight, improved nutritional status and functional outcomes such as muscle strength and quality of all aspects of life. Early treatment of malnutrition also decreases complication rates, length of stay and mortality [7-10, 19-21]. Screening in hospitals improves the recognition of malnutrition from 50% to 80%.

### Shortening the patient's journey

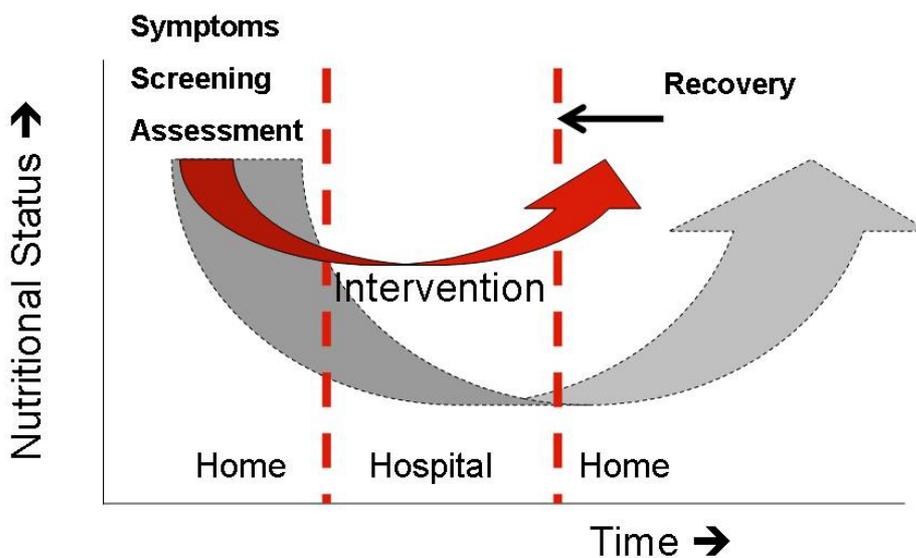


Figure 3 The importance of early recognition and treatment of malnutrition

Early screening and treatment of malnutrition is vital. Screening and intervention in the home situation, early in the course of developing disease, can prevent severe malnutrition and decrease the amount and complexity of care. This is shown in Figure 3. The grey line shows the possible course of nutritional status without screening. Malnutrition is recognised at a later stage and the patient is admitted to the hospital with much poorer nutritional status. The red line shows the preferred situation in which the patient is screened in general practice or through the home-care system. The nutritional status of this patient does not deteriorate so significantly thereby helping to prevent the development of multiple problems

## Chapter 2. How is malnutrition defined

Malnutrition is a complex problem which is related to many other factors such as the intensity and nature of the underlying disease and the age of the patient. For this reason an international consensus on the criteria of malnutrition has not yet been established. The criteria described below are commonly used both nationally and internationally. The diagnostic criteria are further explained in Chapter 4.

### 2.1 Malnutrition and adults

Malnutrition occurs in adults when there is unintentional weight loss of more than 10% in the past 6 months or more than 5% in the last month. Additionally, malnutrition occurs when the Body Mass Index (BMI(weight/height<sup>2</sup>)) is less than 18,5.[22]

### 2.2 Malnutrition and the elderly

In the elderly (>65 years) malnutrition is defined as unintentional weight loss of more than 10% in the past 6 months or more than 5% in the last month and/or a Body Mass Index (BMI(weight/height<sup>2</sup>)) less than 20. [23-26]

### 2.3 Malnutrition and children

Because children are growing, growth curves (height/age, weight/age and or weight/height) are used to screen for malnutrition. These identify acute and chronic malnutrition withindifferent age categories. [27]

#### *Acute malnutrition*

- Children > 28 days and < 1 year: < -2 standard deviations (SD) for weight/age.
- Children > 1 year: < -2SD for weight/height
- All children: > 1 SD fall in growth curve in the last 3 months

#### *Chronic malnutrition*

- All children: < -2SD for height/age
- Children < 4 years: 0,5-1 SD fall in the past year for height/age
- Children ≥ 4 year: 0,25 fall in the past year for height/age

## Chapter 3. Screening of malnutrition

The first step in solving the problem of malnutrition is to screen for malnutrition and, when necessary, to identify a plan for treatment. Several screening tools have been developed during recent years by different healthcare disciplines.

### 3.1 Screening in primary care and home care

Groups at risk are the fragile elderly at home or in a nursing or care home; patients suffering from multi-morbidities, chronic disease or using multi-medication; patients who are physically disabled; patients with badly fitting dentures; problems with chewing or swallowing; patients (mostly the elderly and people suffering from severe illness) who have recently been discharged from hospital; patients with psychosocial problems and patients with alcohol or drug(s) abuse. The following are the most important chronic diseases: COPD, CVA, decubitus, dementia, depression, heart failure, inflammatory bowel disease, malignancy and rheumatoid arthritis. [28] Decrease of appetite and function (eg not being able to walk up stairs) have been shown to be independent predictors for developing malnutrition. [29] All patients receiving any type of home care are at risk. Screening for malnutrition should be part of the nursing procedure both on admission and every six months on subsequent review / evaluation. [30]

Malnutrition among the elderly (>65 years) In primary care and home care can be detected using the SNAQ<sup>65+</sup> (Short Nutritional Assessment Questionnaire for 65+, see figure 4a)[31] or in case of adults (18-65 years) by calculating the BMI and unintentional weight loss(see figure 4b).

The SNAQ<sup>65+</sup> has been developed for the elderly who are living at home and who may or may not receive home care. This tool is easy and quick to use. The mid-upper arm circumference is used, instead of BMI, because this is easier and more reliable for measuring patients at home rather than height and weight which are needed to calculate the BMI. Further, it has been shown that a reduced circumference of the mid-upper arm in the elderly is associated more strongly with high mortality than a low BMI [32]

When the first question scores 'red', than the following questions do not have to be asked. Also, the SNAQ<sup>65+</sup> contains some alternative questions which can be used when a patient does not know whether he/she has lost weight. Additionally the questions on appetite and functioning have been developed within the tool to identify the elderly who are at risk of malnutrition.

Based on the screening results a multidisciplinary treatment plan should be started:

- With a SNAQ<sup>65+</sup> score 'green' there is no malnutrition and no intervention is needed.
- With a SNAQ<sup>65+</sup> score 'orange' there is an increased risk of malnutrition. The patients should receive oral and written information about energy- and protein rich meals and in-between meal snacks. They should also be advised to weigh themselves on a regular basis.
- When there is a 'red' SNAQ<sup>65+</sup>-score, malnutrition is present. The physician or nurse should consult a dietitian within one day of the screening. The dietitian should then contact the patient by telephone within two days of this referral. The dietitian should assess the

patient’s nutritional status (see Diagnosis in Chapter 4), explain the risk profile<sup>1</sup> and the nutritional diary. Within five days of the first telephone assessment, an initial face-to-face consultation should be scheduled at which the dietitian will advise the patient and provide a personally adjusted protein and energy rich nutritional treatment plan<sup>2</sup>. The first review / evaluation of this treatment plan should take place within two to ten working days of this consultation.

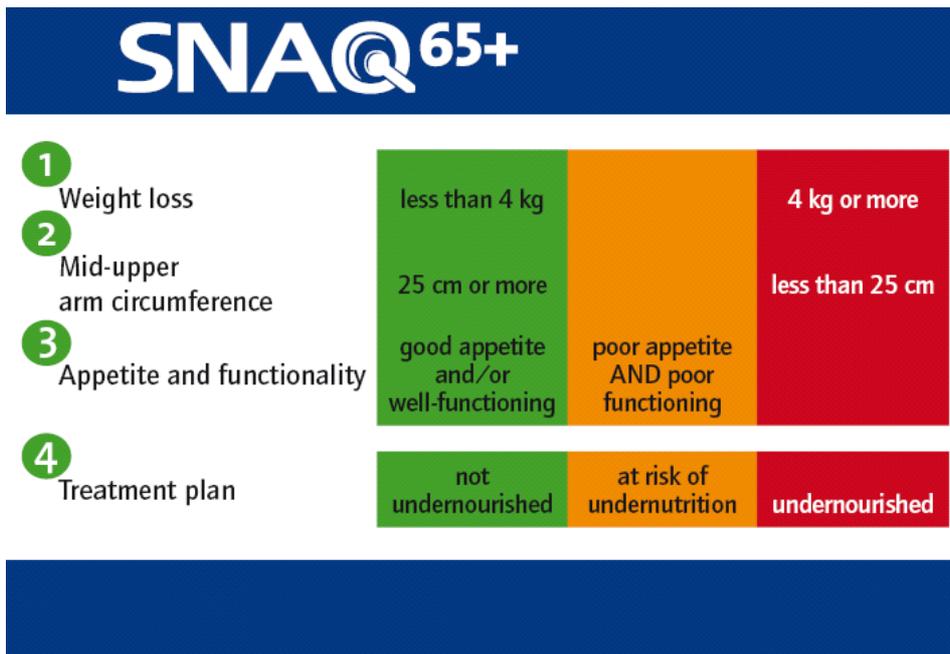


Figure 4a SNAQ<sup>65+</sup> (Short Nutritional Assessment Questionnaire for 65+)

<sup>1</sup>  
[http://www.fightmalnutrition.eu/fileadmin/images/home\\_care/Preparing\\_for\\_your\\_consultation\\_with\\_the\\_dietitian.doc](http://www.fightmalnutrition.eu/fileadmin/images/home_care/Preparing_for_your_consultation_with_the_dietitian.doc)

<sup>2</sup>  
[http://www.fightmalnutrition.eu/fileadmin/images/home\\_care/Treatment\\_plan\\_for\\_the\\_treatment\\_of\\_malnourished\\_patients\\_in\\_the\\_community](http://www.fightmalnutrition.eu/fileadmin/images/home_care/Treatment_plan_for_the_treatment_of_malnourished_patients_in_the_community)

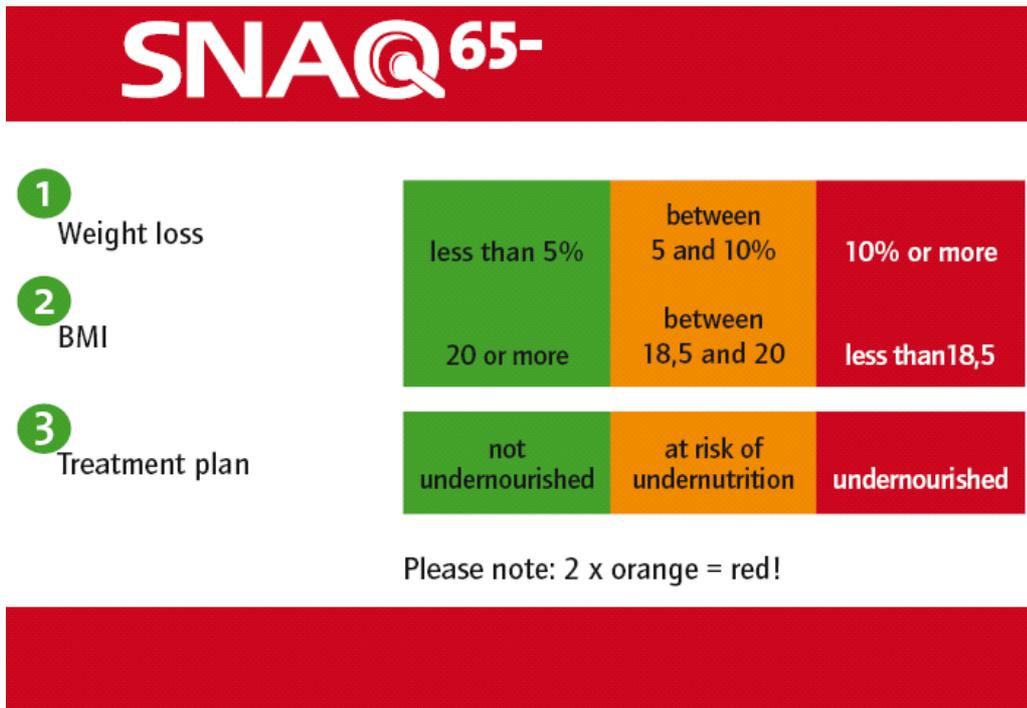


Figure 4b Weight and weight reduction<sup>65-</sup> in primary - and home-care.

### 3.2 Screening in the out-patient clinic

When screening adults ( $\geq 18$  years) in the out-patient clinic it is advisable to use the criteria described in paragraph 2.1 and 2.2 or to use a combination of the SNAQ and BMI.

A yet unpublished study has shown that both the SNAQ and the MUST are not valid for this population.

The MUST has a low predictive value (43%) and therefore gives too many false positive tests. The SNAQ has a low sensitivity (43%) and therefore does not detect enough patients suffering from malnutrition.

This is probably due to the fact that many patients treated in out-patient clinics suffer from malnutrition due to a low BMI but do not have recent weight loss. The SNAQ-score mainly focuses on unintentional weight loss (figure 5). Previous studies have demonstrated that the questions used in the SNAQ are of most predictive value when screening for malnutrition rather than just for weight loss.[33]

When an electronic patient record is used in the out-patient clinic then the preference would be to incorporate the criteria of malnutrition (see paragraphs 2.1 and 2.2 of this Guideline) within the electronic system. When an electronic system is not in place, then it would be more practical to use a combination of the SNAQ and BMI (sensitivity 95%), possibly with a BMI swivel table, so that calculations are not needed. For BMI the following limits can be used:

- Patients  $\leq 65$  year:
 

BMI < 18.5	: 3 points (count up to the SNAQ score)
BMI 18.5 - 20	: 2 points
- Patients > 65 year:
 

BMI < 20	: 3 points
BMI 20 - 22	: 2 points

A multidisciplinary treatment plan can then be started based on the screening results:

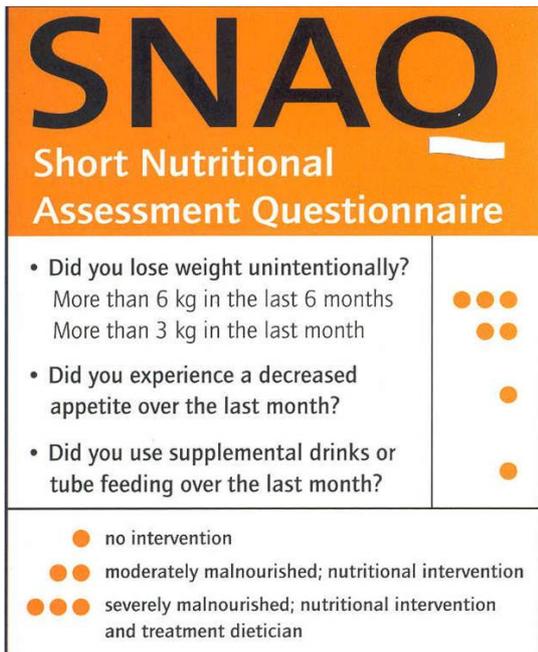
- With a SNAQ (+BMI) score of 0 - 1 point there is no malnutrition and no intervention is needed.
- With a SNAQ (+BMI) score of 2 points there is mild malnutrition. These patients should receive oral and written information about energy and protein enriched meals and in-between meal snacks. They should also be advised to weigh themselves on a regular basis.
- With a SNAQ (+BMI) score of 3 points there is severe malnutrition. The physician or nurse should refer to a dietitian within one day of screening. The dietitian should then contact the patient by telephone within two days of this referral,. The dietitian should assess the nutritional status of the patient (see Diagnostics in Chapter 4) and explain the risk profile and nutritional diary. The first face-to-face consultation will be scheduled within five days after the first telephone assessment when the dietitian should advise the patient about a personally tailored protein and energy rich nutritional treatment plan. The first evaluation of this treatment plan should take place within two to ten working days of its commencement

As far as specialist out-patient clinics for the elderly are concerned, the SNAQ<sup>65+</sup>, the MNA and the MNA-SF can be used. [34, 35]

### 3.3.1 Screening in hospitals

Many screening tools are available for screening adults (>18years) for malnutrition in hospitals.

In Dutch hospitals the SNAQ (Short Nutritional Assessment Questionnaire) is the most widely used screening tool [36]. The SNAQ is a validated 'quick-and-easy' tool to use and malnutrition can be detected by asking just three questions (see Figure 5).



**SNAO**  
Short Nutritional Assessment Questionnaire

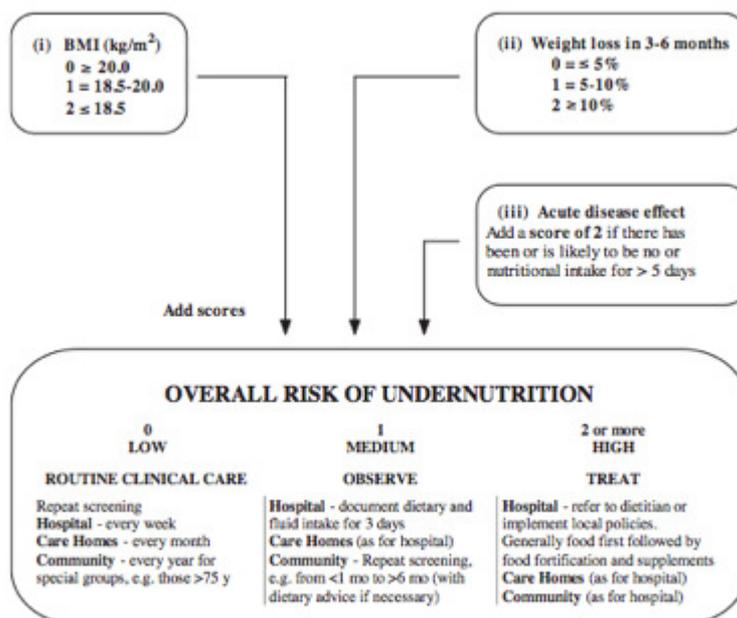
- Did you lose weight unintentionally?  
More than 6 kg in the last 6 months  
More than 3 kg in the last month
- Did you experience a decreased appetite over the last month?
- Did you use supplemental drinks or tube feeding over the last month?

● no intervention  
 ●● moderately malnourished; nutritional intervention  
 ●●● severely malnourished; nutritional intervention and treatment dietician

Figure 5 SNAQ (Short Nutritional Assessment Questionnaire)

A more detailed diagnostic screening tool is the MUST (Malnutrition Universal Screening Tool, [www.bapen.org.uk](http://www.bapen.org.uk)). When using this tool for screening on malnutrition, BMI (body Mass Index) and percentage of weight loss are calculated and, additionally, an ‘illness-factor’ is assigned to each patient (see figure 6).

*Malnutrition Universal Screening Tool (MUST) for adults*



Can be adapted for special circumstances (e.g. when weight and height cannot be measured or when there are fluid disturbances) using specified alternative measurements including subjective criteria. It also identifies obesity (BMI > 30 kg/m<sup>2</sup>).

Figure 6 MUST (Malnutrition Universal Screening Tool)

Based on the screening results a multidisciplinary treatment plan can be started:

- With a SNAQ score of 0 - 1 point or a MUST-score of 0 points there is no malnutrition and no intervention is needed. Monitoring food intake and weighing once a week are indicated.
- With a SNAQ score of 2 points or a MUST-score of 1 point there is a risk of moderate malnutrition. The patient should be offered energy and protein rich meals and in-between meal snacks. Monitoring food intake and weighing once a week are indicated.
- With a SNAQ score of 3 or more points or a MUST score of 2 or more points there is risk of severe malnutrition. A dietitian needs to be consulted within 24 hours of admission who will then assess the patient’s nutritional status (see Chapter 4). An individually tailored protein and energy rich nutritional treatment plan should be started within 48 hours. The dietitian should evaluate the treatment plan on a regular basis during admission. The dietetic treatment will then be continued or transferred to a colleague following discharge from hospital.

### 3.3.2 Screening children in the hospital

Children are screened by measuring weight and length and checking the growth curves.

The criteria described in Paragraph 1 should be used. Additionally, the STRONG<sub>kids</sub> [37] is used to estimate the risk of developing malnutrition during hospital admission.

#### STRONG<sub>kids</sub>

Screening risk of developing malnutrition (during admission)	Score if YES
1) Is there a high-risk illness with an increased risk of developing malnutrition? <sup>1</sup>	2
2) Does the patient suffer from poor nutritional status in your clinical view? Estimation of hollow face and/or loss of fat mass and/or muscle mass?	1
3) Does one of the following statements apply: <ul style="list-style-type: none"> <li>▪ Excessive diarrhoea (x&gt;5 a day) and/or vomiting (x&gt;3 a day) during the last 1-3 days</li> <li>▪ Patient receives intervention with additional oral or tube-feeding</li> <li>▪ Clearly impaired intake during the last 1-3 days</li> <li>▪ Impaired intake caused by pain</li> </ul>	1
4) Has there been weight loss or growth restriction (<1year) during the last ..... weeks/months?	1
Total score	

Figure 7 STRONG<sub>kids</sub>

High-risk illnesses are: anorexia nervosa, burns, bronchopulmonary dysplasia, coeliac disease, cystic fibrosis, immaturity/prematurity, chronic heart disease, infectious disease(AIDS), inflammatory bowel diseases, cancer, chronic hepatic diseases, chronic kidney diseases, pancreatitis, short bowel syndrome, neuromuscular diseases, trauma, mental retardation, major surgery. The physician can also take other health problems into account when assessing the patient.

**Results:**

- 0 points: Low risk of malnutrition during admission; no intervention needed.
- 1-3 points: Moderate risk of malnutrition during admission; the physician or nurse should discuss the nutritional treatment with the dietitian; weight should be checked twice a week and the risk of malnutrition should be evaluated once a week.
- 4-5 points: High risk of malnutrition during admission. The dietitian should be involved in the clinical treatment in order to optimize the daily nutritional intake. Weight should be checked twice a week and the risk of malnutrition evaluated once a week. Nutritional intake should be monitored closely during admission and any treatment should be continued after discharge if necessary.

A multidisciplinary treatment plan should be started based on evaluation of the growth curves.

If there is malnutrition, a nurse should contact a dietitian within 24 hours of admission and the dietitian should start a personalised protein and energy enriched treatment plan within 48 hours. The dietitian should review and evaluate the treatment plan within five days of admission and thereafter twice weekly as a minimum.

**3.4 Screening in nursing and care homes.**

The SNAQ<sup>RC</sup> (Short Nutritional Assessment Questionnaire for Residential Care) is suitable for screening for malnutrition in nursing and care homes [38]. This screening tool uses a traffic light system and by asking just three questions and measuring the BMI, it can be determined whether a patient’s nutritional status is good (green), moderate (orange) or poor (red).

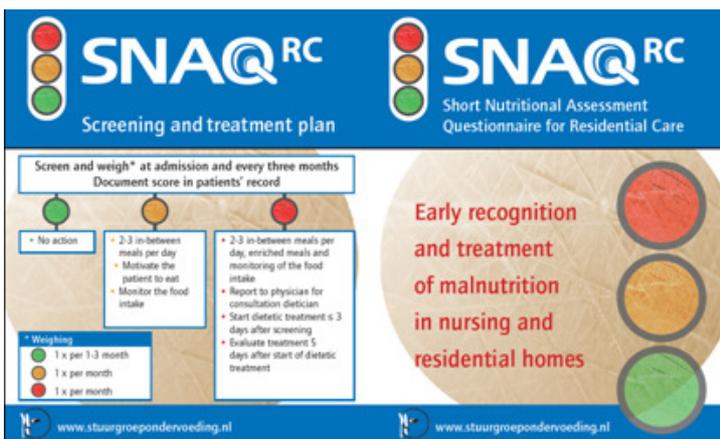


Figure 8 SNAQ<sup>RC</sup> (Short Nutritional Assessment Questionnaire for Residential Care)

A multidisciplinary treatment plan should start based on the outcome of the screening:

- With a SNAQ<sup>RC</sup> score 'green' there is no malnutrition and no intervention is needed. Weighing the patient once a month or once every three months is indicated.
- With a SNAQ<sup>RC</sup> score 'orange' there is moderate malnutrition. The patient should be advised to eat energy and protein enriched meals and in-between meal snacks. Monitoring food intake and weighing once a month are indicated.
- With a SNAQ<sup>RC</sup>-score 'red' there is severe malnutrition. The physician or nurse should refer to a dietitian within 3 days. The dietitian determines the patient's nutritional status (see Chapter 4) and should start a personalised protein and energy enriched treatment plan within 8 days. The dietitian should evaluate the nutritional treatment plan on a regular basis.

## Chapter 4. Diagnosing and treating malnutrition

### 4.1 Diagnosis of malnutrition

Screening and diagnosis are two clearly different steps in the detection and treatment of malnourished patients. A screening tool is developed to recognize malnutrition easily and at an early stage so that a treatment plan can be started on a timely basis. Nutritional status will be fully assessed in the diagnostic stage. The severity of malnutrition is measurable and the effect of treatment can be evaluated using (a combination) of measurable outcomes. The SGA and PG-SGA are often referred to as screening tools but they are also diagnostic instruments and can be used in this way. In the Dutch “Directory for Malnutrition in Geriatric Patients” it is stated that a Comprehensive Geriatric Assessment (CGA) is the basis for assessing nutritional problems in the elderly and this also gives an understanding of somatic, physical, social and / or functional factors causing malnutrition. The MNA is suitable as a supplemental assessment tool for the elderly patient.[34]

In Chapter 1 the following definition of malnutrition is used: “Malnutrition can be defined as an acute or chronic condition where a deficiency or imbalance of energy, protein and other nutrients cause measurable, adverse effects on body composition, functioning and clinical results”. [1]

A distinction is made between three different syndromes where malnutrition plays an important role: cachexia, sarcopenia and wasting. Cachexia is a complex multifactorial metabolic syndrome characterized by loss of muscle with or without loss of fat mass, which cannot be completely reversed with nutritional intervention and which causes loss of functioning. [39]. Sarcopenia is age-associated loss of muscle and functioning. It is a complex multifactorial syndrome caused by changes in anabolic hormone levels (eg. testosterone, oestrogen, growth hormone), reduced energy and protein intake, reduced physical activity, chronic illness, inflammation and insulin resistance. [40, 41] Wasting is loss of muscle and fat mass following severe nutritional deficiency, for example as consequence of anorexia. Included are Anorexia Nervosa but also weight loss caused by neglect or bereavement. [1]

A malnutrition-related term is ‘frailty’. This is a state of age-related physiological vulnerability caused by reduced homeostatic reserve and reduction of resistance capacity. Frailty takes place when three of the following five symptoms are present: weight loss, exhaustion, physical inactivity, slow walking speed and low grip strength. [42] These syndromes of malnutrition are hard to differentiate in practice. The different types can occur together or follow each other. The difference between cachexia, sarcopenia and wasting is summarized in Table 1.

Table 1 Characteristics of cachexia, sarcopenia and wasting [39-41, 43]

	Cachexia	Sarcopenia	Wasting
<b>Decreased body cell mass (BCM)</b>	Yes	Yes	BMI < 18,5
	Skeletal muscle index < 7,26 kg/m <sup>2</sup> for female and < 5,45 kg/m <sup>2</sup> for men	Skeletal muscle index < 7,26 kg/m <sup>2</sup> for female and < 5,45 kg/m <sup>2</sup> for men	>65 years : BMI < 20
<b>Weight loss</b>	>5% in the last 6 months or > 2% in combination with BMI < 20 kg/m <sup>2</sup>	Not always	>5% in the last month or >10% in the last 6 months
<b>Decreased energy intake</b>	yes	Not always	yes
<b>Increased basal metabolic rate</b>	yes	Not always	Not always
<b>Decreased functioning</b>	yes	yes	yes
<b>Inflammation</b>	yes	Not always	Not always
<b>Decreased functioning immune system</b>	yes	Not always	Not always
<b>Increased mortality</b>	yes	yes	yes
<b>Treatment</b>	Optimal intake Exercise Anti-cytokine agents anabolic hormones	Optimal intake Muscle strength training, exercise	Optimal intake Exercise
<b>Examples</b>	Hepatic disease, RA, heartfailure, some types of cancer	Ageing, inactivity	AIDS, marasmus, neglect

Because the cause of malnutrition predicts the consequences, it is important to gather information about the following sets of diagnostic measures. The underlined elements form a minimal set for every situation; it is best to use all the measures.

**1. The balance of intake and output: energy and protein requirements**

- a. Nutritional history and requirements
- b. Loss of nutrients
- c. Energy consumption with attention to physical activity
- d. Appetite
- e. Indirect calorimetry
- f. Nitrogen-balance

## 2. *Body composition*

- a. Weight and weight trends over time
- b. Height
- c. BMI
- d. Mid-upper arm circumference
- e. Bio-electric impedance analysis (BIA / BIS)
- f. DEXA
- g. Skin folds

## 3. *Extent of inflammation*

- a. C-Reactive Protein
- b. Albumin
- c. Anti-inflammatory cytokines (IL-4, IL-12, IL-15)
- d. ESR
- e. Haemoglobin
- f. Pro-inflammatory cytokines (TNF- $\alpha$ , IL-1, IL-6, IFN- $\gamma$ )

## 4. *Functional, medical and social factors*

- a. Activities of Daily Living (ADL)
- b. Delirium
- c. Use of medication
- d. Muscle strength (eg. grip strength, strength in the upper leg muscles)
- e. Cognition (Mini Mental State Examination (MMSE))
- f. Depression
- g. Quality of life
- h. Short Physical Performance Battery (SPPB)

### 4.2 Dietetic diagnosis

The dietetic diagnosis is established on the basis of the health issue as the patient experiences it, medical factors (eg prognosis), social factors (living and work circumstances), personal factors (nutritional and physical activity habits, language, motivation and comprehension of illness). Based on the dietitian's diagnosis, goals and the programme of treatment can be determined by the multidisciplinary team with the patient indicating his / her preferred direction.

An example of a dietetic diagnosis:

81 years old man, surviving spouse and living on his own. Enough help in the community. Recently operated for a hip fracture, for which the patient now receives physical therapy. Decline in nutritional state, 8% weight loss in 5 weeks (BMI 19, FFMI 15,4), caused by poor intake (energy 60% and protein 50% of

personal requirements) due to exhaustion, dryness of the mouth, dental problems and not being able to cook by himself.

### 4.3 Protein and energy requirements

In the treatment of malnourished patients the focus should be an adequate protein and energy intake. The protein requirement increases in illness. It is important to take enough energy and protein to ensure muscle breakdown is minimised. When there is illness, normal metabolism changes to a state of catabolism. This causes inefficient use of nutrients and an increase of muscle breakdown because more energy is needed [6, 41, 44]. As well as optimising nutritional intake, physical activity is also an important element of the treatment needed to conserve muscle mass. [45, 46].

#### *Adults*

The minimal adequate protein requirement for adults is 1,2-1,5 gram protein per kg bodyweight per day (consensus based [22]). When the BMI > 27 an “ideal” figure (BMI = 27) is used for this calculation. The minimal energy requirement is calculated using the Harris & Benedict formula<sup>3</sup> + 30% [47-49], whereby the actual body weight can always be used, also in instances of obesity or underweight. [50]

#### *Children*

For children the daily protein requirement is based on the calculated energy requirement. For children under the age of 1 year the following WHO guidelines apply: for all acutely malnourished children the protein intake should be 11-15% of the energy requirement [51]. For children above the age of 1 year the same recommendation as for adults applies: 1,2-1,5 gram protein per kg bodyweight per day [52]. To calculate the energy requirement the following calculation is used: energy need = basal metabolic rate (BMR) + additions. BMR can be calculated using the Schofield (H+W) formula [53] or by using indirect calorimetry.

Additions need to be calculated for: illness, physical activity, growth, gaining growth and the energy-absorption\* coefficient.

### 4.4 Treatment plan for malnourished patients

Malnourished patients are usually complex patients. Therefore, the treatment is always provided on a multidisciplinary basis and close, high quality collaboration is essential. Multidisciplinary collaboration and communication will be further discussed in Chapter 6. The treatment plan should aim to increase the patient’s intake to 100% of the daily protein and energy requirement as quickly as possible.

The Council of Europe Alliance has published recommendations that will help in developing nutritional guidelines for (hospital) patients [54].

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<sup>3</sup> The Harris & Benedict formula by Roza (49)

Men: 13,397 weight (kg) + 4,799 length (cm) - 5,677 age + 88,362  
 Female: 9,247 weight (kg) + 3,098 length (cm) - 4,33 age + 477,593

*Optimal nutritional treatment dictates that:*

- All hospitalized patients, residents of nursing and care homes, patients in primary care and home care are screened for malnutrition (Chapter 3);
- The severity of malnourishment is assessed by a professional;
- A treatment plan has been started within 2 to 4 days after a diagnosis of moderate or severe malnutrition;
- The treatment plan for energy and protein intake is regularly evaluated;

The dietitian should calculate the protein- and energy requirement of the malnourished patient using the patient's calculated intake as a guide. This will form the basis of a multidisciplinary treatment plan. The dietitian will discuss the plan with the patient and/or family or caregiver to evaluate whether the energy and protein needs can be met by changes to the daily intake. The prognosis of the patient and other factors leading to medical intervention will be taken into account.

1. Patient meets 100% of his/her requirement: The protein and energy enriched diet will be continued. Monitoring intake is important.
2. Patient meets 75-100% of his/her requirement: The treatment consists of a protein and energy enriched diet using enriched meals and oral nutritional supplements when necessary.
3. Patient meets 50-75% of his/her requirement: the advice is to start oral nutritional supplements or tube feeding in addition to a protein and energy rich diet. Review and evaluation should be undertaken within 4 to 7 days and treatment should be adjusted if necessary. Monitoring intake remains important following this evaluation.
4. Patients meets <50% of his/her requirement: Tube feeding supplemented with oral nutrition when possible is advised. Review and evaluation should take place within 2 to 4 days with treatment being adjusted if necessary. Monitoring intake remains essential following evaluation.

*Table 2 Treating malnourished patients*

Intake vs requirement	Dietetic Intervention	Hospital evaluation and action	Nursing home Evaluation and action	Primary care Evaluation and action
100% of the requirements	Energy and protein rich diet and possibly oral supplements	Appropriate monitoring	Appropriate monitoring	Patient monitors weight and intake Evaluation (by telephone) ≤ 10 working days
75-100% of the requirements	Energy and protein rich diet and possibly oral supplements	< 48 hours: Evaluation and continue or start nutrient dense drinks	≤ 10 working days: Evaluation and continue or start nutrient dense drinks	≤ 10 working days: Evaluation and continue or start nutrient dense drinks
50 - 75% of the requirements	Energy and protein rich diet supplemented with nutrient dense drinks or tube feeding	< 48 hours: Evaluation  Continue or start tube feeding	≤ 5 working days: Evaluation  Continue or start tube feeding	≤ 5 working days: Evaluation  Continue or start tube feeding
< 50% of the requirements	Energy and protein rich diet with supplemental tube feeding or total tube feeding	< 48 hours: Evaluation  Continue or start nutrient dense drinks if possible	≤ 2 working days: Evaluation  Continue or start nutrient dense drinks if possible	≤ 2 working days: Evaluation  Continue or start nutrient dense drinks if possible

If there is no calculated personal requirement in the treatment plan, then a new treatment plan should be made using the information in Table 2. Children will need an age adjusted treatment plan. Evaluation should follow within 48 hours of starting the new treatment plan. When an oral/enteral diet is not possible, the next step is parenteral nutrition. More information about this can be found in the ESPEN Guidelines on Parenteral Nutrition <http://www.espen.org/espenguidelines.html>

## Chapter 5. Weighing and screening policy

### 5.1 Goal

After a patient has been screened, his/her nutritional status should still be monitored. A specific policy for each of the different sectors has been developed. It is important that the patient receives advice adjusted to the home environment before he/she is discharged from hospital.

The goal of a weighing and screening policy in all sectors is:

- Monitoring of weight (change);
- Evaluation of nutritional treatment;
- Early recognition of changes in nutritional status.

Special attention should be given to:

- using the same scales because weight change is most important;
- weighing without shoes, jacket and other heavy clothing;
- weighing at fixed times, preferably in the morning;
- weighing with an empty bladder;
- recording the data on designated forms;
- informing the treating physician or dietitian if there are any undesirable changes in weight and/or intake;
- taking into account any relevant illness, oedema and/or ascites that can influence weight.

### 5.2 Primary care and home care

In primary care it is assumed that the patient is screened using the SNAQ<sup>65+</sup> or “Weight and weightloss<sup>65-</sup>” Based on the results the patients can either not be at risk of malnutrition, be at risk of malnutrition or be malnourished. Depending on the result, nutritional treatment will be started if necessary. The weighing and screening policy applies in this situation.

The patient should monitor his/her own weight as part of this policy with appropriate advice being given about when to contact the general practitioner or dietitian. This will be as follows:

- For patients  $\geq 65$  years: If there is weight loss  $> 4$  kg in the past (maximum) six months<sup>4</sup>.
- For patients  $< 65$  years:  $> 5\%$  or 3 kg in the past month or  $> 10\%$  or 6 kg in the past (maximum) six months.

The decision to weigh and screen on regular basis is made by the general practitioner and/or nurse and/or dietitian together with the patients and/or his family. This timescale can be adjusted if the patient has a short life expectancy.

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<sup>4</sup> Note that when 4 kg within six months are lost, someone should not wait until the six months are expired. This also applies to weight loss of 3 and 6 kg within resp. one and six months.

	Weighing policy	Screening policy HC: homecare, GP: general practitioner
<b>No malnutrition</b>	Advise patient to weigh themselves every (three) months. Contact the GP if: ≥ 65 years: > 4 kg weight loss within 6 months < 65 years: > 3 kg weight loss in last 3 months or > 6 kg weight loss in the last 6 months	HC: Evaluation GP Regular consultation GP/HC: Minimum once a year and more often if the patient is not feeling well
<b>At risk of malnutrition</b>	Advise patient to weigh every month (and follow the advice above if not malnourished) GP: During regular consultation HC: Every month	See advice above if not malnourished
<b>Malnourished</b>	Advise patient to weigh every week Dietitian: during consultation After treatment: The dietitian advises who to contact and when depending on the treatment goal GP/HC: on advice of the dietitian	See advice above if not malnourished GP/HC: on advice of dietitian

*Table 3 Weighing and screening policy for primary care and home care*

### 5.3 Nursing and care homes

In nursing and care homes the screening policy should be incorporated within the multidisciplinary meeting that takes place every six months for each patient. The patient should be screened for malnutrition before this meeting takes place so that nutritional status can then be taken into account when discussing any treatment.

It is advisable to weigh patients with a moderate or severe nutritional status monthly. Patients with adequate nutritional status need only be weighed when the SNAQ<sup>RC</sup> is used.

Besides screening for malnutrition by using the SNAQ<sup>RC</sup>, approximate monitoring of intake can also give information about the current nutritional status of a patient. ‘Rate-a-plate’<sup>5</sup> is available for this purpose. The client, caregiver or nutritional assistant can record the daily intake of the client on this form. By recording whether the client eats all, half or quarter of a plate, it can be estimated whether the client is meeting his / her nutritional requirements.

### 5.4 Hospitals

Weighing the patient and recording their food intake are the most important tools for monitoring nutritional status in hospital. A similar instrument to that used in nursing and care homes has been developed for an approximation of a patient’s intake in hospital. ‘Rate-a-plate’ has been developed

<sup>5</sup> Available for downloading at [www.fightmalnutrition.eu](http://www.fightmalnutrition.eu)

mainly to recognize and treat patients who have good nutritional status on admission but who suffer a decline of nutritional status while in hospital. The dietitian should be involved in the treatment of all malnourished patients and should calculate the intake and requirements of each patient on an individual basis.

It is advisable to weigh each patient on admission (and calculate the BMI) and thereafter at least once a week, or twice a week in the case of severely malnourished patients (SNAQ score  $\geq 3$  or MUST score  $\geq 2$ ) as well as those receiving tube feeding or parenteral nutrition. The duration of admission is usually short and any changes in nutritional status will not lead to significant changes in weight within just a few days. In addition some patients may have a fluid and electrolyte imbalance causing their weight to be unreliable as an indicator of their nutritional status.

## Chapter 6. Collaboration and transfer

### 6.1 Collaboration

In every care system the caregiver/nurse/physician assistant/nurse practitioner is responsible for identifying and managing malnutrition. The nurse and caregiver manage the monitoring of intake and the implementation of a nutritional treatment plan, especially when tube feeding is prescribed. The nurse refers malnourished patients to a physician or a dietitian, depending on local departmental procedures. The nurse provides screening information and nutritional data. The physician informs the nurse about the prescribed treatment. The dietitian then designs an appropriate treatment plan in collaboration with the patient. The treatment plan contains the protein and energy requirements and also the practical process for implementing nutritional treatment. The treatment is monitored, evaluated and, if necessary, adjusted at fixed times. All the involved healthcare professionals are responsible for keeping the patient informed. The physician, nurse and caregiver provide general advice while the dietitian explains the details of each individual nutritional treatment. The occupation therapist, speech therapist, dental hygienist and physical therapist can also be involved in the medical treatment in which case it can be very useful to include these professionals in any discussions about nutritional problems and treatments. A multidisciplinary collaboration for the care of malnourished patients within primary healthcare has been documented by the Dutch College of General Practitioners(NHG), the Dutch Nurses' Association (V&VN) and the Dutch Dietetic Association (NVD) in the National Primary Care Collaboration Agreement on Malnutrition(LESA) in 2010 [28]. This agreement can be used as a model for collaboration with and between other professional groups.

### 6.2 Referral, consultation and procedure

Physicians should refer all malnourished patients to a dietitian. This should be supported by a completed standard questionnaire and the provision of any other relevant information. Relevant information includes: medical history and examination related to the nutritional problem, earlier nutritional treatments, relevant medication, co-morbidity, prognosis and background information (eg social aspects).

The dietitian should consult the physician if:

- The goal of the nutritional intervention is unclear
- There is a risk of refeeding syndrome
- The expected recovery does not take place
- The previously defined treatment goals are not achieved

The dietitian should refer the patient back to the physician for further diagnosis and treatment if the patient develops additional disease symptoms. The dietitian should also consult the nurse involved with the nutrition intervention if expected recovery does not take place or if previously defined treatment goals are not met. The dietitian should communicate with the physician at the beginning and the end of the nutritional intervention as a minimum,

### 6.3 Inter-agency collaboration between dietitians

The duration of hospital admission is getting shorter. This means that the amount of clinical improvement that can be made in respect of nutritional status is limited. When a patient is discharged from hospital the nutritional care and treatment will be transferred to a dietitian working within primary care or a nursing home, unless continuing nutritional treatment on an outpatient basis is preferred. To provide continuous care and prevent contradictory advice and treatment, clear communication and agreement between the hospital dietitian and the dietitians working within primary care and nursing homes is extremely important. During the transfer process particular attention should be paid to the following:

*Table 4 Inter-agency transfer form*

<b>Basic information</b>	
- Client information	Client information
- Treating physician	- Name of dietitian - Name of physician - Name of nurse
- Medical information	Medical diagnosis, test results, therapy, information about medication, other care providers and medical history
<b>Dietetic information</b>	
- Nutritional status	- Result of screening - Treatment goal(s) - Psychosocial information - Current weight, height and usual weight - Weight trend over time (1 and 6 months, admission/discharge, 1 <sup>st</sup> /last visit to the outpatient clinic) - BMI and/or mid-upper arm circumference - Fat free mass and/or upper arm muscle circumference Conclusion: severe or moderate (risk of) malnutrition
- Intake vs requirement	- Intake of and requirement for protein and energy - Intake of and requirement for other relevant nutrients - Reason for anorexia or increased requirement - Physical activity
<b>Dietetic diagnosis</b>	
-	- Health issues as the patient experiences them - Medical factors - External factors (home / living / work circumstances) - Personal factors (nutrition, physical activity, language, motivation, understanding of disease)
<b>Treatment goal</b>	
- Goal	- Long term - Short term
<b>Treatment plan</b>	
- Nutritional advice	- Wishes of patient - Amount of energy, protein and other important nutrients - Supplements - Consistency - Diet supplements for medical use - Attention to any other compromising factors: pain, problems with swallowing, nausea - Multidisciplinary consultation appointments
- Evaluation	- Results and advice about further evaluation
- Future treatment and reason of referral	- Advice about follow up including appropriate timescale - You do, we do.. (describe which discipline is responsible for which part of the treatment plan)

Other things	
Comments	<ul style="list-style-type: none"> <li>- Diet list included: yes/no</li> <li>- Treatment time in minutes</li> </ul>

**6.4 Reimbursement arrangements for medical nutrition**

In the Netherlands, patients who need nutritional supplementation in order to optimize the treatment of their illness (based on legal indications eg disease-related malnutrition) can receive reimbursement from the insurance companies for these specific products. This allowance applies to those patients who use medical nutrition in hospital and who need to continue this at home or in a nursing home. The dietitian or physician can submit an application in respect of oral supplements or tube feeding.

**6.5 Background information**

[www.fightmalnutrition.eu](http://www.fightmalnutrition.eu)

The website of the Dutch Malnutrition Steering Group contains detailed information about several projects describing how to implement early recognition and treatment of malnutrition in hospitals, nursing and care homes as well as in primary care and homecare. On this website you can also find the tools that are needed for implementation.

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