



Screening

Screening is the first step and essential for a successful nutritional management to detect those at risk of or with nutritional problems. Screening should be performed within 24 hours of admission so that nutrition therapy can be defined and started quickly.

Nutritional screening should be done with a validated screening tool and followed up by appropriate action.

NRS 2002 – part of the gnp program – is the most validated screening tool for the clinic, based on 128 studies and recommended by “ESPEN – Guidelines for Nutrition Screening 2002”.¹

It is a rapid and simple procedure, which can be done routinely by any healthcare professional in less than 5 minutes.

**Screening needs
to take place within
24 hours
of admission**

Source:

¹ Kondrup J et al. Nutritional risk screening (NRS 2002): a new method based on an analysis of controlled clinical trials. Clin Nutr. 2003 Jun;22(3):321-36.

The first part of NRS 2002 is the initial screening. If at least one question is answered with “YES”, the degree of risk of nutrition deficiency must be appraised. This is done by the final screening considering a survey of nutritional status, severity of disease and age. The highest scores of the respective part determined in the final screening needs to be summed up to a(n) (age adjusted) total score. The result of screening leads directly to individual patient related actions.

Initial Screening

Is the Body Mass Index (BMI) < 20.5 kg/m ² ?	YES	NO
Has weight loss occurred during the last 3 months?	YES	NO
Has food intake declined over the last week?	YES	NO
Is a major illness involved?	YES	NO

Final Screening

Impaired nutritional status	Score	Score	Severity of disease
- Normal nutritional status	0	0	Low
- Weight loss > 5% in 3 months <u>or</u> - Food intake 50–75% of normal requirements in preceeding week	1 mild	1 mild	e.g. hip fracture, chronic disease, in particular with acute complications: cirrhosis, COPD, chronic haemodialysis, diabetes, cancer
- Weight loss > 5% in 2 months <u>or</u> - BMI 18.5–20.5 + impaired general condition <u>or</u> - Food intake 25–50% of normal requirements in preceeding week	2 moderate	2 moderate	e.g. major abdominal surgery, stroke, severe pneumonia, haematologic malignancy
- Weight loss > 5% in 1 month (> 15% in 3 months) <u>or</u> - BMI < 18.5 + impaired general condition <u>or</u> - Food intake 0–25% of normal requirements in preceeding week	3 severe	3 severe	e.g. intensive care patients (APACHE > 10), head injury, bone marrow transplantation
	Score	+	Score =
	If age ≥ 70 years + 1 =		Age adjusted total score

Evaluation and actions

- | | | |
|---|--|---|
|  <p>0 points = low risk
 Repeat screening weekly.
 If an operation is planned:
 Consider preoperative
 nutrition therapy.</p> |  <p>1–2 points = moderate risk
 Patient needs nutrition support.
 Repeat screening weekly.
 If an operation is planned:
 Consider preoperative nutrition
 therapy.</p> |  <p>≥ 3 points = high risk
 Patient needs nutrition
 support.</p> |
|---|--|---|

Patient related actions

- | | |
|---|---|
| ☒ Weekly re-screening | ☐ Contact nutrition support team |
| ☒ Assessment | ☒ Start a nutritional care plan |
| ☒ Food & Fluid protocol | ☐ Start directly with nutrition therapy (e.g. ONS) |

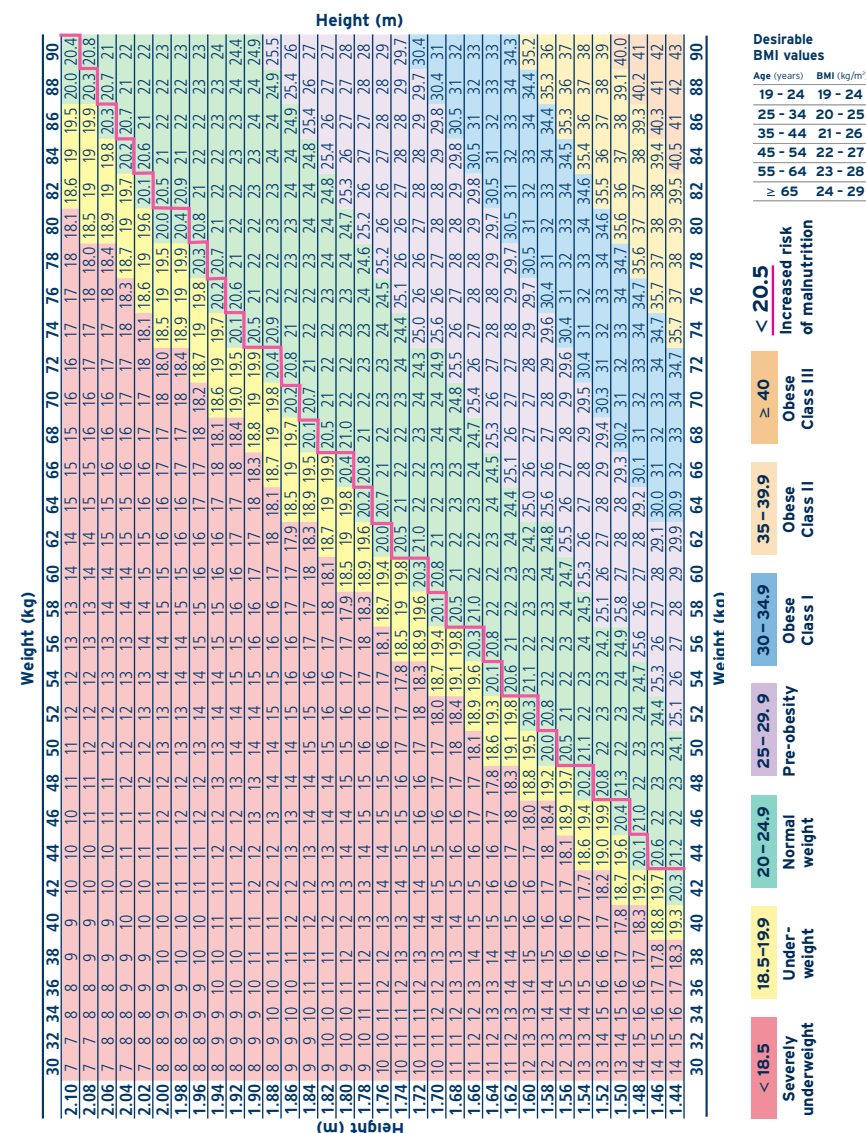
Please note:
If another screening tool, e.g. MUST oder SGA is already established and used, continue with gnp Step 2: Assessment.

Source: Kondrup J et al. (2003) ESPEN Guidelines on Enteral Nutrition Screening 2002. Clin Nutr: 22: 415–421

The following calculation tools are designed to help you to complete the screening (Step 1) as quick and easy as possible.

BMI Chart for adults

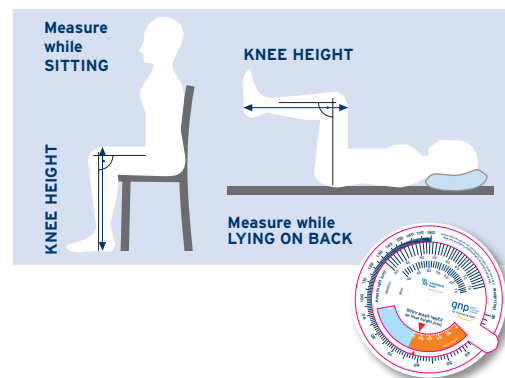
Calculation of Body Mass Index (BMI = kg/m²)



Source: adapted from WHO 1995, WHO 2000, WHO 2001

Estimation of body height by measurement of knee height

To be used, if usual measurement of body height is not possible (e.g. in bedridden patients)



Measurement of knee height

The knee height is measured in cm along the outside of the left leg in lying or sitting position of the patient (please see figure on the left). For this purpose, the leg is bent by 90° at the knee joint. The knee height is the direct line from the sole of the foot at the heel to the upper edge of the kneecap. Ask your Fresenius Kabi contact person for the gnp knee height calculator for a quick and easy performance.

Calculation of body height

Patients from 60 to 90 years²:

Men: $64.19 - (0.04 \times \text{age}) + (2.02 \times \text{knee height in cm})$

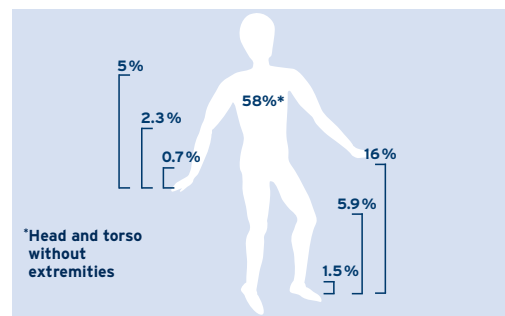
Women: $84.88 - (0.24 \times \text{age}) + (1.83 \times \text{knee height in cm})$

Patients from 18 to 60 years³:

Men: $71.85 + (1.88 \times \text{knee height in cm})$

Women: $70.25 + (1.87 \times \text{knee height in cm}) - (0.06 \times \text{age})$

Estimation of BMI in patients with amputation by correction of body weight



Example 1: Amputation of one leg

Current body weight (BW) = 65 kg

Leg = 16 % of height

Weight = $65 \text{ kg} \times 100 : (100 - 16)$

Corrected weight = 77.4 kg

Example 2: Amputation of both arms

Current body weight (BW) = 60 kg

Both arms = 2 x 5 % of height

Weight = $60 \text{ kg} \times 100 : (100 - 2 \times 5)$

Corrected weight = 66.7 kg

Correction formulas for estimating the BMI of amputees

BW = Body weight [kg], BH = Body height [m]

Amputation of	%	BMI-Calculat
foot	1.5	$(\text{BW} : 0.985) : (\text{BH})^2$
"below-the-knee"	5.9	$(\text{BW} : 0.941) : (\text{BH})^2$
leg	16.0	$(\text{BW} : 0.84) : (\text{BH})^2$
hand	0.7	$(\text{BW} : 0.993) : (\text{BH})^2$
"below-the-elbow"	2.3	$(\text{BW} : 0.977) : (\text{BH})^2$
arm	5.0	$(\text{BW} : 0.995) : (\text{BH})^2$

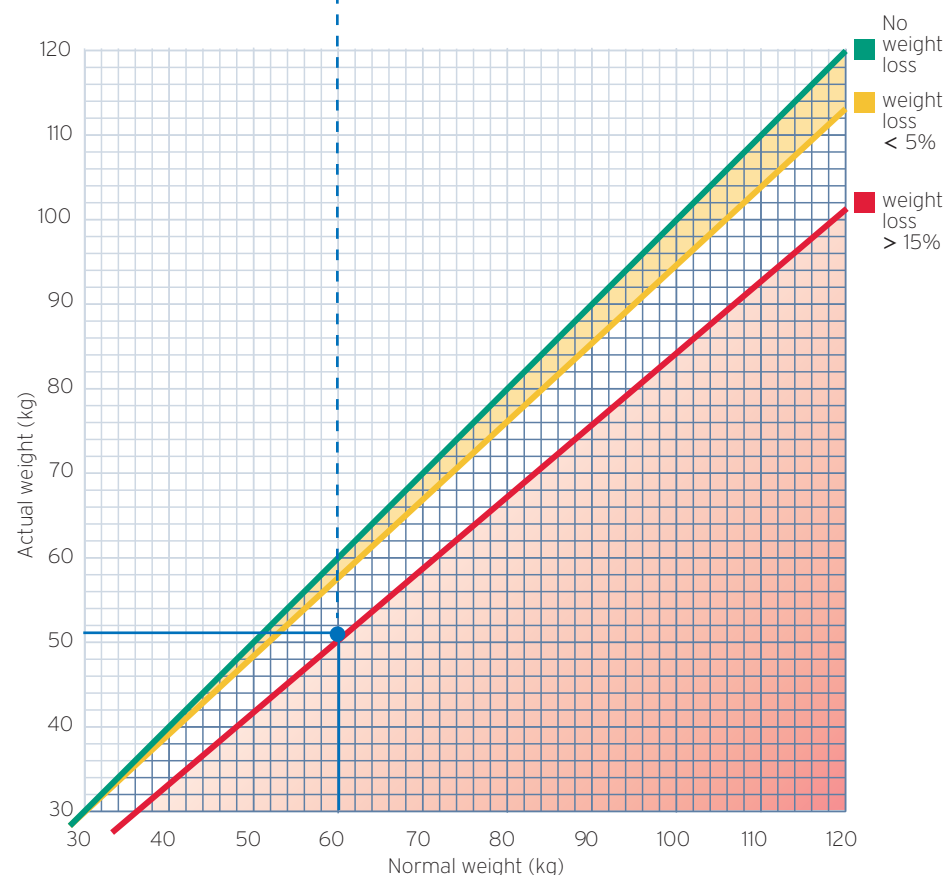
Amputation of	%	BMI-Calculat
both feet	3.0	$(\text{BW} : 0.97) : (\text{BH})^2$
both "below-the-knee"	11.8	$(\text{BW} : 0.882) : (\text{BH})^2$
both legs	32.0	$(\text{BW} : 0.68) : (\text{BH})^2$
both hands	1.4	$(\text{BW} : 0.986) : (\text{BH})^2$
both "below-the-elbow"	4.6	$(\text{BW} : 0.954) : (\text{BH})^2$
both arms	10.0	$(\text{BW} : 0.9) : (\text{BH})^2$

Example 1: Amputation of one leg
 Current body weight (BW): 65 kg
 Body height = 1.75 m
 BMI = $(65 : 0.84) : 1.75^2 = 77.4 : (1.75 \times 1.75)$
BMI = 25.3 kg/m²

Example 2: Amputation of both arms
 Current body weight (BW): 60 kg
 Body height = 1.75 m
 BMI = $(60 : 0.9) : 1.75^2 = 66.7 : (1.75 \times 1.75)$
BMI = 21.8 kg/m²

Calculation of weight loss in %

Normal weight [kg]	Weight loss	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115
Actual weight [kg]	5%	38	43	47.5	52	57	62	66.5	71	76	81	85.5	90	95	100	104.5	109
	10%	36	40.5	45	49.5	54	58.5	63	67.5	72	76.5	81	85.5	90	94.5	99	103.5
	15%	34	38	42.5	47	51	55	59.5	64	68	72	76.5	81	85	89	93.5	98



Sources:

1 Chumlea WC, Roche AF. Assessment of the nutritional status of healthy and handicapped adults. In: Lohman TG, Roche AF, Martorell R. Anthropometric standardization reference manual. 1988 Champaign Illinois: Human Kinetics Books. S. 115 - 119

2 AKE. Recommendations for enteral and parenteral nutrition in adults. AKE, 2008/2010; Wien

3 Chumlea WC, Guo SS, Steinbaugh ML. Prediction of stature from knee height for black and white adults and children with application to mobility-impaired or handicapped persons. J Am Diet Assoc 1994; 94:1385-8, 1391.