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Manon Laporte RD, MSc

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# Validated Nutrition Screening Tools

## (for hospital use)

- ❖ Simple Screening Tools (# 1 & # 2)
- ❖ Malnutrition Screening Tool (MST)
- ❖ Mini Nutritional Assessment – Short Form (MNA-SF)
- ❖ Nutritional Risk Screening 2002 (NRS 2002)
- ❖ Malnutrition Universal Screening Tool (MUST)
- ❖ Short Nutritional Assessment Questionnaire (SNAQ)
- ❖ **Canadian Nutrition Screening Tool (CNST)**

Table 1  
Simple screening tools 1 and 2 (1)<sup>a</sup>

Risk factors	1 point <sup>b</sup>	2 points <sup>b</sup>
<b>Tool 1</b>		
BMI ( $\geq 65$ years)	21 - 23.9 kg/m <sup>2</sup>	<21 kg/m <sup>2</sup>
% weight loss over time:		
1 week	<1%	$\geq 1\%$ - 2%
1 month	2%	$\geq 5\%$
3 months	5%	$\geq 7.5\%$
6 months	7.5%	$\geq 10\%$
Unlimited/unknown time frame	<10%	$\geq 10\%$
<b>Tool 2</b>		
BMI ( $\geq 65$ years)	21 - 23.9 kg/m <sup>2</sup>	<21 kg/m <sup>2</sup>
Albumin	28 - 35 g/L	<28 g/L

BMI = body mass index, PEM = protein-energy malnutrition  
<sup>a</sup>Tool 1 = BMI and percentage of weight loss over time; tool 2 = BMI and albumin level  
<sup>b</sup>Total score for each simple screening tool:  
 0 - 1 point = low PEM risk  
 2 - 4 points = high PEM risk  
 Note: The total score can be based on one or both risk factors.

# Malnutrition

## Is your patient at risk?

### Malnutrition Screening Tool<sup>1</sup> (MST)

- Have you/the patient lost weight recently without trying?
  - No: 0
  - Unsure: 2
  - Yes, how much (kg)?
    - 1 - 5: 1
    - 6 - 10: 2
    - 11 - 15: 3
    - > 15: 4
    - Unsure: 2
- Have you/the patient been eating poorly because of a decreased appetite?
  - No: 0
  - Yes: 1

**Total Score**

**Score 2 or more** → **Action**

**If your patients have lost weight and/or are eating poorly - ie, score two or more, or they are very underweight, then they may be at risk of malnutrition.**

**Applies to the last six months**

**If unsure, ask if they suspect they have lost weight - eg, clothes are looser**

**For example, less than three-quarters of usual intake may also be eating poorly due to chewing and swallowing problems**

**Of weight loss and appetite questions**



### Mini Nutritional Assessment MNA<sup>®</sup>

Last name: \_\_\_\_\_ First name: \_\_\_\_\_ Sex: \_\_\_\_\_

Date: \_\_\_\_\_ Age: \_\_\_\_\_ Weight, kg: \_\_\_\_\_ Height, cm: \_\_\_\_\_

Complete the screen by filling in the boxes with the appropriate numbers. Total the numbers for the final screening score.

**Screening**

**A Has food intake declined over the past 3 months due to loss of appetite, digestive problems, chewing or swallowing difficulties?**

0 = severe decrease in food intake  
 1 = moderate decrease in food intake  
 2 = no decrease in food intake

**B Weight loss during the last 3 months**

0 = weight loss greater than 3 kg (6.6 lbs)  
 1 = does not know  
 2 = weight loss between 1 and 3 kg (2.2 and 6.6 lbs)  
 3 = no weight loss

**C Mobility**

0 = bed or chair bound  
 1 = able to get out of bed/ chair but does not go out  
 2 = goes out

**D Has suffered psychological stress or acute disease in the past 3 months?**

0 = yes 2 = no

**E Neuropsychological problems**

0 = severe dementia or depression  
 1 = mild dementia  
 2 = no psychological problems

**F1 Body Mass Index (BMI) (weight in kg / (height in m)<sup>2</sup>)**

0 = BMI less than 19  
 1 = BMI 19 to less than 21  
 2 = BMI 21 to less than 23  
 3 = BMI 23 or greater

IF BMI IS NOT AVAILABLE, REPLACE QUESTION F1 WITH QUESTION F2. DO NOT ANSWER QUESTION F2 IF QUESTION F1 IS ALREADY COMPLETED.

**F2 calf circumference (CC) in cm**

0 = CC less than 31  
 3 = CC 31 or greater

**Screening score (max. 14 points)**

12-14 points: Normal nutritional status  
 8-11 points: At risk of malnutrition  
 0-7 points: Malnourished

### Table 1 Initial Screening

1	Is BMI < 20.5?	Yes	No
2	Has the patient lost weight within the last 3 months?		
3	Has the patient had a reduced dietary intake in the last week?		
4	Is the patient severely ill? (e.g. in intensive therapy)		

Yes: If the answer is "Yes" to any question, the screening in Table 2 is performed.  
 No: If the answer is "No" to all question, the patient is re-screened at weekly intervals. If the patient e.g. is scheduled for a major operation, a preventive nutritional care plan is considered to avoid the associated risk status.

### Table 2 Final Screening

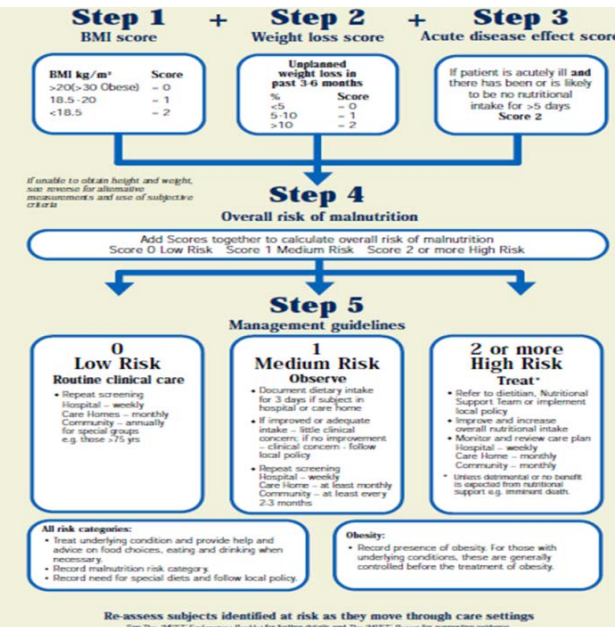
Impaired nutritional status		Severity of disease (increase in requirements)	
Absent Score 0	Normal nutritional status	Absent Score 0	Normal nutritional status
Mild score 1	Wt loss $\geq 5\%$ in 3 months or food intake below 50-75% of normal requirements in preceding week	Mild score 1	Hip fracture* Chronic patients, in particular with acute complications cirrhosis*, COPD*, Chronic hemodialysis, diabetes, oncology
Moderate score 2	Wt loss $\geq 5\%$ in 2 months or BMI 18.5 - 20.5 + impaired general condition or food intake 25 - 60% of normal requirement in preceding week	Moderate score 2	Major abdominal surgery* Stroke* Severe pneumonia, hematologic malignancy
Severe score 3	Wt loss $\geq 5\%$ in 1 month ( $> 1.5\%$ in 3 months) or BMI $\leq 18.5$ + impaired general condition or food intake 0-25% of normal requirement in preceding week	Severe score 3	Head injury* Bone marrow transplantation* Intensive care patients (APACHE $> 10$ ).

Score: \_\_\_\_\_ + \_\_\_\_\_ = **Total score**

Age \_\_\_\_\_ if  $\geq 70$  years: add 1 to total score above

**age-adjusted total score**

Score = / = 3: the patient is nutritionally at risk and a nutritional care plan is initiated  
 Score  $\leq 3$ : weekly re-screening of the patient. If the patient e.g. is scheduled for a major operation, a preventive nutritional care plan is considered to avoid the associated risk status.



# 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

# Canadian Nutrition Screening Tool (CNST) 2014

Ask the patient the following questions	Yes	No
<b>Have you lost weight in the past 6 months without trying to lose this weight?</b> <small>If the patient reports a weight loss but gained it back, consider it as a NO weight loss.</small>		
<b>Have you been eating less than usual for more than a week?</b>		
<b>Two “YES” answers indicate nutrition risk</b>		

- If patient is uncertain regarding weight loss, ask if clothing is now fitting more loosely.
- If the patient is unable to answer the questions, a knowledgeable informant can be used to obtain the information

Screening Tools	Parameters				Criterion Validity		
	Weight loss	BMI	Appetite/ Food intake	Others	Gold Standards	Sensitivity	Specificity
<b>Simple Screening tools 1998 #1 and #2</b>	✓	✓		Albumin	In-depth assessment by two dietitians (2 studies)	75% - 92%	69% - 75%
<b>MST 1999</b>	✓		✓		SGA / BMI & Weight loss / Dietitian assessm. (9 studies)	39%-93%	55%-93%
<b>MNA-SF<sup>©</sup> 2001</b>	✓	✓	✓	Psycho. stress Acute disease Neuropsych. Problems, Mobility	Dietitian assessment / SGA / BMI & weight loss (3 studies)	89%-100%	38%-49%
<b>NRS 2002</b>	✓	✓	✓	Severity of disease	SGA / BMI & Weight loss (7 studies)	62% - 92%	70%-93%
<b>MUST 2003</b>	✓	✓	✓	Acutely ill	SGA / BMI & Weight loss (7 studies)	43%-96%	78%-99%
<b>SNAQ<sup>©</sup> 2005</b>	✓		✓	Supplem. drinks / Tube feeding	Weight loss & BMI / SGA (3 studies)	75%-79%	83%-90%
<b>CNST 2014</b>	✓		✓		SGA (2 studies)	67%-73%	80-86%

Screening Tools	Reliability (inter-rater) Kappa Score	Simple / Easy to use?	Limits
Screening Tools 1998 # 1 and # 2	0.60 - 0.76	±	<ul style="list-style-type: none"> <li>• Calculation of % weight loss</li> <li>• Laboratory parameter</li> </ul>
MST 1999	0.21 – 0.93	Yes	<ul style="list-style-type: none"> <li>• Eating poorly only because ↓ appetite &amp; No time frame of eating poorly and weight loss</li> <li>• Validity 93% → Same rater completed the tool and conducted the nutrition assessment</li> </ul>
MNA-SF <sup>©</sup> 2001	0.37	No	<ul style="list-style-type: none"> <li>• Low specificity</li> <li>• For elderly population only</li> <li>• Too comprehensive</li> </ul>
NRS 2002	0.41	No	<ul style="list-style-type: none"> <li>• Too detailed (% of food intake and weight loss)</li> </ul>
MUST 2003	0.31-0.56	±	<ul style="list-style-type: none"> <li>• Calculation of % weight loss in a specific time</li> <li>• Same BMI range for adult and elderly populations</li> </ul>
SNAQ <sup>©</sup> 2005	0.69	± Yes	<ul style="list-style-type: none"> <li>• No acceptable reference standard (EAL-ADA 2011)</li> <li>• Decrease appetite over the last month...</li> </ul>
CNST 2014	0.88	Yes	

# Comparison of nutrition screening tools for hospital use

- For many of the validation assessments of nutrition screening tools, same rater completed the tool and conducted the nutrition assessment, which favors higher validity results.
- The validity and reliability of most of the nutrition screening tools were tested when the tools were completed by trained researchers or dietitians or trained nurses, which favors higher validity results.
- **CNST** is the first simple tool validated and reliability tested at admission to acute care hospital by a large number of untrained nursing personal, which reflects the real-world hospital setting.
- Reference: Laporte M, Keller H, Payette H et al. Validity and Reliability of the new Canadian Nutrition Screening Tool in the “real-world” hospital setting. *European Journal of Clinical Nutrition* advance online publication, December 2014; doi:10.1038/ejcn.2014.270