# Nutritional Assessment

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- Cancer cachexia
- Sarcopenia
- Malnutrition
- Assessing nutritional status
- Prehab programmes



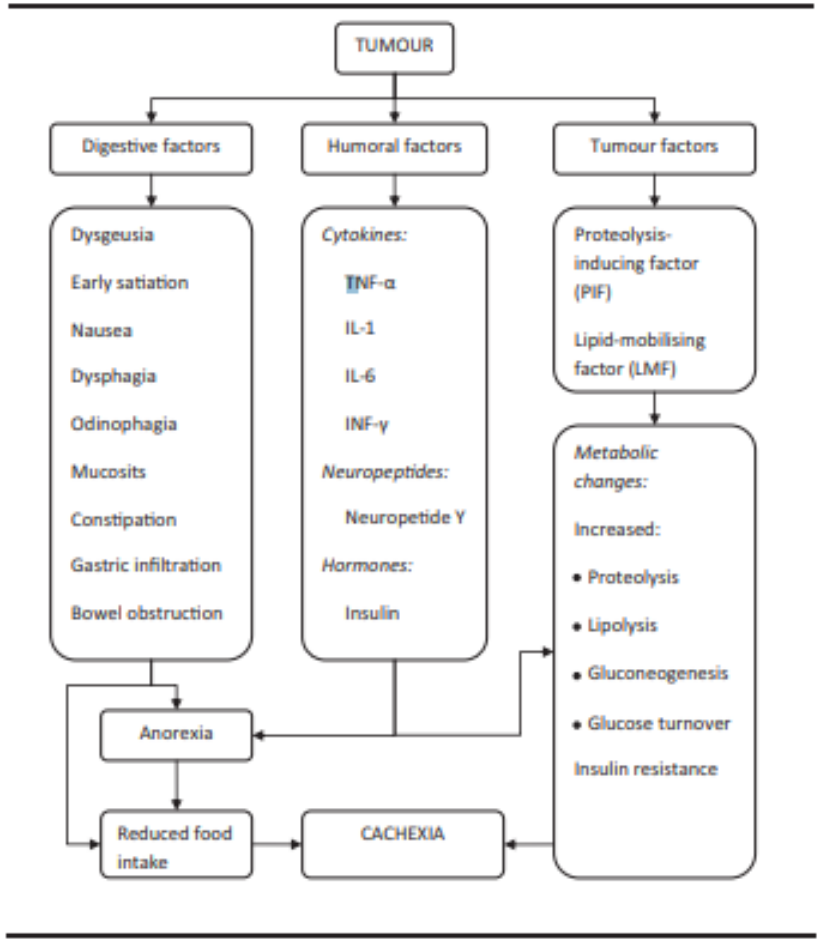
# Cancer Cachexia

Multifactorial syndrome

“Cachexia is a complicated metabolic syndrome related to underlying illness and characterized by muscle mass loss with or without fat mass loss that is often associated with anorexia, an inflammatory process, insulin resistance, and increased protein turnover”

Baker Rogers et al 2022

Graph 1: Physiopathology of cancer cachexia




Graph 1. Physiopathology of cancer cachexia.

# International Consensus Classification of Cachexia

Involuntary weight loss > 5 months in the absence of simple starvation

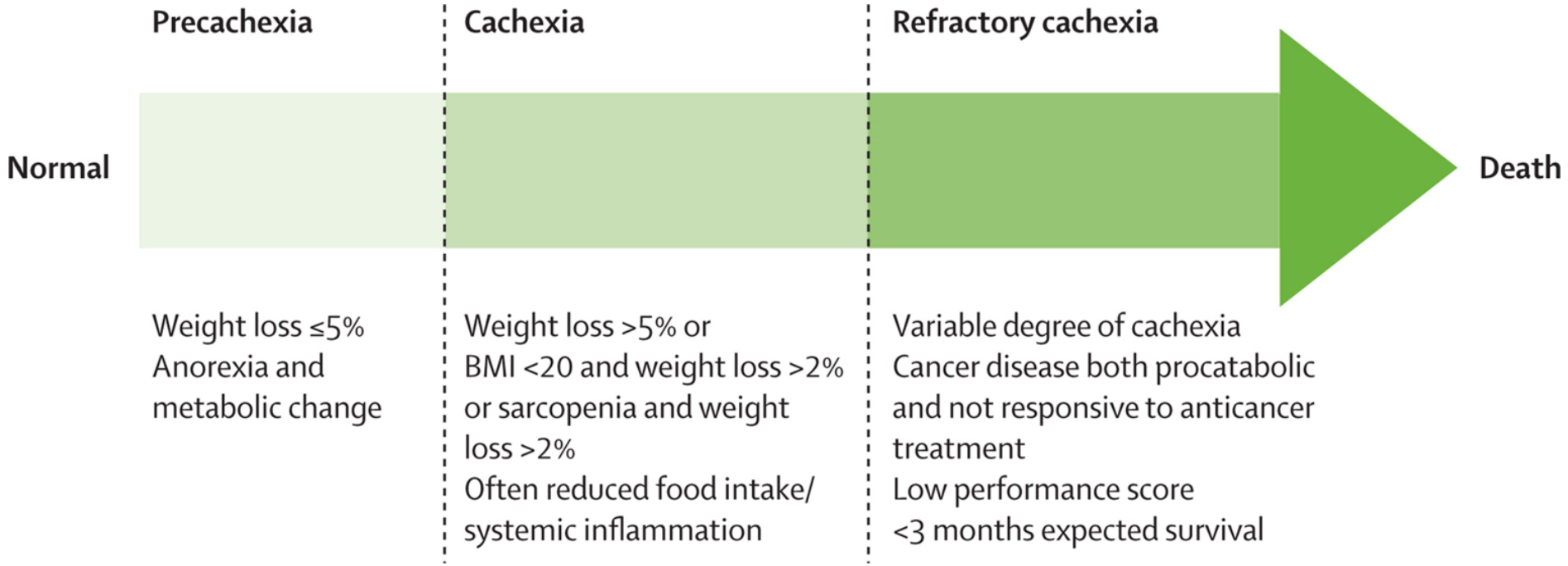
Or

Weight loss of >2% if BMI was <20kg/m2 or sarcopenia was present

Fearson et al 2011

70-80% of patients with pancreatic cancer are malnourished or cachectic (Basile et al 2019)

Pancreatic cancer patients with cachexia have reduced survival (Bachmann et al 2009)


Precachexia
Cachexia
Refractory cachexia
Normal
Death
Weight loss ≤5%
Anorexia and
metabolic change
Weight loss >5% or
BMI <20 and weight loss >2%
or sarcopenia and weight
loss >2%
Often reduced food intake/
systemic inflammation
Variable degree of cachexia
Cancer disease both procatabolic
and not responsive to anticancer
treatment
Low performance score
<3 months expected survival

Note that not all malnourished patients are cachectic, but all cachectic patients are malnourished

# Sarcopenia

"A syndrome characterised by progressive and generalised loss of skeletal muscle mass and strength with a risk of adverse outcomes such as physical disability, poor quality of life and death."

**Table 1.** Criteria for the diagnosis of sarcopenia

| Diagnosis is based on documentation of criterion 1 plus (criterion 2 or criterion 3) |
|---|
| 1. Low muscle mass |
| 2. Low muscle strength |
| 3. Low physical performance |

(Cruz-Jentof et al 2010)

# Updated Sarcopenia Definition

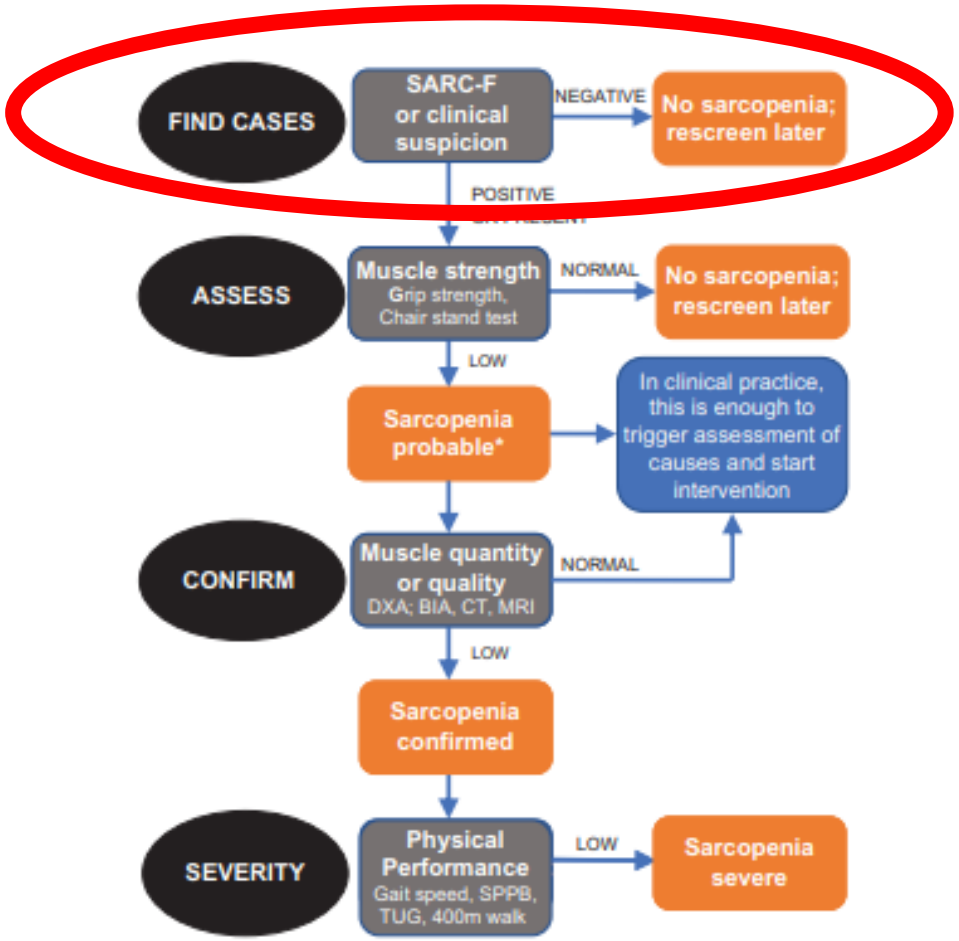



**Figure 1.** Sarcopenia: EWGSOP2 algorithm for case-finding, making a diagnosis and quantifying severity in practice. The steps of the pathway are represented as Find-Assess-Confirm-Severity or F-A-C-S. *Consider other reasons for low muscle strength (e.g. depression, sroke, balance disorders, peripheral vascular disorders).

Cruz-Jentoff et al. 2019

JAMDA

journal homepage: www.jamda.com

Editorial

# SARC-F: A Simple Questionnaire to Rapidly Diagnose Sarcopenia

Theodore K. Malmstrom PhD [a,b], John E. Morley MB, BCh [b,*]

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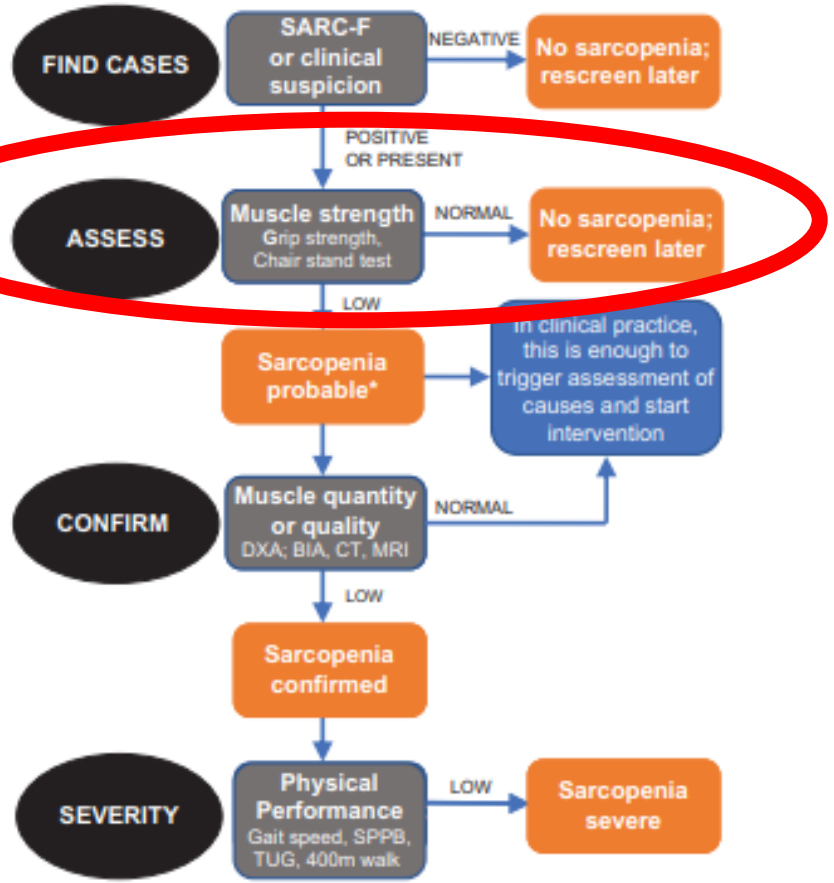
Sarcopenia was originally defined as an age-associated loss of muscle mass.[1,2] Recently a number of European and international groups have redefined sarcopenia as being a decline in muscle function (either walking speed or grip strength) associated with loss of muscle mass.[3–5] This approach has been validated.[6,7] Sarcopenia leads to disability, falls, and increased mortality.[8–16] Loss of muscle strength and aerobic function are 2 of the hallmarks of frailty.[17–21] Sarcopenia has been linked to an increased prevalence of osteoporosis, thus further increasing its propensity to produce hip fractures.[22–27]

Although osteoporosis has been classically diagnosed by measuring bone mineral density, it has been recognized that a number of other factors play into the role of diagnosing the propensity to have a fracture.[28,29] This is particularly true in older persons with diabetes mellitus who often have good bone mineral density but weak bones, and this is coupled with an increase in sarcopenia.[30–33] This has led to the concept that the questions associated with the Fracture Risk Assessment Tool (FRAX) (www.shef.ac.uk FRAX) may be sufficient to screen for osteoporosis. Two studies

**Table 1**
SARC-F Screen for Sarcopenia

| Component | Question | Scoring |
|---|---|---|
| Strength | How much difficulty do you have in lifting and carrying 10 pounds? | None = 0<br>Some = 1<br>A lot or unable = 2 |
| Assistance in walking | How much difficulty do you have walking across a room? | None = 0<br>Some = 1<br>A lot, use aids, or unable = 2 |
| Rise from a chair | How much difficulty do you have transferring from a chair or bed? | None = 0<br>Some = 1<br>A lot or unable without help = 2 |
| Climb stairs | How much difficulty do you have climbing a flight of 10 stairs? | None = 0<br>Some = 1<br>A lot or unable = 2 |
| Falls | How many times have you fallen in the past year? | None = 0<br>1–3 falls = 1<br>4 or more falls = 2 |

Malmstrom 2016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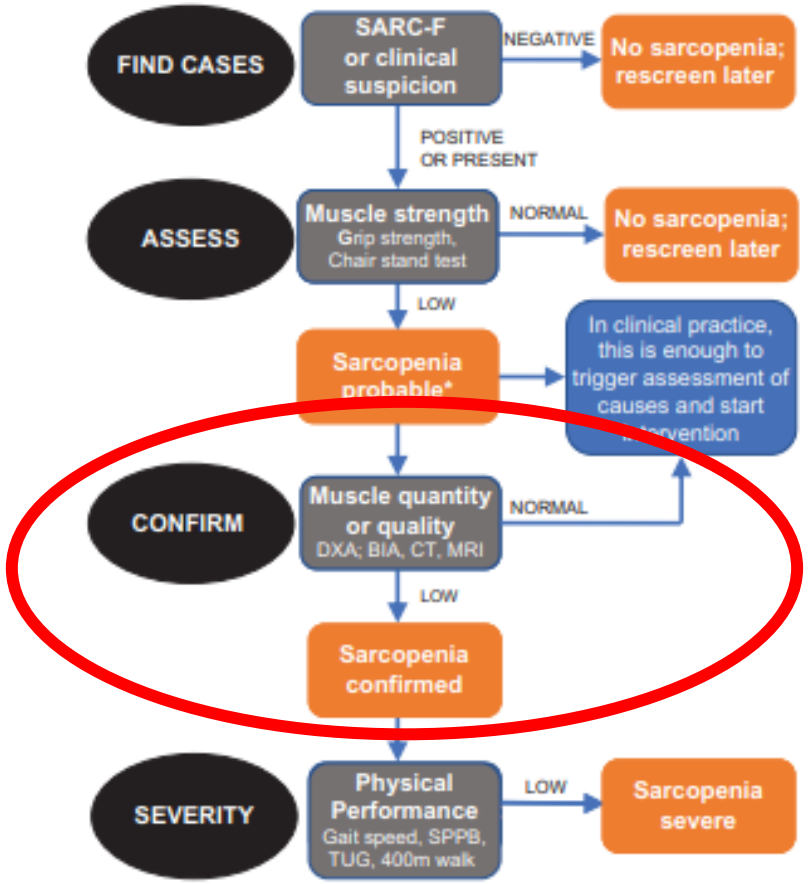
Cruz-Jentoff et al. 2019

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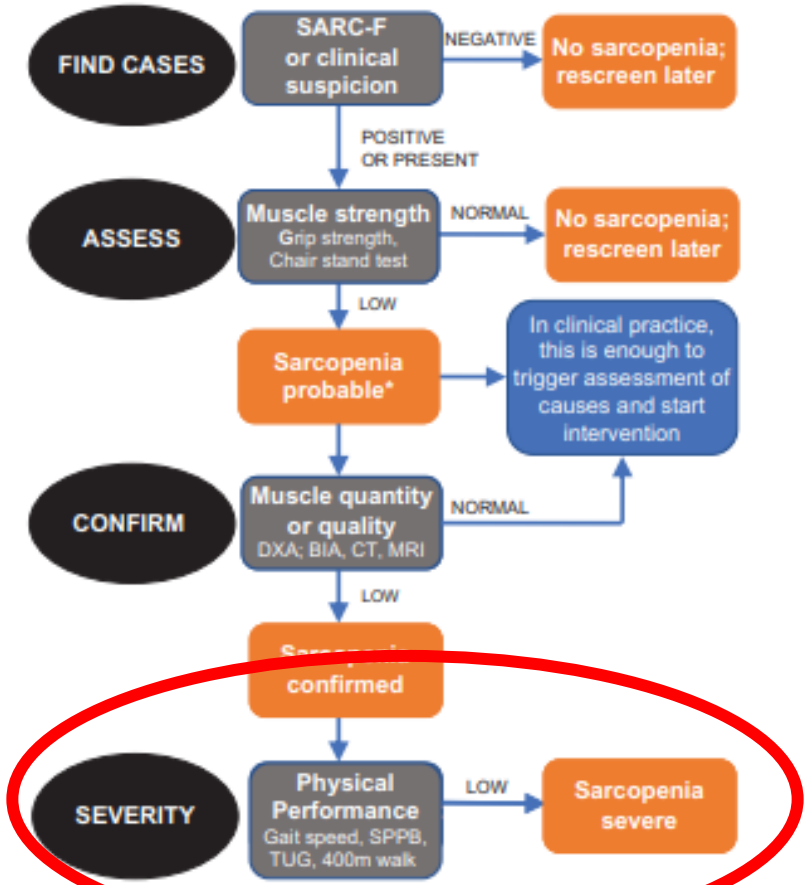
Cruz-Jentoff et al. 2019

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Cruz-Jentoff et al. 2019

VOLUME 31 · NUMBER 12 · APRIL 20 2013

JOURNAL OF CLINICAL ONCOLOGY

ORIGINAL REPORT

NHS CUH

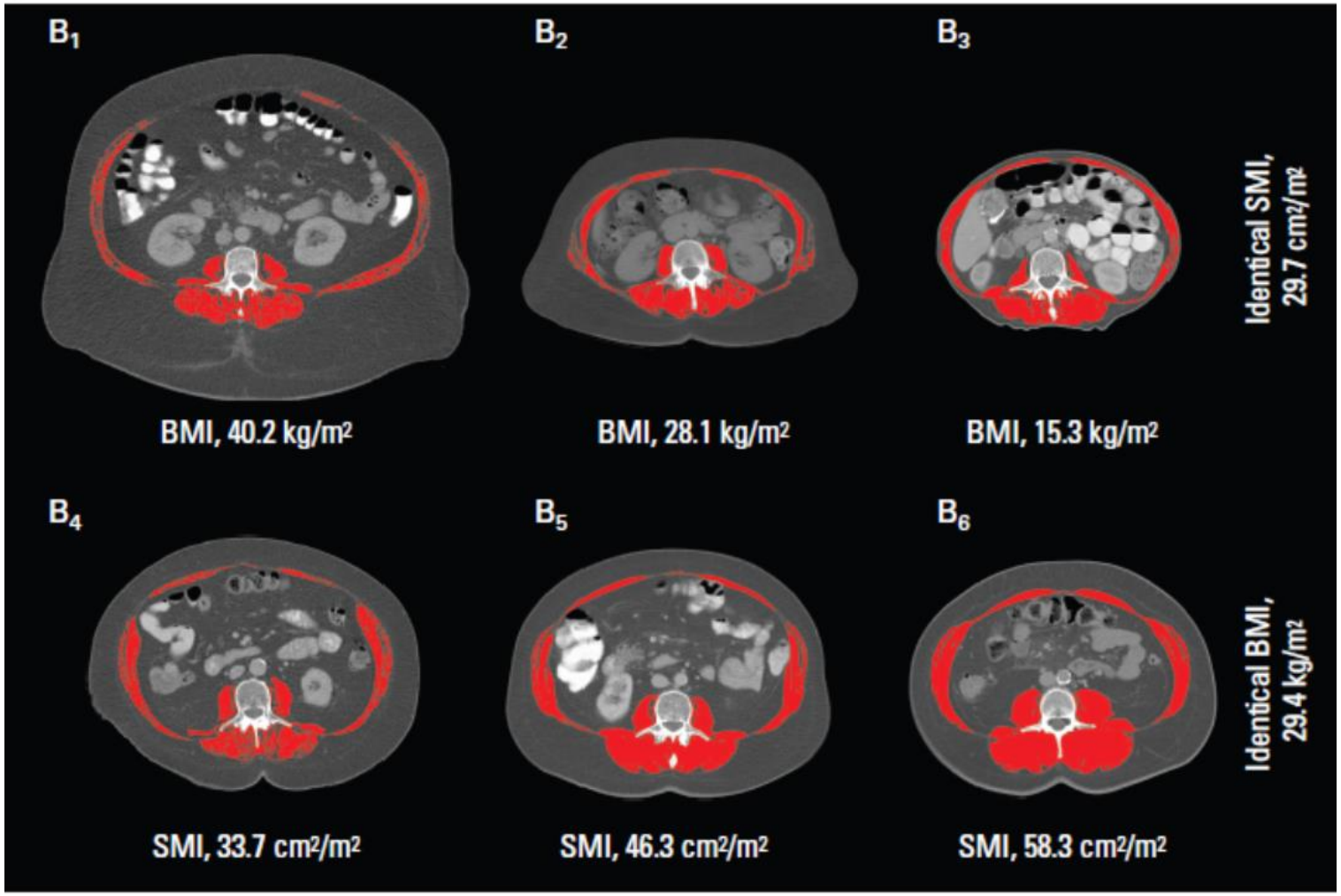
# Cancer Cachexia in the Age of Obesity: Skeletal Muscle Depletion Is a Powerful Prognostic Factor, Independent of Body Mass Index

*Lisa Martin, Laura Birdsell, Neil MacDonald, Tony Reiman, M. Thomas Clandinin, Linda J. McCargar, Rachel Murphy, Sunita Ghosh, Michael B. Sawyer, and Vickie E. Baracos*

**Table 4.** Median Overall Survival by BMI Category and Cancer Site for Overweight/Obese Patients

| BMI Category (kg/m$^2$) | Overall | | | | No. of Prognostic Variables: Zero | | | | One or Two* | | | | Three | | | | Overall Comparisons Within BMI Categories[a,b,c] *P*† |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. of Patients | No. of Deaths | Median Survival (months) | 95% CI | No. of Patients | No. of Deaths | Median Survival (months) | 95% CI | No. of Patients | No. of Deaths | Median Survival (months) | 95% CI | No. of Patients | No. of Deaths | Median Survival (months) | 95% CI | |
| Overall | 1,473 | 966 | 16.7 | 15.2 to 18.2 | 292 | 147 | 28.4[a] | 24.2 to 32.6[a] | 995 | 671 | 16.0[b] | 14.5 to 17.4[b] | 186 | 148 | 8.4[c] | 6.5 to 10.3[c] | < .001 |
| < 20.0 | 181 | 135 | 11.5[d] | 8.8 to 14.1[d] | 14 | 10 | 13.3[a] | 11.4 to 15.1[a] | 129 | 92 | 13.2[a,b] | 8.2 to 18.1[a,b] | 38 | 33 | 8.3[c] | 5.6 to 10.9[b] | .08 |
| 20.0 to 24.9 | 536 | 366 | 15.2[e] | 13.1 to 17.3[e] | 79 | 38 | 28.4[a] | 23.7 to 33.2[a] | 375 | 261 | 15.2[b] | 12.9 to 17.4[b] | 85 | 67 | 9.7[b] | 5.3 to 14.1[b] | .001 |
| 25.0 to 29.9 | 511 | 313 | 18.8[e] | 15.6 to 22.1[e] | 131 | 63 | 27.6[a] | 19.7 to 34.3[a] | 331 | 213 | 17.2[b] | 13.3 to 21.1[b] | 49 | 37 | 9.4[c] | 5.0 to 13.8[c] | < .001 |
| ≥ 30.0 | 245 | 152 | 20.1[f] | 15.8 to 24.4[f] | 68 | 36 | 35.6[a] | 24.5 to 46.8[a] | 163 | 105 | 17.3[b] | 12.8 to 21.9[b] | 14 | 11 | 8.5[c] | 4.1 to 12.8[c] | < .001 |
| Overall comparisons between BMI categories[d,e,f] *P*‡ | | | < .001 | | | | .30 | | | | .017 | | | | .389 | | |

Regardless of BMI at presentation, people with wt loss, sarcopenia and low muscle density had worse survival (28.4 vs. 8.4 months)




VOLUME 31 · NUMBER 12 · APRIL 20 2013
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ORIGINAL REPORT

Cancer Cachexia in the Age of Obesity: Skeletal Muscle Depletion Is a Powerful Prognostic Factor, Independent of Body Mass Index

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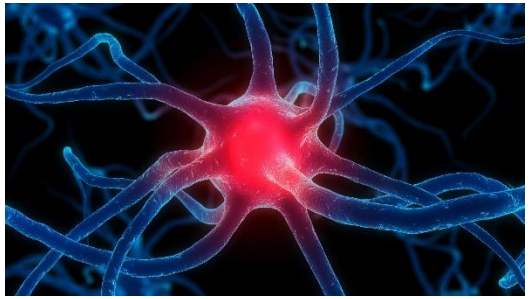
# Aetiology

Sarcopenia



Pancreatology
Volume 19, Issue 1, January 2019, Pages 127-135

# Sarcopenia is a reliable prognostic factor in patients with advanced pancreatic cancer receiving FOLFIRINOX chemotherapy

Yusuke Kurita [a, b], Noritoshi Kobayashi [b], Motohiko Tokuhisa [b], Ayumu Goto [b], Kensuke Kubota [a], Itaru Endo [c], Atsushi Nakajima [a], Yasushi Ichikawa [b]



https://doi.org/10.1016/j.pan.2018.11.001

# Malnutrition

No universal definition

“Malnutrition refers to deficiencies or excesses in nutrient intake, imbalance of essential nutrients or impaired nutrient utilization”

(World Health Organization 2021)


- **Undernutrition**, which includes wasting (low weight-for-height), stunting (low height-for-age) and underweight (low weight-for-age);
- **Micronutrient-related malnutrition**, which includes micronutrient deficiencies (a lack of important vitamins and minerals) or micronutrient excess; and
- **Overweight, obesity and diet-related noncommunicable diseases** (such as heart disease, stroke, diabetes and some cancers).

(World Health Organization, 2021)



Published OnlineFirst November 3, 2009; DOI: 10.1158/1078-0432.CCR-09-1525

*Imaging, Diagnosis, Prognosis*

# Sarcopenia in an Overweight or Obese Patient Is an Adverse Prognostic Factor in Pancreatic Cancer

Benjamin H.L. Tan,[1] Laura A. Birdsell,[2] Lisa Martin,[2] Vickie E. Baracos,[2] and Kenneth C.H. Fearon[1]

<10% of PC pts have **obvious** malnutrition

40% were overweight or obese

41% of **obese** pts were **sarcopenic**

56% of all pts were sarcopenic

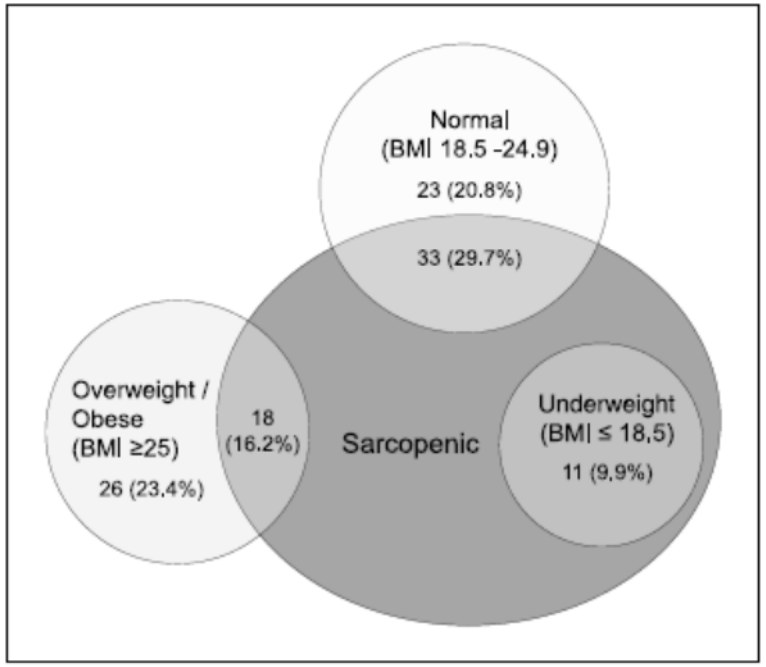
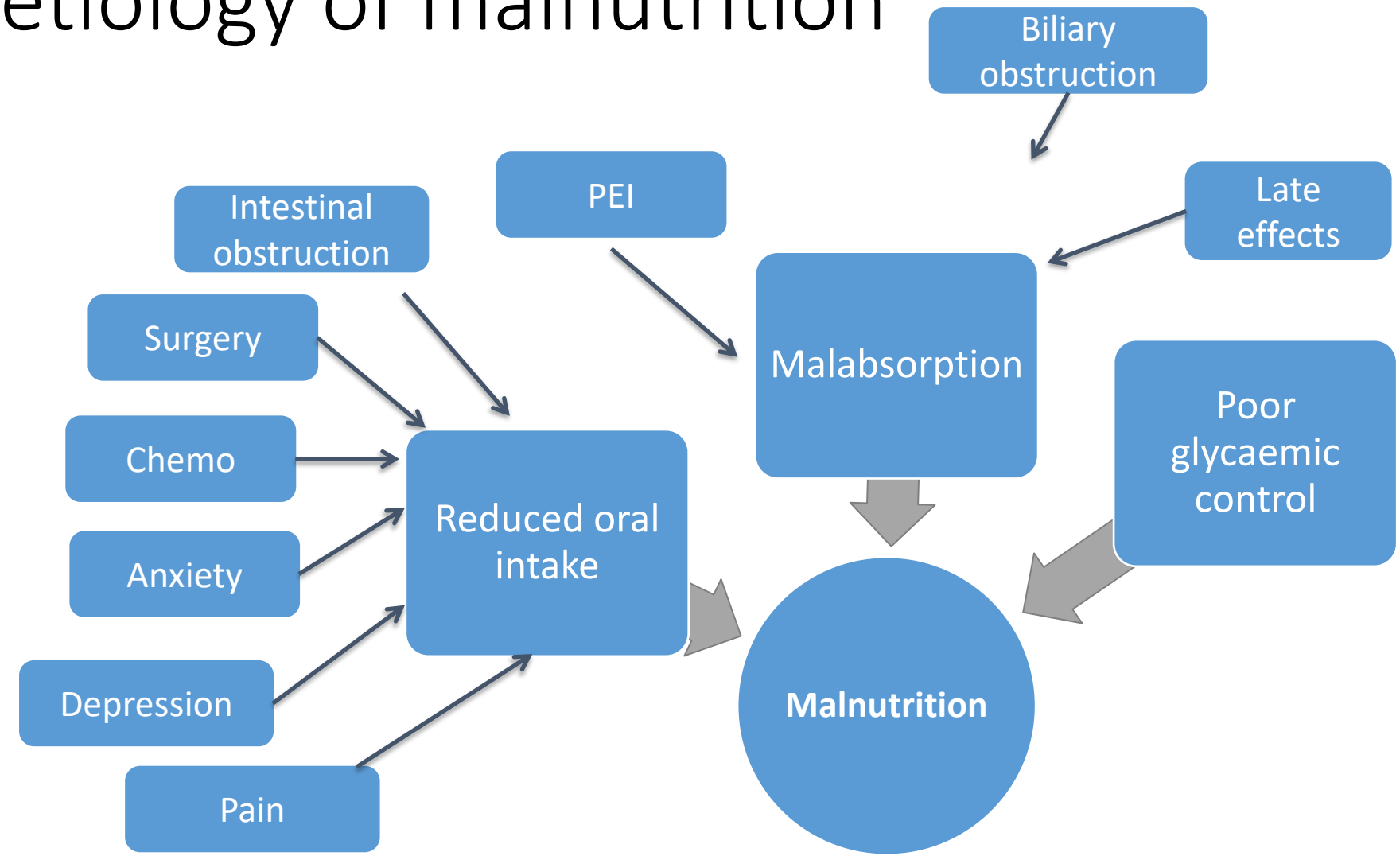



**Fig. 1.** Venn diagram of BMI classes and sarcopenic patients.

# Aetiology of malnutrition




# Prevalence

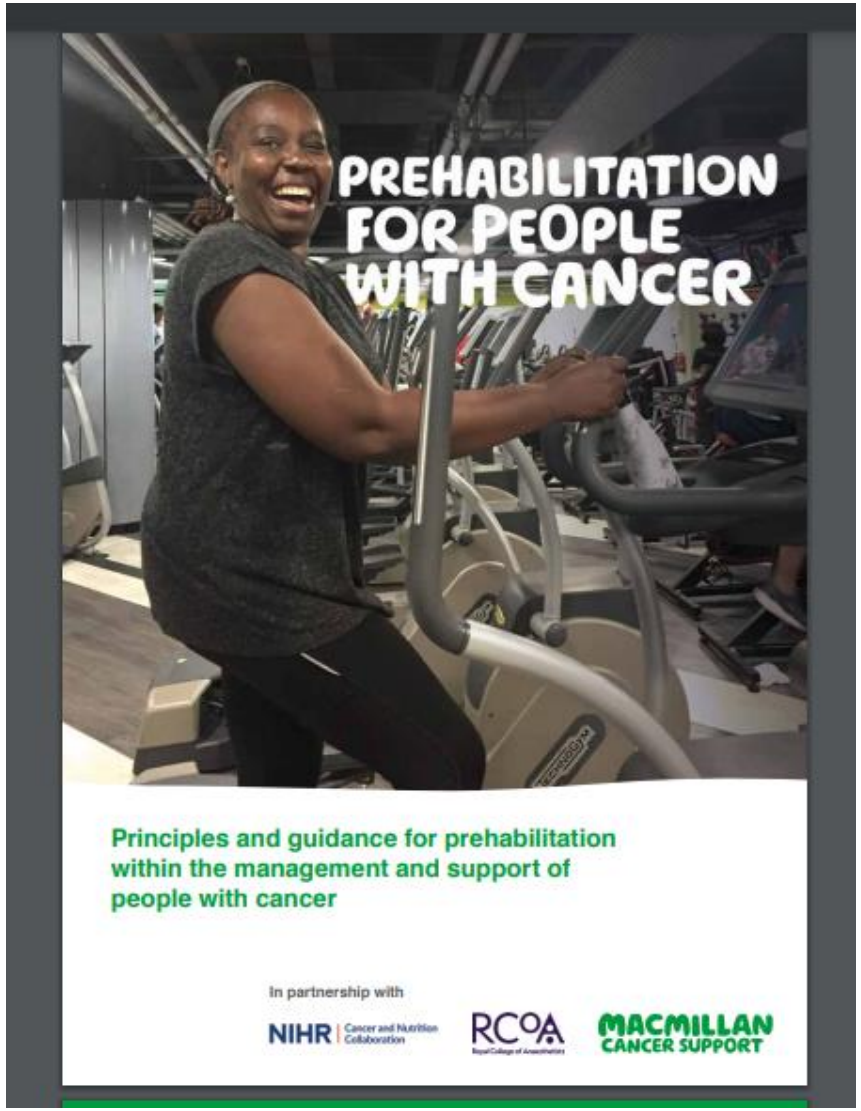
80-85% of Pancreatic Cancer patients are thought to be malnourished

Average weight loss at diagnosis is 10-16%

>40% of patients pre-resection have lose >10% of their bogy weight at the time of surgery

Okusaka *et al.* 1998, Bachman 2009, Mariette 2012, Ronga *et al.* 2014, Borzetti 2009, Bachman 2008

Malnutrition refers to deficiencies or excesses in nutrient intake, imbalance of essential nutrients or ***impaired nutrient utilization***


PREHABILITATION FOR PEOPLE WITH CANCER
Principles and guidance for prehabilitation within the management and support of people with cancer
In partnership with
NIHR | Cancer and Nutrition Collaboration
RCoA
MACMILLAN CANCER SUPPORT

Prehabilitation enables people with cancer to prepare for treatment through promoting healthy behaviours and through needs based prescribing of exercise, nutrition and psychological interventions.

Macmillan principles and guidelines for prehabilitation within the management and support of people with cancer

# 'Malnutrition Universal Screening Tool'

BAPEN

MAG

## 'MUST'

'MUST' is a five-step screening tool to identify **adults,** who are malnourished, at risk of malnutrition (undernutrition), or obese. It also includes management guidelines which can be used to develop a care plan.

It is for use in hospitals, community and other care settings and can be used by all care workers.

**This guide contains:**

- A flow chart showing the 5 steps to use for screening and management
- BMI chart
- Weight loss tables
- Alternative measurements when BMI cannot be obtained by measuring weight and height.

## The 5 'MUST' Steps

### Step 1

**Measure height and weight to get a BMI score using chart provided. *If unable to obtain height and weight, use the alternative procedures shown in this guide.***

### Step 2

**Note percentage unplanned weight loss and score using tables provided.**

### Step 3

**Establish acute disease effect and score.**

### Step 4

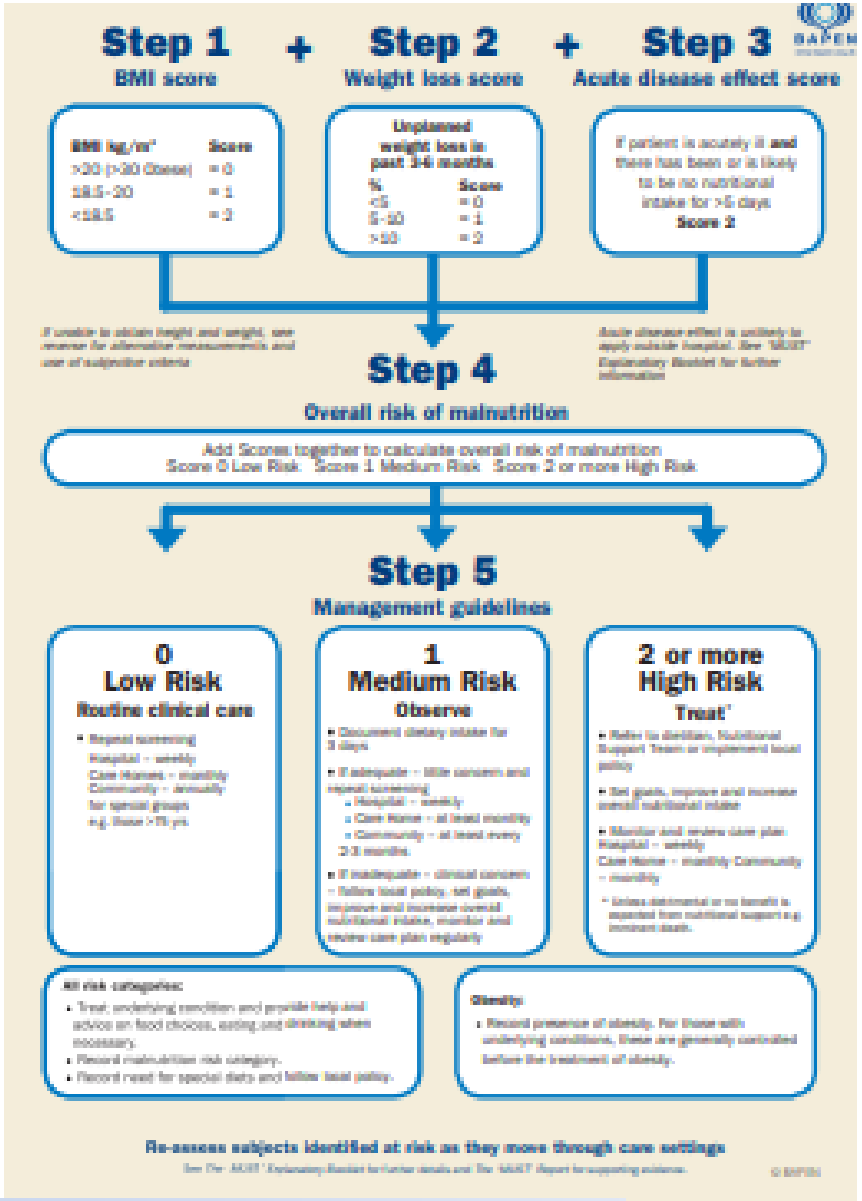
**Add scores from steps 1, 2 and 3 together to obtain overall risk of malnutrition.**

### Step 5

**Use management guidelines and/or local policy to develop care plan.**

Please refer to *The 'MUST' Explanatory Booklet* for more information when weight and height cannot be measured, and when screening patient groups in which extra care in interpretation is needed (e.g. those with fluid disturbances, plaster casts, amputations, critical illness and pregnant or lactating women). The booklet can also be used for training. See *The 'MUST' Report* for supporting evidence. Please note that 'MUST' has not been designed to detect deficiencies or excessive intakes of vitamins and minerals and is of **use only in adults.**







## Scored Patient-generated Subjective Global Assessment (PG-SGA)

**History: Boxes 1 - 4 are designed to be completed by the patient.**
[Boxes 1-4 are referred to as the PG-SGA Short Form (SF)]

Patient identification information

**1. Weight** *(see worksheet 1)*

In summary of my current and recent weight:

I currently weigh about _____ pounds
I am about _____ feet _____ inches tall

One month ago I weighed about _____ pounds
Six month ago I weighed about _____ pounds

During the past two weeks my weight has:

☐ Decreased (1) ☐ Not changed (0) ☐ Increased (0)

**Box 1** ☐

**2. Food intake:** As compared to my normal intake, I would rate my food intake during the past month as

- ☐ Unchanged (0)
- ☐ More than usal (0)
- ☐ Less than usal (1)

I am now taking

- ☐ *Normal food* but less than normal amount (1)
- ☐ Little solid food (2)
- ☐ Only liquids (3)
- ☐ Only nutritional supplements (3)
- ☐ Very little of anything (4)
- ☐ Only tube feedings or only nutribution by vein (0)

**Box 2** ☐

**3. Symptoms:** I have had the following problems that have kept me from eating enough during the past two weeks (check all that apply)

- ☐ No problem eating (0)
- ☐ No appetite, just did not feel like eating (3)
- ☐ Nausea (1)
- ☐ Constipation (1)
- ☐ Mouth sores (2)
- ☐ Things taste funny or have no taste (1)
- ☐ Problems swallowing (2)
- ☐ Pain; where? (3) _____
- ☐ Other (1)** _____
- ☐ Vomiting (3)
- ☐ Diarrhea (3)
- ☐ Dry moth (1)
- ☐ Smells bother me (1)
- ☐ Feel full quickly (1)
- ☐ Fatigue (1)

**Examples: Depression,money, or dental problems **Box 3** ☐

**4. Activities and function:**
Over the past month, I would generally rate my activity as:

- ☐ Normal with no limitations (0)
- ☐ Not my normal self, but able to be up and about with fairly normal activities (1)
- ☐ Not feeling up to most things, but in bed or chair less than half the day (2)
- ☐ Able to be little activity and spend most of the day in bed or chair (3)
- ☐ Pretty much bed ridden, rarely out of bed (3)

**Box 4** ☐

*The remainder of this form is to be completed by your doctor, nurse, dietitian, or therapist. Thank you.*

**Additive score of boxes 1-4** ☐ **A**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# Any Questions ??

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