# Nutrition Care & Assessment

Course: Chapter 1

Book: Chapter 17

# Nutrition Care in Hospitals

Medical Nutrition Therapy

.. "is a specific application of the **Nutrition Care Process** in clinical settings that is focused on the management of diseases." – Academy of Nutrition and Dietetics

MNT works to prevent and correct nutrition problems to improve the outcome of diseases and prevent complications.

Nutrition status can be affected by various ways including:

- Reduced food intake
- Impaired digestion and absorption
- Altered nutrient metabolism and excretion

# Effect of Illness on Nutrition Status



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# Multidisciplinary Team



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# Malnutrition

There is no full agreement among experts on the elements defining malnutrition

Since adult malnutrition cannot be defined by a single parameter, the identification of 2 or more of the following is recommended for diagnosis:

- Insufficient energy intake
- Weight loss
- Loss of muscle mass
- Loss of subcutaneous fat
- Localized or generalized fluid accumulation that may sometimes mask weight loss
- Diminished functional status as measured by handgrip strength



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http://www.espen.org/prestle/atederBoima120115/ptfus

# Continued...

Malnutrition, Synonym: Undernutrition

ESPEN proposes the following definition of undernutrition: "A state resulting from lack of uptake or intake of nutrition leading to altered body composition (decreased fat free mass (FFM) and body cell mass (BCM)) leading to diminished physical and mental function and impaired clinical outcome from disease". In potentially recoverable clinical conditions, such a definition is also helpful in determining the cases in which nutritional support is likely to make a difference.

# Continued...

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Characteristic	Acute Illness or Injury Related Malnutrition	Chronic Disease Related Malnutrition	Social or Environmental Related Malnutrition
Weight loss	>2%/1 week	>5%/1 month	>5%/1 month
	>5%/1 month	>7.5%/3 months	>7.5%/3 months
	>7.5%/3 months	>10%/6 months	>10%/6 months
		> 20%/1 year	> 20%/1 year
Energy intake	$\leq$ 50% for $\geq$ 5 days	$\leq$ 75% for $\geq$ 1 month	$\leq$ 50% for $\geq$ 1 month
Body fat	Moderate depletion	Severe depletion	Severe depletion
Muscle mass	Moderate depletion	Severe depletion	Severe depletion
Fluid accumulation	Moderate $\rightarrow$ severe	Severe	Severe
Grip strength	Not recommended in intensive care unit	Reduced for age/gender	Reduced for age/gender

Table 4. Characteristics to Diagnose Severe Malnutrition.4

Table 5. Characteristics to Diagnose Nonsevere (Moderate) Malnutrition.4

Characteristic	Acute Illness or Injury Related Malnutrition	Chronic Disease Related Malnutrition	Social or Environmental Related Malnutrition
Weight loss	1%-2%/1 week	5%/1 month	5%/1 month
	5%/1 month	7.5%/3 months	7.5%/3 months
	7.5%/3 months	10%/6 months	10%/6 months
		20%/1 year	20%/1 year
Energy intake	<75% for >7 days	$<75\%$ for $\ge1$ month	$<75\%$ for $\ge 3$ months
Body fat	Mild depletion	Mild depletion	Mild depletion
Muscle mass	Mild depletion	Mild depletion	Mild depletion
Fluid accumulation	Mild	Mild	Mild
Grip strength	Not applicable	Not applicable	Not applicable

# Why detect malnutrition?

1 it is a common problem in hospitalized patients suffering from acute/chronic conditions.

2 It is a costly problem, as it increases the financial burden on the patient and healthcare system

- 3 Increases risk of re-hospitalization
- 4 May lead to short & long term health effects, that impair function and recovery
- 5 It is easily detectable, and treatable in most cases

6 On admission, malnutrition prevalence is high, and increases further during the hospitalization period



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# Body Composition terminology

Fat Mass (FM) is the total amount of stored lipids in the body.

- **Subcutaneous Fat** is located directly beneath the skin.
  - Subcutaneous fat serves as an energy reserve and as insulation

against outside cold.

• Visceral Fat is located deeper within the body. Visceral fat serves

as an energy reserve and as a cushion between organs.



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# Body Composition terminology

**Fat-Free Mass (FFM)**, also called Lean Body Mass (LBM), is the total amount of nonfat (lean) parts of the body.

- Body Cell Mass (BCM) contains all the metabolically active tissues (living cells) of the body, including muscle cells, organ cells, blood cells, and immune cells. BCM includes the "living" portion of fat cells, but not the stored fat lipids. BCM also includes water inside living cells. This water is called Intracellular Water (ICW). The main electrolyte of intracellular water is potassium.
- Extracellular Mass (ECM) contains all the metabolically inactive (non-living) parts of the body, such as bone minerals and blood plasma. ECM includes water contained outside living cells. This water is called Extracellular Water (ECW). The main electrolyte of extracellular water is sodium.

# Nutrition Screening

"The process of identifying patients, clients, or groups who may have a nutrition diagnosis and benefit from nutrition assessment and intervention"

- Used to identify whether patients are malnourished or are at risk of malnourishment
- Conducted within 24 hrs of patient admission
- Simple form, collects a number of health-related information (completed within 10-15 Minutes)
- Sensitive to capture which patients require nutrition care
- Determines whether a more detailed assessment is warranted

# Considerations for the screening tool

- 1. Tools should be quick, easy to use, and able to be conducted in any practice setting
- 2. Tools should be valid and reliable for the patient population or setting (e.g., home, clinic, hospital, long-term care facility.(
- 3. <u>Tools and parameters are established by RDNs</u>, but the screening can be performed by a trained personnel
- 4. Screening and rescreening should occur within an appropriate time frame for the setting

Krause's Food & The Nutrition Care Process, 14<sup>th</sup> edition

## TABLE 17-2 Information Included in a Nutrition Screening

- Age, medical diagnosis, severity of illness
- · Height and weight, BMI, unintentional weight changes
- Tissue wasting, loss of subcutaneous fat
- Changes in appetite or food intake
- Problems that interfere with food intake (such as chewing or swallowing difficulty, or nausea and vomiting)
- Food allergies or intolerances, extensive dietary restrictions
- · Laboratory test results that indicate poor health status
- History of diabetes, renal disease, or other chronic illness
- Presence of anemia or pressure sores
- · Use of medications that can impair nutrition status
- Depression, social isolation, dementia

# Validated Screening Tools

- MNA: Mini Nutritional Assessment
- SNAQ: Short Nutritional Assessment Questionnaire
- NRS 2002: Nutritional Risk Screen
- MUST: Malnutrition Universal Screening Tool
- MST: Malnutrition Screening Tool
- SGA: Subjective Global Assessment

Use:

- MNA: Elderly
- MUST: Community adults
- NRS: Clinical setting

# MUST



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0	1	2 or more
Low risk	Medium risk	High risk
Routine clinical care	Observe	Treat*
<ul> <li>Repeat screening Hospital – weekly Care homes – monthly Community – annually for special groups (e.g. those &gt; 75 y)</li> </ul>	<ul> <li>Document dietary intake for 3 days if subject in hospital or care home</li> <li>If improved or adequate intake, little clinical concern; if no improvement, clinical concern – follow local policy</li> <li>Repeat screening Hospital – weekly Care home – at least monthly Community – at least every 6 months</li> </ul>	<ul> <li>Refer to dietitian, nutrition support team or implement local policy</li> <li>Improve and increase overall nutritional intake</li> <li>Monitor and review care plan Hospital – weekly Care home – monthly Community - monthly</li> <li>* Unless detrimental or no benefit is expected from nutritional support e.g. imminent death</li> </ul>

Record malnutrition risk category, presence of obesity and/or need for special diets and follow local policy. Reassess those identified at risk as they move through care settings <sup>+</sup>In the obese, underlying acute conditions are generally controlled before the treatment of obesity.

If unable to obtain height and weight, alternative measurements and subjective criteria are provided (Elia, 2003). © BAPEN 2003

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# %Weight Loss calculation

%Weight change= [ (Current weight – Previous weight) / Previous weight ] x 100

Example:

Current weight 80 kg, usual weight 83 kg

%Weight loss = ((80-83)/83) \* 100 = - 3.6%

# Case Study

https<u>://www.bapen.org.uk/pdfs/must/must-case-studies-hospitals.pdf</u>

Mrs P is a frail 82 year old lady admitted to hospital for assessment of her respiratory problems. She has always been a smoker but her daughter recently persuaded her to stop. Her current weight is 44Kg and her daughter says she is about 5ft 2" tall. When she attended clinic a couple of months ago she weighed 48 Kg.

Her appetite is poor and recently she has only been able to manage small amounts of food and drink due to her breathing difficulties. She still lives at home on her own and manages with the help and support of her daughter who lives near by..

What is her BMI Score on admission?	
What percentage weight has she lost?	%
What is her percentage weight loss score?	
What is her overall 'MUST' Score/Risk Category?	

# Case Study

https<u>://www.bapen.org.uk/pdfs/must/must-case-studies-hospitals.pdf</u>

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Her appetite is poor and recently she has only been able to manage small amounts of food and drink due to her breathing difficulties. She still lives at home on her own and manages with the help and support of her daughter who lives near by..

What is her BMI Score on admission?	17.8	Underweight	
What percentage weight has she lost?	8.3-		%
What is her percentage weight loss score?	1		
What is her overall 'MUST' Score/Risk Category?	2<	High Risk	

# NRS – 2002

Nutritional Risk Screening (NRS 2002)

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)		č

	Impaired nutritional status	Severity of disease ( $\approx$ increase in requirements)		
Absent Score 0	Normal nutritional status	Absent Score 0	Normal nutritional requirements	
Mild Score 1	Wt loss > 5% in 3 mths or Food intake below 50–75% of normal requirement 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 > 5% in 2 mths 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 > 5% in 1 mth (>15% in 3 mths) or BMI < 18.5 + impaired general condition or Food intake 0-25% of normal requirement in preceding week in preceding week.	Severe Score 3	Head injury* Bone marrow transplantation* Intensive care patients (APACHE>10).	
Score:	+	Score:	= Total score	
Age	if $\geq$ 70 years: add 1 to total score above	= age-adjusted total score		

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# %Nutritional intake

=total energy consumed/ total energy requirements x 100

Example:

TER= 2500 kcal

Consumed = 1500 kcal

%intake = 1500/2500 x 100 = 60%

# Case

Mr. X is a 65 year old man that has been admitted to the hospital as a case of hip fracture after a recent fall. He's 174 cm tall, and currently weighs 69 kg. His son reported that his usual weight is 74 kg, but after a recent acute illness 2 months ago he had lower appetite and reduced his food intake.

You assessed his current food intake estimated his consumption to be approximately 680 calories. You calculate his total energy requirement to be 2100 calories.

# Mini Nutritional Assessment

#### Step 1: Screening

The patient or caregiver provides answers to questions A through D, and the screener determines answers to questions E and F. If the sum of points is 11 or less, the patient is at risk for malnutrition and Step 2 is conducted. A sum of 12 or more suggests that the patient is not at risk. Point values are shown below each question.

- A. Has food intake declined in the past 3 months due to loss of appetite, digestive problems, or chewing or swallowing difficulties?
  - 0 = severe loss of appetite; 1 = moderate loss of appetite; 2 = no loss of appetite
- B. Any weight loss during the past 3 months?

```
0 = weight loss >3 kg; 1 = does not know; 2 = weight loss of 1 to 3 kg; 3 = no weight loss
```

C. Any mobility problems?

0 = cannot leave bed or chair; 1 = cannot leave house; 2 = able to leave house

D. Any psychological stress or acute disease in the past 3 months?

0 = yes; 2 = no

E. Any neuropsychological problems?

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

F. Healthy BMI?

0 = BMI is <19; 1 = BMI is 19 to <21; 2 = BMI is 21 to <23; 3 = BMI is  $\geq$ 23

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Case Study

Fatima is 76 years old and is residing in a nursing home for the month

She has a reduced appetite but can still manage to eat on her own with some assistance from the nursing staff

She has not suffered from any acute illnesses and her mental status is adequate

She is 175 cm tall, and weighs 52 kg. She has lost weight since she entered the nursing home, as her usual weight was 57 kg.

She currently can only move using the wheelchair

What is your assessment of her nourishment status? What tool is most appropriate?

# Subjective Global Assessment

#### TABLE 17-4 Subjective Global Assessment

The Subjective Global Assessment rates features of the medical history and physical examination. Each variable is given an A, B, or C rating: A for well nourished, B for potential or mild malnutrition, and C for severe malnutrition. Patients are classified according to the final numbers of A, B, and C rankings.

#### Medical History

- · Body weight changes: percentage change in past 6 months; weight change in past 2 weeks
- · Dietary changes: suboptimal, low-kcalorie, liquid diet, or starvation
- · GI symptoms: nausea, diarrhea, vomiting, or anorexia for more than 2 weeks
- · Functional ability: full capacity versus suboptimal, walking versus bedridden
- · Degree of disease-related metabolic stress: low, medium, or high

#### **Physical Examination**

- · Subcutaneous fat loss (triceps or chest)
- · Muscle loss (quadriceps or deltoids)
- Ankle edema
- · Sacral (lower spine) edema
- Ascites (abdominal edema)

#### Classification:

- A: Well nourished: if no significant loss of weight, fat, or muscle tissue and no dietary difficulties, functional impairments, or GI symptoms; also applies to patients with recent weight gain and improved appetite, functioning, or medical prognosis
- B: Moderate malnutrition: if 5 to 10 percent weight loss, mild loss of muscle or fat tissue, decreased food intake, and digestive or functional difficulties that impair food intake; the B classification usually applies to patients with an even mix of A, B, and C ratings
- C: Severe malnutrition: if more than 10 percent weight loss, severe loss of muscle or fat tissue, edema, multiple GI symptoms, and functional impairments

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### Full SGA Form Example:

https://www.health.qld.g ov.au/ data/assets/pdf file/0030/143877/hphe sga.pdf

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# Example: Sections of SGA

Medical History			A	в	С
WEIGHT Wt change past 6 months 0-<5% loss 5-10% loss >10% loss	Usual weight Amount weight loss	Current weight % weight loss			
Weight change past 2 weeks No change; normal weight Increase to within 5% Increase (1 level above) No change, but below usual wt Increase to within 5-10% Decrease		Amount	:	•	
DIETARY INTAKE No change; adequate No change; inadequate			8 <b>•</b> 2		
Change Suboptimal diet Full liquid Hypocaloric liquid Starvation	Duration of ch	ange			:
Intake borderline; increasing Intake borderline; decreasing Intake poor; no change Intake poor; increasing			Uploaded B	y: anor	, ymeus

# Example: Sections of SGA

### MUSCLE WASTING

Physical examination	Normal	Mild/Moderate	Severe	
Temple	Well-defined muscle	Slight depression	Hollowing, depression	
Clavicle	Not visible in males; may be visible but not prominent in females	Some protrusion; may not be all the way along	Protruding/prominent bone	
Shoulder	Rounded	No square look; acromion process may protrude slightly	Square look; bones prominent	
Scapula/ribs	Bones not prominent; no significant depressions	Mild depressions or bone may show slightly; not all areas	Bones prominent; significant depressions	
Quadriceps	Well defined	Depression/atrophy medially	Prominent knee, Severe depression medially	
Interosseous muscle between thumb and forefinger (back of hand)**	Muscle protrudes; could be flat in females	Slightly depressed	Flat or depressed area	



#### Normal

Orbital Region: Orbital Fat Pads • Slightly bulged Fat pads

Temple Region: Temporalis

Muscle

 Well-defined muscle, flat or slight bulge



#### Mild – Moderate Orbital Region: Orbital Fat Pads • Slightly dark circles, somewhat

hollow look

Temple Region: Temporalis Muscle • Slight depression



Severe

- Orbital Region: Orbital Fat Pads

  Hollow look, depressions around
  eye, dark circles, loose saggy skin
- Temple Region: Temporalis Muscle
  Deep hollowing/scooping, lacking
  muscle to the touch, facial bone
  structures very defined



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- Scapular Bone Region: Trapezius, supraspinatus, infraspinatus
- Bones not prominent, no significant depressions



Mild - Moderate

- Scapular Bone Region: Trapezius, supraspinatus, infraspinatus
- Mild depression around scapula or bone may slightly show



Severe

- Scapular Bone Region: Trapezius, supraspinatus, infraspinatus
- Prominent, visible scapula bone; notable depressions between ribs, scapula, and/or shoulder/spine



#### Normal

Clavicle Bone Region: Pectoralis major, deltoid, trapezius

Well-defined muscle surrounding bone, clavicle bone typically not visible in males and may be slightly prominent in females

Acromion Bone Region: Deltoid

 Rounded curves at arms, shoulder, and neck



Mild - Moderate

Clavicle Bone Region: Pectoralis major, deltoid, trapezius

 More prominent clavicle bone, less prominent muscle when palpated

Acromion Bone Region: Deltoid • Acromion process may slightly protrude



Severe

- Clavicle Bone Region: Pectoralis major, deltoid, trapezius
  - Protruding and prominent bone with low surrounding muscle mass when palpated
  - Acromion Bone Region: Deltoid
  - Shoulder to arm joint looks square, bones more prominent, acromion process very prominent



Normal

Thoracic and Lumbar Region: Ribs, lower back, midaxillary line at iliac crest

 Chest is full, ribs do not show, slight to no protrusion of the iliac crest



#### Mild - Moderate

Thoracic and Lumbar Region: Ribs, lower back, midaxillary line

 Ribs somewhat more apparent, depressions not very pronounced, iliac crest somewhat prominent



Severe

Thoracic and Lumbar Region: Ribs, lower back, midaxillary line

 Depression between ribs very apparent, iliac crest is very prominent

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https://alaskapharmacy.org/wp-content/uploads/2020/02/Slides-Steward.pdf







#### Normal

Anterior Thigh Region: Quadriceps

· Well rounded, well developed

#### Patellar Region: Quadriceps

 Muscles protrude, kneecap not prominent

#### Posterior Calf Region: Gastrocnemius

Well-developed bulb of muscle

Mild – Moderate Anterior Thigh Region: Quadriceps

Mild depression on inner thigh

#### Patellar Region: Quadriceps

Kneecap more prominent

Posterior Calf Region: Gastrocnemius

Not well developed





#### Severe

Anterior Thigh Region: Quadriceps

 Depression/line on thigh, not well developed

#### Patellar Region: Quadriceps

 Kneecap prominent, little sign of muscle around knee

Posterior Calf Region: Gastrocnemius

Thin, minimal to no muscle definition



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https://alaskapharmacy.org/wp-content/uploads/2020/02/Slides-Steward.pdf

# Nutrition Care Process



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# Nutrition Assessment

The collection and analysis of health related information in order to identify nutrition-related problems.

This step interprets data from the nutrition screening and incorporates additional information to make a professional judgement

An assessment includes:

Medical history, Social history, Personal history, Food/Nutrition history, Anthropometric data, Biochemical analyses, Medical tests, Physical examination

# Historical Information

**Medical History** 

- Current complaint(s(
- Past medical conditions
- ♦ Surgical history
- Family medical history
- Chronic disease risk
- Mental/emotional health status

**Medication History** 

- Prescription drugs
- ♦ Over-the-counter drugs
- Dietary/herbal supplements
- Alcohol intake
- Cigarettes/tobacco use
- ✤Illegal drug use

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# Historical Information

Personal/Social History

- Age
- Occupation
- Educational level
- ✤ Socioeconomic status
- Cultural/ethnic identity
- Religious beliefs
- Home/family situation
- Cognitive abilities
- Food/Nutrition History
- Food intake
- Food allergies and intolerances
- Nutrition/health knowledge
- ✤ Food availability
- Physical activity and exercise patterns

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# Nutrition Assessment

The following section will discuss these indicators in detail:

- Food history
- Anthropometrics
- Biochemical examination
- Physical examination
# Food/Nutrition History – 24 hour recall

Time	Meal	Type of food	Method of preparation	Amount	Where consumed
08:00	Breakfast	Eggs	boiled	1medium	Home

# Food/Nutrition History – 24 hour recall

Method	Description	Advantages	Disadvantages			
24-hour recall Guided interview in which the foods	Results are not dependent on	Process is reliant on memory.				
	and beverages consumed in a 24- hour period are described in detail. Iteracy or educational level of respondent.	literacy or educational level of respondent.	<ul> <li>Food items that cause embarrass- ment (alcohol, desserts) may be</li> </ul>			
		<ul> <li>Interview occurs after food is</li> </ul>	omitted.			
<ul> <li>consumed, so with food choose</li> <li>It is a relative</li> </ul>	consumed, so it does not interfere with food choices.	<ul> <li>Underestimation and overestima- tion of food intakes are common.</li> </ul>				
	<ul> <li>It is a relatively easy and quick assessment method</li> </ul>	Skill of interviewer affects outcome.				
	assessment method.	ussessment metrou.	<ul> <li>Data from a single day cannot represent the respondent's usual intake accurately.</li> </ul>			
			<ul> <li>Seasonal variations may not be addressed.</li> </ul>			

# Food/Nutrition History – FFQ

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#### FIGURE 17-3 Sample Section of a Food Frequency Questionnaire

			H	HOW MUCH								
FRUIT	Never or less	1	2-3	1	2	3-4	5-6	Even	MEDIUM	YOUR SERVING SIZE		
	than once per month	mon.	mon.	week	week	week	week	day	SERVING	s	м	L
EXAMPLE: Bananas	0	0	0		0	0	0	0	1 medium		-	
Bananas	0	0	0	0	0	0	0	0	1 medium		0	0
Apples, applesauce	0	0	0	0	0	0	0	0	1 medium or 1/2 cup		0	
Oranges (not including juice)	0	0	0	0	0	0	0	0	1 medium		0	
Grapefruit (not including juice)	0	0	0	$\circ$	$\odot$	0	0	0	1/2 medium			$\bigcirc_t$
Cantaloupe	0	0	0	0	0	0	0	0	1/4 medium		1/4	0
Peaches, apricots (fresh, in season)	0	0	0	0	0	0	0	0	1 medium			
Peaches, apricots (canned or dried)	0	0	0	0	0	0	0	0	1 medium or <sup>1</sup> /2 cup		0	$\bigcirc_2$
Prunes, or prune juice	0	0	0	0	0	0	0	0	1/2 cup		0	$\bigcirc_1$
Watermelon (in season)	0	0	0	0	0	0	0	0	1 slice	0	<b>O</b>	
Strawberries, other berries (in season)	0	0	0	0	0	0	0	0	1/2 cup		0	O,
Any other fruit, including kiwi, fruit cocktail, grapes, raisins, mangoes	0	0	0	0	0	0	0	0	1/2 cup		1/2	<b></b>

# Food/Nutrition History – FFQ

Method	Description	Advantages	Disadvantages
Food frequency questionnaire	Written survey of food consumption during a specific period of time, often a one-year period.	<ul> <li>Process examines long-term food intake, so day-to-day and seasonal variability should not affect results.</li> <li>It is completed after food is consumed, so it does not interfere with food choices.</li> <li>It is a low-cost method.</li> </ul>	<ul> <li>Process is reliant on memory.</li> <li>It is not good for monitoring short-term changes in food intake.</li> <li>Serving sizes are often difficult for respondents to evaluate without assistance.</li> <li>Calculated nutrient intakes may not be accurate.</li> <li>Food lists include common foods only.</li> <li>Food lists for the general population are of limited value in special populations.</li> </ul>

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# Food/Nutrition History – Food Record

Day & Date	Breakfast	Amount	Mid-morning snack	Amount	Lunch	
Tuesday June 13 <sup>th</sup> , 2018	Eggs, fried	1egg 1tsp corn oil	Apple	1medium, 120grams		
	Milk, whole	½cup				
	Pita bread, refined	1medium				

# Food/Nutrition History – Food Record

Method Description		Advantages	Disadvantages			
Food record	Written account of food consumed during a specified period, usually several consecutive days. Accuracy is improved by including weights or measures of foods.	<ul> <li>Process does not rely on memory.</li> <li>Recording foods as they are consumed improves likelihood of obtaining accurate food intake data.</li> <li>It is useful for controlling intake because keeping records can increase awareness of food choices.</li> </ul>	<ul> <li>Recording process itself influences food intake.</li> <li>Process is time-consuming and burdensome for respondent; requires high degree of motivation.</li> <li>Underreporting is common.</li> <li>It requires literacy and the physical ability to write.</li> <li>Seasonal changes in diet are not to burden and the physical ability is a seasonal changes in diet are not to burden and the physical ability is a seasonal changes in diet are not to burden and the physical ability is a seasonal changes in diet are not to burden and the physical ability is a seasonal changes in diet are not to burden and the physical ability is a seasonal changes in diet are not to burden and the physical ability is a seasonal changes in diet are not to burden and the physical ability is a seasonal changes in diet are not to burden and the physical ability is a seasonal changes in diet are not to burden and the physical ability is a seasonal changes in diet are not to burden and the physical ability is a seasonal changes in diet are not to burden and the physical ability is a seasonal changes in diet are not to burden and the physical ability is a seasonal changes in diet are not to burden and the physical ability is a seasonal changes in diet are not to burden and the physical ability is a seasonal changes in diet are not to burden and the physical ability is a seasonal changes in diet are not to burden and the physical ability is a seasonal changes in diet are not to burden and the physical ability is a seasonal changes in diet are not to burden and the physical ability is a seasonal changes in diet are not to burden and the physical ability is a seasonal changes in diet are not to burden and the physical ability is a seasonal changes in diet are not to burden and the physical ability is a seasonal changes in diet are not to burden and the physical ability is a seasonal changes in diet are not to burden and the physical ability is a seasonal changes in distance and the physical ability is a seasonal changes in distance and to bur</li></ul>			

# Food/Nutrition History – Direct Observation



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# Food/Nutrition History – Direct Observation

# Innovation in Food History Forms

Does your app know what you are eating?

- Lose it!
- MyFitnessPal
- Meal Snap
- Fooducate









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# Analysis of Nutrient Intake

- USDA

- FNDDS
- FDA Total Diet Study Database
- Dietary Supplements Database

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### Websites based on the USDA data

- 1 <a href="https://nutritiondata.self.com/">https://nutritiondata.self.com/</a>
- 2 <u>https://happyforks.com/analyzer</u>
- 3 <u>https://ndb.nal.usda.gov/ndb/search/list</u>

Calorie	Information			
Amounts Per Selected S	erving	%DV		
Calories	77.3 (324 kJ)	4%		
From Carbohydrate	74.1 (310 kJ)			
From Fat	1.8 (7.5 kJ)			
From Protein	1.5 (6.3 kJ)			
From Alcohol	0.0 (0.0 kJ)			
Carb	ohydrates			
Amounts Per Selected S	erving	%DV		
Total Carbohydrate	20.5 g	7%		
Dietary Fiber	2.1 g	8%		
Starch	~			
Sugars	16.3 g			
	More	details <b>v</b>		
Fats &	Fatty Acids			
Amounts Per Selected Serving %DV				

Total Fat

Saturated Fat

Monounsaturated Fat

0.2 g

0.0 g

0.0 g

0%

0%

#### NUTRITION INFORMATION

Amounts per 1 medium (3" dia) (161g)

#### Protein & Amino Acids

Amounts Per Selected Serving		%DV
Protein	0.4 g	1%
	_	
	More d	etails 🔻

Vitamins		
Amounts Per Selected Serving		%DV
Vitamin A	61.2 IU	1%
Vitamin C	6.4 mg	11%
Vitamin D	~	~
Vitamin E (Alpha Tocopherol)	0.1 mg	0%
Vitamin K	1.0 mcg	1%
Thiamin	0.0 mg	2%
Riboflavin	0.0 mg	3%
Niacin	0.1 mg	1%
Vitamin B6	0.1 mg	3%
Folate	0.0 mcg	0%
Vitamin B12	0.0 mcg	0%
Pantothenic Acid	0.1 mg	1%
Choline	5.5 mg	
Betaine	~	

#### More details 🔻

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### Anthropometric Data

Height (or Length)

Body Weight

HeadCircumference

WaistCircumference

LimbsCircumference

BMI, %IBW, %UBW

# Height & Length

□ Always measure—never ask!

Measure the length of infants and young children by using a measuring board with a fixed headboard and a movable footboard.

Measure height next to a wall on which a <u>nonstretchable measuring tape</u> or board has been fixed. Ask the person to <u>stand erect</u> without shoes and with heels together. The person's eyes and head should be <u>facing forward</u>, with heels, buttocks, and shoulder blades <u>touching the wall</u>.





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# Length-for-Age / Height-for-Age



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# Height estimation – Ulna length

HU	Men(<65 years)	1.94	1.93	1.91	1.89	1.87	1.85	1.84	1.82	1.80	1.78	1.76	1.75	1.73	1.71
Ξ÷	Men(>65 years)	1.87	1.86	1.84	1.82	1.81	1.79	1.78	1.76	1.75	1.73	1.71	1.70	1.68	1.67
1	Ulna length (cm)	32.0	31.5	31.0	30.5	30.0	29.5	29.0	28.5	28.0	27.5	27.0	26.5	26.0	25.5
CHT	Women (<65 years)	1.84	1.83	1.81	1.80	1.79	1.77	1.76	1.75	1.73	1.72	1.70	1.69	1.68	1.66
Ξ.	Women (>65 years)	1.84	1.83	1.81	1.79	1.78	1.76	1.75	1.73	1.71	1.70	1.68	1.66	1.65	1.63
IN)	Men(<65 years)	1.69	1.67	1.66	1.64	1.62	1.60	1.58	1.57	1.55	1.53	1.51	1.49	1.48	1.46
Ξ_	Men(>65 years)	1.65	1.63	1.62	1.60	1.59	1.67	1.56	1.54	1.52	1.51	1.49	1.48	1.46	1.45
	Ulna length (cm)	25.0	24.5	24.0	23.5	23.0	22.5	22.0	21.5	21.0	20.5	20.0	19.5	19.0	18.5
Han a	Women (<65 years)	1.65	1.63	1.62	1.61	1.59	1.58	1.56	1.55	1.54	1.52	1.51	1.50	1.48	1.47
HE	Women (>65 years)	1.61	1.60	1.58	1.56	1.55	1.53	1.52	1.50	1.48	1.47	1.45	1.44	1,42	1.40

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# Weight

□ Always measure—never ask!

Valid weight measurements require scales that have been carefully maintained, calibrated, and

checked for accuracy at regular intervals.

Measure an infant's weight with a scale that allows the infant to sit or lie down.

□ If repeated weight measurements are needed, each weighing should take place at the same time of day (preferably before breakfast), in the same amount of clothing, after the person has voided, and on the same scale.



### Weight Estimation

Male's weight (kg) = knee height x 1.10 + MAC (cm) x 3.07 - 75.81

Female's weight (kg) = knee height x 1.10 + MAC (cm) x 2.81 - 66.04

Lin, B., Yoshida, D., Quinn, J. and Strehlow, M. (2009). A better way to estimate adult patients' weights. The American Journal of Emergency Medicine, 27(9), pp.1060-1064





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## BMI Classification (WHO(

Classification	BMI(kg/m)
	Principal cut-off points
Underweight	<18.50
Severe thinness	<16.00
Moderate thinness	16.00 - 16.99
Mild thinness	17.00 - 18.49
Normal range	18.50 - 24.99
Overweight	≥25.00
Pre-obese	25.00 - 29.99
Obese	≥30.00
Obese class I	30.00 - 34-99
Obese class II	35.00 - 39.99
Obese class III	≥40.00

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### IBW & UBW

TABLE 17-9	Use of Body Weight for Assessing Nutritional Risk	
%IBW	%UBW	Nutritional Risk
80-89	85-95	Risk of mild malnutrition
70–79	75-84	<b>Risk of moderate malnutrition</b>
<70	<75	Risk of severe malnutrition

IBW = (current weight/ideal weight) x 100
UBW= (current weight/usual weight) x100

)ideal weight = (height (m))^2 x \*\*(22

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# IBW for Amputees?





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IBW for Amputees

- BMI: increase the weight by the percentage based on the missing limb.
- IBW: subtract the percentage of the missing limb after your IBW calculation.



FIGURE 2 Weight of body parts expressed as percent of total body weight. Reproduced with permission from reference 10.

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Estimating Urea Volume in Amputees on Peritoneal Dialysis by Modified Anthropometric Formulas, Antonios H. Tzamaloukas,' Glen H. Murata2 Dialege By: anonymous

### Head Circumference

\* Assess brain growth and malnutrition in children up to 3 years of age

Track brain development in premature and SGA children

Encircle the largest circumference measure of a child's head, just above the eyebrows and ears





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# Waist Circumference

- Correlates with abdominal fat and helps assess over-nutrition
- WC for women >88 cm, and for men > 102 cm increases the risk for abdominal obesity related health conditions



Men	Women	Health Risk Level
0.95 or less	0.80 or less	Reduced Risk
0.96 to 1.0	0.81 to 0.85	Elevated Risk
1.0 or higher	0.85 or higher	High Risk





### **Biochemical Data**

#### ✤ Hematology

- Serum Proteins
- Serum Enzymes
- Serum Electrolytes
- Blood glucose profile
- Lipid profile
- Others

# Hematology

Laboratory Test	Acceptable Range	Description
Hematology		
Red blood cell (RBC) count	Male: 4.3–5.7 million/µL Female: 3.8–5.1 million/µL	Number of RBC; aids anemia diagnosis.
Hemoglobin (Hb)	Male: 13.5–17.5 g/dL Female: 12.0–16.0 g/dL	Hemoglobin content of RBC; aids anemia diagnosis.
Hematocrit (Hct)	Male: 39–49% Female: 35–45%	Percentage RBC in total blood volume; aids anemia diagnosis.
Mean corpuscular volume (MCV)	80–100 fL	RBC size; helps to distinguish between microcytic and macrocytic anemias.
Mean corpuscular hemoglobin concentration (MCHC)	31-37% Hb/cell	Hb concentration within RBC; helps to distinguish iron-deficiency anemia.
White blood cell (WBC) count	4500-11,000 cells/µL	Number of WBC; general assessment of immunity.

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### Serum Proteins

Blood Chemistry		
Serum Proteins		
Total protein	6.4–8.3 g/dL	Protein levels are not specific to disease or highly sensitive; they can reflect body protein, illness or infections, changes in hydration or metabolism, pregnancy, or medications.
Albumin	3.4-4.8 g/dL	May reflect illness or PEM; slow to respond to improvement or worsening of disease.
Transferrin	200–400 mg/dL >60 yr: 180–380 mg/dL	May reflect illness, PEM, or iron deficiency; slightly more sensitive to changes than albumin.
Prealbumin (transthyretin)	10-40 mg/dL	May reflect illness or PEM; more responsive to health status changes than albumin or transferrin.
C-reactive protein	68-8200 ng/mL	Indicator of inflammation or disease.

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## Glucose Profile

Fasting blood glucose

Normal: (70 to 99 mg/dl(

Prediabetes or Impaired Glucose Tolerance: (100 to 125 mg/dl(

Diagnosis of diabetes: (126 mg/dl) or above.

Hemoglobin A1C

Normal - Below 5.7%

Prediabetes – 5.7% to 6.4%

Diabetes 6.5% or over

# Lipid profile

Marker	
Total Cholesterol	Acceptable: <170mg/dl, Borderline: 170-199 mg/dl, High: >200 mg/dl
LDL Cholesterol	Acceptable: <110 mg/dl, Borderline: 110-129 mg/dl, High: >130 mg/dl
HDL Cholesterol	Males: 35-65 mg/dl, Females: 35-80 mg/dl. Risk for CHD doubles if <25 mg/dl
Triglycerides	150>mg/dl

STUDENTS-HUBhttps://www.urmc.rochester.edu/encyclopedia/content.aspx?ContentTypeID=90&ContentUD=P01593

# Physical Examination

Examples of malnutrition related signs:

Hair: dull, brittle, falls out (PEM)

Eyes: night blindness (vitamin A(

Lips: dry, cracked with sores in the corners (B vitamins)

Gums: swollen, bleeding (Vitamin C(

Skin: poor wound healing (PEM, Vitamin C)

Nails: Ridged (PEM(

Neck: Swollen glands (lodine)

Legs: bowed (Vitamin D(



# Hydration State

- Fluid Retention (Edema(

Causes: malnutrition or impaired blood circulation, which frequently accompanies disorders of the heart and blood vessels, kidneys, liver, and lungs.

Physical signs: weight gain, facial puffiness, swelling of limbs, abdominal distention, and tight-fitting shoes.

- Dehydration

Causes: vomiting, diarrhea, sweating, fever, excessive urination, and skin injuries or burns

Symptoms: thirst, dry skin or mouth, reduced skin tension, dark urine color, and reduced volume of urine.

# Nutrition Diagnosis

The identification of nutrition problems following the analysis of the assessment data. Each diagnosis includes the problem, etiology, and symptom (PES Statement(

)the problem) related to (the etiology or cause) as evidenced by (the sign or symptom.(





### Intake diagnosis examples

- Excessive alcohol intake
- Inadequate energy intake
- ✤ Inadequate fluid intake
- Increased calcium needs
- Inconsistent carbohydrate intake

### Clinical diagnosis examples

- Altered blood potassium levels
- Breastfeeding difficulty
- Involuntary weight loss
- Swallowing difficulty

# Behavioral-Environmental Diagnosis examples

- Disordered eating pattern
- Limited access o food
- Self-feeding difficulty
- Physical inactivity

# Ask yourself

1. Can the RDN resolve the problem?

2. Does the etiology make sense? Does it match the assessment data?

- 3. Is there a reasonable intervention?
- 4. Can you monitor this patient on the basis of the stated signs and symptoms?

PES Example:

Excessive calorie intake related to regular consumption of large portions of high fat meals as evidenced by 7 kg weight gain over the last 12 months.

oawed Representation
## Example 1

- Male patient
- Weight loss of 9 kg in 2 months
- Shortness of breath
- Inability to consume large meals
- Inability to shop or cook
- -24hour recall indicates he uses many frozen and processed foods; intake between 1000 1200 kcal/day
  - 1. Inadequate energy intake related to shortness of breath as evidenced by 9 kg of weight loss in 2 months.
  - Inadequate oral intake related to inability to shop and cook as evidenced by a caloric intake of 500 kcals less than estimated requirements and 9 kg of weight loss in 2 months.

#### Uploaded.Roprarcogymous

# Example 2

- An 8 year old white male child
- Allergies to eggs and peanuts. Patient has fear of allergic reactions
- Food and Nutrition related knowledge deficit
- Diagnosed with Fe deficiency anemia
- Current BMI at the 30th percentile (44th percentile one year ago(
- Intake of 1200–1500 kcal/day
- Poor appetite and limited food variety; intake of only 4 or 5 different foods
  - 1. Inadequate energy intake related to fear of allergic reactions as evidenced by underweight at the 30th percentile for height, weight, and age.
  - 2. Inadequate iron intake related to fear of allergic reactions as evidenced by medical diagnosis of iron deficiency anemia.
  - 3. Food and nutrition-related knowledge deficit related to fear of allergens in foods as evidenced by poor appetite and intake of only 4-5 foods in a 24 hour food recall, and stated concern about food allergies.

# Nutrition Intervention

The goal of the nutrition intervention is to control and modify the practices (dietary, lifestyle, or environmental) that interfere with the patient's nutrition status. Discussed in Chapter .2

# Monitoring and evaluation

This process allows for the effectiveness of the nutrition care plan to be evaluated. This is done by reviewing and comparing goals and outcome measures.

Example

Monitoring indicators:

- 1 Protein intake
- 2 Energy intake

Evaluation criteria:

- 1 Consumes more than 55 grams protein/day
- 2 Consumes >2000 kcal/day