ASSESSMENT OF THE HOSPITALIZED PATIENTS

Chapter 7

Introduction

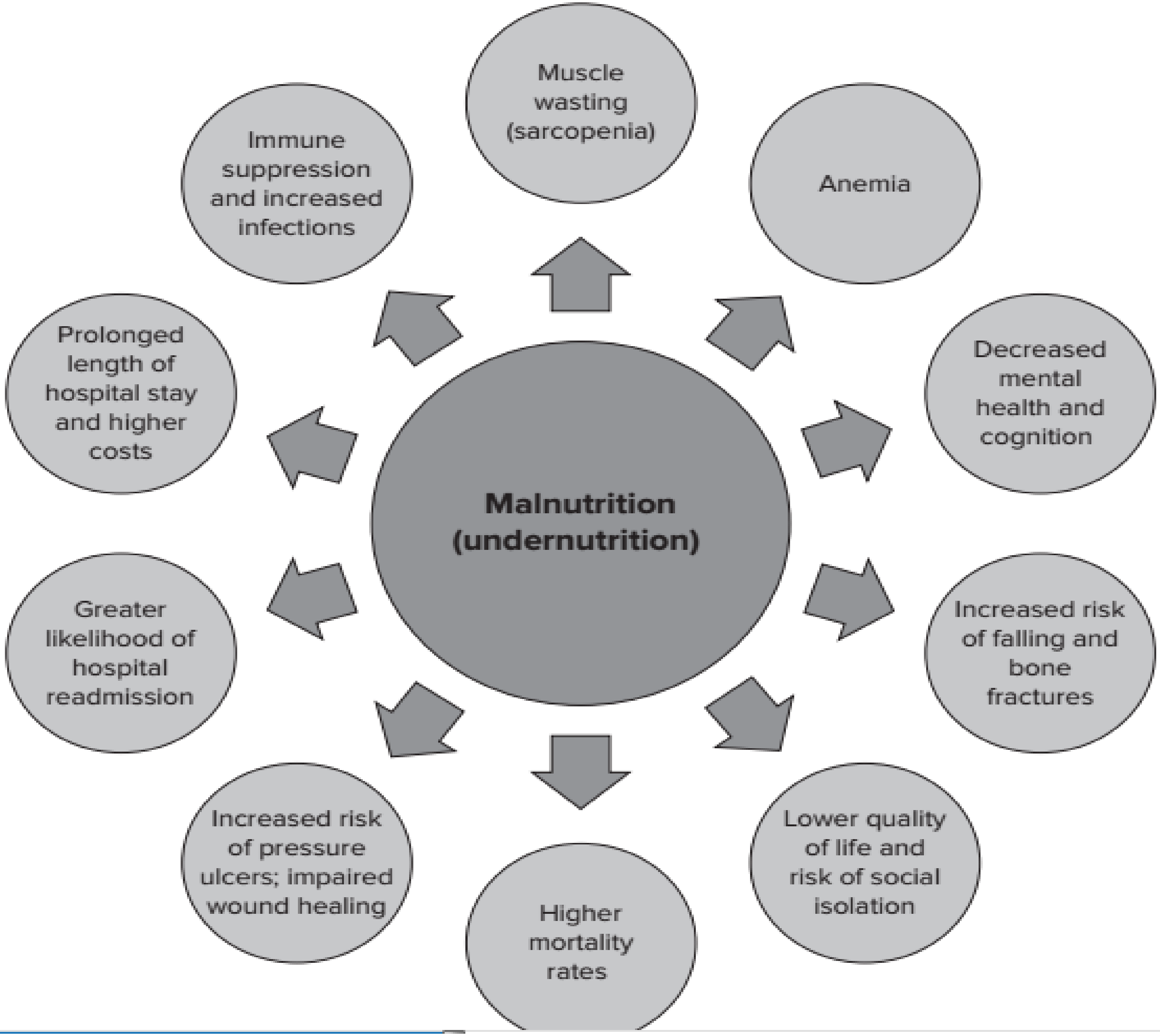
Nutritional assessment of hospitalized patients is very important ;

- **The prevalence of protein – energy malnutrition (PEM) among hospitalized patient typically range from 13% to 78% .**

Malnutrition in hospitalized patients

Has been linked to :

- Muscle wasting (sarcopenia)
- Immune suppression
- Increased infections
- Prolonged hospital stay
- High treatment cost
- High chance of readmission
- High mortality rate
- High risk of pressure ulcer and impaired wound healing
- And more …


Muscle wasting (sarcopenia)
Anemia
Decreased mental health and cognition
Increased risk of falling and bone fractures
Lower quality of life and risk of social isolation
Higher mortality rates
Increased risk of pressure ulcers; impaired wound healing
Greater likelihood of hospital readmission
Prolonged length of hospital stay and higher costs
Immune suppression and increased infections
Malnutrition (undernutrition)

Assessing malnutrition

The Academy of Nutrition and Dietetics (Academy) and the American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.) recommend that a standardized set of diagnostic characteristics be used to identify and document adult malnutrition in routine clinical practice. The identification of two or more of the following six characteristics is recommended for diagnosing malnutrition, and it should be assessed on admission and at frequent intervals throughout the patient's stay in an acute, chronic, or transitional care setting:

1. Insufficient energy intake
2. Weight loss
3. Loss of muscle mass
4. Loss of subcutaneous fat
5. Localized or generalized fluid accumulation that may sometimes mask weight loss
6. Diminished functional status as measured by hand-grip strength

Assessment tools

- Malnutrition can be assessed with several assessment tools including:
  - Mini Nutritional Assessment- short form (MNA –SF)
  - Subjective Global Assessment (SGA)
  - Nutrition Risk Screening (NRS)
  - Malnutrition universal screening tool (MUST)
  - Simplified nutritional appetite questionnaire (SNAQ)

Mini Nutritional Assessment MNA

- Quick
- Easy to administer
- Multiple studies showed that MNA is highly sensitive in identifying malnourished patients
- The most widely used

MNA® Nestlé NutritionInstitute

Last name: ______ First name: ______

Sex: ______ Age: ______ Weight, kg: ______ Height, cm: ______ Date: ______

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)^2 ☐
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

Save
Print
Reset

MNA

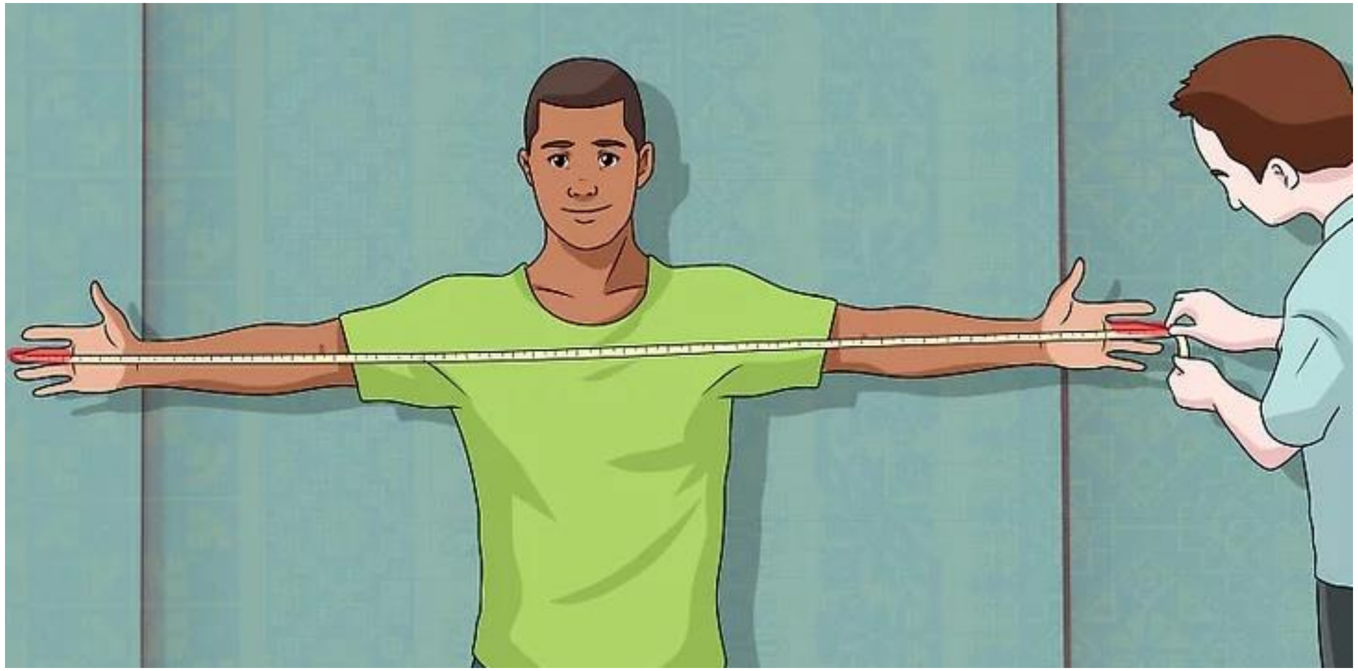
- If height cannot be measured, the MNA guidelines recommend estimating height using :
  - Half arm span
  - Demispan
  - Knee height

Half arm span

- distance from the med-line at the sternal notch to the tip of the middle finger while the non-dominant arm is stretched out in a horizontal position
- Then height is calculated by doubling the measurement

Measuring the half arm span

Figure 7.4 The half arm-span is the distance from the midline at the sternal notch to the tip of the middle finger while the nondominant arm is stretched out in a horizontal position. Height is then simply calculated by doubling the half arm-span measurement.



Demispan

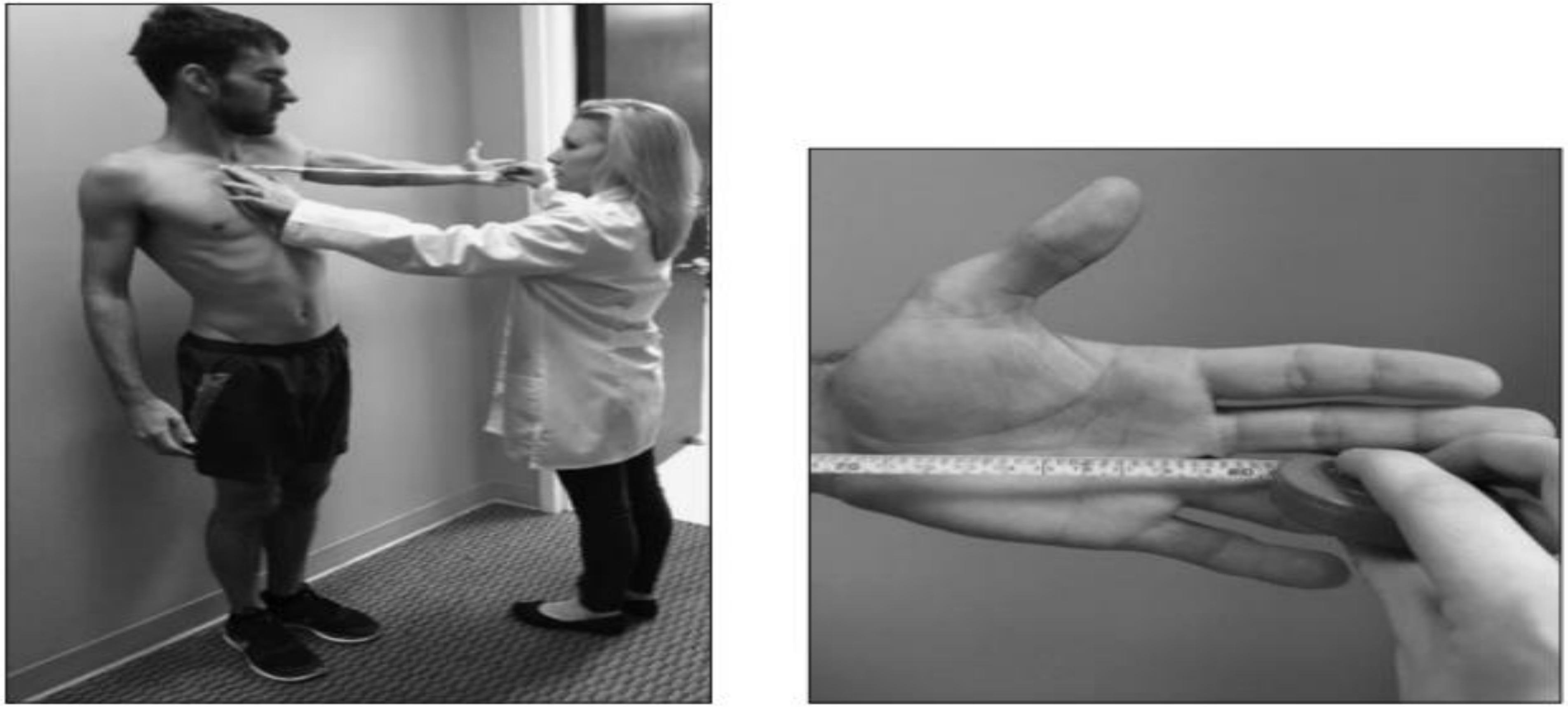


Figure 7.5 **Demispan is the distance from the midline at the sternal notch to the web between the middle and ring fingers along the outstretched nondominant arm. Height can be calculated by two simple gender-specific formulas.**

Demispan formulas for estimating height

- Females: Height in cm = (1.35 × demispan cm) + 60.1
- Males: Height in cm = (1.40 × demispan cm) + 57.8

Knee height

- After measuring knee height , use appropriate formula from table 7.2

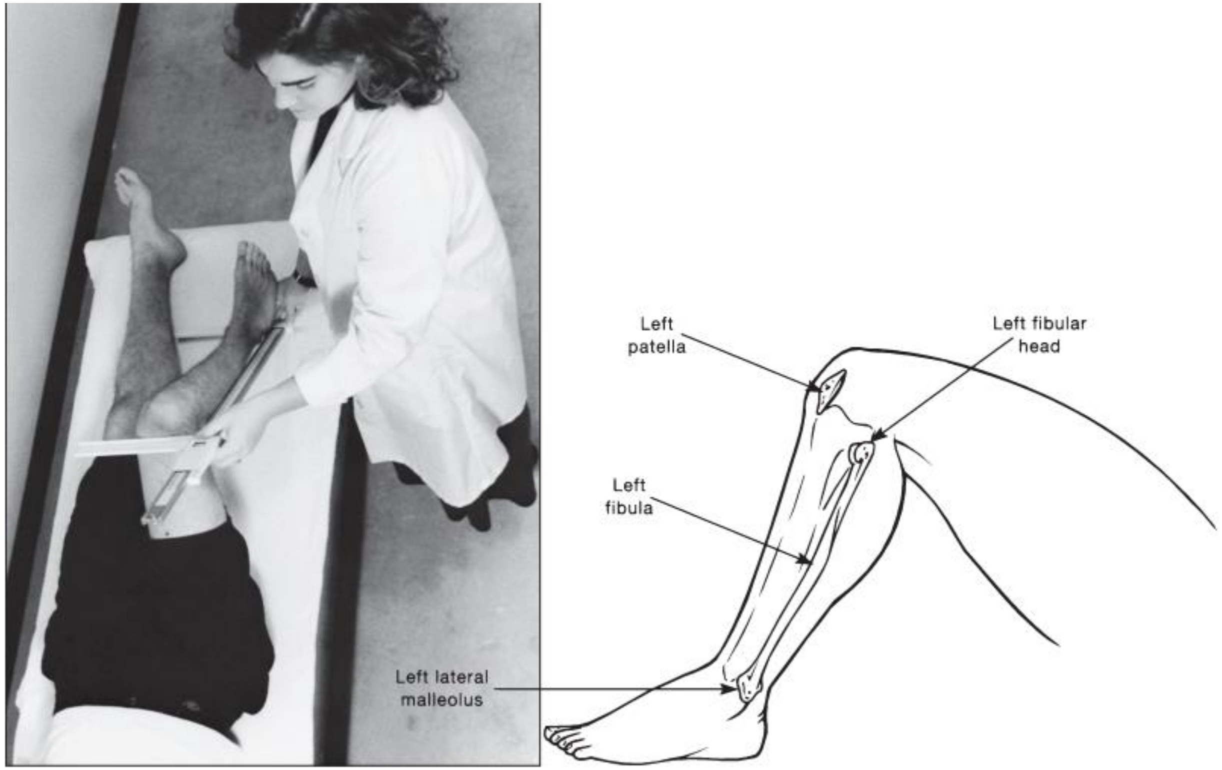


Figure 7.6 Knee height is best measured using a sliding knee height caliper with the patient's knee at a 90°angle while lying supine or sitting on a table with legs hanging off the table. Measure from the heel of the foot to the anterior surface of the thigh about 3 cm above the patella, and use an appropriate population-specific formula to calculate height (see Table 7.2).

TABLE 7.2	Population-Specific Formulas for Estimating Total Body Height from Knee Height
Population	**Formula (Height cm =)**
Non-Hispanic white men	78.31 + (1.94 × knee height cm) – (0.14 × age)
Non-Hispanic black men	79.69 + (1.85 × knee height cm) – (0.14 × age)
Mexican-American men	82.77 + (1.83 × knee height cm) – (0.16 × age)
Non-Hispanic white women	82.21 + (1.85 × knee height cm) – (0.21 × age)
Non-Hispanic black women	89.58 + (1.61 × knee height cm) – (0.17 × age)
Mexican-American women	84.25 + (1.82 × knee height cm) – (0.26 × age)

If BMI cannot be calculated..

- Measure the calf circumference

To obtain the calf circumference, the patient should be sitting with the left leg hanging loosely or lying supine with the leg bent at a 90° angle. Wrap the tape around the calf at the widest circumference and take the measurement. A limitation of calf circumference measurement is peripheral edema, which is prevalent in approximately 25% of older adults.

Determining BMI for amputees

- Read page 213

Table 7.3	**Percentage of Total Body Weight for Selected Body Components**
Missing Body Part	**Percentage**
Hand	0.7%
Foot	1.5%
Forearm and hand	2.3%
Entire arm	5.0%
Lower leg and foot	5.9%
Entire leg	16%

Source: Osterkamp LK. 1995. Current perspective on assessment of human body proportions of relevance to amputees. *Journal of the American Dietetic Association* 95:215–218.

Subjective Global Assessment (SGA)

- Is a clinical technique for assessing the nutritional status of patient based on features of the patient's history and physical examination

- Based on four elements of the patient's history and three elements of the physical examination

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

SOURCES: R. S. Gibson, *Principles of Nutritional Assessment* (New York: Oxford University Press, 2005), pp. 809–826; A. S. Detsky and coauthors, What is subjective global assessment of nutritional status? *Journal of Parenteral and Enteral Nutrition* 11 (1987): 8–13.

Elements of the history

- **History**

1. Weight change
2. Dietary intake
3. GI symptoms (lasting > 2weeks)
4. Functional capacity

- **Physical examination**

1. loss of subcutaneous fats
2. Muscle wasting
3. Ankle edema
4. Ascites

HISTORY

1. Weight Change

$$\% \text{ Wt change} = \frac{\text{wt 6 months ago} - \text{current wt}}{\text{wt 6 mos ago}} \times 100$$

Maximum body weight ___________

Weight 6 months ago ___________

Current weight ___________

Overall weight loss in past 6 months ___________

Percent weight loss in past 6 months ___________

Change in 2 past weeks: ______ increase ______ no change ______ decrease

2. Dietary Intake (relative to normal)

________ No change

________ Change Duration: ________ Weeks

Type: ________ Increased intake

________ Suboptimal solid diet

________ Full liquid diet

________ IV or hypocaloric liquids

________ Starvation

3. Gastrointestinal Symptoms (lasting > 2 weeks)

________ None

________ Nausea ________ Vomiting ________ Diarrhea ________ Anorexia

4. Functional Capacity

________ No dysfunction

________ Dysfunction Duration: ________ Weeks

Type: ________ Works suboptimally

________ Ambulatory

________ Bedridden

PHYSICAL EXAMINATION

(For each trait specify: 0 = normal; 1+ = mild; 2+ = moderate; 3+ = severe)

________ Loss of subcutaneous fat (shoulders, triceps, chest, hands)

________ Muscle wasting (quadriceps, deltoids)

________ Ankle edema

________ Ascites

Subjective Global Assessment Rating (select one)

________ A = well nourished

________ B = moderately (or suspected of being) malnourished

________ C = severely malnourished

Elements of history

- Weight change
  - Weight loss <5% -- small
  - 5% to 10% -- potentially significant
  - > 10% -- definitely significant

Elements of history

- Dietary intake
  - Normal
  - Abnormal
    - Ask about duration
    - Increased intake ?
    - Suboptimal solid diet ?
    - Full liquid diet ?
    - IV liquids ?
    - Starvation ?
    - You can take 24-hr recall !

Subjective Global Assessment (SGA)

- The final step in SGA is arriving at a rating of nutritional assessment
- Instead of an explicit numerical weighting scheme, SGA depends on the clinician's subjectively combining the various elements to arrive at an overall or global assessment

Subjective Global Assessment (SGA)

- Patient with weight loss >10% that is continuing , poor dietary intake, and severe loss of subcutaneous fat and muscle wasting
  - ✓ (severely malnourished category : class C)

- Patient with at least a 5% weight loss, reduced dietary intake, and mild to moderate loss of subcutaneous fat and muscle wasting
  - ✓ (moderately malnourished category : class B)

Nutrition risk screening tool

- See in pdf form

MUST

screening tool to identify adults who are at risk of malnutrition, and it is composed of three clinical parameters rated as 0, 1, or 2, as follows: BMI $\geq$ 20.0 kg/m^2 = 0 points, 18.5–20.0 kg/m^2 = 1 point; < 18.5 kg/m^2 = 2 points; weight loss within the last three to six months less than 5% = 0 points; 5%–10% = 1 point; > 10% = 2 points; presence of acute disease, with 2 points added in the case of acutely ill patients with no nutritional intake or likelihood of no nutritional intake for more than five days. MUST has received mixed support in validation and comparative studies.[7,8,15,16] In one systematic review, MUST performed well in detecting malnutrition in about half the studies reviewed in adults, but not in older patients.[15] Among nursing home residents, MUST screening estimated a prevalence of malnutrition significantly below the MNA.[16]

'MUST' Tool

Step 1
BMI kg/m² — Score
- >20 (>30 Obese) = 0
- 18.5—20 = 1
- <18.5 = 2

Step 2
Unplanned weight loss in past 3-6 months

%	Score
<5	= 0
5-10	= 1

Step 3
If patient is acutely ill and there has been or is likely to be no nutritional intake for >5 days
Score 2

Step 4
Overall risk of malnutrition

Add scores together to calculate overall risk of malnutrition.

Score 0 Low Risk — Score 1 Medium Risk — Score 2 or more High Risk

0 Low Risk
Routine clinical care
- Ensure appropriate food and drink choices
- Repeat screening every 3-6 months, unless there is clinical concerns.
- Document action taken

1 Medium Risk
Observe
- Follow 'MUST' 1 care pathway on page 10 of Guidelines Booklet

2 or more High Risk
Treat*
- Follow action plan for medium risk
- Refer to Dietitian*
- Re-weigh weekly
- Document action taken

*unless detrimental or no benefit is expected from nutritional support e.g. end of life care pathway

This tool is to assist your assessment. If in doubt, use your professional judgement

MUST

- During MUST screening, BMI can be estimated from the mid upper arm circumference (MUAC) if weight or height cannot be obtained using these equations :

  - Male: $BMI = 1.01 \times MUAC - 4.7$
  - Female: $BMI = 1.10 \times MUAC - 6.7$

- MUAC in centimeters

From these equations, MUAC measurement of less than 23.5 cm approximately equates to BMI of $< 18.5\ kg/m^2$, raising the potential concern about nutritional status and indicating the need for more detailed assessment.

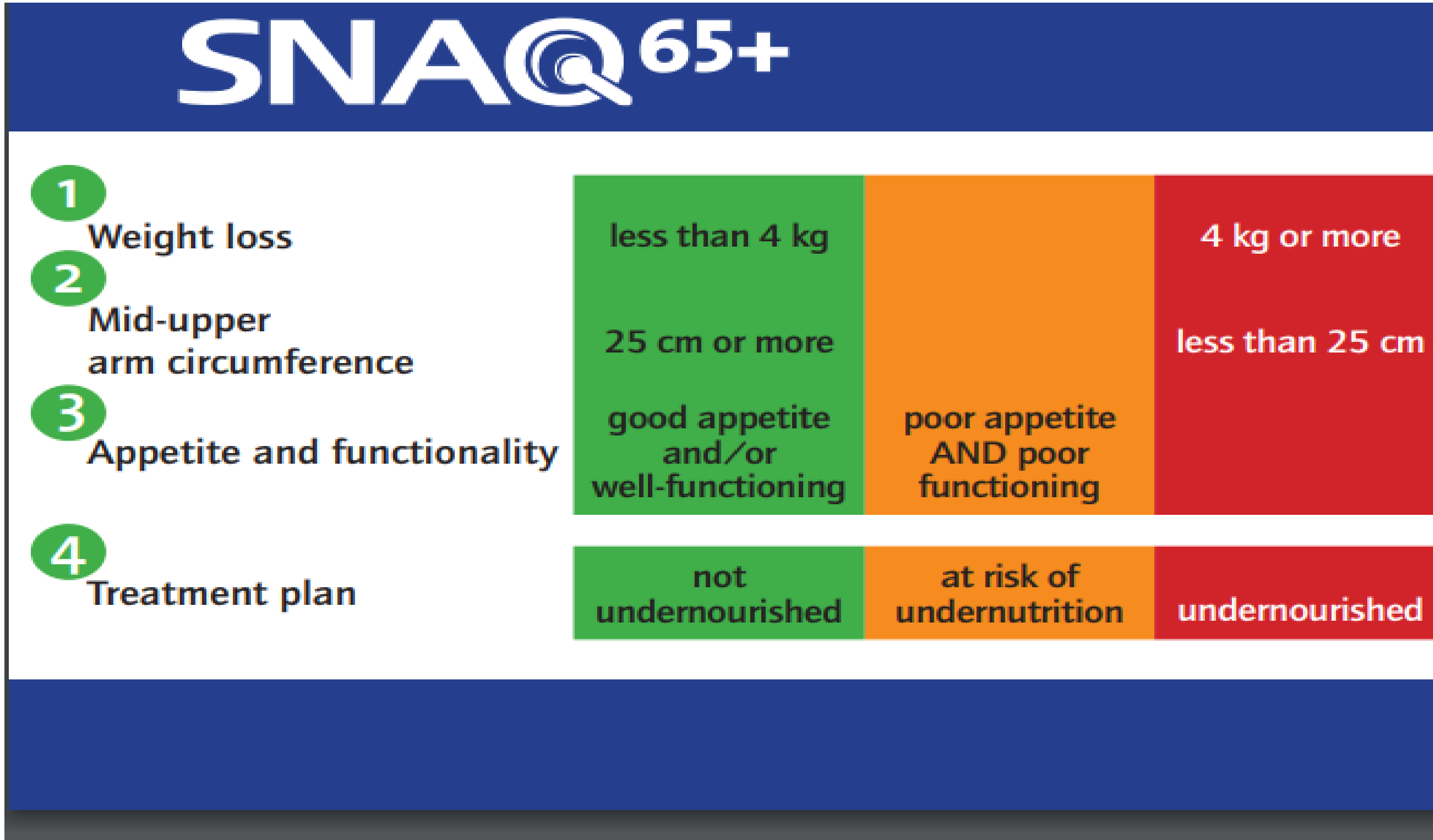
MUAC measurement

Figure 7.9 The mid-upper arm circumference (MUAC) is measured in the ambulatory patient while the patient is standing. The tape is placed around the arm, perpendicular to the long axis, at the level of the triceps skinfold site.

Figures 7.10 and 7.11 **Measurement of MUAC in the nonambulatory patient.** When the patient cannot stand, MUAC is measured by first locating and marking the midpoint of the upper arm between the tip of the acromion process and the olecranon process (i.e., the triceps skinfold site). A folded towel under the elbow raises the arm off the surface of the table. The arm circumference is measured without

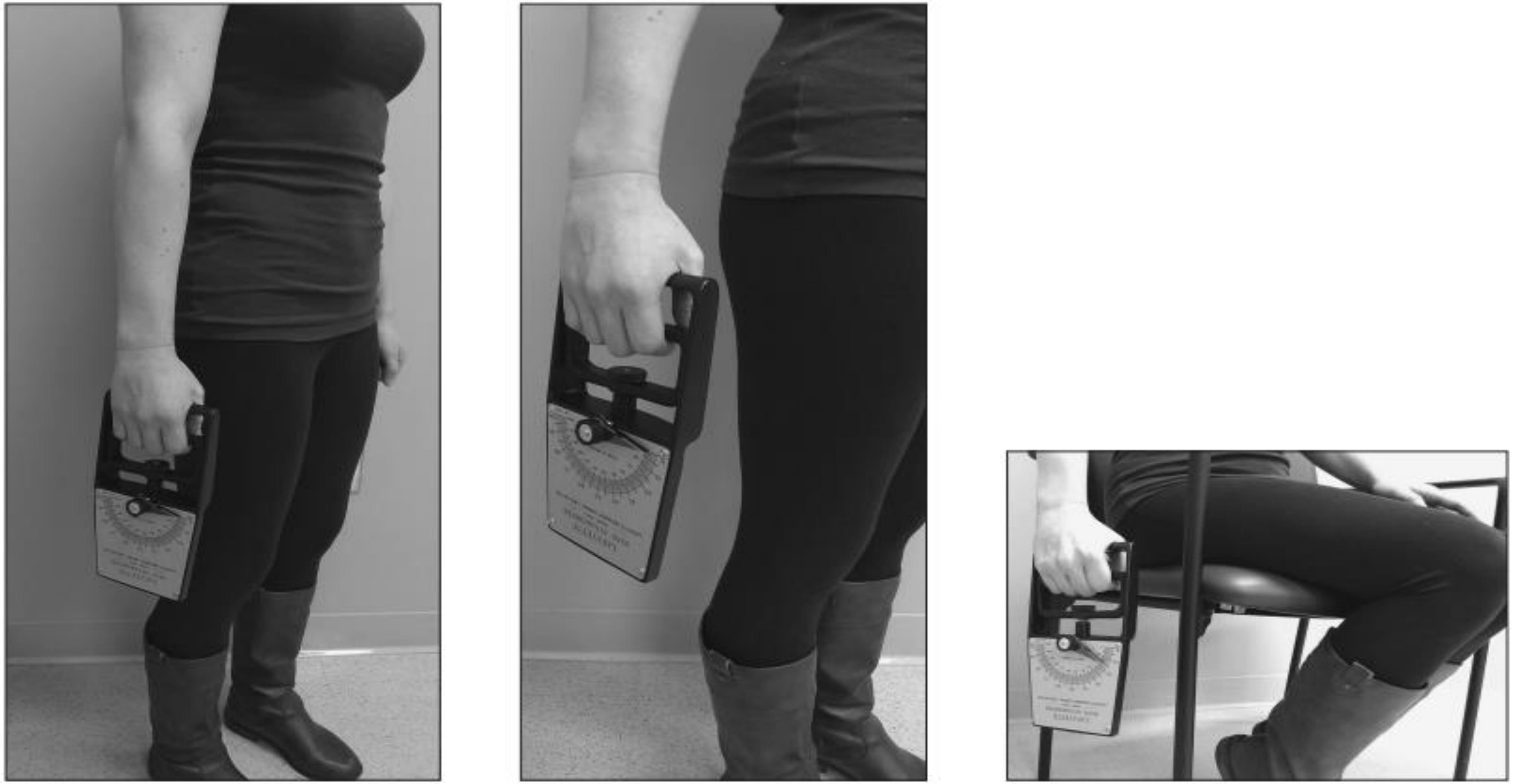
Simplified Nutritional Appetite Questionnaire (SNAQ)

- Developed to measure the loss of appetite
- Targeted for elderly



Hand grip strength

- Measure of function , can be utilized during geriatric comprehensive assessment
- It is used to determine weakness
- **Weakness** : Grip strength values of less than 26 kg for men and less than 16 kg for women
  - The maximum value of any of six grip strength tests, three with each hand separately)



A B C

Figure 7.15 **The hand-grip test should be assessed with the patient standing or sitting straight up, with the arm hanging straight down.**

Other Anthropometric Measurements

Recumbent Skinfold Measurement

In the recumbent patient , the triceps and subscapular skinfolds can be measured with patient lying on the right and the left side.

Figure 7.17 **Measurement of triceps skinfold of the recumbent subject.**

Figure 7.18 **Measurement of subscapular skinfold of the recumbent subject.**

Anthropometric Measurements

Recumbent Skinfold Measurement

The sum of the triceps and subscapular skin fold thicknesses can be used as an indicator of the body's energy reserves

Anthropometric Measurements

Estimating Body Weight

It can be estimated from various anthropometric measurements :

- **Knee height**
- **Mid-arm circumference**
- **Calf circumference**
- **Subscapular skinfold thickness**

Table 7.4 and table 7.5

TABLE 7.4 Equations for Estimating Body Weight in Persons 65 Years of Age and Older from Anthropometric Measures

	SEE[†]
Females*	
Weight = (MUAC × 1.63) + (CC × 1.43) – 37.46	± 4.96 kg
Weight = (MUAC × 0.92) + (CC × 1.50) + (SSF × 0.42) – 26.19	± 4.21 kg
Weight = (MUAC × 0.98) + (CC × 1.27) + (SSF × 0.40) + (KH × 0.87) – 62.35	± 3.80 kg
Males*	
Weight = (MUAC × 2.31) + (CC × 1.50) – 50.10	± 5.37 kg
Weight = (MUAC × 1.92) + (CC × 1.44) + (SSF × 0.26) – 39.97	± 5.34 kg
Weight = (MUAC × 1.73) + (CC × 0.98) + (SSF × 0.37) + (KH × 1.16) – 81.69	± 4.48 kg

Source: Chumlea WC, Guo S, Roche AF, Steinbaugh ML. 1988. Prediction of body weight for the nonambulatory elderly from anthropometry. *Journal of the American Dietetic Association* 88:564–568.

*Weight is in kg; MUAC = midarm circumference, in cm; CC = calf circumference, in cm; SSF = subscapular skinfold thickness, in mm; KH = knee height, in cm.

[†]SEE = standard error of the estimate.

TABLE 7.5 Equations for Estimating Body Weight from Knee Height (KH) and Midarm Circumference (MUAC) for Various Groups

Age*	Race	Equation[†]	Accuracy[‡]
Females			
6–18	Black	Weight = (KH × 0.71) + (MUAC × 2.59) – 50.43	± 7.65 kg
6–18	White	Weight = (KH × 0.77) + (MUAC × 2.47) – 50.16	± 7.20 kg
19–59	Black	Weight = (KH × 1.24) + (MUAC × 2.97) – 82.48	± 11.98 kg
19–59	White	Weight = (KH × 1.01) + (MUAC × 2.81) – 66.04	± 10.60 kg
60–80	Black	Weight = (KH × 1.50) + (MUAC × 2.58) – 84.22	± 14.52 kg
60–80	White	Weight = (KH × 1.09) + (MUAC × 2.68) – 65.51	± 11.42 kg
Males			
6–18	Black	Weight = (KH × 0.59) + (MUAC × 2.73) – 48.32	± 7.50 kg
6–18	White	Weight = (KH × 0.68) + (MUAC × 2.64) – 50.08	± 7.82 kg
19–59	Black	Weight = (KH × 1.09) + (MUAC × 3.14) – 83.72	± 11.30 kg
19–59	White	Weight = (KH × 1.19) + (MUAC × 3.21) – 86.82	± 11.42 kg
60–80	Black	Weight = (KH × 0.44) + (MUAC × 2.86) – 39.21	± 7.04 kg
60–80	White	Weight = (KH × 1.10) + (MUAC × 3.07) – 75.81	± 11.46 kg

Estimating Body Weight

- The decision of which equation to use will depend on the patients age and the anthropometric measures that can be obtained or are available

- There is a certain amount of error (±14 kg) → can be minimized by using equation requiring a **larger number of variables**, and by strict attention to measurement technique

Estimating Energy Needs

- Can be determined in two ways:
  - Measuring energy expenditure
    - Calorimetry (direct & indirect)
  - Estimating these needs using a variety of guidelines
    - Since EE is not practical to measure

Calorimetry

Calorimetry

- The measurement of the body's energy expenditure

- Methods conducted in the lab. :
  1. **Direct calorimetry**
  2. **Indirect calorimetry**

- For free living subjects:
  - **Doubly labeled water**
  - **Bicarbonate urea method**

Direct Calorimetry

- It represents the measurement of heat exchange between body and environment.

- It requires an isolation chamber:

  The walls of chambers contain a **layer of water that warmed by the body heat.**

  - Air enter and exit the chamber analyzed to determine CO_2 and CH_4 production, and O_2 consumption.

  - Temperature, pressure and humidity are controlled.

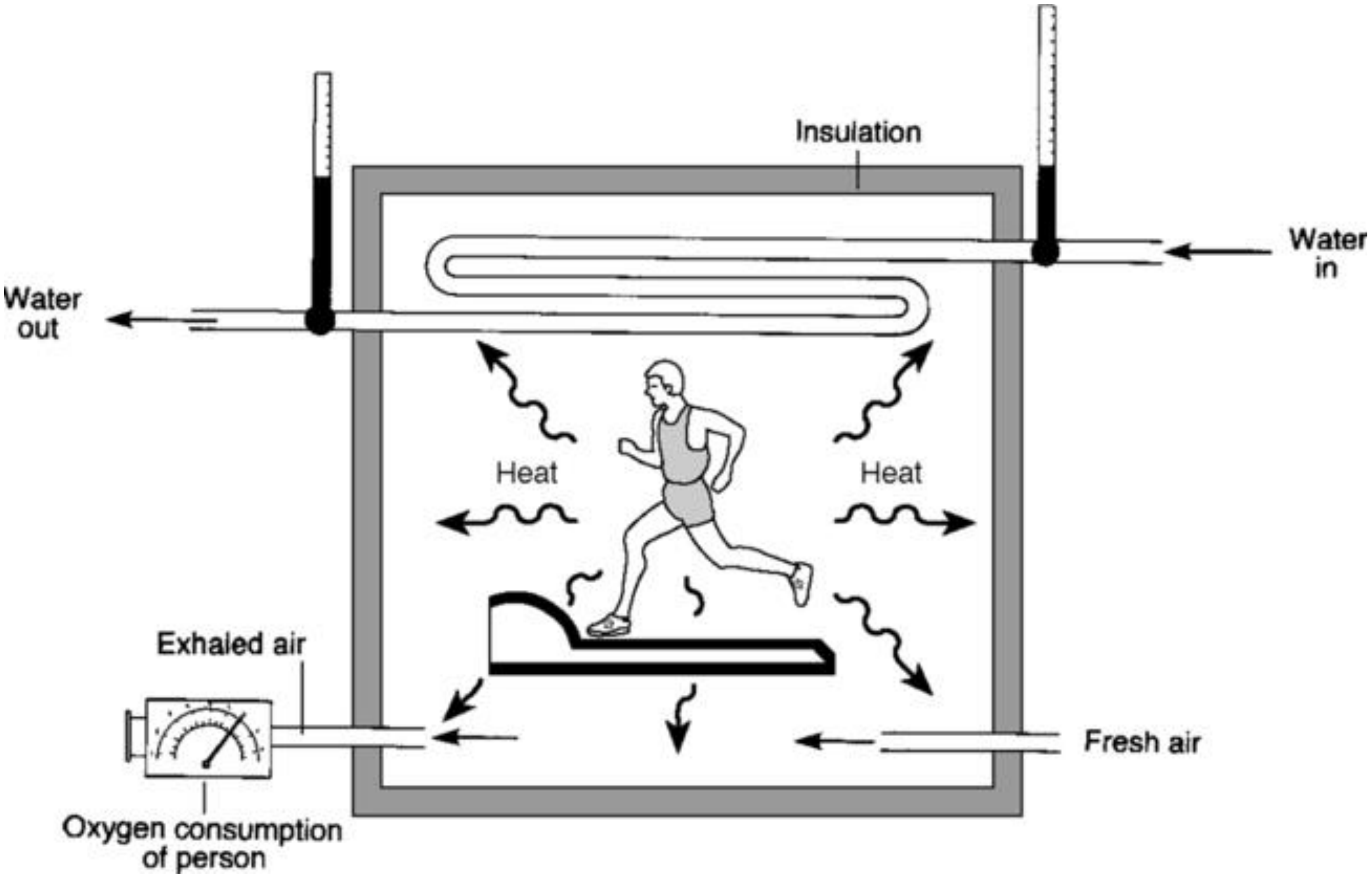
Direct Calorimetry

- Strengths of Direct Calorimetry:

1. Highly accurate
2. Allows some degree of activity to the subject.

- Weaknesses of Direct Calorimetry:

1. Complex
2. expensive
3. Requiring a high cooperation.


Insulation
Water in
Water out
Heat
Heat
Exhaled air
Fresh air
Oxygen consumption of person

Indirect Calorimetry

- Depends on O_2 utilization and CO_2 production.

- It has a different techniques:
    1. Closed Circuit Calorimetry.
    2. Opened Circuit Calorimetry.

Closed Circuit Calorimetry

- The subject is connected via mouthpiece, mask, endotracheal tube to Spirometer filled of 100% oxygen.
- The subject rebreathes only the gas within the spirometer (closed system)
- Carbon dioxide is removed from the system by canister of potassium hydroxide.
- **The VO_2 is determined either from:**

➢ O_2 consumed from the spirometer.

Or:

➢ The added O_2 needed to maintain a constant volume within the spirometer.

Open Circuit Calorimetry

- Subject breath through 2- way valve:

➢ room air is inspired from one side of the valve and expired from the opposite side of the valve.

➢ Expired air is either analyzed immediately or collected for later analysis.

Doubly Labeled Water

- Subject drinks a known amount of two different stable isotopic forms of water: $H_2{}^{18}O$ and ^2H_2O.
- They mix with the body's water and gradually eliminated from the body.
- Urine samples are collected and used to measure the rate of isotopic disappearance.
- **The rate of disappearance is used to calculate energy expenditure**.

Estimating Energy Needs

To estimate Resting Energy Expenditure in Kcal per day use:-

- **Harris –Benedict equation .**
  - **Under estimated requirements for ill patients.**
- **World health Organization (WHO) equation .**
- **National Institute of Health equation .**
- **University of Vermont equation .**

TABLE 7.7 Examples of Equations for Estimating Resting Energy Expenditure in Healthy Persons

Harris-Benedict			
Females	REE = 655.096 + 9.563 W + 1.850 S – 4.676 A		
Males	REE = 66.473 + 13.752 W + 5.003 S – 6.755 A		
Harris-Benedict (Values Rounded for Simplicity)			
Females	REE = 655.1 + 9.6 W + 1.9 S – 4.7 A		
Males	REE = 66.5 + 13.8 W + 5.0 S – 6.8 A		
World Health Organization (WHO)			***SD****
Females	3–9 years old	22.5 W + 499	± 63
	10–17 years old	12.2 W + 746	± 117
	18–29 years old	14.7 W + 496	± 121
	30–60 years old	8.7 W + 829	± 108
	> 60 years old	10.5 W + 596	± 108
Males	3–9 years old	22.7 W + 495	± 62
	10–17 years old	17.5 W + 651	± 100
	18–29 years old	15.3 W + 679	± 151
	30–60 years old	11.6 W + 879	± 164
	> 60 years old	13.5 W + 487	± 148
National Institutes of Health			
REE = 638 + (15.9 × FFM)			
University of Vermont			
REE = 418 + (20.3 × FFM)			

Estimating Energy Needs

- The equations in table 7.7 and 7.8 predict REE in kilocalories, and to arrive at estimates of 24-hr energy expenditure, REE must be multiplied by TEE
  - Theoretically, **REE includes TEF as well as TEE**
  - Usually , no additional allowance is made for TEF
  - But It is necessary to account for increased metabolism caused by disease

Estimating Energy Needs

Activity factors used to account for the thermic effect of exercise

Confined to bed	**1.2**
Ambulatory low activity	**1.3**
Average activity	**1.5-1.75**
Highly active	**2.0**

Estimating Energy Needs

Injury Factors Used to Account for the Thermic Effect of Disease and Injury .

Table 7.11	Injury Factors Used to Account for the Thermic Effect of Disease and Injury
Condition	**Injury Factor***
Minor surgery	1.0–1.1
Major surgery	1.1–1.3
Mild infection	1.0–1.2
Moderate infection	1.2–1.4
Severe infection	1.4–1.8
Skeletal or blunt trauma	1.2–1.4
Skeletal or head trauma (steroid treated)	1.6–1.8
Burns involving ≤ 20% BSA†	1.2–1.5
Burns involving 20% to 40% BSA	1.5–1.8
Burns involving > 40% BSA	1.8–2.0

Box 7.1 Estimating Resting Energy Expenditure (REE) and 24-Hour Energy Expenditure Using the World Health Organization (WHO) Equations

Using the WHO equations in Table 7.7, the Harris-Benedict equations in Table 7.7, or the DRI equations for calculating REE in Table 7.8 is quite easy. As an example, take a 23-year-old female with a body weight of 64 kg (141 lb). Begin by selecting the proper equation for the subject's sex and age. Then calculate the predicted REE using the appropriate WHO equation.

$$\text{REE} = 14.7\ \text{W} + 496$$

$$\text{REE} = (14.7 \times 64) + 496$$

$$\text{REE} = 941 + 496$$

$$\text{REE} = 1437\ \text{kcal}$$

To arrive at an estimate of 24-hour energy expenditure, the value for REE (1437 kcal) is then multiplied by an activity factor (Table 7.9) that accounts for the thermic effect of exercise—the calories expended during physical activity. Assuming this person has an activity level at the low end of the average activity category, the activity factor of 1.2 will be used.

$$1437\ \text{kcal} \times 1.2 = 1724\ \text{kcal}$$

This gives an estimated 24-hour energy expenditure of 1724 kcal. Assuming that the subject is 168 cm (66 in.) tall, how do these values compare with those obtained by using the DRI equations for calculating EER?