ThiQar college of Medicine
.Family & Community medicine dept
Nutrition Lecture 4/ online
Third stage

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Body weight

The body weight

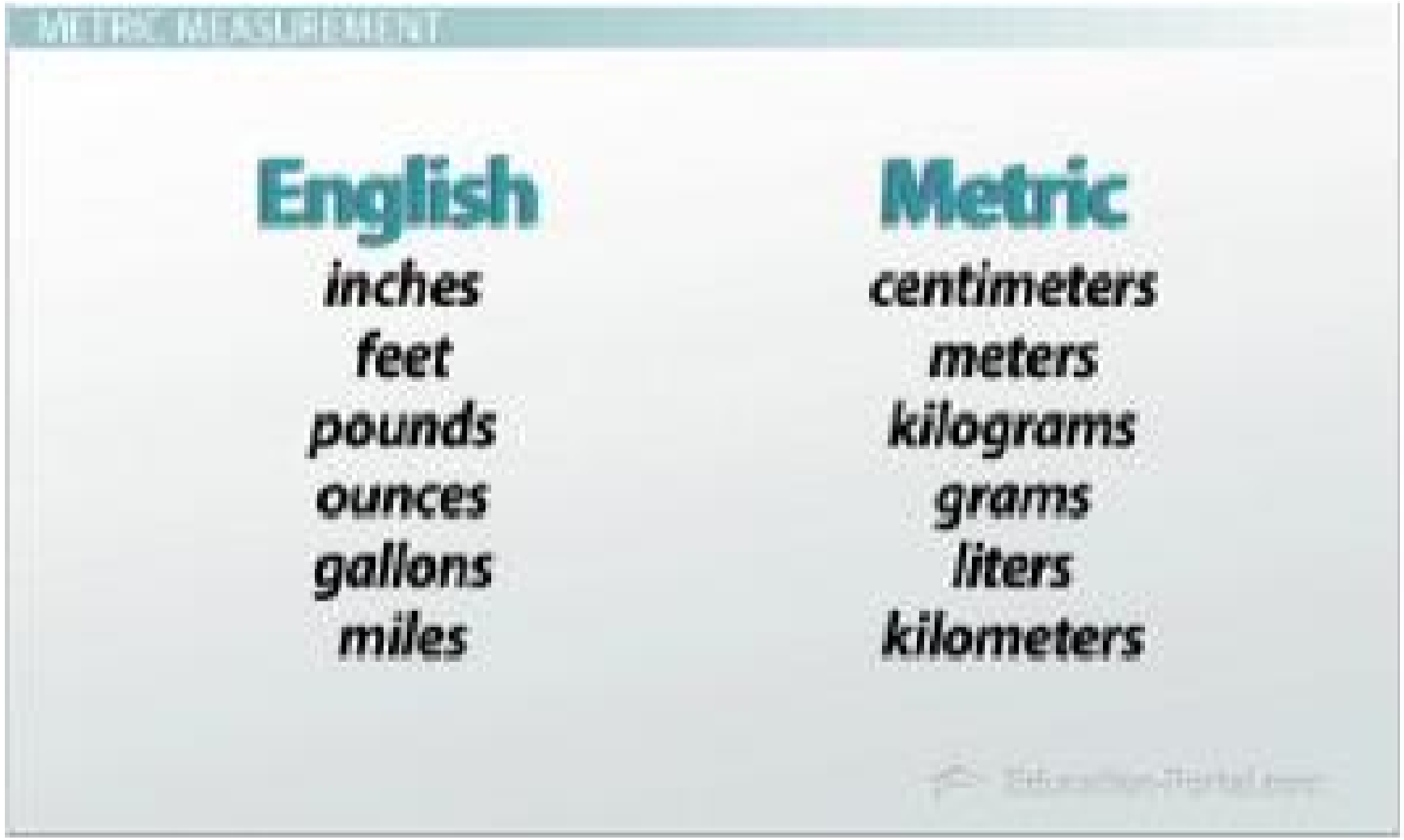
- Definition:

The amount that a person weighs.
Measured in kilograms or pounds.
One kilogram = 2.2 pounds.

Metric system (kilogram)

Imperial/ English System (lb)

Metric versus English system



Metric versus English system

Common Units and Their Equivalents, Continued

Mass

1 kilogram (km)	=	2.205 pounds (lb)
1 pound (lb)	=	453.59 grams (g)
1 ounce (oz)	=	28.35 (g)

Volume

1 liter (L)	=	1000 milliliters (mL)
1 liter (L)	=	1000 cubic centimeters (cm^3)
1 liter (L)	=	1.057 quarts (qt)
1 U.S. gallon (gal)	=	3.785 liters (L)

Metric versus English system

IMPERIAL UNITS OF LENGTH

12 inches = 1 foot

3 feet = 1 yard

1 inch = 2.54 cm

1 inch ≈ 2.5 cm

1 foot ≈ 30 cm

1 yard ≈ 90 cm

Approximately, how many cm in 90 inches?

1 inch ≈ 2.5 cm

4 inches ≈ 10 cm

36 inches ≈ 90 cm

Measurement of body weight

- Types of scales

Manual or digital

Bathroom scale

Manual or digital

Platform scale

How to measure body weight

- *Firm surface*: Carpets and fluffy surfaces doesn't allow the scale to give exact reading.
- *Light clothes* : to estimate the nearest weight to the actual.
- Before exercise : after exercise weight usually is higher because of the increase in muscle mass.
- *Once a week*: there are many theories regarding the optimum frequency of weighing , but the modest is once a week, because daily weighing may lead to obsession and very distant weighing doesn't help following weight changes.

'4s: Same time Same day Same clothes Same scale'

How to measure body weight

- **Rule of thumb (4S)**

- **Same day of week:** for easy follow up
- **Same time of day:** to avoid weight changes through the day, preferred time in the morning, before breakfast and with empty bladder.
- **Same clothes:** preferred light clothes.
- **Same scale:** to avoid bias.

Interpretation of body weight

What does this mean ??!!

Interpretation of body weight

- To interpret body weight other data should be available.

(Age and Height)

- **In children**:

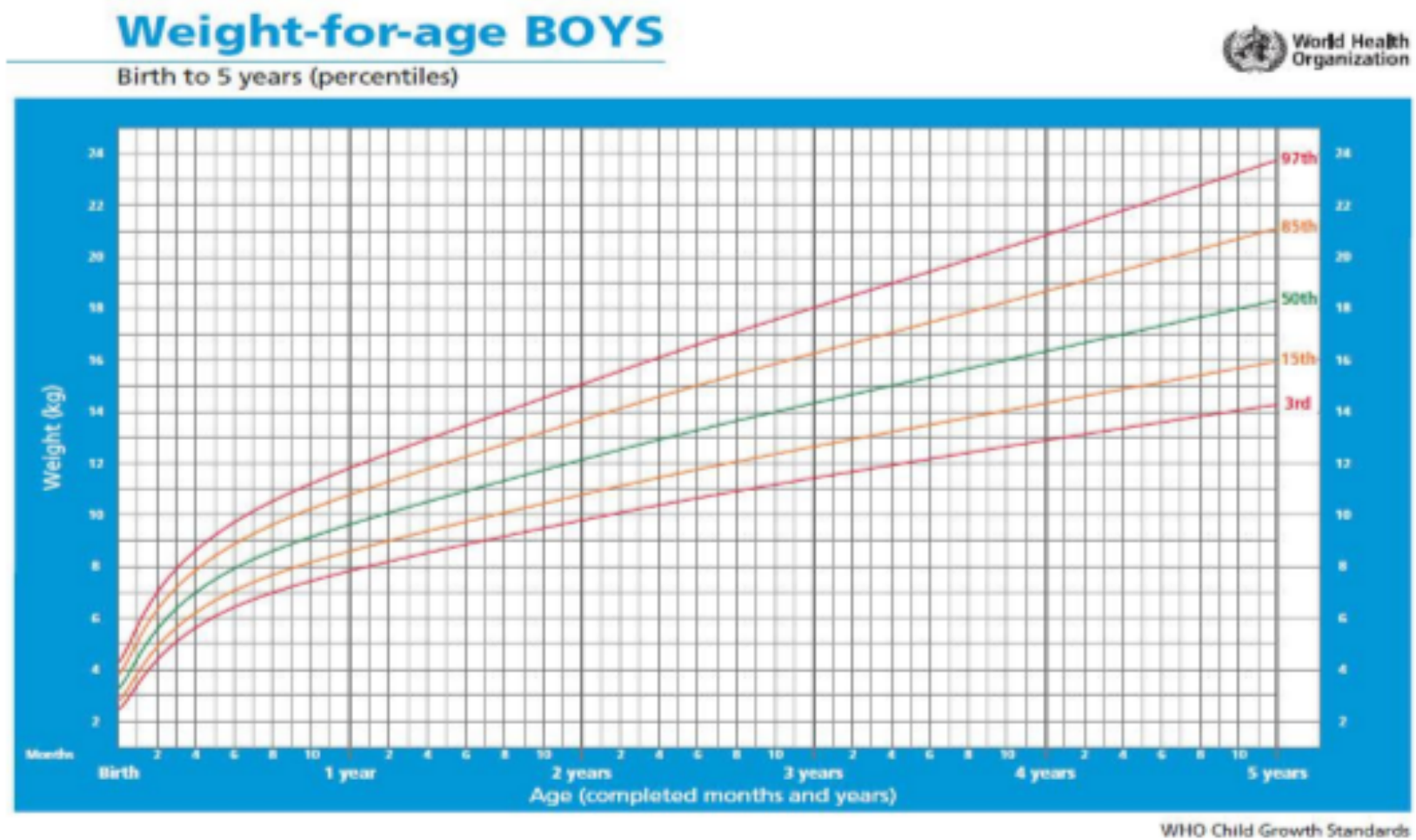
To tell if the body weight is appropriate or not, the age should be known, other factor is length/height.

The WHO has already growth charts and tables for children where weight is compared to age and height

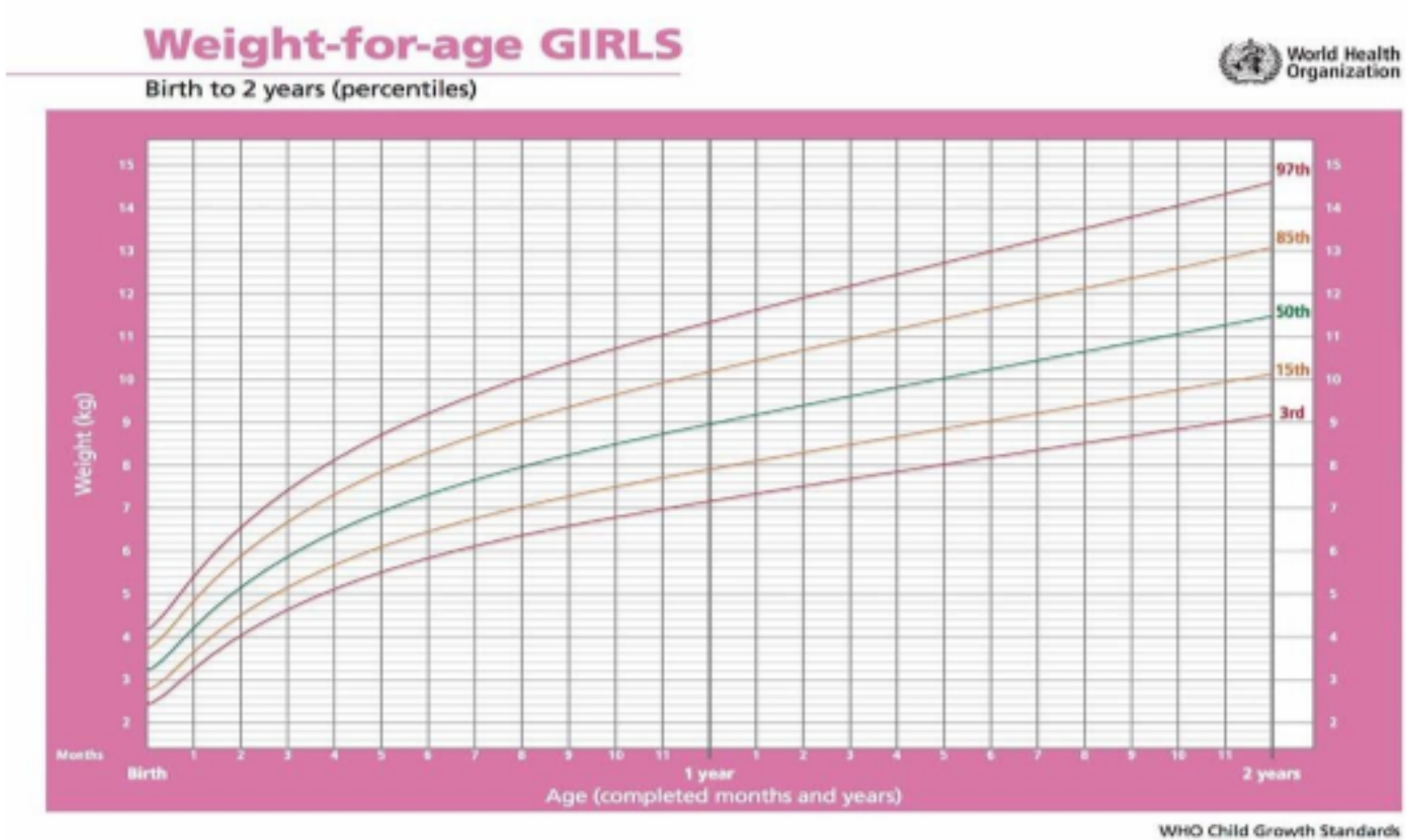
(weight for age, weight for height, BMI for age growth charts)

Where a child with certain age can be classified either normal, underweight , overweight or obese.

Who growth charts



Who growth charts



Interpretation of body weight in adults

Body weight interpretation had been a field if discussion for decades and different scientists had created formulae to predict the ideal body weight for individuals.

- Broca's Formula:

  Ideal body weight = (height in cm – 100).

- Example:

  A man whose height 170 cm should weigh 70 kg

  A woman whose height 160 cm should weigh 60 kg.

Same formula for men and women??

Interpretation of body weight in adults

- Body mass index: *(for both sexes)*

$$\frac{\text{Weight in kilograms}}{(\text{Height in meter})^2}$$

Example:

A man 170 am and weighs 70 kg what is his BMI??

$70/ (1.7)^2 = 24.2$

A man 170 am and weighs 65 kg what is his BMI?

$65/ (1.7)^2 = 22.4$

A man 170 am and weighs 68.4 kg what is his BMI?

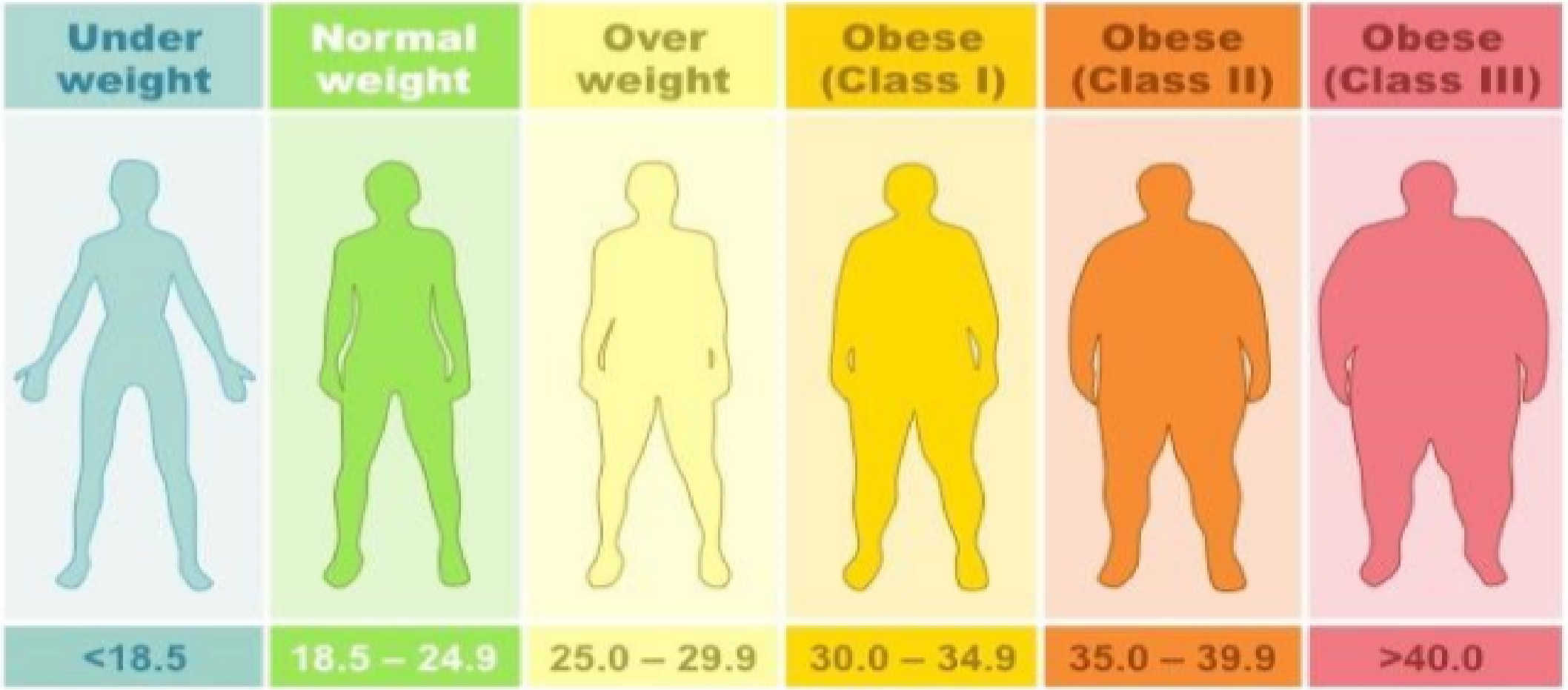
$68.4/ (1.7)^2 = 23$

Interpretation of body mass index in adults

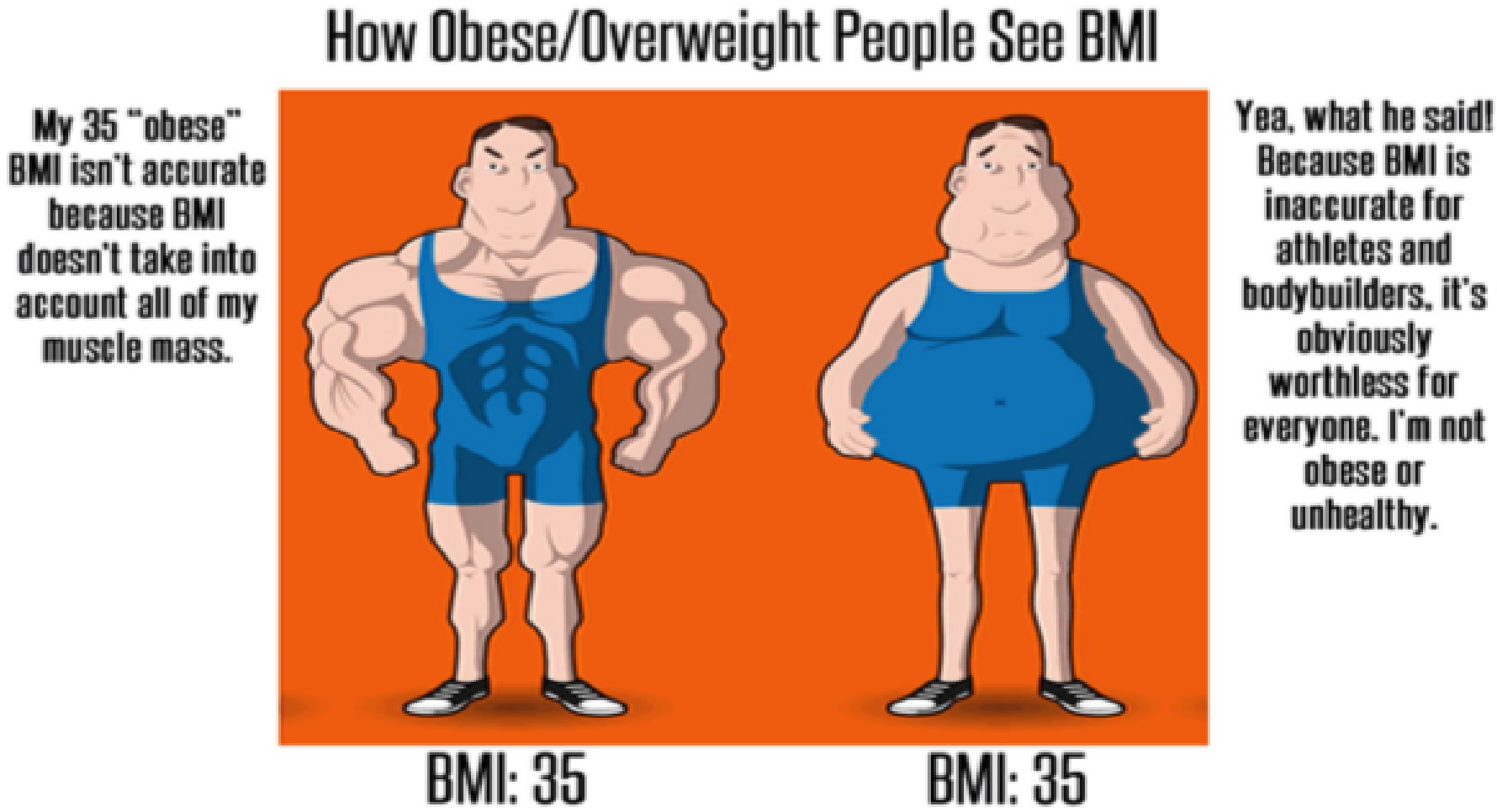
- For adults 20 years and older:
  - A BMI below 18.5 is considered underweight.
  - A BMI of 18.5 to 24.9 is considered healthy.
  - A BMI of 25 to 29.9 is considered overweight.
  - A BMI of 30 or higher is considered obese.

Body mass index is not a NUMBER but a Range

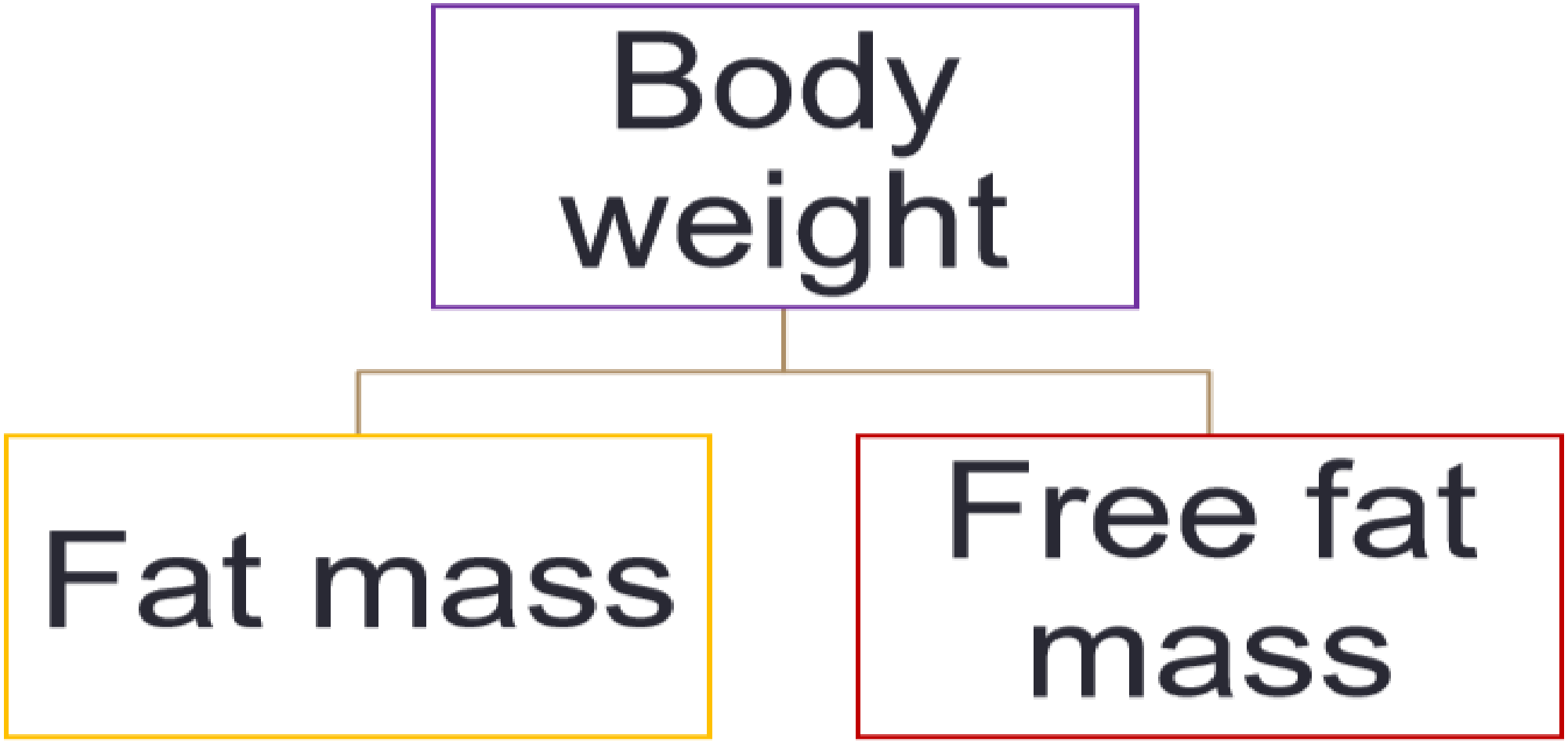
Interpretation of body mass index



Is Body Mass Index fair for everyone?



Components of body weight



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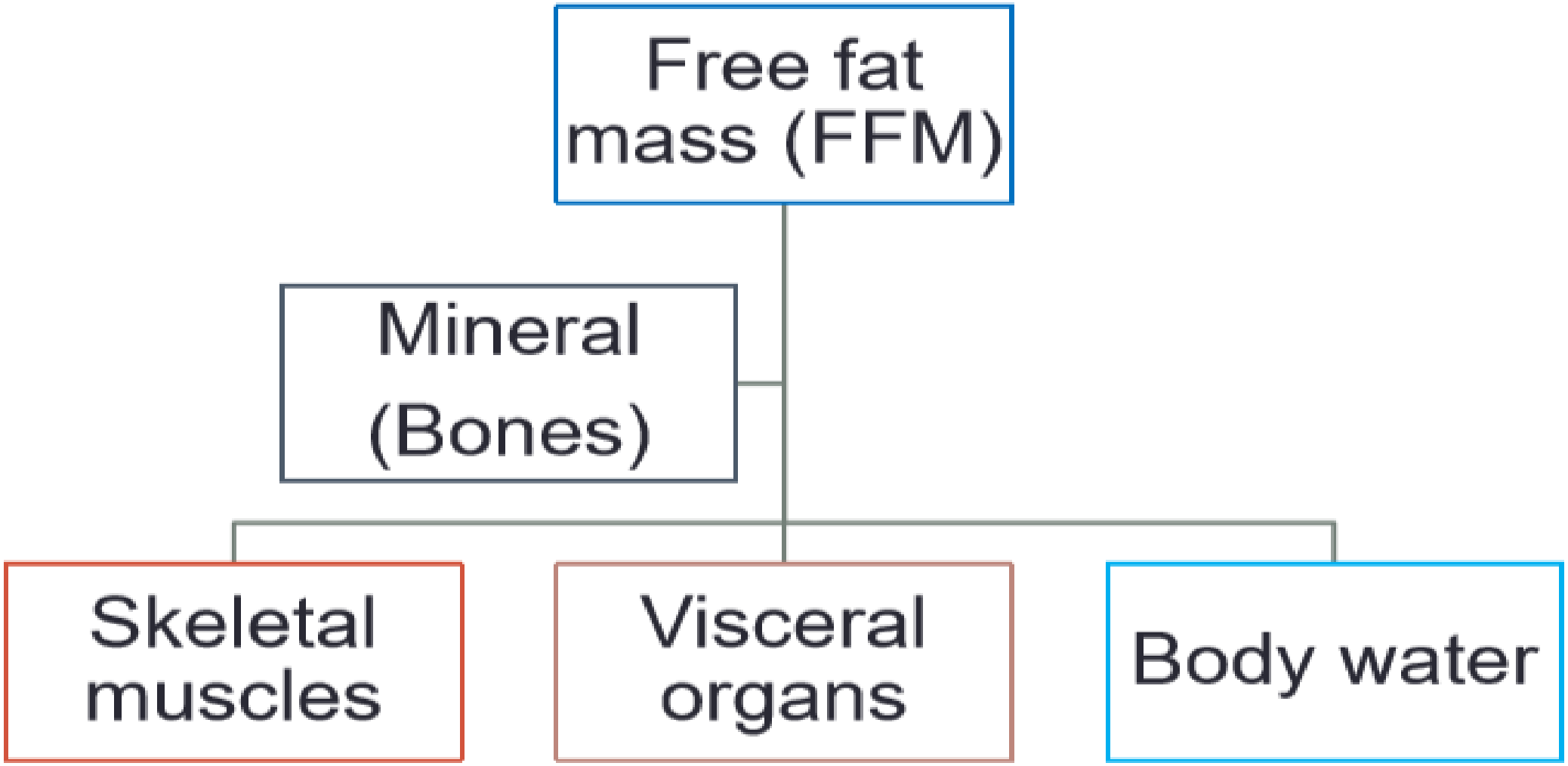

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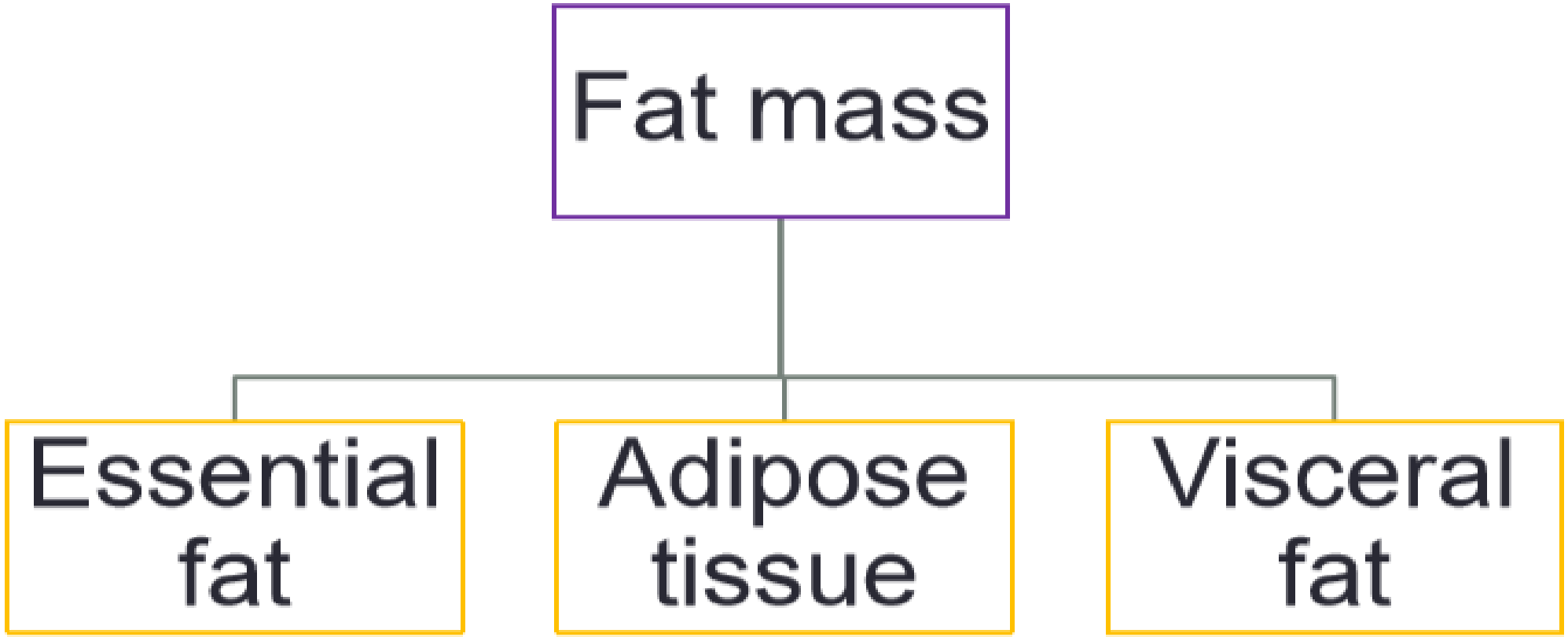
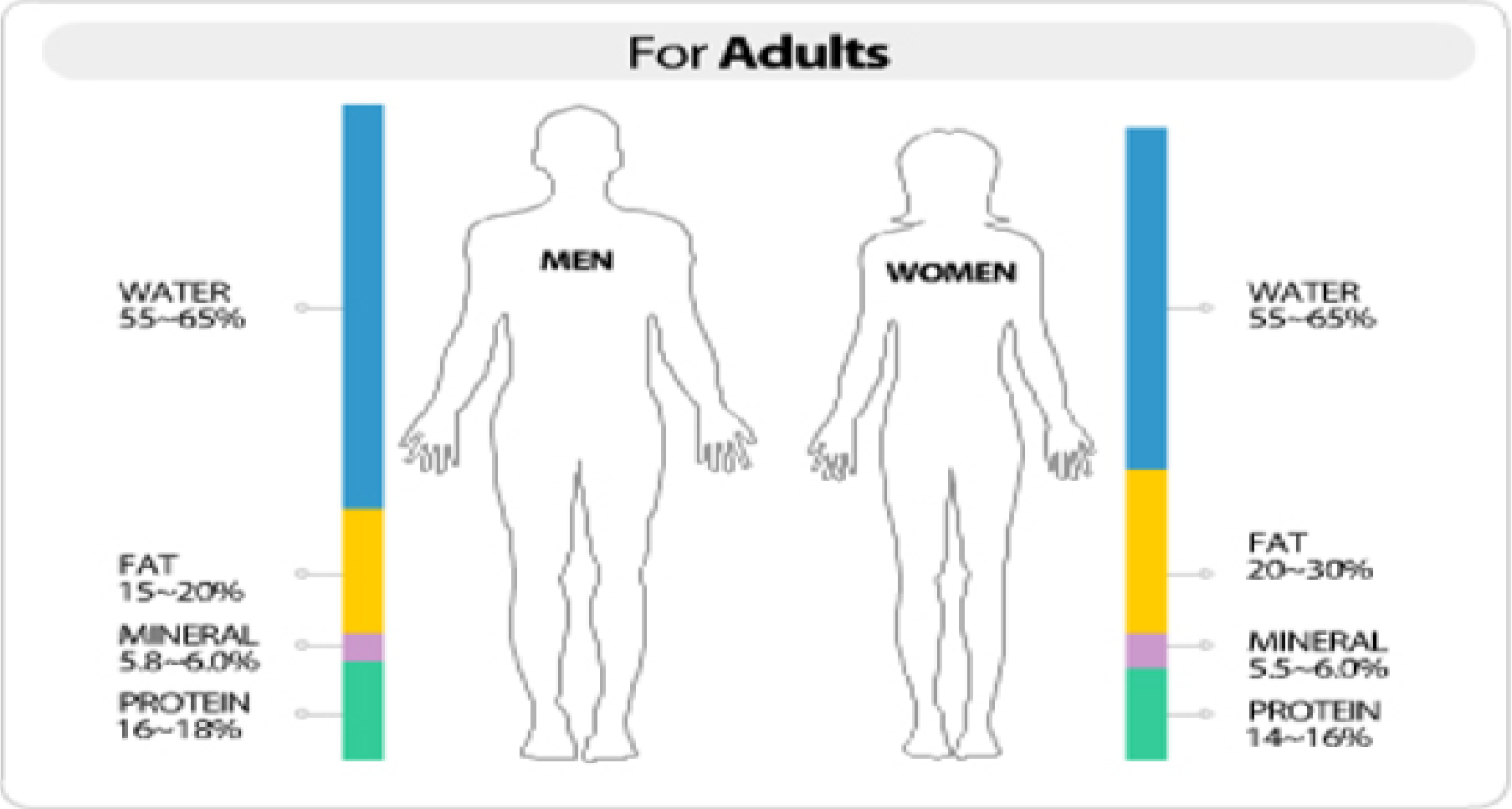


Components of body weight



How to measure body compartments

- Skin caliper
- Under water weighing
- Dexa scan
- Bioelectrical impedance

Important definitions

- Body composition: it is the make up of body weight, including muscle, bone, fat , body water and other tissues.
- Lean body mass: (fat free mass) it is the muscle tissue and other non-fat tissues like bones, organs , water and skin it's about 75-85% of body weight.
- Fat mass: it is the amount of fat in our bodies including essential fat, visceral fat ,subcutaneous fat and adipose tissue.
- Obesity is the excess in stored fat (adiposity)

Estimating calories needs

Why do we need calories?

To maintain life

- Calories needed to maintain life are those used by the body for vital organs to perform like breathing, heart pump action , digestive system. The calories needed for these actions are called the basal metabolic rate or the resting energy expenditure, the best way to describe it is what we burn while sleeping.

To perform activities

- Every single activity needs calories, however not all activities consume the same amount of calories.

The basal metabolic rate

- Basal metabolic energy required to support the basic processes of life, including circulation, respiration, temperature maintenance, etc. It excludes digestion and voluntary activities.

- BMR constitutes the largest proportion (2/3) of a person's daily expenditure.

Factors affecting the basal metabolic rate

Age

Gender

Surface area

Genetics

Factors affecting the basal metabolic rate

Physiological needs

Nutritional status

Fever

Physical activity

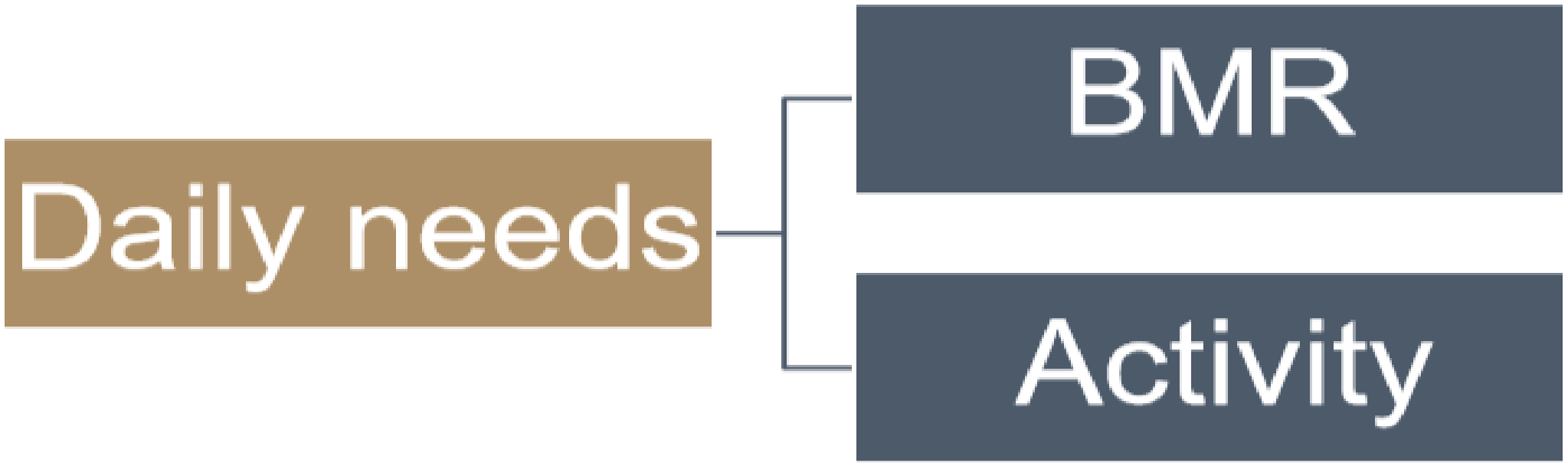
Factors affecting the basal metabolic rate

- Age : BMR decreases by age, due to changes in body composition and activity levels.
- Sex: males tend to burn more calories than females, because of their bigger muscle mass.
- Surface area: taller people have higher body mass index.
- Genetics: obesity and underweight run in families, some people are born with faster metabolism than others.

Factors affecting the basal metabolic rate

- Physiological needs: growth in children consumes energy of building new tissues therefore they have higher metabolism, also pregnant and lactating women need more energy due to their increased BMR.
- Nutritional status: malnutrition and starvation leads to decline in basal metabolic rate.
- Fever: an increase in body temperature by 0.5 degree increases BMR by 7%
- Physical activity: the most variable and changeable factor, it affects the body composition therefore affect the BMR.

Estimating caloric needs



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