

Nutritional Requirements

OVERVIEW:

- What is nutrition?
- Assessment of malnutrition
- **Dietary reference intakes (DRIs)**
- **Estimated Average Requirement (EAR)**
- **Recommended Dietary Allowance (RDA)**
- **Adequate Intake (AI)**
- **Acceptable Macronutrient Distribution Ranges (AMDR)**
- The Food Pyramid: dietary guidelines and goals
- Energy requirement and expenditure in humans



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Nutrition

Human Nutrition

Divided into 3 areas:

Undernutrition
(nutrient deficiency)

Overnutrition
(excessive nutrient intake)

Optimal nutrition
(balanced nutrient intake)

Definition

- ❑ Composition and quantity of food intake by living organisms
- ❑ Biochemical utilization of food

Assessment of malnutrition

Dietary intake studies

identify people with deficient diets

Biochemical studies

identify subclinical nutritional deficiencies

Clinical symptoms

identify clinical nutritional deficiencies

Dietary Reference Intakes (DRIs)

The quantitative estimates of nutrient intakes required to prevent deficiencies and maintain optimal health in populations, there are **FOUR** standers:

Estimated Average Requirement (EAR)

The amount of nutrient intake estimated to meet the nutritional requirement of **half (50%) of the healthy individuals** in an age and gender group.

Recommended Dietary Allowance (RDA)

The amount of nutrient intake that is sufficient to meet the nutritional requirement of **nearly all (97-98%) healthy individuals** in a group.

RDA is two SD above EAR

$$RDA = EAR + 2 SD$$

Adequate Intake (AI)

Covers the nutritional requirement of **all individuals in group with approximation** due to insufficient data.

It is used instead of EAR and RDA if:

A nutrient is considered essential but the experimental data are inadequate for determining EAR and RDA

Tolerable Upper Intake Level (UL)

The highest level of daily nutrient intake that has no adverse health effects or toxicity in almost all individuals.

ACCEPTABLE MACRONUTRIENT DISTRIBUTION RANGES (AMDR)

Range of adequate intake of a macronutrient associated with reduced risk of chronic diseases

AMDRs for adult (% of total calories) ¹	
Carbohydrates	45 - 65
Fats	20 - 35
Proteins	10 - 35
Fibers	> 25g

ENERGY REQUIREMENT IN HUMANS

Sex	Age	Weight (Kg)	Avg. Energy Needs (kcal)
Men	23-50	70	upto 2900
Women	23-50	55	upto 2200
Pregnant	.	.	+300
Lactating	.	.	+500

- ❑ The dietary energy intake required to maintain energy balance in a healthy individual.
- ❑ Energy balance is maintained by calorie intake and energy expenditure.
- ❑ **Energy content of food is measured in calories or kilocalories (heat energy)**

1. It means that a certain percentage of your daily calories should come from certain source

The Food Guide Pyramid A Guide to Daily Food Choices



Key

- Sugars (naturally occurring and added)
- Fat (naturally occurring and added)

These symbols show fat and added sugars in food

Food pyramid

- Public educational tool established in 1992.
- Recommends size of daily servings
- Fats, oils and sweets have small serving size

Dietary guidelines and goals

Consume a variety of foods from the basic food groups

Control calorie intake to manage body weight

Daily physical activity

Choose fats and CHO's wisely for good health

↑ daily intake of fruits, vegetables, whole grains, and non-fat or low-fat milk and milk products

Choose and prepare foods with little salt

Vegetarians and chronic disease

↓ Body Mass Index (BMI)

↓ death rate from ischemic heart disease

↓ blood pressure

↓ cancer rates compared to non-vegetarians

Vegetarians and nutrient intake

↓ intake of iron, calcium and vitamin D

Long-term vegans may develop megaloblastic anemia due to vitamin B₁₂ deficiency

Most consume enough protein

↓ total dietary fat

Basic energy expenditure depends on:

Resting metabolic rate (RMR)

Energy expense at rest
Required for normal body function

*Depends on age, sex, growth, body surface area, fever, fasting, stress

Men: 1800 kcal

Women: 1300 kcal

Physical activity

30% of total energy expenditure

Sedentary person:

30-50% above RMR

Active person:

100%+ above RMR

Thermic effect of food

Heat produced by the body due to food digestion and absorption

5-10% of total energy expenditure

SUMMARY

- **Human nutrition is divided into three areas:**
 - ❖ Undernutrition.
 - ❖ Overnutrition.
 - ❖ Optimal nutrition.
- **Assessment of malnutrition is measured by:**
 - ❖ Dietary intake studies.
 - ❖ Biochemical studies.
 - ❖ Clinical symptoms.
- **Four standers of dietary reference intakes:**
 1. **EAR** → Nutrient intake sufficient for 50% of population.
 2. **RDA** → Nutrient intake sufficient for 100 % of population (most accurate)
 3. **AI** → Covers required nutrients for all individuals in group with approximation (least accurate, used if RDA and EAR cant be determined)
 4. **UL** →The highest level of daily nutrient intake with no toxicity or adverse effects.
- **Energy balance is maintained by calorie intake and energy expenditure.**
- **Long-term Vegans may develop Megaloblastic Anemia due to Vitamin B12 Deficiency.**
- **Vegetarians have a Lower Body Mass Index (BMI).**
- **Basic energy expenditure depends on:**
 - ✓ Resting metabolic rate (RMR)
 - ✓ Physical activity
 - ✓ Thermic effect of food.

1) Quantitative estimates of nutrient intakes required to prevent deficiencies and maintain optimal health in populations is the definition of :

- a) Dietary Reference Intakes
- b) Estimated Average Requirement
- c) Recommended Dietary Allowance
- d) Upper Intake Level

2) Which of the following is used in case of insufficient data?

- a) Estimated Average Requirement
- b) Recommended Dietary Allowance
- c) Adequate Intake
- d) Dietary Reference Intake

3) Which of the following is usually deficient in Vegetarians?

- a) Vitamin A
- b) Vitamin B12
- c) Vitamin D
- d) Both B & C

4) The highest level of daily nutrient intake that has no adverse health effects or toxicity in almost all individuals is:

- a) Recommended Dietary Allowance
- b) Dietary Reference Intake
- c) Estimated Average Requirement
- d) Upper Intake Level

5) Nutrient intake that is sufficient to meet the nutritional requirement of nearly all (97-98%) healthy individuals in a group:

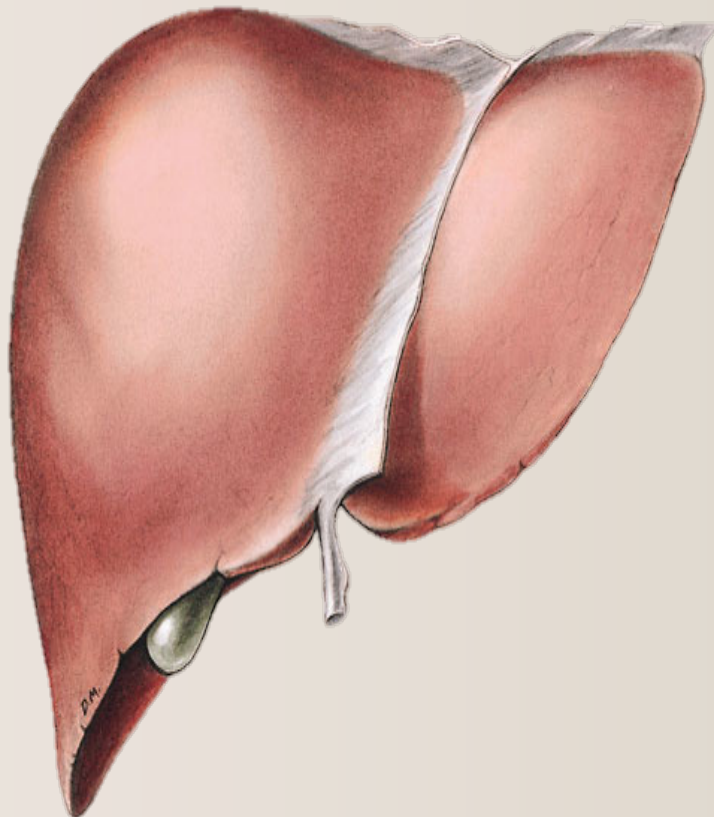
- a) Dietary Reference Intake
- b) Estimated Average Requirement
- c) Recommended Dietary Allowance
- d) Upper Intake Level

6) Nutrient intake estimated to meet the nutritional requirement of half of the healthy individuals (50%) is :

- a) Dietary Reference Intakes
- b) Upper Intake Level
- c) Estimated Average Requirement
- d) Recommended Dietary Allowance

7) Which of the following is The Resting Metabolic Rate in Men ?

- a) 1800 kcal
- b) 1300 kcal
- c) 2900 kcal
- d) 2300 kcal



Thank You!

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