

Conceptos actuales en recomendaciones nutricionales

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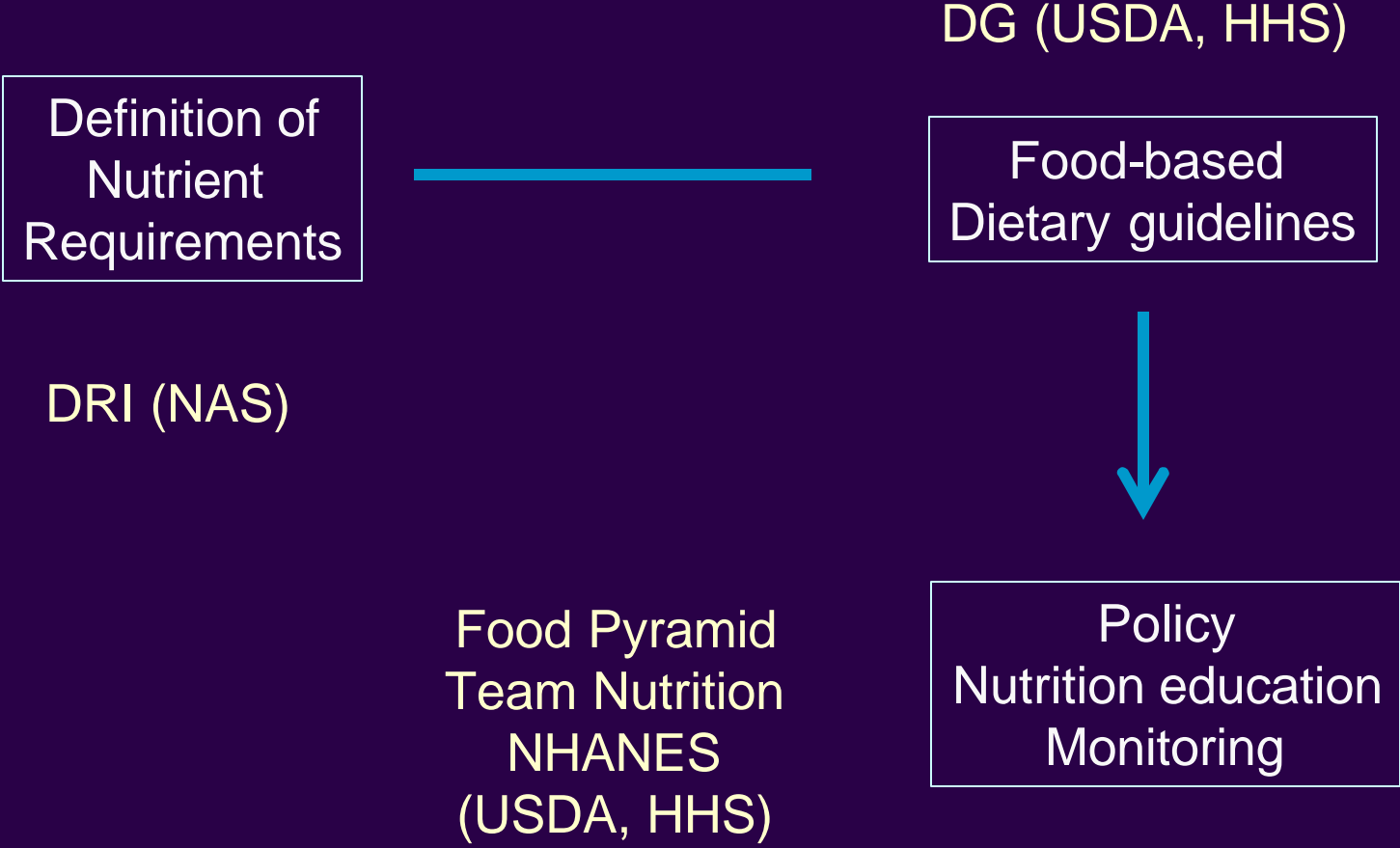


JOHNS HOPKINS
BLOOMBERG
SCHOOL of PUBLIC HEALTH

Global disease burden: top 10 causes

Developing countries		Developed countries
High mortality	Low mortality	
<ol style="list-style-type: none"> 1. Underweight 2. Unsafe sex 3. Unsafe water 4. Indoor smoke (fuels) 5. Zinc deficiency 6. Iron deficiency 7. Vitamin A deficiency 8. Blood pressure 9. Tobacco 10. Cholesterol 	<ol style="list-style-type: none"> 1. Alcohol 2. Blood pressure 3. Tobacco 4. Underweight 5. Overweight 6. Cholesterol 7. Low fruit & veg. intake 8. Indoor smoke (fuels) 9. Iron deficiency 10. Unsafe water 	<ol style="list-style-type: none"> 1. Tobacco 2. Blood pressure 3. Alcohol 4. Cholesterol 5. Overweight 6. Low fruit & vegetable intake 7. Physical inactivity 8. Illicit drugs 9. Unsafe sex 10. Iron deficiency

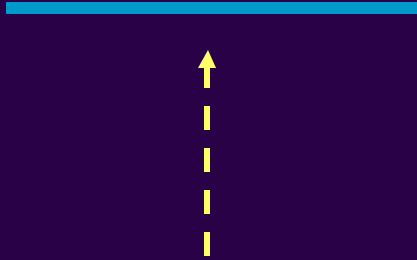
Dietary guidelines: from science to policy



Dietary guidelines: from science to policy

Definition of
Nutrient
Requirements

Food-based
Dietary guidelines



- Bioavailability
- Nutrient interactions
- Contaminants
- Host factors
- Availability and cost
- Cultural factors
- DIET PATTERNS

Energy density
Nutrient density
Complementarity

Recent advances in nutrient recommendations and dietary guidelines

- New approaches to assess adequacy
- Estimating energy requirements
- Health effects of non-essential nutrients
- Emphasis in diet patterns to meet nutrient needs
- Definition of upper tolerable levels

RDA

10th
Ed.

NATIONAL
ACADEMY
PRESS



DRIs

Vitamin C
Vitamin E
Selenium
Carotenoids



DRIs

Applications in Dietary Assessment



DRIs

Applications in Dietary Planning



DRIs

Vitamin A
Vitamin K
Arsenic
Boron
Chromium
Copper
Iodine
Iron
Manganese
Molybdenum
Nickel
Silicon
Vanadium
Zinc



DRIs

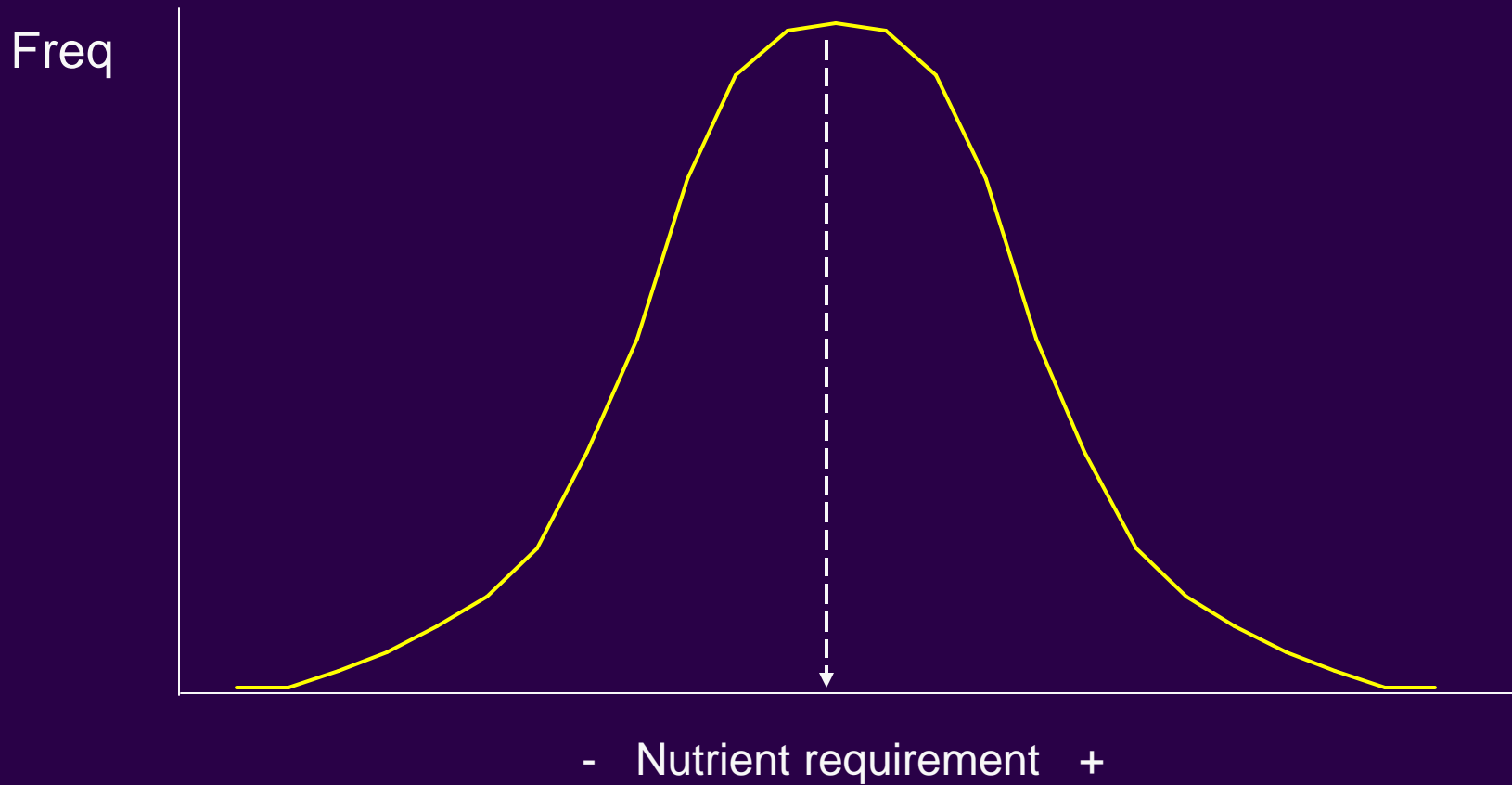
Thiamin
Riboflavin
Niacin
Vitamin B₆
Folate
Vitamin B₁₂
Pantothenic
Acid
Biotin
Choline



DRIs

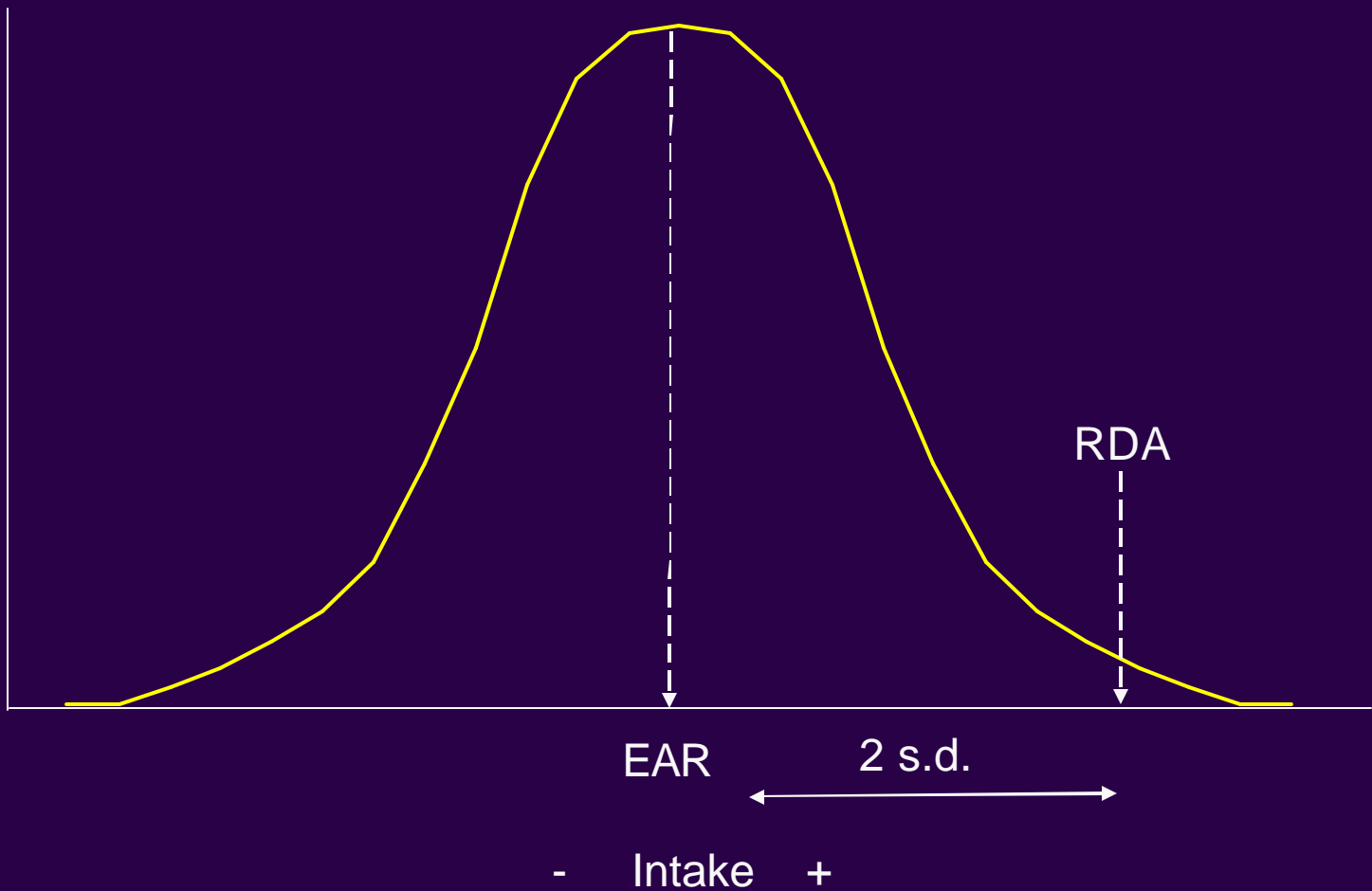
Calcium
Phosphorus
Magnesium
Vitamin D
Fluoride

Dietary Reference Intakes

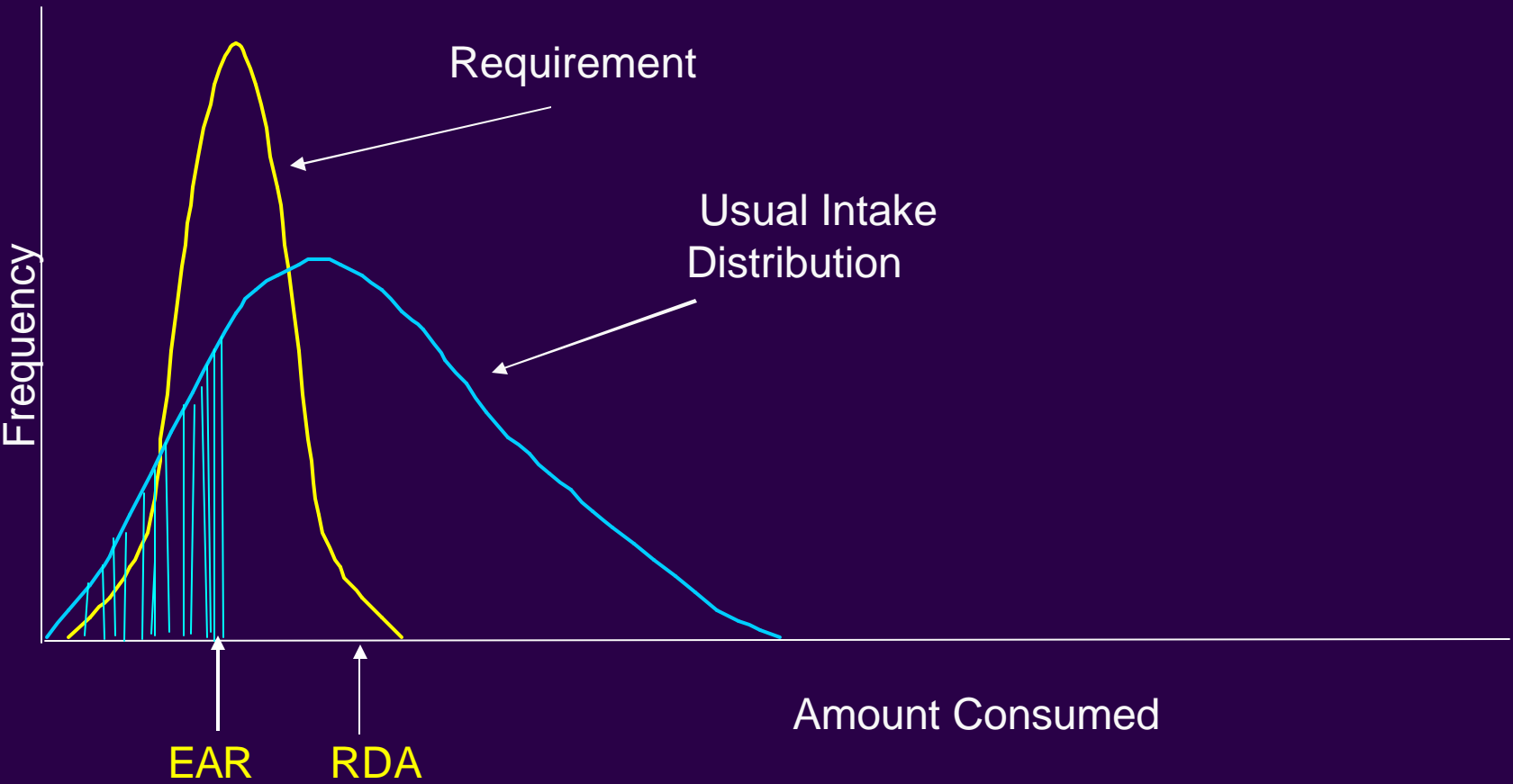


Dietary Reference Intakes

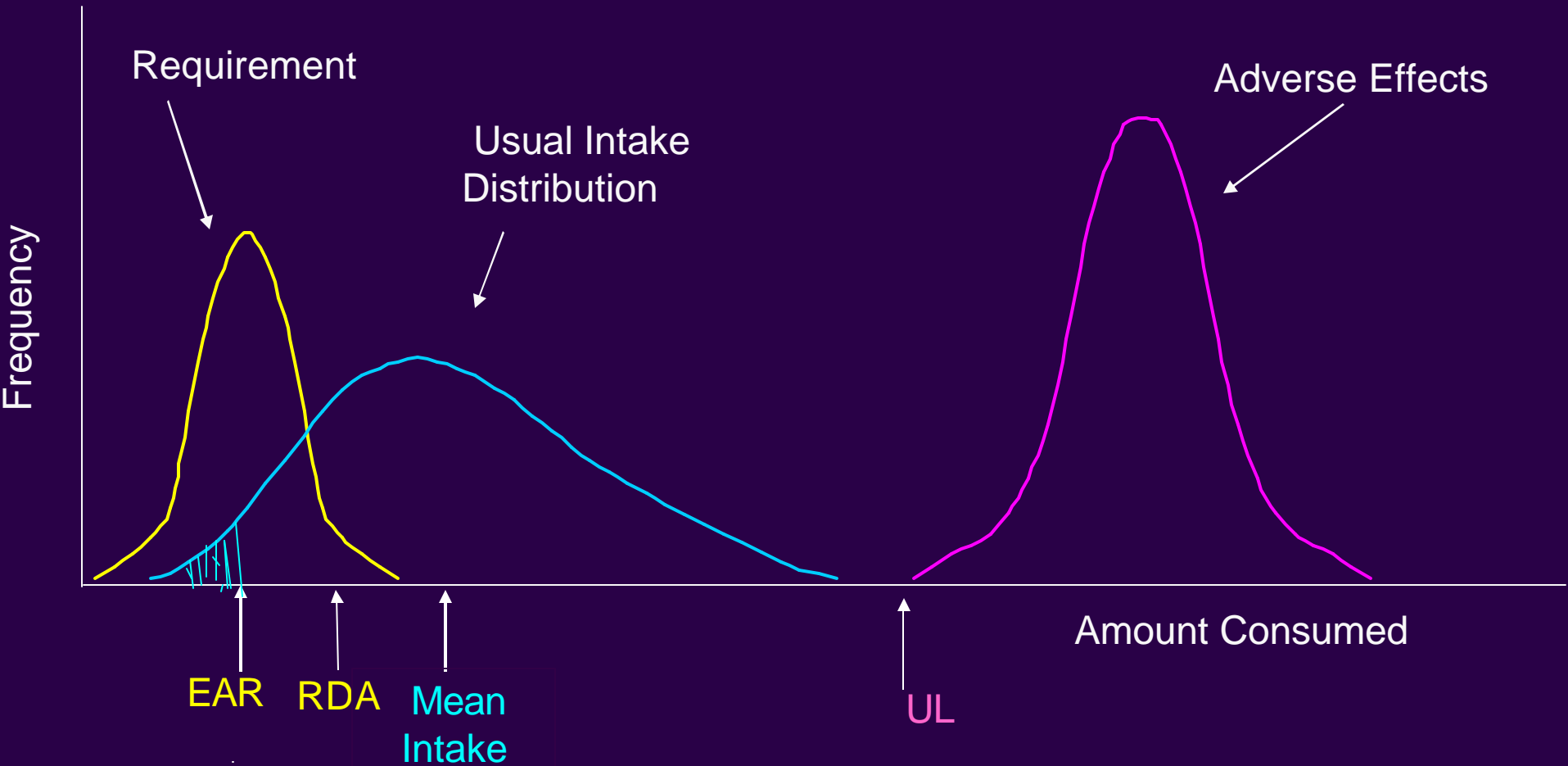
Frequency Distribution
of Individual Requirements



Usual intake compared with EAR to estimate adequacy

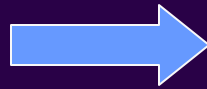


Distribution of intake for a low prevalence of inadequacy (2-3% below EAR)



Elements of energy balance

Energy IN



Energy OUT

- Dietary energy intake

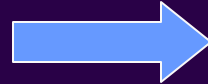
- Basal Metabolic Rate
- Thermic effect of foods
- Physical activity

Measurement of energy balance

Energy Intake

- Food freq. quest.
- 24-hr recall
- Food records
- Food weighing
- Direct observation

24 hrs

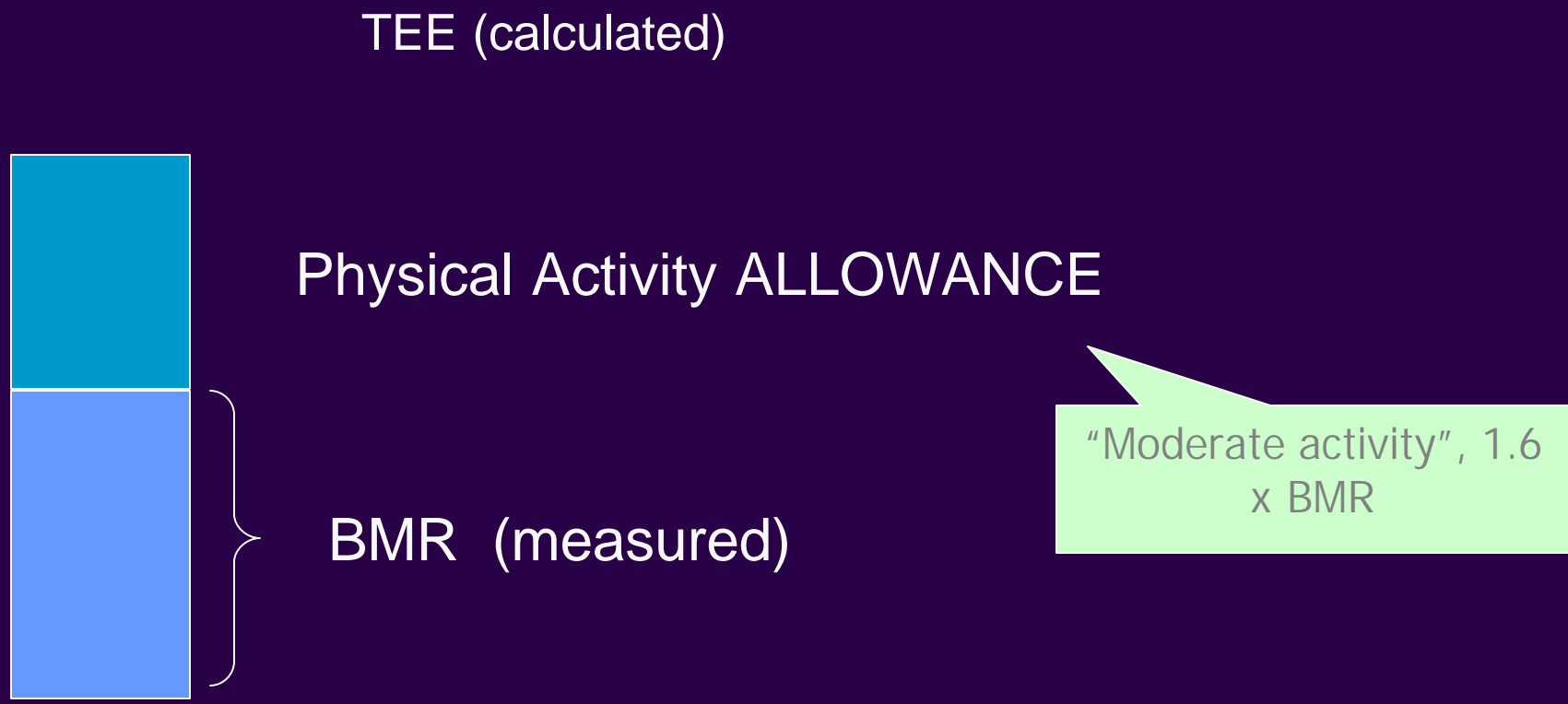


Energy Expenditure

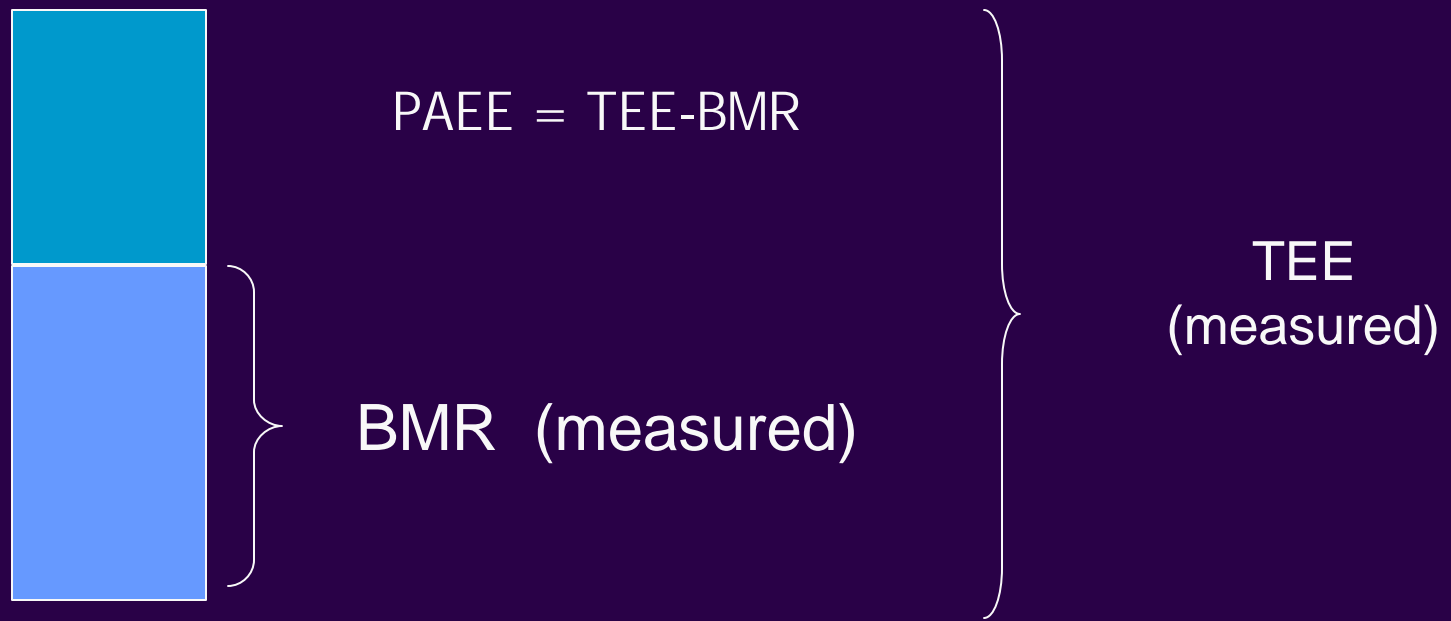
- Gas exchange calorimetry
- Heart rate monitoring
- Estimated from activity:
 - Motion sensors
 - Activity diary
 - Direct observation
- Doubly labeled water ($D_2^{18}O$)

Approaches for the determination of dietary energy requirements: Factorial method

RDA, 1989



Approaches for the determination of dietary energy requirements: Doubly-labeled water DRI, 2002



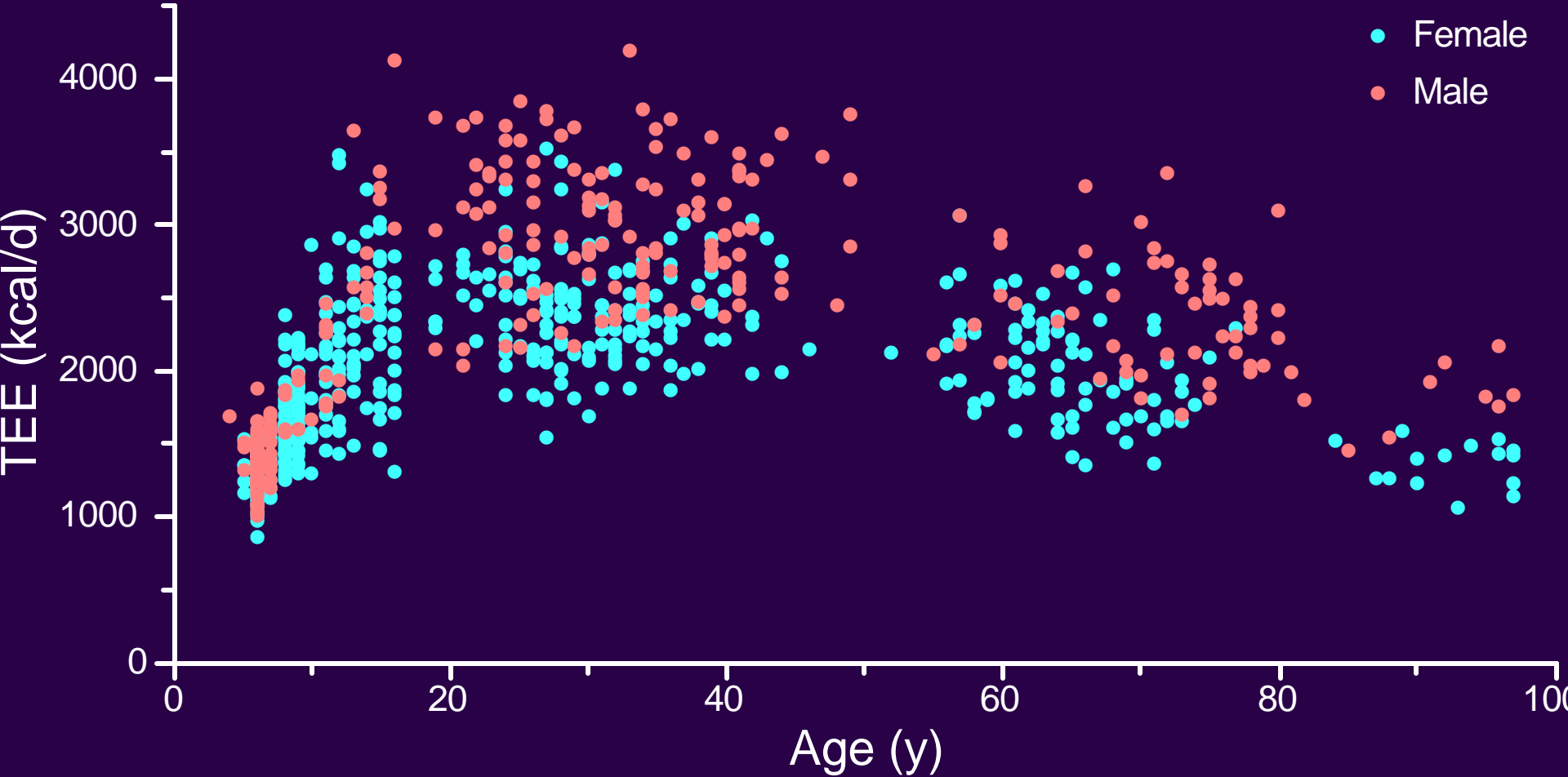
DLW Database

Infants (< 3 yrs of age, n=320)

Age (y)	n	BMI	TEE
0-0.5	116	16.86	501
0.6-1.0	72	17.20	713
1-2	132	16.19	869

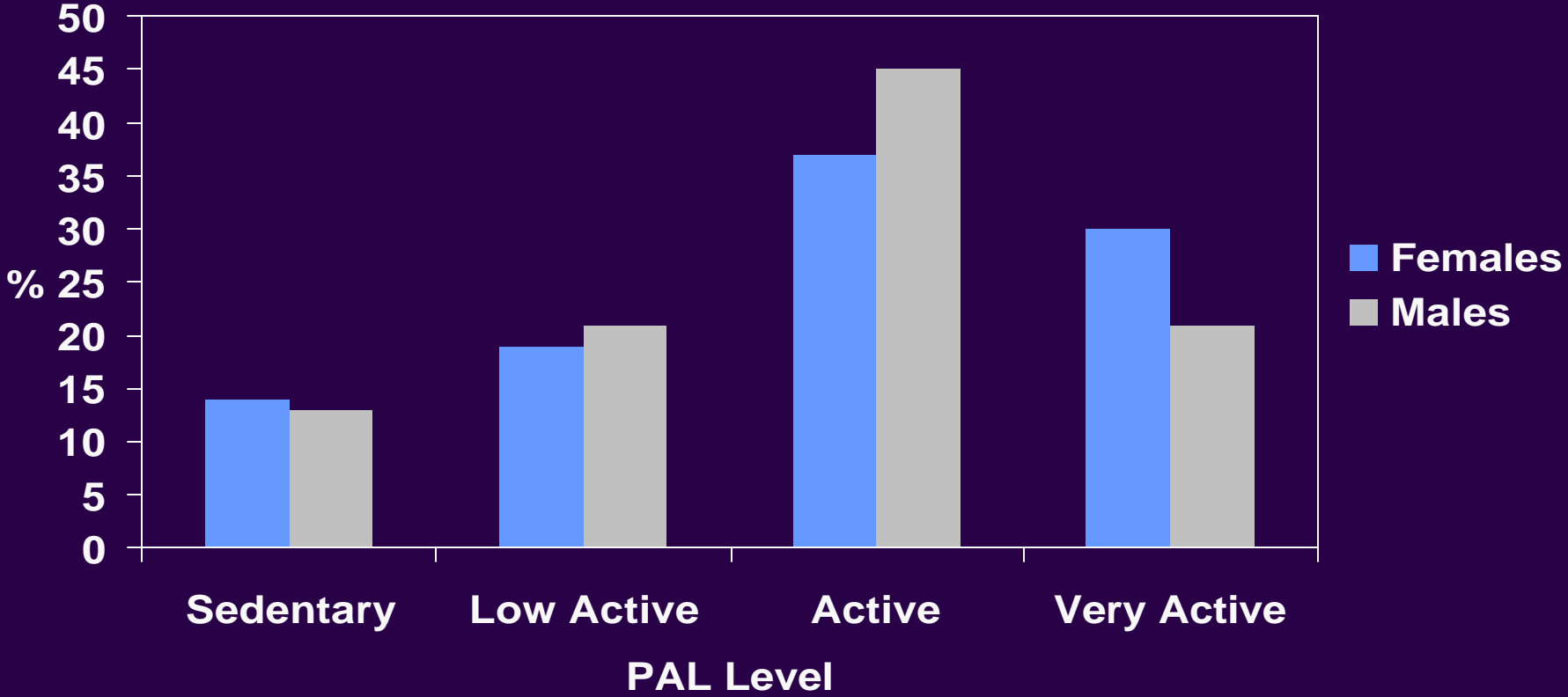
Normative DLW Database

TEE by age



DLW Database

Distribution of PAL levels as percents



Comparison of the 1989 and 2002 recommendations for energy intake - REE

	1989 ¹	2002 ²
25 y/o male: 79 kg, 1.76 m	1,800	1,675
25 y/o female: 63 kg, 1.63 m	1,380	1,322

¹ Using the 1985 WHO/FAO equation

² From DLW database

Comparison of the 1989 and 2002 recommendations for energy intake - TEE

	1989 ¹	2002 ²
25 y/o male, 79 kg, 1.76 m	2,900	2,873
PAL	1.6	1.71
25 y/o female, 63 kg, 1.63 m	2,200	2,149
PAL	1.59	1.63

¹ RDA 10th Edition, p. 33

² DRI for Macronutrients, p. 5-57

Energy needs and nutrient needs

- Food intake is driven by energy needs
- Nutrient needs must be met within energy allowance

Essential and discretionary calories

- Emphasizes the importance of nutrient density

Essential calories and discretionary calories

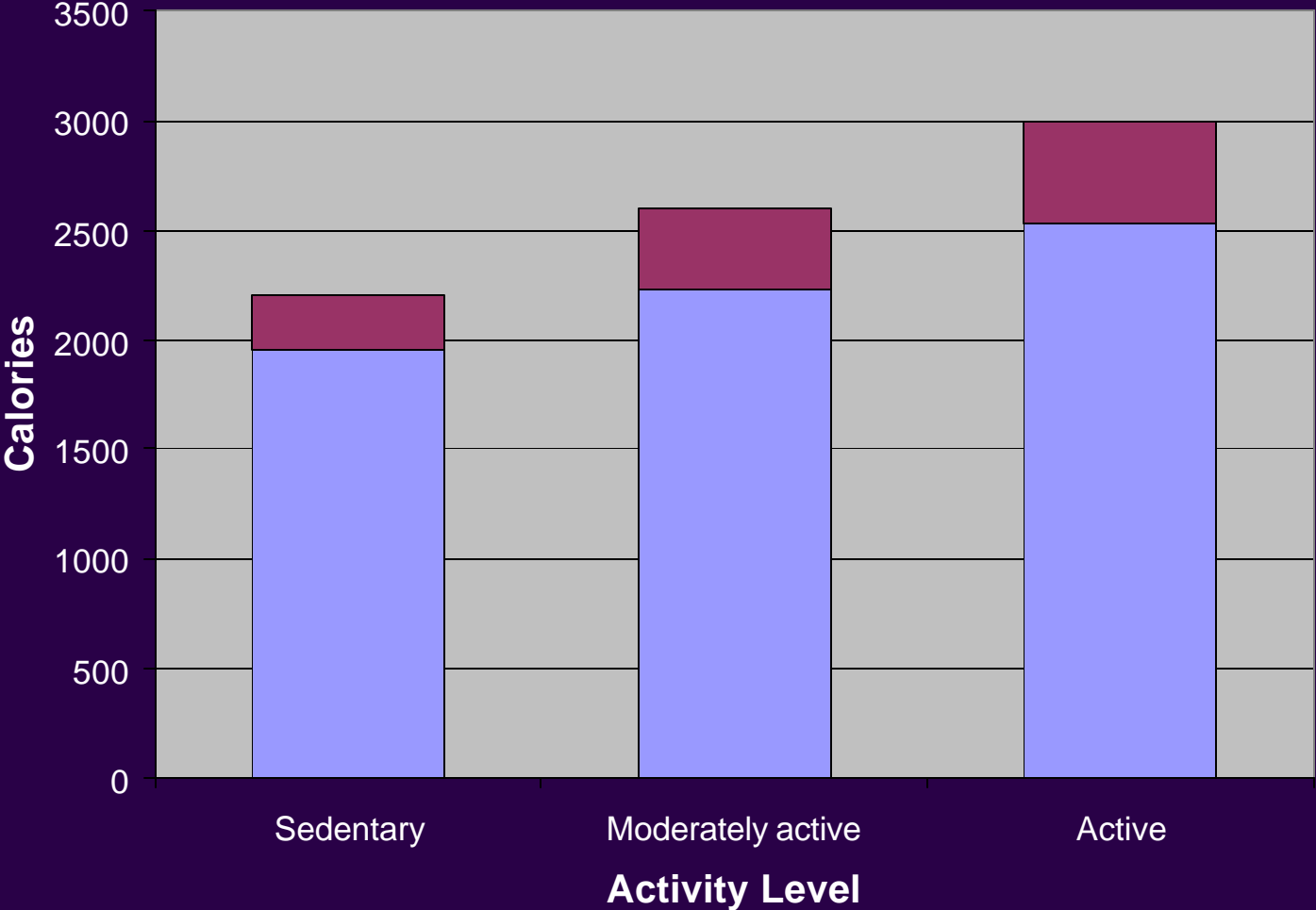


Table D1-4. Percentage of School-aged Children Whose Usual Daily Nutrient Intake was Below the Estimated Average Requirement (EAR) for all Children and by Age and Gender, 1994-1996. (Nutrients considered “shortfall” nutrients in bold)

Nutrient	All	M 6-8	F 6-8	M 9-13	F 9-13	M 14-18	F 14-18
Vitamin A	10.1	0	0	3	6	15	24
Vitamin C	10.5	1	0	2	9	18	22
Vitamin E	78.9	48	68	70	85	84	99
Thiamin	1.9	0	0	9	0	2	10
Ribloflavin	2.1	0	0	0	0	3	5
Niacin	1.9	0	0	0	0	0	5
Vitamin B-6	1.3	0	0	0	2	3	15
Folate¹	50.6	13	14	36	59	58	90
Vitamin B-12	1.3	0	0	0	1	0	8
Phosphorus	19.9	0	0	15	37	7	48
Magnesium	36.5	1	0	16	33	62	89
Iron	2.9	1	1	0	0	1	13
Zinc	8.2	0	0	1	11	3	24

¹Before national flour fortification started

Nutrient density

Amount of food required to provide **5mg** of Zinc:

	(g)	(kcal)
Beef, top loin	82	183
Lettuce, butterhead	2,500	334
Green beans	1,347	478
Potato, baked	1,733	1,610

Typical EER (IOM, 2002)

	<u>Males</u>	<u>Females</u>	
7 - 12 months	743 (757)*	676 (700)	kcal/d
1 – 3 years	1046 (1390)	992 (1297)	

*(1985 recommendations)

Breast-milk intake (kcal/d)

	<u>Industrialized</u> <u>Countries</u>	<u>Developing</u> <u>Countries</u>
6 - 8 months	486	413
9 - 11 months	375	379
12 - 23 months	313	346

Energy needed from complementary foods (by difference, kcal/d)

	<u>Males</u>	<u>Females</u>
7 - 12 months	330	263
1 – 2 years	716	662

Target zinc intake from complementary foods for a 9-mo. child

- From breast milk = 0.74 mg/d
- RDA = 3.0 mg/d (may need to adjust for lower bioavailability)
- Difference = 2.26 mg/d (the estimate of the 1998 WHO report was 2.3 mg/d)

Summary

- Energy:
 - New approach for the first time accounts for actual EE in spontaneous and voluntary physical activity, as well as TEF and other minor contributors to TEE

Dietary patterns and health

- Energy density:
 - Fat content
 - Fiber content
- Nutrient density
 - Bioavailability
 - Interactions
- Variety