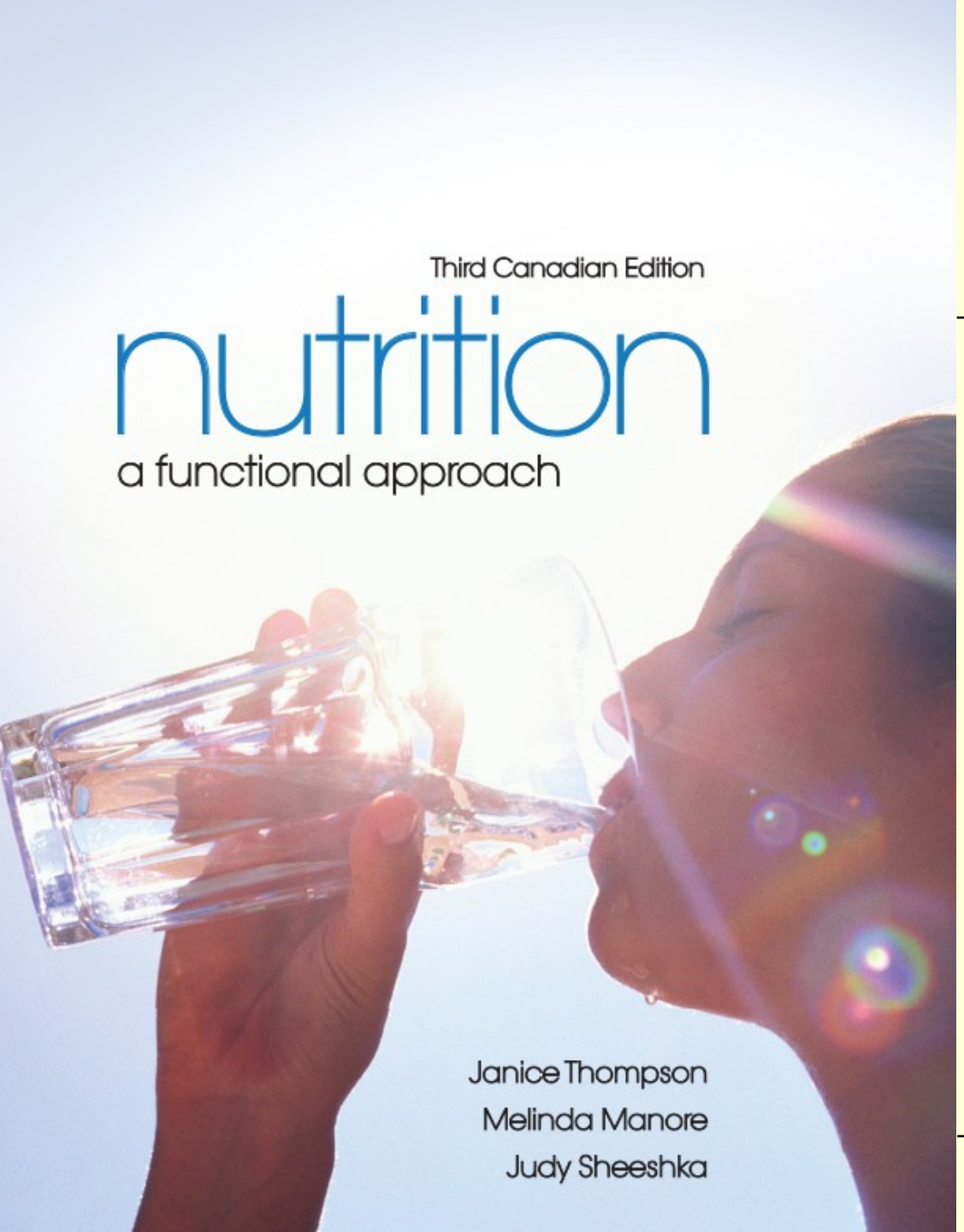

CHAPTER

15

Nutrition Through the Life Cycle: Childhood to Late Adulthood and In Depth

Toddlers

Age 1 to 3 years

- Rapid growth rate of infancy begins to slow
- Gain 14 to 19 cm (5.5 to 7.5 inches) and 4 to 5 kg (9 to 11 pounds)
- High energy requirement due to increased activity level

Toddlers

Macronutrients

- 30–40% of total kcal from fat
- 1.10 g of protein per kg body weight (approximately 13 g)
- 130 g carbohydrates per day
- 14 g fibre (approximately 19 g) per 1,000 kcal of energy consumed

Toddlers

Micronutrients

- Ensure adequate intake of calcium and iron
- Iron-deficient anemia is the most common nutrient deficiency in young children

Fluid needs

- 1 litre/day

Toddlers

Supplements

- Toddlers may need supplements due to their erratic eating habits, especially for fluoride
- Supplements should not exceed 100% of the Recommended Dietary Allowance (RDA) for any nutrient

Toddlers

TABLE 15.1 Nutrient Recommendations for Children and Adolescents

Nutrient	Toddlers (1–3 years)	Children (4–8 years)	Children (9–13 years)	Adolescents (14–18 years)
Fat	No DRI	No DRI	No DRI	No DRI
Protein	1.10 g/kg body weight per day	0.95 g/kg body weight per day	0.95 g/kg body weight per day	0.85 g/kg body weight per day
Carbohydrate	130 g/day	130 g/day	130 g/day	130 g/day
Vitamin A	300 µg/day	400 µg/day	600 µg/day	Boys = 900 µg/day Girls = 700 µg/day
Vitamin C	15 mg/day	25 mg/day	45 mg/day	Boys = 75 mg/day Girls = 65 mg/day
Vitamin E	6 mg/day	7 mg/day	11 mg/day	15 mg/day
Calcium	500 mg/day	800 mg/day	1300 mg/day	1300 mg/day
Iron	7 mg/day	10 mg/day	8 mg/day	Boys = 11 mg/day Girls = 15 mg/day
Zinc	3 mg/day	5 mg/day	8 mg/day	Boys = 11 mg/day Girls = 9 mg/day
Fluid	1.3 litres/day	1.7 litres/day	Boys = 2.4 litres/day Girls = 2.1 litres/day	Boys = 3.3 litres/day Girls = 2.3 litres/day

Table 15.1

Toddlers

Nutritious food choices

- Toddlers have an innate ability to match their intake with their needs
- Keeping a nutritious variety of foods available encourages a healthful diet
- Food should not be forced on a child
- Do not use bribery to encourage children to eat
- Foods prepared should be fun
- New foods should be introduced gradually
- Role modelling is important

Toddlers

Allergies

- Continue to watch for food allergies
- Introduce one new food at a time

Overweight

- A child who is above the 80th percentile should be monitored
- Encourage increased physical activity

Vegetarian families

- A diet including eggs and dairy can be a healthful diet
- A strict vegan diet lacks protein, the essential vitamins and minerals and fibre young children need

Young Children

Age 4 to 8 years

- DRI values are the same for both boys and girls through the age of about 8
- Growth rate is 5 to 10 cm (2 to 4 inches) per year

Young Children

Macronutrients

- Total fat intake should gradually drop to a level closer to adult fat intake
- 25–35% of total energy from fat
- 130 g carbohydrate per day
- 0.95 g of protein per kg body weight
- 14 g fibre per 1,000 kcal of energy consumed

Young Children

Micronutrients

- Vitamins and minerals from fruits and vegetables continue to be a concern
- Vitamins A, C, E, calcium, iron, zinc
- Large increases in DRIs compared to toddlers

Young Children

Supplements

- May be recommended when particular food groups are not eaten regularly
- Supplements should be appropriate for the child’s age

Fluid

- 1.2 to 2 litres/day, including water

Young Children: Encouraging Nutritious Food Choices

- Parents can teach children about healthful food choices
  - Involve children in growing their own food, shopping, and preparing meals
  - Introduce kids to “cool” role models who follow nutritious diets
- Adults should consistently model healthful eating and physical activity patterns

What is the Effect of School Attendance on Nutrition?

Children's school attendance can affect their nutrition

- Many children minimize or skip breakfast: this may increase the risk for behavioural and learning problems associated with hunger in the classroom
- With little or no supervision of what they eat, children do not always consume appropriate types or amounts of food

Children: Nutrition-Related Concerns

- Overweight/obesity
- Dental caries
- Inadequate calcium intake
- Body image
- Food insecurity

Nutrition for Adolescents

Age 9 to 13 years

- Growth is slow and steady—on average, girls grow 5 to 25 cm, and boys grow 10 to 30 cm during puberty
- Half of peak bone mass is deposited
- Weight gain is extremely variable
- Activity levels vary

Adolescents

Macronutrients

- 25–35% of total energy from fat
- 130 g carbohydrates per day
- 0.85 g protein per kg body weight
- 45–65% of kcal from carbohydrates
- AI for fibre is 26 g/day

Adolescents

Micronutrients

- Micronutrients of concern are calcium, iron, and vitamins A and D
- AI for calcium is 1300 mg/day
- RDA for iron for boys is 11 mg/day and for girls is 15 mg/day
- RDA for vitamin A is 900 µg/day for boys and 700 µg/day for girls
- RDA for vitamin D is 15 µg/day

Adolescents

Fluid

- Adequate Intake (AI) of fluids varies by gender, ranging from 2 litres/day (females) to 2.7 litres/day (males)

Supplements

- A multivitamin and mineral supplement supplying no more than 100% of the daily values may be warranted

Adolescents

Nutritious food choices

- Peer influences and fast-paced lifestyle can lead adolescents to choose fast foods
- Parents can act as role models and keep healthful food choices available
- Adequate intake of fruits, vegetables, and whole grains should be encouraged

Adolescents

Nutrition-related concerns

- Bone density concerns arise from inadequate calcium intake
- Eating disorders and poor body image problems can begin during these years
- Acne can be problematic, mostly due to the hormonal changes of puberty
- Cigarette smoking, alcohol consumption, and illicit drug use all have a significant impact on growth and health

Pediatric Obesity

Currently, about 8.6% of children and youth aged 6 to 17 years old are classified as obese (2011)

- Increased risk for developing type 2 diabetes, hypertension, sleep apnea, and other serious medical problems

A reversal of pediatric obesity can be accomplished only through an aggressive, comprehensive, nationwide health campaign

Pediatric Obesity: Prevention

- Healthful, balanced, regular meals
- Developing healthful eating habits early in life
- Family-wide support for nutritious food choices
- Parental control of food purchase and preparation
- Minimize the amount of meals eaten out of the home, especially fast food
- School support for healthful food choices
- Daily activity and exercise that is varied to prevent boredom

Nutrition for Older Adults

- It is estimated that by 2036, there will be 10.4 million Canadians aged 65+ years old

- A nutritious diet and regular physical activity throughout life can help prevent or delay the onset of chronic disease and help keep adults happy and productive in their later years

Older Adults

Physiologic changes to the bodies of older adults, aged 65 years and older, include

- Taste, smell and visual perception is often diminished
- Gastrointestinal function diminishes
- Impaired absorption of nutrients
- Decreased muscle and lean tissue and increased fat mass
- Decreased bone density

Older Adults

Macronutrients

- Energy needs usually decrease due to reduced activity levels and lower lean body mass
- General recommendations for fat, carbohydrate, and protein intakes are the same as for younger adults
- Recommended to not consume more than 30% of energy from sugars
- Fibre recommendations are slightly lower for older adults

Older Adults

TABLE 15.2 Nutrient Recommendations That Change with Increased Age

Changes in Nutrient Recommendations	Rationale for Changes
Vitamin D Increased need for vitamin D from 15 µg/day for children, women and men from 9 to 70 years to 20 µg/day for adults over age 70 years	Decreased bone density Decreased ability to synthesize vitamin D in the skin
Calcium Increased need for calcium from 1000 mg/day for young adults to 1200 mg/day for adults 51 years of age and older	Decreased bone density Decreased absorption of dietary calcium
Fibre Decreased need for fibre from 38 g/day for young men to 30 g/day for men 51 years and older; decreases for women from 25 g/day for young women to 21 g/day for women 51 years and older	Decreased energy intake
B-Vitamins Increased need for vitamin B_6 and need for vitamin B_{12} as a supplement or from fortified foods Decreased absorption of food B_{12} from gastrointestinal tract	Lower levels of stomach acid Increased need to reduce homocysteine levels and to optimize immune function

Table 15.2

Older Adults

Micronutrients

- Calcium and vitamin D requirements increase due to poor calcium absorption
- Iron needs decrease
- Zinc intake should be maintained for optimizing immune function and wound healing
- Vitamins C and E remain the same
- Adequate intake of B-vitamins is a special concern, especially vitamin B_{12}
- Vitamin A requirements are the same as for all adults, but older adults should be careful to not exceed the RDA

Older Adults

Fluid

- AI for fluid is the same as for younger adults
  - Men: 3.7 litres/day
  - Women: 2.7 litres/day
- Older adults are especially susceptible to dehydration because changes in kidney function can impair the thirst mechanism
- Important to seek medical attention for incontinence and to drink plenty of fluids

Older Adults

Nutrition-related concerns

- Many chronic diseases are more prevalent in overweight or obese adults
- Mortality rates are higher in underweight elderly than in overweight elderly
- Dental health issues may cause older adults to avoid meats, firm fruits, and vegetables

Older Adults

Nutrition-related concerns, continued

- Age-related eye diseases can cause vision impairment and blindness
- Some prescription medications can alter nutrient absorption or decrease appetite

Geriatric Weight Loss

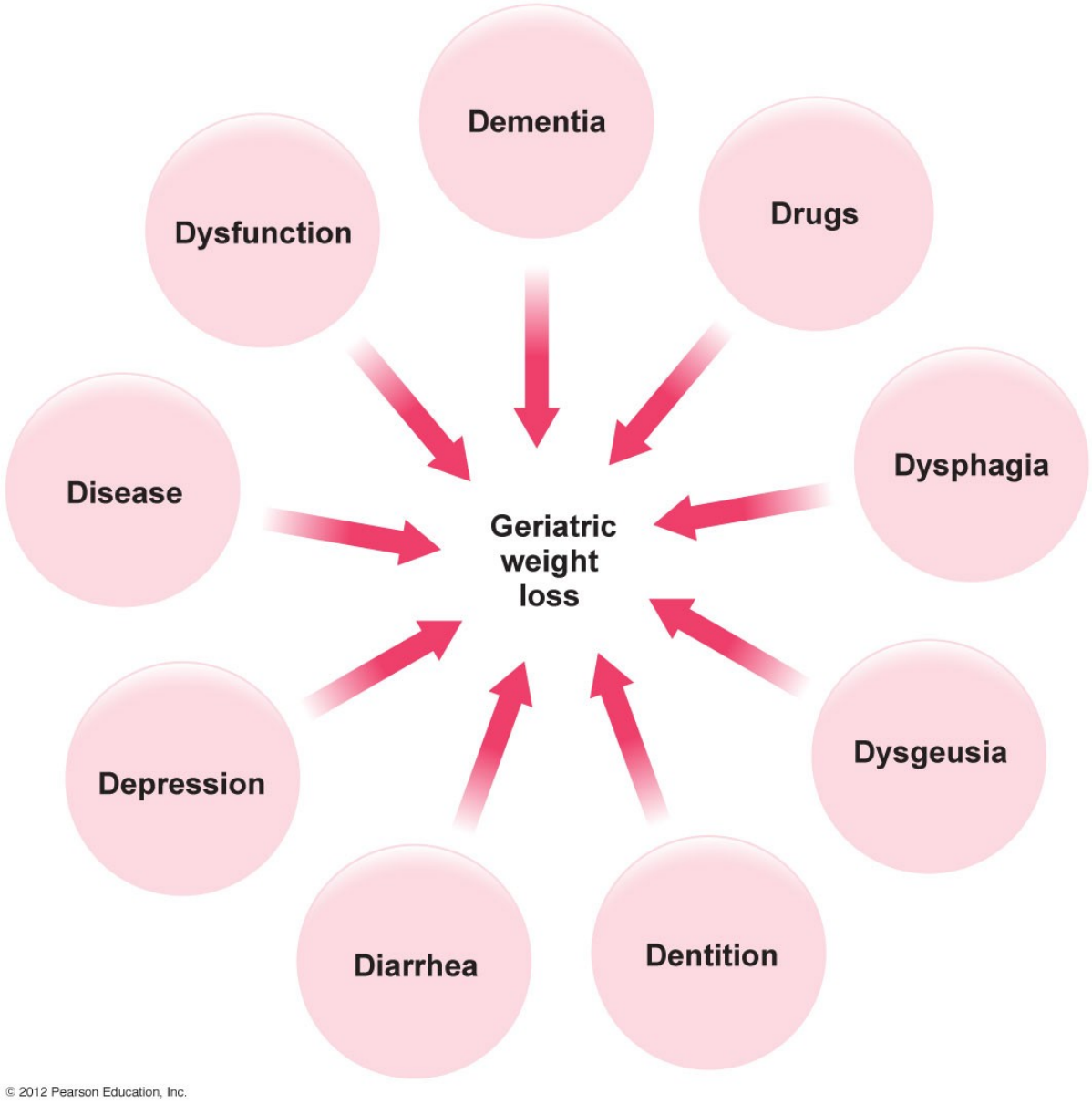

Figure 15.4

Drug-Nutrient Interactions

TABLE 15.3 Examples of Common Drug–Nutrient Interactions

Category of Drug	Interactions
Antacids	May decrease the absorption of iron, calcium, folate, vitamin B_{12}
Antibiotics	May reduce the absorption of calcium, fat-soluble vitamins; reduces the production of vitamin K by gut bacteria
Anticonvulsants	Interfere with activation of vitamin D
Anticoagulants ("blood thinners")	Reduce the activity of vitamin K
Antidepressants	May cause weight gain as a result of increased appetite
Antiretroviral agents (used in treatment of HIV/AIDS)	Reduce absorption of most nutrients
Aspirin	Lowers blood folate levels; increases iron loss due to gastrointestinal bleeding
Diuretics	May increase urinary excretion of potassium, sodium, calcium, magnesium; may cause retention of potassium, other electrolytes
Laxatives	Increase fecal excretion of dietary fat, fat-soluble vitamins, calcium and other minerals

Table 15.3

In Depth: The “Fountain of Youth”

Growing numbers of people are experimenting with new methods to achieve greater longevity

- Calorie restriction
- Fasting
- Supplements

Calorie Restriction (CR)

- Researchers have not identified a precise number of calories to qualify as “restricted”
- Typically involves eating fewer calories than your body needs to maintain normal weight
- Should allow for differences in gender, age, body composition, activity level, and so forth
- Many people practicing CR strive to consume 20–30% fewer calories than usual

Calorie Restriction: Metabolic Effects

- Decreased fat mass and lean body mass
- Decreased insulin levels and improved insulin sensitivity
- Decreased core body temperature and blood pressure
- Decreased energy expenditure
- Decreased oxidative stress (less free radical damage)
- Lower levels of DNA damage
- Lower levels of chronic inflammation
- Protective changes in some hormone levels

Calorie Restriction: Challenges

- Data are still preliminary
- May be ethical concerns for some people's participation (potential malnutrition)
- Much of the data are self-reported from CR groups
- May be necessary for CR to last many years to see longevity benefits
- Reported side effects include constant hunger, feeling cold, lower sex drive
- Long-term effects are not known

Calorie Restriction: Alternatives

- Intermittent Fasting (IF):
  - Alters the pattern of food consumption
  - Has shown positive effects in animals
  - May be able to be tolerated by more people
- Limiting total protein intake
- Exercise-induced leanness

Supplements

- The “anti-aging” market is rife with supplements making longevity claims
- No research trials to date have shown a clear connection between increased nutrient intake from supplements and lower rates of death
- Greatly increased nutrient intake levels may pose dangers to some people
- Many non-nutrient supplements (e.g., ginko, human growth hormone, DHEA, etc.) can have potentially serious side effects

In Depth: The “Fountain of Youth”

Proven things you can do to increase your chances of living a long and healthful life

- Get regular physical activity
- Eat nutritious, balanced meals
- Take only supplements recommended by a qualified healthcare provider, in only the amounts recommended
- Maintain a healthful body weight and body composition
- Don't smoke or use tobacco products
- Consume alcohol in moderation