

be important. For example, amino acids cannot be used for protein synthesis if they are not supplied together; instead, they will be used for energy production, although in healthy individuals eating adequate diets, the distribution of protein intake over the course of the day has little effect on health.

**Disease** Dietary deficiency diseases include protein-calorie malnutrition, iron-deficiency anemia, goiter (due to iodine deficiency), rickets and osteomalacia (vitamin D deficiency), and xerophthalmia (vitamin A deficiency), megaloblastic anemia (vitamin B<sub>12</sub> or folic acid deficiency), scurvy (vitamin C/ascorbic acid deficiency), beriberi (thiamin deficiency), and pellagra (niacin and tryptophan deficiency) (**Chaps. 96e and 97**). Each deficiency disease is characterized by imbalances at the cellular level between the supply of nutrients or energy and the body's nutritional needs for growth, maintenance, and other functions. Imbalances and excesses in nutrient intakes are recognized as risk factors for certain chronic degenerative diseases, such as saturated fat and cholesterol in coronary artery disease; sodium in hypertension; obesity in hormone-dependent endometrial and breast cancers; and ethanol in alcoholism. Because the etiology and pathogenesis of these disorders are multifactorial, diet is only one of many risk factors. Osteoporosis, for example, is associated with calcium deficiency, sometimes secondary to vitamin D deficiency, as well as with risk factors related to environment (e.g., smoking, sedentary lifestyle), physiology (e.g., estrogen deficiency), genetic determinants (e.g., defects in collagen metabolism), and drug use (chronic steroid and aromatase inhibitors) (**Chap. 425**).

#### DIETARY ASSESSMENT

In clinical situations, nutritional assessment is an iterative process that involves: (1) screening for malnutrition, (2) assessing the diet and other data to establish either the absence or the presence of malnutrition and its possible causes, (3) planning and implementing the most appropriate nutritional therapy, and (4) reassessing intakes to make sure that they have been consumed. Some disease states affect the bioavailability, requirements, use, or excretion of specific nutrients. In these circumstances, specific measurements of various nutrients or their biomarkers may be required to ensure adequate replacement (**Chap. 96e**).

Most health care facilities have nutrition-screening processes in place for identifying possible malnutrition after hospital admission. Nutritional screening is required by the Joint Commission, which accredits and certifies health care organizations in the United States. However, there are no universally recognized or validated standards. The factors that are usually assessed include abnormal weight for height or body mass index (e.g., BMI <19 or >25); reported weight change (involuntary loss or gain of >5 kg in the past 6 months) (**Chap. 56**); diagnoses with known nutritional implications (e.g., metabolic disease, any disease affecting the gastrointestinal tract, alcoholism); present therapeutic dietary prescription; chronic poor appetite; presence of chewing and swallowing problems or major food intolerances; need for assistance with preparing or shopping for food, eating, or other aspects of self-care; and social isolation. The nutritional status of hospitalized patients should be reassessed periodically—at least once every week.

A more complete dietary assessment is indicated for patients who exhibit a high risk of or frank malnutrition on nutritional screening. The type of assessment varies with the clinical setting, the severity of the patient's illness, and the stability of the patient's condition.

**Acute-Care Settings** In acute-care settings, anorexia, various other diseases, test procedures, and medications can compromise dietary intake. Under such circumstances, the goal is to identify and avoid inadequate intake and to assure appropriate alimentation. Dietary assessment focuses on what patients are currently eating, whether or not they are able and willing to eat, and whether or not they experience any problems with eating. Dietary intake assessment is based on information from observed intakes; medical records; history; clinical examination; and anthropometric, biochemical, and functional status

evaluations. The objective is to gather enough information to establish the likelihood of malnutrition due to poor dietary intake or other causes in order to assess whether nutritional therapy is indicated (**Chap. 98e**).

Simple observations may suffice to suggest inadequate oral intake. These include dietitians' and nurses' notes; observation of a patient's frequent refusal to eat or the amount of food eaten on trays; the frequent performance of tests and procedures that are likely to cause meals to be skipped; adherence to nutritionally inadequate diet orders (e.g., clear liquids or full liquids) for more than a few days; the occurrence of fever, gastrointestinal distress, vomiting, diarrhea, or a comatose state; and the presence of diseases or use of treatments that involve any part of the alimentary tract. Acutely ill patients with diet-related diseases such as diabetes need assessment because an inappropriate diet may exacerbate these conditions and adversely affect other therapies. Abnormal biochemical values (serum albumin levels <35 g/L [ $<3.5$  mg/dL]; serum cholesterol levels <3.9 mmol/L [ $<150$  mg/dL]) are nonspecific but may indicate a need for further nutritional assessment.

Most therapeutic diets offered in hospitals are calculated to meet individual nutrient requirements and the RDA *if they are eaten*. Exceptions include clear liquids, some full-liquid diets, and test diets (such as those adhered to in preparation for gastrointestinal procedures), which are inadequate for several nutrients and should not be used, if possible, for more than 24 h. However, because as much as half of the food served to hospitalized patients is not eaten, it cannot be assumed that the intakes of hospitalized patients are adequate. Dietary assessment should compare how much and what kinds of food the patient has consumed with the diet that has been provided. Major deviations in intakes of energy, protein, fluids, or other nutrients of special concern for the patient's illness should be noted and corrected.

Nutritional monitoring is especially important for patients who are very ill and who have extended lengths of hospital stay. Patients who are fed by enteral and parenteral routes also require special nutritional assessment and monitoring by physicians and/or dietitians with certification in nutritional support (**Chap. 98e**).

**Ambulatory Settings** The aim of dietary assessment in the outpatient setting is to determine whether or not the patient's usual diet is a health risk in itself or if it contributes to existing chronic disease-related problems. Dietary assessment also provides the basis for planning a diet that fulfills therapeutic goals while ensuring patient adherence. The outpatient dietary assessment should review the adequacy of present and usual food intakes, including vitamin and mineral supplements, oral nutritional supplements, medical foods, other dietary supplements, medications, and alcohol, because all of these may affect the patient's nutritional status. The assessment should focus on the dietary constituents that are most likely to be involved or compromised by a specific diagnosis as well as on any comorbidities that are present. More than one day's intake should be reviewed to provide a better representation of the usual diet.

There are many ways to assess the adequacy of a patient's habitual diet. These include use of a food guide, a food-exchange list, a diet history, or a food-frequency questionnaire. A commonly used food guide for healthy persons is the USDA's Choose My Plate, which is useful as a rough guide for avoiding inadequate intakes of essential nutrients as well as likely excesses in the amounts of fat (especially saturated and trans fats), sodium, sugar, and alcohol consumed (**Table 95e-4**). The Choose My Plate graphic emphasizes a balance between calories and nutritional needs, encouraging increased intake of fruits and vegetables, whole grains, and low-fat milk in conjunction with reduced intake of sodium and high-calorie sugary drinks. The Web version of the guide provides a calculator that tailors the number of servings suggested for healthy patients of different weights, sexes, ages, and life-cycle stages to help them to meet their needs while avoiding excess (<http://www.supertracker.usda.gov/default.aspx> and [www.ChooseMyPlate.gov](http://www.ChooseMyPlate.gov)). Patients who follow ethnic or unusual dietary patterns may need extra instruction on how foods should be categorized and on the appropriate portion sizes that constitute a serving. The process of reviewing the guide with patients helps them transition