CHAPTER 10

# DIETARY REFERENCE STANDARDS AND NUTRITION MONITORING


Dietary and nutritional reference standards are used in assessing and monitoring the diets and health of individuals. Food assistance programs use dietary reference standards to establish program goals and objectives and to evaluate program effectiveness.

## Research Highlights

### *New dietary reference standards make it possible to assess nutrient adequacy*

In the past, Recommended Dietary Allowances (RDAs) were the benchmark measures used for assessing nutrient intake. However, with advances in the scientific knowledge regarding the roles of nutrients in human health, the Institute of Medicine (IOM) developed a new set of dietary reference standards—Dietary Reference Intakes (DRIs)—to replace and expand the RDAs. Because adoption of DRIs represents a major shift from the use of RDAs, the IOM established a subcommittee to focus specifically on the application of the new DRIs. FANRP provided funding to the subcommittee that resulted in two reports: one providing scientific guidance on the application of the DRIs in dietary assessment with a new methodology that allows estimating the percentage of a group with adequate intake for specific nutrients (Institute of Medicine, 2000); the other providing guidance on the use of DRIs in planning diets for individuals and groups (Institute of Medicine, 2003).

### *Assessing the nutrient intakes of vulnerable subgroups*

Studies of nutrient intake conducted prior to the development of the new DRIs used inappropriate methods to assess nutrient adequacy. A study by Devaney et al. (2005) used the new DRIs to assess the nutrient adequacy of segments of the population at risk of inadequate nutrient intake, excessive intake, or dietary imbalances. The vulnerable population subgroups of interest included adolescent females, older adults, children and adults at risk of overweight, individuals living in food-insufficient households, low-income individuals, and individuals targeted by and participating in food and nutrition assistance programs. The study indicated: generally inadequate intakes of key micronutrients, especially magnesium, calcium, folate, and vitamin E, as well as of fiber; caloric intakes less than recommended caloric requirements for adults; and consumption of too many calories from fat and not enough from carbohydrates. Surprisingly, the study also found caloric intake less than recommended caloric requirements for adults, although a later study, described below, explored possible explanations for the apparent inconsistency with data on the ongoing rise in obesity. The study adds to a growing literature that uses current, improved knowledge of nutrient requirements and the new dietary assessment methods recommended by the IOM to analyze nutrient intakes.

### *Errors in dietary recall data may partially explain the inadequacies and excessive intakes of some nutrients*

First-generation studies using the new DRIs raised questions as to whether the findings of dramatic dietary deficiencies among some population subgroups indicate true dietary problems, limitations of dietary assessment methods, or shortcomings with the DRIs for some nutrients. It is important to understand which interpretation is most valid. Devaney et al. (2007) reviewed the studies and methods used to set the DRIs for selected nutrients and subgroups—food energy, zinc, preformed vitamin A for infants and young children, and magnesium, vitamin E, fiber, and potassium for older children and adults—to identify and document the factors that explain the study results. They concluded that although errors in dietary recall data—either overreporting of intakes for infants and young children, or underreporting of food intake and lack of data on nutrient supplements for older children and adults—may explain some of the inadequacies and excessive intakes, they are unlikely to explain away the problems (except, perhaps for excessive energy intake among infants and young children). They also cautioned that difficulties in collecting reliable data on the amounts and types of fats and oils consumed, and highly variable and imputed data on vitamin E values in nutrient databases, suggest that vitamin E intake may be underestimated. Data limitations and the resulting extrapolations used to set the DRIs raise several research questions regarding the derivation of the DRIs in question.

## Research Summary

FANRP research has contributed to improved analytic methods for assessing and monitoring the diets and health of program participants as well as non-participants. For example, FANRP studies provided guidance on appropriate methods for using the new Dietary Reference Intakes (DRIs), which replaced the old Recommended Dietary Allowances (RDAs). Other studies have used the new DRIs to assess the nutrient adequacy as well as the nutritional and health characteristics of segments of the population. This information is critical in identifying current and potentially important dietary problems that can be addressed by food policy, in establishing a baseline that can be used for monitoring over time, and for examining the impact of food assistance programs. FANRP also contributed to the development of the new international child growth standards for infants and young children and played a role in the 2005 Dietary Guidelines recommendations.

### *Baseline from which to monitor the nutritional and health characteristics of low-income populations is established*

FANRP funded a study that examined the nutritional characteristics and health status of four population subgroups—Food Stamp Program participants (Fox and Cole, 2004a); WIC participants (Cole and Fox, 2004b); school-age children (Fox and Cole, 2004b); and older Americans age 60 years and older (Cole and Fox, 2004a). The study establishes a baseline from which to monitor the nutritional and health characteristics of Americans, focusing on the low-

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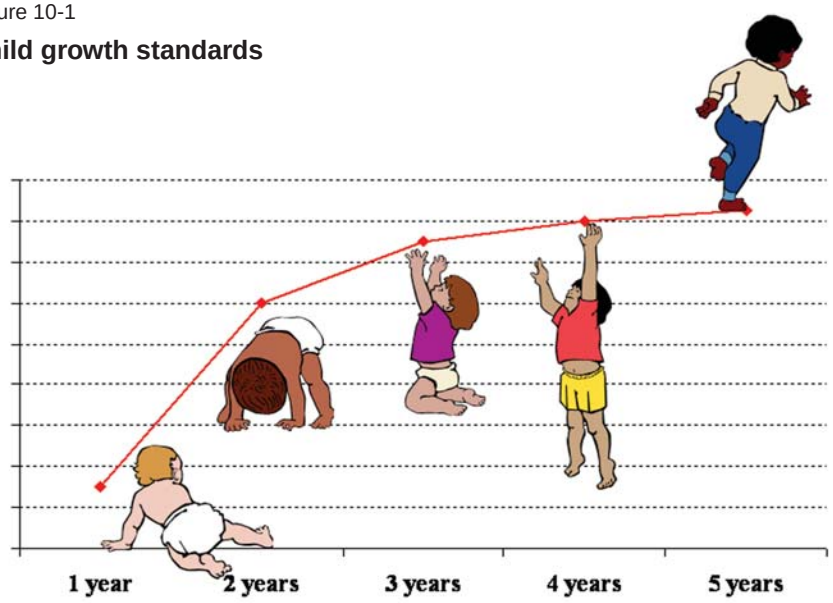
Figure 10-1

**Child growth standards**




Source: World Health Organization, http://www.who.int/childgrowth/en/.

income population, over time and to generate questions for future research. A broad array of measures were examined, including dietary intake, body weight, bone density, health-related behavior, health status, and access to health care services.

### *The 2005 Dietary Guidelines restore recommendation to consume a variety of nutrient-dense foods and beverages*

Between 1980 and 1995, all versions of the *Dietary Guidelines for Americans* included a recommendation to consume a variety of foods. However, concerns that advice to eat a variety of foods might lead to overconsumption resulted in the removal of the variety guideline in the 2000 Dietary Guidelines. A study by Foote et al. (2004), one of the first to examine the effect of dietary variety on nutrient adequacy using the new DRIs, showed that consuming a variety of foods contributed to nutrient adequacy even though dietary variety was also associated with higher caloric intake. Based in part on this study, the 2005 Dietary Guidelines included a recommendation to consume a variety of nutrient-dense foods and beverages while meeting recommended intakes within caloric needs.

### *New growth standards for infants and young children developed*

FANRP funded the U.S. data collection component for the new international Child Growth Standards for infants and young children up to age 5, developed by the World Health Organization (WHO) (see World Health Organization, 2006 for information on the methods and development of the new growth standards) (fig. 10-1). Current growth standards are based on a representative sample of the population and, therefore, reflect how children are currently growing, rather than how they should optimally grow. The new standards are based on breastfed children and, therefore, bring coherence between the tools used to assess growth and the national and international feeding guidelines, which recommend breastfeeding as the optimal source of nutrition during infancy. The new growth standards, which, for the first time, include standards for Body Mass Index (BMI) and six key motor development milestones, will allow improved assessment, measurement, and evaluation of breastfeeding and complementary feeding.