

# Position of the Academy of Nutrition and Dietetics: Food and Nutrition for Older Adults: Promoting Health and Wellness

## ABSTRACT

It is the position of the Academy of Nutrition and Dietetics that all Americans aged 60 years and older receive appropriate nutrition care; have access to coordinated, comprehensive food and nutrition services; and receive the benefits of ongoing research to identify the most effective food and nutrition programs, interventions, and therapies. Health, physiologic, and functional changes associated with the aging process can influence nutrition needs and nutrient intake. The practice of nutrition for older adults is no longer limited to those who are frail, malnourished, and ill. The population of adults older than age 60 years includes many individuals who are living healthy, vital lives with a variety of nutrition-related circumstances and environments. Access and availability of wholesome, nutritious food is essential to ensure successful aging and well-being for the rapidly growing, heterogeneous, multiracial, and ethnic population of older adults. To ensure successful aging and minimize the effects of disease and disability, a wide range of flexible dietary recommendations, culturally sensitive food and nutrition services, physical activities, and supportive care tailored to older adults are necessary. National, state, and local strategies that promote access to coordinated food and nutrition services are essential to maintain independence, functional ability, disease management, and quality of life. Those working with older adults must be proactive in demonstrating the value of comprehensive food and nutrition services. To meet the needs of all older adults, registered dietitians and dietetic technicians, registered, must widen their scope of practice to include prevention, treatment, and maintenance of health and quality of life into old age.

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## POSITION STATEMENT

It is the position of the Academy of Nutrition and Dietetics that all Americans aged 60 years and older receive appropriate nutrition care; have access to coordinated, comprehensive food and nutrition services; and receive the benefits of ongoing research to identify the most effective food and nutrition programs, interventions, and therapies.

**H**EALTHY LIFESTYLES, EARLY detection of diseases, immunizations, and injury prevention have proven to be effective in promoting the health and longevity of older adults. One in every eight people in America is an older adult, defined by the Older Americans Act (OAA) as an individual who is aged 60 years older.<sup>1</sup> The enjoyment of food and nutritional well-being, along with other environmental influences, has an influence on health-related quality of life and the aging process (Figure 1). Quality of life is defined in public health and medicine as a person's perceived physical and mental health over time, including factors such as health risks, and conditions, functional status, social support, and socioeconomic status.<sup>2</sup>

Beginning early in life, eating a nutritious diet, maintaining a healthy body weight, and a physically active lifestyle are key influential factors in helping individuals avoid the physical and mental deteriorations associated with aging.

Approximately one third of older adults are aging successfully based on objective criteria; however, a great number of older adults perceive themselves as aging successfully despite the presence of illness and disability.<sup>3</sup> Of the most common causes of death of adults aged 65 years and older in the United States, five of eight have a known nutritional influence (Figure 2).<sup>4</sup> Almost 80% of older adults have one chronic condition, and half of all older adults have two or more.<sup>5</sup> More than 39% of all noninstitutionalized persons aged 65 years and older are in excellent health and only 6.4% of these adults need help with their personal daily care.<sup>6</sup> Preventing chronic diseases

and reducing associated complications is an essential strategy for keeping older adults healthy, independent, and community dwelling.

## ROLE OF FOOD AND NUTRITION IN AGING

Although health status has multiple contributing factors, nutrition is one of the major determinants of successful aging. Food is not only critical to one's physiological well-being but also contributes to social, cultural, and psychological quality of life. Primarily, nutrition helps promote health and functionality. As a secondary and tertiary strategy, medical nutrition therapy (MNT) is an effective disease management approach that lessens chronic disease risk, slows disease progression, and reduces disease symptoms. Thus, the years at the end of the life cycle can be healthful, enjoyable, and productive if

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This Academy position paper includes the authors' independent review of the literature in addition to systematic review conducted using the Academy's Evidence Analysis Process and information from the Academy's Evidence Analysis Library (EAL). Topics from the EAL are clearly delineated. The use of an evidence-based approach provides important added benefits to earlier review methods. The major advantage of the approach is the more rigorous standardization of review criteria, which minimizes the likelihood of reviewer bias and increases the ease with which disparate articles may be compared. For a detailed description of the methods used in the Evidence Analysis Process, go to [www.andevidencelibrary.com/eaprocess](http://www.andevidencelibrary.com/eaprocess).

**Conclusion Statements** are assigned a grade by an expert work group based on the systematic analysis and evaluation of the supporting research evidence. **Grade I=Good; Grade II=Fair; Grade III=Limited; Grade IV=Expert Opinion Only; and Grade V=Not Assignable (because there is no evidence to support or refute the conclusion).** See grade definitions at [www.adaevidencelibrary.com/grades](http://www.adaevidencelibrary.com/grades).

**Recommendations** are also assigned a rating by an expert work group based on the grade of the supporting evidence and the balance of benefit vs harm. Recommendation ratings are Strong, Fair, Weak, Consensus, or Insufficient Evidence. Recommendations can be worded as **conditional or imperative statements**. *Conditional statements* clearly define a specific situation and most often are stated as an "if, then" statement, while *imperative statements* are broadly applicable to the target population without restraints on their pertinence. Evidence-based information for this and other topics can be found at [www.andevidencelibrary.com](http://www.andevidencelibrary.com) and subscriptions for non-members are purchasable at [www.adaevidencelibrary.com/store.cfm](http://www.adaevidencelibrary.com/store.cfm).

chronic diseases and conditions can be prevented or effectively managed. Registered dietitians (RDs) and dietetic technicians, registered (DTRs), are uniquely qualified to provide a broad array of culturally sensitive food and nutrition services in addition to encouraging physical activity and other supportive care for older Americans.

## THE GROWING AGING POPULATION

The demographics of the aging US population is changing and growing dramatically as baby boomers reach older ages. Since 1900, the percentage of

Americans aged 65 years and older has more than tripled: from 4.1% to 13.1% of the population in 2010.<sup>7</sup> The number of older Americans reached 40.4 million persons in 2010. By 2030, there will be about 72.1 million older persons representing 19.3% of the population—almost twice the number there was in 2007. The 85 years and older population is expected to increase to 6.6 million in 2020.<sup>7</sup>

### Minority Aging

The racial/ethnic composition of Americans aged 65 years and older is also expected to continue to grow and diversify. Minority populations, estimated at 8.1 million in 2010 (20.0% of older adults), are projected to increase to 13.1 million in 2020 (24% of older adults).<sup>7</sup> Table 1 shows projected population growth data from 2010 to 2050 by race for persons ages 65 years and older and ages 85 years and older.<sup>7</sup>

### Life Expectancy

Persons living to age 65 years have an average life expectancy of 18.8 more years.<sup>8</sup> Men and women who reach age 85 years can expect to live more than 5.7 and 6.8 additional years, respectively.<sup>8</sup> Along with general trends for the US population, the Hispanic, American Indian and Alaskan Native, African American, Asian, and Hawaiian and Pacific Islander populations are also now living longer.<sup>7</sup>

### The Genetics of Longevity

In 2001 there were 48,000 individuals in the United States who were aged 100 years or older. By 2009 there were more than 64,000 persons aged 100 years or more, accounting for 0.2% of the population older than age 65 years.<sup>7</sup> Genetic research has identified the presence of genes and combinations of genes in centenarians that contribute to protection from age-related diseases, healthy aging, and longevity.<sup>9,10</sup> Some longevity-enabling genes are thought to function by offering protection against chronic diseases;<sup>10</sup> other evidence, however, has not confirmed an association between specific genes and longevity or suggests that the relationship is small.<sup>11</sup> In addition, longevity genes may function in combination with environment and lifestyle choices. Although the possibility exists for a ge-

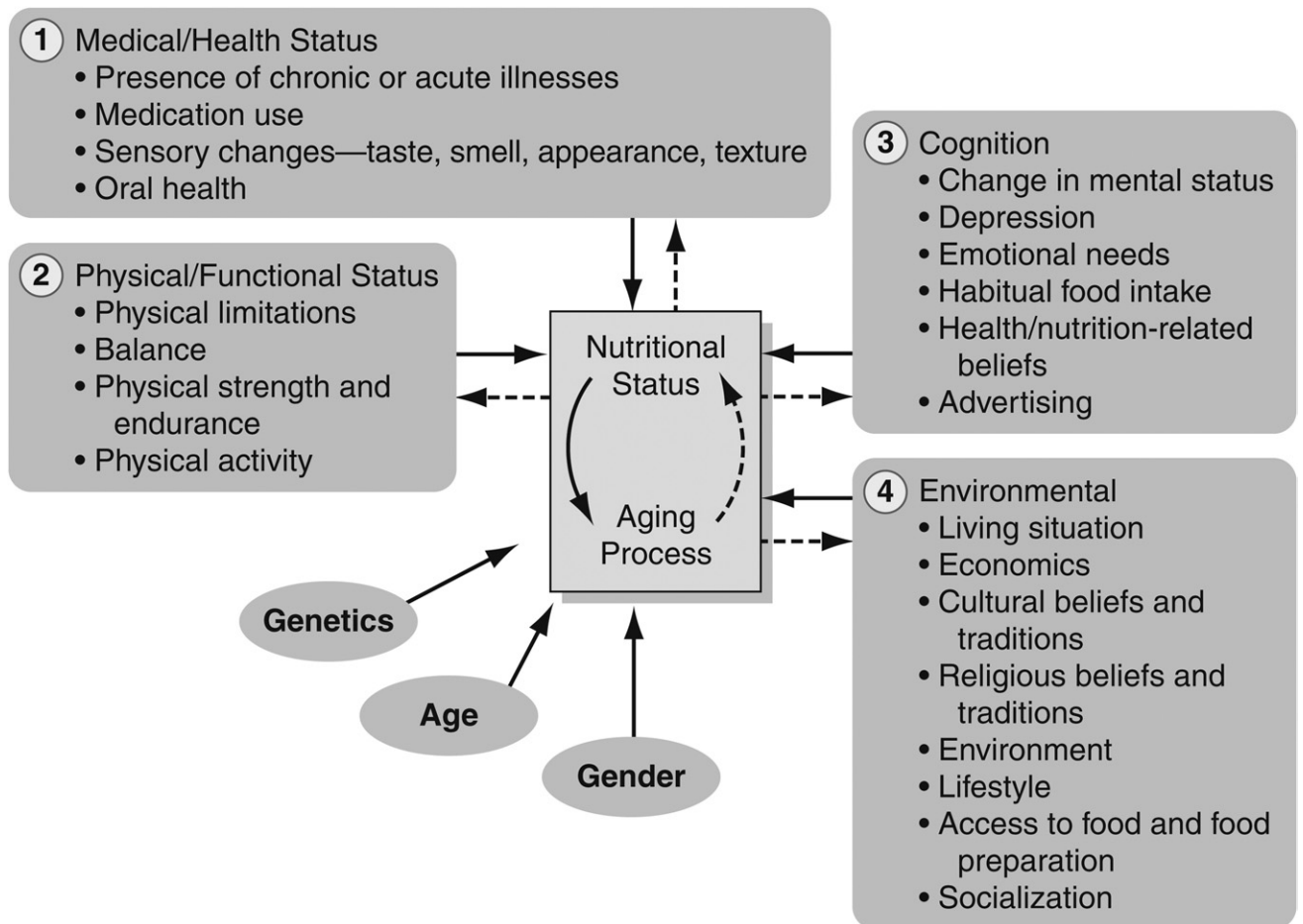
netic predisposition to long life for some individuals, healthy dietary habits, regular physical activity, avoidance of tobacco products, and maintenance of a healthy body weight all appear to have a favorable influence on genetic predispositions toward long life.

## HEALTH DISPARITIES AND NUTRITION-RELATED HEALTH CONDITIONS

Many older adults have at least one or more chronic health condition. The most frequently occurring conditions among older adults are shown in Table 2. The main goal for older adults in Healthy People 2020 is to "improve the health, function and quality of life."<sup>12</sup> Disparities in health are believed to be the result of complex interaction among genetic variations, environmental factors, and cultural and health behaviors. Inequities in access to health care, income, and poverty, as well as food security also contribute to health disparities among older adults. Differences in rates of physical activity also exist, with minority populations engaging in lower rates of physical activity.<sup>12</sup> However, despite improvements in the overall health of the US population, racial and ethnic health disparities continue to persist between whites and African Americans, for example (Table 2). The ability of RDs to effectively reduce the burden of illness among older racial/ethnic minority adults will depend on an increased understanding of environmental and lifestyle factors in individuals of various races and ethnicities and how those factors interact with biological and physiological aging processes.<sup>13</sup> Interventions tailored to the culture, language, and age group of the target population are key strategies to increase the effectiveness of programs designed to improve food security of older adults with limited resources.<sup>14</sup>

### Health Care, Income, and Poverty

Inequalities in access to medical care resources, income, and poverty can result in health disparities. Minorities are more likely to report that they have no usual source of medical care or that they were unable to obtain or were delayed in receiving needed medical care.<sup>7</sup> In 2010, an estimated 3.5 million elderly persons (9.0%) were below the poverty level; another 2.1 million older



**Figure 1.** Factors that influence health-related quality of life and the aging process. Figure from reference 24: Bernstein MA, Luggen AS. *Nutrition for Older Adults*. 2010: Jones & Bartlett Learning, Sudbury, MA. [www.jblearning.com](http://www.jblearning.com). Reprinted with permission.

adults were considered “near poor” (<125% of the poverty level). Rates were higher among minority older adults, and older women.<sup>7</sup> Almost 16% of persons aged 65 years and older were poor in part due to medical out-of-pocket expenses.<sup>15</sup> In general, population groups with the worst health status are also those with the highest poverty rates.<sup>16</sup> This can be attributed to food insecurity, limited access to medical care, and decreased opportunity to engage in health-promoting behaviors such as physical activity.

### Hunger and Food Insecurity

Hunger and food insecurity are definite issues for a portion of community-residing older adults, placing them at risk for poor nutritional status and deteriorating physical and mental function.<sup>17,18</sup> Food insecurity occurs whenever the availability of nutritionally adequate and safe food, or the ability to acquire foods in so-

cially accepted ways, is inadequate or uncertain.<sup>17</sup> The level of food insecurity among older adults in the United States varies considerably.<sup>18</sup> Food insecurity is more prevalent in older adults with incomes below the poverty line, population subgroups such as blacks and Hispanics and those who live in rural areas, rent their homes, are less educated, are disabled, have a grandchild living in the house, and participants in the Supplemental Nutrition Assistance Program (SNAP).<sup>19</sup>

### FOOD AND NUTRITION IN HEALTH AND DISEASE

Food is an essential component of everyday life. Meals add a sense of security, meaning, and structure to an older adult’s day, providing feelings of independence and control and a sense of mastery over his/her environment.<sup>20</sup> Assessment of dietary patterns from participants in the Health, Aging, and

Body Composition study found that in older adults a diet consistent with current guidelines, including relatively high amounts of vegetables, fruits, whole grains, poultry, fish, and low-fat dairy products may be associated with superior nutritional status, quality of life, and survival.<sup>21</sup> Food habits of older adults are determined not only by lifetime preferences and physiologic changes but also by such factors as living arrangements, finances, transportation, and disability. The positive psychological and social aspects of eating are important pleasures of life. When planning the care of older adults, RDs and DTRs must acknowledge that food habits make a significant contribution to well-being.

### Changes in Nutrient Needs with Age

Health, physiologic, and functional changes that occur with aging affect nutrient needs. Knowledge of the nutrient

requirements of older adults is growing, yet in some instances inadequately investigated to establish standards. Specific dietary recommendations for energy and several essential nutrients and food components, such as dietary fiber, have been delineated in the Dietary Reference Intakes (DRIs).<sup>22</sup> The DRIs include the age categories 51 to 70 years and >70 years, and although chronological age is used as an indicator, actual nutrient requirements may be wide-ranging in this population. Chronological age categories may be useful for many purposes such as assessing current and planning future nutrient intakes related to both the diet of an individual and of groups. The precise nutrition needs of an older adult at any age are multi-factorial because of the high diversity within this population. The MyPlate for Older Adults icon illustrates the recommendations of the 2010 Dietary Guidelines for Americans (DGA) and MyPlate specially tailored to older adults by emphasizing topics such as adequate fluid; convenient, affordable, and readily available foods; and physical activity.<sup>23</sup>

A decrease in food intake by an older adult can have overlapping causes and far-reaching effects. Older adults often have multiple medical conditions requiring them to alter their dietary intake and use numerous prescription and over-the-counter medications that can impair food intake or alter digestion, absorption, metabolism, and excretion. Barriers to the consumption of a healthy diet can be attributed to social factors, economic hardships, functional difficulties while shopping for or preparing foods, changes in mental ability, as well as physiologic alterations in taste sensations, a decline in olfactory function, difficulty chewing and swallowing, and changes in digestion and absorption.<sup>24</sup> Physiologic changes may occur naturally with aging, as a result of disease, or as a side effect of medication use. Changes in body composition or physiologic function that occur with age may also have a direct influence on nutrient requirements. Reductions in muscle mass, bone density, immune function, and nutrient absorption and metabolism may make it difficult for older adults to meet nutrition requirements, especially when energy needs are reduced.

Rank	Cause of death
1	Heart disease 479,150
2	Malignant neoplasms 391,035
3	Chronic lower respiratory disease 117,098
4	Cerebrovascular disease 109,238
5	Alzheimer's disease 78,168
6	Diabetes mellitus 48,944
7	Influenza and pneumonia 43,469
8	Nephritis 40,465

**Figure 2.** Top eight leading causes of death for adults aged  $\geq 65$  years in 2009. Adapted from reference 4: 10 leading causes of death by age group, United States—2009. National Vital Statistics System, National Center for Health Statistics, Centers for Disease Control and Prevention website. [www.cdc.gov/Injury/wisqars/pdf/10LCD-Age-Grp-US-2009-a.pdf](http://www.cdc.gov/Injury/wisqars/pdf/10LCD-Age-Grp-US-2009-a.pdf). Accessed June 28, 2012.

**Energy**

Total and resting energy requirements decrease progressively with age.<sup>25</sup> Although the decline in energy requirement with advancing age is multifactorial, it can be attributed in a large part to decreases in physical activity. Physical inactivity that accompanies advancing age lowers energy requirements directly by reducing energy expenditure and leads to a decline in basal metabolic rate due to losses of lean mass. Loss of skeletal muscle, as well as gains in total body fat and visceral fat content continue into late life.<sup>26</sup> The main determinant of energy expenditure is fat-free mass in sedentary individuals, which declines by about 15% between the third and eighth decade of life. When energy needs decline with age, individuals often do not make a comparable reduction in energy intake leading to an increased body fat content.<sup>27</sup>

A lower energy requirement represents a challenging nutrition situation for older adults because vitamin and mineral needs often remain constant or may even increase for many nutrients.<sup>28,29</sup> Consuming a diet that meets

nutrition requirements without exceeding energy requirements poses an additional challenge for older adults and requires limiting discretionary energy intake. Recent evidence on dietary trends is concerning. Usual intake for a large percentage of older adults aged 51 to 70 years and those  $\geq 71$  years was below the minimum recommended amounts, especially for the nutrient-rich food groups.<sup>30</sup> More than 90% of persons aged 51 to 70 years and >80% of persons aged  $\geq 71$  had intakes of empty energy that exceeded the discretionary energy allowances.<sup>30</sup> This imbalance creates a nutritionally difficult situation where food and dining experiences contribute significantly to quality of life and overall health in older age yet may require more close attention than at any other stage of life. RDs working with this population have the unique challenge to help older adults balance nutrient requirements for overall health and well-being.

**Other Nutrients**

**Fluid.** The Adequate Intake for water from food and beverages is set at a level

**Table 1.** Population projections by race and ethnicity for persons aged  $\geq 65$  y and  $\geq 85$  y and percent of the population: 2010-2050<sup>a</sup>

Census year	Total - all races <sup>b</sup>		Hispanic		Non-Hispanic white		Non-Hispanic black		Non-Hispanic American Indian and Alaskan Native		Non-Hispanic Asian		Non-Hispanic Native Hawaiian and Pacific Islander		Non-Hispanic with 2 or more races	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
2010 $\geq 65$ y	40,228,712		2,857,619	7	32,243,428	80	3,322,859	8	200,323	<1	1,318,961	3	33,235	<1	252,287	<1
2010 $\geq 85$ y	5,751,299		304,702	5	4,901,877	85	387,090	7	17,300	<1	111,819	2	2,525	<1	25,986	<1
2050 $\geq 65$ y	88,546,973		17,514,734	20	51,771,738	58	9,942,696	11	645,537	<1	7,434,131	8	170,040	<1	1,068,097	1
2050 $\geq 85$ y	19,041,041		2,871,224	15	12,825,427	67	1,880,860	10	133,826	<1	1,127,644	<1	27,916	<1	174,144	<1

<sup>a</sup>Compiled by the US Administration on Aging using the census data noted. Source: 2008 national population projections. Administration on Aging website. [www.aoa.gov/AoARoot/Aging\\_Statistics/Minority\\_Aging/index.aspx](http://www.aoa.gov/AoARoot/Aging_Statistics/Minority_Aging/index.aspx). Accessed July 30, 2011.

<sup>b</sup>Total population for all ages during 2010: 310,232,863; anticipated for 2050: 439,010,253.

**Table 2.** Frequently occurring health conditions among older persons

Condition	All older adults <sup>a</sup> (%)	African-American older adults <sup>b</sup> (%)
Hypertension	71	84
Diagnosed arthritis	49	53
All types of heart disease	31	27
Sinusitis	14	15
Diabetes	18	29
Cancer	22	13

<sup>a</sup>Source: Profile of older Americans 2010. Health and health care. Administration on aging website. [www.aoa.gov/AoARoot/Aging\\_Statistics/Profile/2010/14.aspx](http://www.aoa.gov/AoARoot/Aging_Statistics/Profile/2010/14.aspx). Accessed June 7, 2012.

<sup>b</sup>>Source: A statistical profile of black older americans aged 65+. Administration on Aging website. [www.aoa.gov/AoARoot/Aging\\_Statistics/Minority\\_Aging/Facts-on-Black-Elderly-plain\\_format.aspx](http://www.aoa.gov/AoARoot/Aging_Statistics/Minority_Aging/Facts-on-Black-Elderly-plain_format.aspx). Accessed May 5, 2011.

intended to replace normal daily losses and prevent the effects of dehydration<sup>31</sup>; however, the recommended intake is frequently not met by many older adults. Dehydration, a form of malnutrition, is a major problem in older adults, especially persons aged  $>85$  years and institutionalized older adults. Both physiologic changes and factors leading to decreased fluid intake contribute to the risk of dehydration with advancing age. The kidneys' decreased ability to concentrate urine, blunted thirst sensation, endocrine changes in functional status, alterations in mental status and cognitive abilities, adverse effects of medications, and mobility disorders are commonly reported risk factors for dehydration in older adults. Fear of incontinence and increased arthritis pain resulting from numerous trips to the toilet may interfere with consumption of adequate fluid intake. Dehydration can result in constipation, fecal impaction, cognitive

impairment, functional decline, and even death.

**Fiber.** National surveys of dietary intake consistently find that the dietary fiber intake of older adults is lower than recommended levels.<sup>32</sup> To meet carbohydrate recommendations as well as limit discretionary energy intake, older adults should choose a variety of fiber-rich fruits, vegetables, and whole grains.<sup>33</sup> In addition to providing nutrients such as vitamins, minerals, and antioxidants, fiber provides benefits such as improved gastric motility, improved glycemic control, and reduced cholesterol. Foods low in fiber are frequently inferior in nutrient composition and contribute to discretionary energy intake thereby decreasing the nutrient density of the diet placing older adults at risk for malnutrition and obesity.

Frail older adults and those with poor appetite and anorexia need to be eval-

uated carefully so that a high-fiber diet does not lead to excess satiety. This could result in decreased overall food consumption thereby limiting nutrient intake and contributing to difficulty maintaining appropriate body weight or compromised nutritional status. When making recommendations regarding the fiber content in the diet of an older adult, fluid intake must be appropriately assessed and guidelines for adequate fluid should accompany those for dietary fiber.

**Protein.** Regular consumption of high-quality proteins can be challenging for older adults with limited resources, reduced appetite, and physical and environmental limitations.<sup>34</sup> Physiologic changes and reduced lean body mass leads to decreases in total body protein and contributes to increased frailty, impaired wound healing, and decreased immune function with advancing age. The question of whether or not dietary protein needs change with advancing age is subject to scientific debate.<sup>35</sup> Comprehensive short-term nitrogen balance studies suggest that the requirement for dietary protein is not different between apparently healthy younger and older adults, and for most older adults the Recommended Dietary Allowance (RDA) of 0.8 g/kg body weight daily is adequate to meet minimum dietary needs.<sup>36</sup> Although the role of dietary protein in the prevention of sarcopenia remains unclear,<sup>37</sup> a protein intake moderately greater than that amount may be beneficial to enhance muscle protein anabolism and reduce progressive loss of muscle mass with age.<sup>35</sup> Some experts suggest that a

protein intake of 1.0 to 1.6 g/kg daily is safe and adequate to meet the needs of healthy older adults.<sup>38,39</sup>

Despite the possibility for increased protein needs, dietary data suggest that dietary protein intake declines with advancing age.<sup>40</sup> Protein undernutrition can contribute to sarcopenia and morbidity.<sup>35</sup> Although potential differences in the efficiency of protein utilization may exist, aging does not impair the ability to synthesize muscle protein after consumption of high quality protein-rich food or a high quality protein meal and resistance exercise.<sup>41,42</sup> There is evidence to suggest, however, that in both young and old adults the upper limit on how much protein can be used for muscle synthesis at a single meal is approximately 30 g.<sup>43</sup> Therefore, some experts now recommend that older adults aim to consume between 25 and 30 g high-quality protein at each meal.<sup>44</sup> For many older adults this primarily means including a high-quality protein source at each meal throughout the day, as recommended in the US Department of Agriculture's (USDA's) MyPlate food guidance system.<sup>45</sup> RDs working with older adults have the opportunity to encourage dietary modifications that optimize protein synthesis and reduce the consequences of sarcopenia.

**Vitamin D and Calcium.** Among their numerous benefits, adequate vitamin D and calcium are best known for their crucial role in the prevention and delay of the progression of osteoporosis. Recently the role of calcium and vitamin D in other health outcomes such as cancer, heart disease, diabetes, and immunity has received much attention. DRIs were based on evidence that supports the role of calcium and vitamin D in bone health but not other health conditions. In addition, the Institute of Medicine cautions that some research indicates that too much of these nutrients may be harmful.<sup>46</sup>

The Surgeon General's report on bone health and osteoporosis recommendations include consuming recommended amounts of calcium and vitamin D, maintaining a healthful body weight, and being physically active, along with minimizing the risk of falls.<sup>47</sup> However, adequate intake of calcium and vitamin D are difficult to achieve from food alone. Historically,

calcium and vitamin D from dietary or supplement sources have been the major therapeutic focus for bone health.<sup>48</sup>

Other nutrients such as protein, vitamins A and K, magnesium, and phytoestrogens are also involved in bone health, and research continues to expand the understanding of the roles of these nutrients in bone health of apparently healthy and frail older adults.<sup>49,50</sup>

**Vitamin B-12 and Folic Acid.** An estimated 6% to 15% of older adults have vitamin B-12 deficiency and approximately 20% are estimated to have marginal status.<sup>51</sup> Levels of vitamin B-12 are commonly low as a result of malabsorption due to pernicious anemia, lack of intrinsic factor and atrophic gastritis, and in some cases poor diet. The well-recognized complications of vitamin B-12 deficiency include macrocytic anemia and neurologic complications affecting sensory and motor function. However there are also a number of more subtle effects, including osteopenia, neurocognitive impairment, and increased vascular disease risk associated with elevated homocysteine levels that have also been identified.<sup>52</sup>

Since the 1998 folic acid fortification of cereal grain products and ready-to-eat cereals, these foods can now contribute a significant amount of folic acid to the diets of older adults. When the intake of folic acid-fortified foods is combined with supplements containing folic acid, excessive levels may be consumed. Folic acid intake in excess of the tolerable upper intake level may mask the diagnosis of a vitamin B-12 deficiency. Even at subclinical levels of deficiency, older adults may have changes in their mental status, which can be overlooked or attributed to normal aging. Further research is needed to investigate the efficacy and benefits of fortification of flour with vitamin B-12 in older adults.<sup>52</sup>

Six questions on vitamin D and vitamin B-12 and older adults have been answered as part of the Academy of Nutrition and Dietetics systematic Evidence Analysis Process. Conclusion statements can be found in the article, "Position of the American Dietetic Association: Nutrient Supplementation"<sup>53</sup> and the detailed search plan, results, information on the process, and how they were reached are available at the Academy's Evidence Analysis Library

(EAL) website: [www.andevidencelibrary.com](http://www.andevidencelibrary.com).

## Antioxidants

The formation of oxygen free radicals during normal cellular metabolism and as a result of environmental factors can have a dramatic effect on the aging process. Some phytochemicals, such as carotenoids and flavonoids, as well as antioxidant vitamins and minerals, reduce oxidative stress that contributes to disease pathogenesis. Dietary antioxidant intake is associated with lower prevalence of degenerative diseases and maintenance of physiologic functions in older adults. Community-dwelling older women with higher serum carotenoid concentrations have lower mortality.<sup>54</sup> When assessing carotenoid intake, living environment should be evaluated because older community-dwelling women with lower neighborhood socioeconomic status have been found to have lower serum carotenoid concentration.<sup>55</sup>

**Antioxidants and Vision.** Cataracts and age-related macular degeneration (AMD) are common causes of blindness in older adults. Higher intakes of phytochemicals may help to prevent or delay the development and progression of cataracts and AMD.<sup>56</sup> Adequate intakes of carotenoids, especially lutein and zeaxanthin, in the form of whole foods such as fruits and vegetables or supplements, increases serum concentrations and also concentration in the macular pigment density, and therefore have been investigated for their role in the prevention, progression, and treatment of AMD.<sup>57</sup>

- **EAL Question:** *What is the relationship between antioxidants and prevention of AMD in older adults?*  
**EAL Conclusion Statement:** Regarding the development of AMD, findings from studies of antioxidant intake below or above RDA levels are inconclusive. Further research is needed, given the risks of oversupplementation.<sup>58</sup> **Grade II.**
- **EAL Question:** *What is the relationship between antioxidants and progression of AMD in older adults?*  
**EAL Conclusion Statement:** The results of one large trial (Age-Related Eye Disease Study) in the United States found a beneficial effect of beta-carot-

tene, vitamin C, vitamin E, lutein, zeaxanthin, zinc, and copper supplementation on delaying progression of advanced AMD. However, studies published since that time reported inconclusive findings. Further research is needed, given the risks of over supplementation.<sup>58</sup> **Grade II.**

**Antioxidants and Cognition.** Antioxidants are thought to confer benefits in the pathogenesis of cognitive impairment and Alzheimer's disease by protecting against damage to the brain resulting from oxidative stress.<sup>59</sup> Therefore, antioxidant nutrient deficiencies in older adults may exacerbate pathological processes leading to cognitive impairment and/or Alzheimer's disease.<sup>60</sup> Although a wide variety of antioxidant nutrients are available in foods, many studies have focused on single-antioxidant vitamin supplements.<sup>61</sup> Findings from epidemiologic studies have not yielded consistent results.<sup>62</sup> A balanced combination of antioxidant nutrients, which may reduce the potential adverse consequences of over supplementation, may be necessary to have a significant effect on the prevention of cognitive decline and dementia in older adults.<sup>63</sup>

- **EAL Question:** *What is the relationship between antioxidants and cognition in older adults without cognitive impairment?* **EAL Conclusion Statement:** Although studies on healthy older adults consuming recommended levels of antioxidants generally reported no association with impaired cognitive function, studies regarding antioxidant intakes below recommended levels reported an association with cognitive decline. Research on antioxidant intakes at supplemental levels are inconclusive; conflicting results may be due to genetic factors and prior nutrient deficiencies. Further research is needed in this area.<sup>58</sup> **Grade II.**
- **EAL Question:** *What is the relationship between antioxidants and cognition in older adults with diagnosed cognitive impairment or Alzheimer's disease?* **EAL Conclusion Statement:** Compared with healthy older adults, intakes of all nutrients may be lower in

older adults with diagnosed cognitive impairment or Alzheimer's disease; however, it is unclear whether low levels of nutrients precede or are the consequence of cognitive impairment. In addition, antioxidant intake at supplemental levels demonstrated no difference in the delay of cognitive decline. Additional research is needed in this area.<sup>58</sup> **Grade II.**

Based on these conclusion statements, the following are recommendations for RDs related to antioxidants and older adults.

- **EAL Recommendation: Encourage DRIs for all older adults.** For all older adults, RDs should encourage food intake meeting the DRIs (or other recommended levels) for antioxidant vitamins and minerals and recommend a multivitamin if food intake is low. Studies regarding antioxidant intakes below recommended levels reported an association with cognitive decline; however, research regarding AMD was inconclusive.<sup>64</sup> **Rating: Strong, Imperative.**
- **EAL Recommendation: Collaborate with others regarding treatment of diagnosed AMD.** For older adults with diagnosed AMD, RDs should collaborate with others on the inter-professional team (eg, physicians, ophthalmologists, pharmacists, and other health care professionals) to determine whether an older adult would benefit from high-dose supplementation of antioxidants, because some formulations have side effects and contraindications. A systematic Cochrane review reported that the results of one large trial (Age-Related Eye Disease Study) in the United States found a beneficial effect of antioxidant (beta carotene, vitamin C, and vitamin E), lutein/zeaxanthin and zinc and copper supplementation on delaying progression of advanced AMD. However, studies published since that time report inconclusive findings.<sup>64</sup> **Rating: Strong, Conditional.**
- **EAL Recommendation: Advise against antioxidants for treat-**

**ment of diagnosed cognitive impairment/Alzheimer's disease.** For older adults with diagnosed cognitive impairment or Alzheimer's disease, RDs should advise against antioxidant supplementation, because it has not been shown to have an effect and some formulations have side effects and contraindications. Findings from studies of antioxidant intake above RDA levels in subjects with diagnosed cognitive impairment or Alzheimer's disease demonstrated no difference in the delay of cognitive decline. These findings were substantiated by one systematic Cochrane review.<sup>64</sup> **Rating: Strong, Conditional.**

### Actual Dietary Intake of Older Adults vs Recommendations

Both cross-sectional and longitudinal studies document that the quantity of food and energy intake decreases substantially with age. With the decrease in energy intake, there is a concurrent decline in micronutrient intakes, especially calcium, zinc, iron, and B vitamins. Most Americans, older adults included, consume foods that are high in fats and added sugars at the expense of the recommended more nutrient-dense food groups.<sup>65</sup> The mean Healthy Eating Index-2005 score for persons aged  $\geq 65$  years participating in the Chicago Health and Aging Project was 61.2 out of 100, indicating that their diets needed improvement.<sup>66</sup> Specifically, older adults are at risk for not meeting the RDA or Adequate Intake values for calcium; vitamins D, E, and K; potassium; and fiber while possibly overconsuming folate and sodium.<sup>67</sup>

The consequence of the cumulative effect of a lifetime of poor dietary choices has a dramatic influence on health and quality of life. Older adults who follow a dietary pattern of high-fat dairy products and sweets and desserts have a higher risk of mortality than those that followed a healthy dietary pattern.<sup>21</sup> On the other hand, dietary patterns consistent with current recommendations to consume relatively high amounts of vegetables, fruit, whole grains, poultry, fish, and low-fat dairy products is associated with superior nutritional status, more favorable levels of selected nutritional biomarkers, more years of healthy life, and survival in

older adults.<sup>21</sup> Additional dietary studies also support these findings. The Dietary Approaches to Stop Hypertension (DASH) diet has been shown to have a positive effect on both systolic and diastolic blood pressure.<sup>68</sup> Adherence to the Mediterranean diet, which shares many of the characteristics with the DASH diet, is associated with a reduction in total and cardiovascular mortality and inversely associated with systolic and diastolic blood pressure.<sup>69,70</sup> In community-dwelling older adults, those who follow a Mediterranean-style diet pattern high in vegetables and fish have been shown to have slower cognitive declines.<sup>66</sup>

**Fruits and Vegetables.** The recommendation to consume fruits and vegetables to lower risk of chronic diseases continues to be a key component of dietary guidance.<sup>71</sup> The protective effects of fruits and vegetables in the prevention and treatment of chronic and degenerative diseases have been extensively investigated.<sup>72</sup> Although the recommendation to eat more fruits and vegetables applies to all Americans aged  $\geq 2$  years,<sup>71</sup> the benefit of a diet high in fruits and vegetables is underscored in older adults. Higher consumption of fruit and vegetables is considered to be a marker for an overall healthier diet.

Numerous barriers to the regular consumption of fruits and vegetables exist in older adults. Financial constraints, functional limitations, and difficulty with shopping and preparing foods, problems with teeth and gums, poor fitting dentures could all be obstacles making adherence to fruit and vegetable recommendations challenging in this group. Small increases in fruit and vegetable intake are possible in population subgroups and can be achieved by a variety of approaches.<sup>73</sup> Face-to-face education and counseling, community-based interventions, and telephone and computer-tailored information have been shown to produce successful results in increasing fruit and vegetable intake.<sup>73</sup>

**Sodium.** According to the 2010 DGA, adults aged  $\geq 51$  years are recommended to reduce sodium in their diets to 1,500 mg daily in an effort to lower their risk of high blood pressure and associated consequences.<sup>71</sup> The recommendation for older adults to lower

their daily sodium intake is supported by the Academy of Nutrition and Dietetics and the Food and Nutrition Board of the Institute of Medicine.<sup>74,75</sup> Excess sodium increases the risk of hypertension contributing to heart disease, stroke, and kidney disease. As sodium intake drops, so does blood pressure. Elevated blood pressure from a high salt intake can be blunted by eating more fruits, vegetables, and low-fat dairy products and following the DASH diet as recommended by the 2010 DGA, the American Heart Association, and the National Heart, Lung, and Blood Institute.<sup>71,76</sup> Responsibility to reduce the amount of sodium in the diet of all Americans falls on both the food industry and consumers. Older adults, in particular, have additional challenges when trying to adhere to a low-sodium diet. Those with functional and physical limitations that make meal preparation difficult frequently rely on processed, pre-prepared, and ready-to-eat meals that are often higher in sodium. Changes in taste sensation lead older adults to seek out alternatives to salt to add flavor to their food. Providing home-delivered therapeutic meals that are in accordance with DASH guidelines increases compliance with dietary recommendations in older adults with cardiovascular disease, and may be one avenue for improving dietary intake in this group.<sup>77</sup> RDs and DTRs have the responsibility to help older adults overcome individual barriers so they can consume a diet higher in fruits and vegetables and low in sodium.

Evaluation of dietary patterns of older adults unfortunately reveals that along with many Americans, older adults are not compliant with dietary guidance. Older adults can make and sustain behavior change and in many instances achieve a greater benefit from a given improvement in diet than in younger individuals.<sup>78,79</sup> It is important for older adults to adopt dietary and lifestyle practices that prevent and manage chronic conditions, thereby maximizing their chances for successful aging. Deaths because of poor diet and physical inactivity continue to be a major public health problem for adults of all ages. Consuming a wide variety of foods is considered one of the best ways to ensure balance of nutrients and consumption of appropriate amounts of healthful food components while min-

imizing the effects of potentially harmful substances.<sup>80</sup>

### Other Factors that Influence Food Intake

Lifelong eating behaviors, spiritual and religious beliefs, sociocultural influences, disabilities, caregivers, and living arrangements can have a significant influence on the food intake of older adults. By identifying and accommodating the short- and long-term factors that influence the food and lifestyle choices of older adults, RDs and DTRs can better support their well-being.

**Disability.** Disability is often measured by limitations in performing activities of daily living (ADL) and/or instrumental activities of daily living (IADL). Problems with physical functioning are more frequent at older ages. Forty-two percent of people aged  $>65$  years reported a functional limitation with higher levels of functional limitations in women and those who are poor.<sup>8,81</sup> Certain diseases increase the risk of functional limitations; for example, 20% of stroke survivors, 11% of older adults with diabetes, and 10% of older adults with ischemic heart disease require help performing ADLs.<sup>82</sup> Seven percent of older adults with arthritis require help performing ADLs; however, given the high prevalence of arthritis in this age group (52%), arthritis represents a major burden in terms of the number of older adults in need of assistance.<sup>82</sup> Sarcopenic obesity is independently associated with and precedes the onset of IADL disability in community-dwelling elderly.<sup>83</sup>

**Caregiver/Family.** Caregivers engage in activities that support good nutrition, including shopping; meal preparation; feeding the care recipient; and when required, administration of home enteral nutrition. Caregivers may lack the information and skills needed to adapt a diet to meet recommendations for diet therapy, to modify food consistency if indicated, or to determine the necessity of nutritional supplements. Nutrition education or in-depth nutrition counseling targeted for specific diseases and conditions may be necessary to inform the caregiver. Nutrition information designed to promote good eating practices for the caregiver is also needed.<sup>84</sup> RDs and DTRs can work with



community aging services programs, alerting them to the importance of nutrition for both caregiver and care recipient, making targeted nutrition information messages available, and providing nutrition education and counseling. In addition, caregivers should be given appropriate support and be directed to the necessary resources to provide assistance for older adults.

**Living Arrangements.** Living arrangements can affect diet quality. Approximately 29.3% of noninstitutionalized older adults live alone, including 8.1 million women and 3.2 million men.<sup>7</sup> The result of which is a demand for a range of housing options to meet the individual needs of each older adult. Despite the rapid growth in senior housing and care facilities in recent years, there are still gaps in the service delivery system.

RDs and DTRs play an important role in ensuring that individuals with special dietary restrictions, food beliefs, and disabilities receive optimal nutrition. They can develop and implement programs that address health promotion, chronic disease management, and use of special equipment and assistance devices and technologies related to food shopping, meal preparation, and eating that will enable older adults to maintain their independence. Supplementing traditional, informal care giving with health services such as physical therapists, visiting nurses, and hospice care workers will also allow older adults to remain home longer.

## Malnutrition

Malnutrition in older adults can have numerous interconnected etiologies as well as a wide range of consequences. The consumption of a poor-quality diet can result in inadequate energy and essential nutrient intakes, resulting in malnutrition and worsening of health conditions, frailty, and disability. A key predictor of malnutrition in older adults is loss of appetite. Often referred to as anorexia of aging, food intake and appetite typically decline in older adults, as a result of physiologic, psychological, social, and cultural factors.<sup>85</sup> Physiologic appetite regulation differs in older adults compared with younger persons; for example, older adults exhibit less hunger and earlier satiety. Impaired appetite contributes

to the undernutrition seen in older adults in both community and institutionalized settings. Some other factors identified to be associated with risk or presence of malnutrition in older adults include weight loss, functional dependence, cognitive impairment, loneliness, living without a partner, history of lung or heart disease, and the presence of acute vomiting.<sup>86</sup> Otherwise healthy adults may also have acute or chronic health conditions become increasingly sedentary or experience age-related physiologic changes that can contribute to poor nutrition.<sup>87</sup>

In addition to traditional malnutrition commonly seen in frail, ill older adults, a new nutrition paradox of increasing concern is the presence of nutrient deficiencies and malnutrition in overweight and obese older adults. Long-term consumption of an excessive energy, poor-nutrient diet coupled with age-related decreases in physical activity can lead to overweight, over-fat individuals with reduced muscle mass, functional limitations, and multiple nutrient deficiencies. Medical professionals still often overlook this type of malnutrition. Undernourished but overweight or obese older adults are at additional health risks as a result of their poor nutritional status, increased body weight, and associated degenerative conditions. Choosing a high-quality, nutritious diet that meets dietary recommendations as well as specific nutrition recommendations for any current medical conditions can be a challenging task for older adults and presents a growing responsibility for RDs working with this population.

## Diet Individualization

Older adults who consume a more varied diet have better health outcomes.<sup>80,88</sup> Some individuals will make positive dietary changes following the onset of certain chronic health conditions; however, dietary restrictions associated with chronic diseases can contribute to compromised nutritional status among older adults.<sup>87</sup> A restrictive diet can be unacceptable to older adults and contribute to poor food or fluid intake, leading to undernutrition and poor quality of life and negative health consequences.<sup>89</sup> RDs should use a multifaceted approach that focuses on prevention of malnutrition and maintenance of nutritional well-being.

Interventions that target both the causes and the effects of malnutrition and attempt to break the vicious cycle of worsening health should be encouraged. The benefits and risks associated with dietary restrictions and therapeutic diets for older adults should be considered. Less-restrictive diets that are tailored to each person's needs, desires, and medical conditions can lead to enhanced quality of life and improved nutritional status for older adults living in health care communities.<sup>89</sup>

## Nutrient Supplementation

A large proportion of adults aged  $\geq 51$  years do not consume sufficient amounts of many nutrients from foods alone.<sup>90</sup> When dietary selection is limited, nutrient supplementation with low-dose multivitamin and mineral supplements can be helpful for older adults to meet recommended intake levels. As previously mentioned, of specific concern for older adults are the nutrients consistently found to be deficient in the diet such as antioxidants, calcium, vitamin D, and those for which the digestion, absorption, or metabolism declines with age—such as vitamin B-12. A substantial number of older adults aged  $\geq 75$  years take multiple prescription drugs as well as multiple dietary supplements.<sup>91</sup> Capricious dietary supplementation in older adults can contribute to polypharmacy and thereby increase the likelihood for adverse interactions. It is important that health care professionals ask older adults specifically about their use of dietary supplements, including nutrient, phytochemical, and herbal products. RDs play an important role in counseling older adults on the appropriate use of dietary supplements. The potential influence of a healthy dietary pattern plus appropriate supplement use in MNT and on the maintenance of physical and cognitive function in old age has profound consequences for optimization of health, independence, and well-being.

## Body Weight and Composition

**Involuntary Weight Loss.** Body weight generally increases up until the sixth decade of life, then deteriorating health in combination with a low-quality diet and sedentary lifestyle contribute to worsening health and increased frailty, disability, and functional depen-

dence.<sup>24</sup> Rapid involuntary weight loss and low body mass index (BMI) in older persons are indicative of underlying disease and associated with mortality.<sup>92</sup> Unintended weight loss can result from multiple sources, including medical, pharmaceutical, social, economic, and environmental causes. In older adults unintended weight loss is often associated with poor health outcomes and is a marker for deteriorating well-being.

**Sarcopenia.** Loss of skeletal muscle mass and muscle strength, a process called sarcopenia, is a prominent feature of age-related changes in body composition.<sup>26</sup> Sarcopenia is estimated to affect from 8% to 40% of older adults aged >60 years and approximately 50% in those aged >75 years and cost an estimated \$18.5 billion in health care dollars.<sup>93,94</sup> Although multifactorial in etiology simply, sarcopenia is a complex condition resulting from a number of changes that occur with aging, facilitated in large part by a sedentary lifestyle and nutritional inadequacies.<sup>35</sup> Sarcopenia can set in motion a cascade of consequences, including worsening of disease burden and illness, nutritional inadequacy, and increased disability, functional dependence, and death.

**Obesity.** Obesity in older adults is a complex problem that contributes to higher risk for degenerative diseases as well as age-related declines in health and physical function leading to increased dependence, disability, and morbidity. Dietary excesses and poor food choices in combination with physical inactivity has resulted in a growing number of overweight and obese older adults during the past 2 decades.<sup>8</sup> In 2007-2008, 32% of adults aged  $\geq 65$  years were obese and of those aged  $\geq 75$  years, 27% of women and 26% of men were classified as obese.<sup>8</sup> With longer life expectancy and the growing prevalence of overweight and obesity, the burden of ill health resulting from excess body weight and body fat is likely to continue to increase in the older adult population. Overweight older adults are advised not to gain additional weight.<sup>71</sup>

**Sarcopenic Obesity.** Sarcopenic obesity, the coexistence of age-related loss

of skeletal mass and strength and excess body fat, has also been found to increase in prevalence with advancing age.<sup>95,96</sup> Sarcopenic obesity puts older adults at special risk for adverse outcomes and functional impairment because both predict disability. The predominant features of sarcopenic obesity are deterioration of muscle composition and quality in combination with increased fat mass.<sup>97</sup> The prevalence of both sarcopenia and sarcopenic obesity negatively affect physical functioning and health.<sup>98,99</sup> Excess energy intake, physical inactivity, low-grade inflammation, insulin resistance, and changes in the hormonal environment, as well as peptides produced by adipose tissue, have been implicated in the etiology and pathophysiology of sarcopenic obesity.<sup>95,97</sup>

Obesity and sarcopenia in older adults have been shown to potentiate their effects on disability, morbidity, and mortality.<sup>95</sup> Sarcopenic obesity results in worse physical functional declines than just sarcopenia or obesity alone and has been found to be independently associated with and precede the onset of IADL disability in community-dwelling older adults.<sup>83,96</sup> In addition, sarcopenia and obesity together in older adults have found to be modestly associated with increased cardiovascular disease.<sup>100</sup> Screening to identifying elderly subjects with sarcopenic obesity is clinically relevant and should become more widespread so that effective treatment can be implemented to attenuate the clinical impact of this condition.<sup>95,101</sup> Additional research is needed that addresses changes in body composition on future disability as well as studies that target the prevention and cure of this significant geriatric syndrome.<sup>97,102</sup>

**Assessment of Overweight and Obesity in Older Adults.** The assessment of overweight and obesity in older adults and its relationship with physical function and mortality has been widely investigated. Declines in physical function are reported in older adults who have gained or lost weight, experienced changes in body composition that favor increases in fat mass and declines in muscle mass, have a low or high BMI, or have a higher waist circumference or waist-hip ratio.<sup>64</sup>

Higher mortality has been observed in older adults who have had unintentional weight loss and weight cycling,

and in those with a higher waist circumference and/or waste-hip ratio. Results are conflicting on the relationship of body composition and BMI with mortality. Studies of BMI and mortality suggest that underweight is predictive of mortality, but the relationship of overweight and obesity with mortality in older adults is not as clear.<sup>64</sup> However, the results of one systematic review found an increased mortality in obese older adults.<sup>103</sup>

Energy reserves during time of stress, illness and trauma, protection against osteoporosis, lower risk of falls, and reduced post-fall trauma, may explain some of the observed protective effect seen in studies of overweight and obesity with mortality in older adults. Results could also be complicated by disease burden, health and hydration status, as well as limitations with anthropometric measurements in this population. Studies suggest the influence of obesity on mortality may vary according to age, offering another possible explanation for conflicting findings.<sup>104</sup> Therefore, the protective effects of excess body weight may become apparent as a person ages and the consequences of overweight/obesity shift from a health burden to offering some safeguard against age-related mortality.

- **EAL Question:** *For the assessment of overweight/obesity in older adults, what is the effect of weight change on physical function and mortality?* **EAL Conclusion Statement:** Research reported decreased physical function in subjects who had gained weight (20 lb) and lost weight (10 lb), as well as higher mortality rates for subjects who had unintentionally lost weight (5% to 10% of body weight over a period of 3 to 5 years) and whose weight had cycled. Studies regarding the effects of intentional vs unintentional weight loss on physical function and mortality are limited; further research is needed in these areas.<sup>58</sup> **Grade II.**
- **EAL Question:** *For the assessment of overweight/obesity in older adults, what is the effect of body composition on physical function and mortality?* **EAL Conclusion Statement:** In older adults, stud-

ies demonstrated that muscle mass generally decreases and fat mass generally increases over time, even when weight is stable. Subjects with greater percentage of fat mass had increased risks of disability, mobility limitations, and decreased physical function; research reported higher risks in women, with increasing body fatness compared with men. Research regarding the relationship between body composition and mortality reported conflicting results; more research is needed in this area.<sup>58</sup> **Grade II.**

- **EAL Question:** *For the assessment of overweight/obesity in older adults, what is the effect of BMI on physical function and mortality?* **EAL Conclusion Statement:** Studies reported that subjects with higher BMI had increased risks of disability, mobility limitations, and/or decreased physical function. The evidence linking BMI levels with mortality is mixed; most studies reported a U-shaped relationship with increased mortality at lower and higher BMI levels; however, some studies reported reduced or increased mortality at overweight, obese, and underweight BMI levels. Further research is needed regarding the effect of obesity on mortality.<sup>58</sup> **Grade II.**
- **EAL Question:** *For the assessment of overweight/obesity in older adults, what is the effect of waist circumference or waist-hip ratio on physical function and mortality?* **EAL Conclusion Statement:** Studies reported that subjects with higher waist circumference (>102 cm in men, >88 cm in women) or higher waist-hip ratio, had increased risks of disability, mobility limitations, and/or decreased physical function, as well as an increased risk of mortality.<sup>58</sup> **Grade I.**

Based on these conclusion statements, the following are recommendations for RDs related to weight management for older adults.

- **EAL Recommendations: Considerations for weight management in older adults.** Regardless of age, RDs should consider the following when assessing the

need for weight management through modifications in dietary intake and physical activity in older adults: classification of overweight or obesity, presence of comorbidities, physical function, cognitive function, attitude toward longevity, lifestyle, personal choice, and quality of life. Although studies have demonstrated varying associations between assessment indicators of overweight or obesity and physical function and mortality in older adults, the need for weight loss should be based on input from a physician or geriatrician, RD, qualified exercise specialist, and other members of a health care team and will ultimately be the personal decision made by the older adult.<sup>64</sup> **Rating: Fair, Imperative.**

- **EAL Recommendation: Use multiple assessment indicators for classification of overweight/obesity.** Regardless of client age, RDs should use more than one of the following assessment indicators when classifying overweight or obesity: weight change (and weight history), current (and past) weight, height and BMI, waist circumference, and body composition. More than one assessment indicator should be used, due to the potential limitations of each indicator in older adults, such as sex and ethnic differences in their application. In addition, studies demonstrated that muscle mass generally decreases and fat mass generally increases over time, even when weight is stable.<sup>64</sup> **Rating: Fair, Imperative.**

**Body Weight Management.** The appropriate management of overweight and obesity in older adults is complicated by significant health risks of weight loss in this population. Weight loss in overweight and obese older adults has been shown to affect numerous factors associated with excess weight and confers as much benefit as for younger persons.<sup>71,105</sup> Specifically, weight loss in overweight and obese older adults results in improvements in quality of life, including lower risk of chronic disease and reduced medical

complications, including cardiovascular disease and diabetes risk factors, reduced disability, mechanical burden on weak joints, and frailty, as well as improved physical and lower extremity functioning and mobility.<sup>71,92,96,102,106</sup> Even small amounts (5% to 10% initial body weight) of voluntary weight loss in older adults may be beneficial by aiding in the prevention of adverse health consequences of obesity.<sup>101</sup>

However, even when excess fat mass is targeted, intentional weight loss also accelerates muscle loss that normally occurs with aging, and which has been shown to correlate negatively with functional capacity for independent living.<sup>92</sup> Careful consideration should be given to whether the benefits of weight loss outweigh the risks.<sup>96</sup> A comprehensive nutrition assessment of overweight and obese older adults should consider existing comorbidities, weight history, and potential adverse health effects of excess body weight.<sup>101</sup> In addition to recognizing those for whom weight loss may not be appropriate, obese older adults for whom medically supervised weight loss can be advantageous must be identified so that effective, supportive nutrition care that promotes health and well-being can be provided. The Obesity Society recommends weight-loss therapy on an individual basis that minimizes adverse effects on nutritional status, and muscle and bone loss for those older adults who have medical conditions or functional impairments and would benefit from reduced body weight.<sup>105</sup>

Both weight loss and weight gain or overweight are important nutrition concerns for older adults and present challenges for RDs working with this population. RDs have a role in determining which older adults are appropriate to participate in weight loss programs, designing hypocaloric diets, and encouraging a professionally prescribed physical activity and exercise program and behavior modification plan.<sup>89</sup> Careful attention should be given to protein, fluid, fiber, at-risk micronutrients such as vitamins B-12 and D, and discretionary energy.<sup>96</sup> With their expertise in food and nutrition, RDs and DTRs can be valuable members of a health care team, designing and implementing effective individual and community-based obesity prevention and management programs that mini-

## Strong evidence

- Lower risk of early death, coronary heart disease, stroke, high blood pressure, adverse blood lipid profile, type 2 diabetes, metabolic syndrome, and colon and breast cancer
- Prevention of weight gain and falls
- Weight loss, particularly when combined with reduced energy intake
- Improved cardiorespiratory and muscular fitness
- Reduced depression
- For older adults: better cognitive function

## Moderate to strong evidence

- For older adults: better functional health
- Reduced abdominal obesity

## Moderate evidence

- Lower risk of hip fracture and lung and endometrial cancers
- Weight maintenance after weight loss
- Increased bone density
- Improved sleep quality

**Figure 3.** Health benefits associated with regular physical activity for adults and older adults. The US Department of Health and Human Services Physical Activity Guidelines Advisory Committee rated the evidence of health benefits of physical activity as strong, moderate, or weak. To do so, the committee considered the type, number, and quality of studies available, as well as consistency of findings across studies that addressed each outcome. The committee also considered evidence for causality and dose response in assigning the strength-of-evidence rating. Adapted from reference 111.

mize the adverse consequences of obesity and sarcopenic obesity.

## Physical Activity

Regular exercise and physical activity provide numerous and far-reaching health benefits to older adults, including minimizing biologic and physiologic changes that accompany advancing age, preventing and decreasing the risk of chronic and degenerative diseases, and providing treatment for common geriatric syndromes and established diseases (Figure 3). In addition to the effects regular physical activity has on age-related morbidity and mortality, progressive resistance training and aerobic exercises can have numerous benefits on nutritional status, including improved energy and nutrient intake.<sup>107,108</sup> Exercise has also been recognized to counteract some of the effects of pharmacotherapy common in older adults such as corticosteroid treatment, depression, alterations in gastrointestinal functioning, and anorexia.<sup>24</sup>

It is well accepted that habitual physical activity and exercise are central in the prevention and treatment of functional decline and frailty at accompany aging. Sarcopenia is best counteracted by metabolic interventions, including improved nutritional intake—specifically adequate high quality protein, antioxidants, and exercise training—in particu-

lar progressive resistance strength training.<sup>35,109,110</sup> Resistance exercise results in a decrease in nitrogen excretion, lowering dietary protein needs. This increased efficiency of protein use may be important for elderly people suffering from sarcopenia, and in such cases dietary protein intake of up to 1.6 g/kg/day protein may help to enhance the hypertrophic response to resistance exercise.<sup>26</sup>

Encouraging physical activity and exercise in older adults can help individuals reach and maintain their highest level of function and health-related quality of life. Recommendations for physical activity in older adults (aged  $\geq 65$  years) are included in the 2010 DGA as specified in the 2008 Physical Activity Guidelines for Americans.<sup>71,111</sup> The main take home message is that all adults even those that are older should avoid inactive lifestyles and regularly engage in various forms of physical activity.<sup>112</sup> Older adults who are regularly physically active may require additional energy, protein, fluids, and micronutrients such as antioxidants, which can be met through appropriate food choices.

Despite all the well-known benefits of regular physical activity, lack of participation among older adults is widespread. Fewer than 5% of adults participate in 30 minutes of physical activity each day and participation in physical activity declines with age.<sup>71</sup> It is impor-

tant to note that frailty and functional disability do not automatically preclude an individual from performing exercise or engaging in regular physical activity; in fact, often these individuals with degenerative conditions and functional disabilities can benefit the most from a carefully planned exercise program by an exercise specialist trained in geriatrics. Along with barriers to nutrition intervention, barriers to regular physical activity unique to older adults should be addressed on an individual basis by a health care team. RDs and DTRs in collaboration with representatives from other health professions can play a role in encouraging culturally appropriate interventions that increase older adults' confidence to overcome barriers to exercise and to achieve realistic fitness outcomes.

## ACCESS TO COORDINATED, COMPREHENSIVE FOOD AND NUTRITION SERVICES

To ensure successful aging in the population, strategies to effect access to coordinated comprehensive food and nutrition services must be considered in the context of the projected population changes. Americans are living longer than ever. Nutrition plays a significant role in the health and well-being of older adults. A healthy diet can reduce cardiometabolic risk factors, such as hypertension, diabetes, and obesity.<sup>113</sup>

A nutrient-dense diet coupled with physical activity helps to reduce the risks for chronic diseases associated with the aging process as well as promoting independence and well-being.

Access to food in sufficient quantity and quality is essential to sustain a healthy life and active lifestyle. Food insecure older adults are of particular concern as they are significantly more likely to have lower intakes of energy and essential nutrients, be in poor or fair health, and have limitations in the activities of daily living.<sup>19</sup> Participation by older adults in food assistance programs can have both nutritional and non-nutritional benefits by reducing or preventing numerous poor outcomes associated with food insecurity such as quality of life, health care expenses, and nutritional adequacy.<sup>114</sup>

### Publicly Funded Programs

Adequate nutrition and food security are important components in supporting healthy aging. To that end, extensive networks of federally funded programs provide food to millions of older adults every year.<sup>115</sup> These programs provide access to nutrient-dense foods and nutritionally adequate meals. They also have the potential to improve nutritional well-being and promote health, functional independence, and quality of life through targeted nutrition screening, assessment, nutrition education, and counseling. There is evidence that these programs seem to improve the nutrient intake of participants.

Well-designed studies can be used to document the positive impact publicly funded programs have on helping older persons remain in their community setting. Figure 4 summarizes services and eligibility requirements of federal food and nutrition programs. A full description of the food and nutrition programs available to older adults is outlined in "Position of the American Dietetic Association, American Society for Nutrition, and Society for Nutrition Education: Food and Nutrition Programs for Community-Residing Older Adults."<sup>115</sup>

### OAA Programs Evidence Evaluation

Originally enacted in 1965, the OAA Nutrition Services Program Title IIIC is charged with decreasing hunger and food insecurity, supporting socializa-

tion in older adults, promoting health and well-being, as well as contributing to the delay of negative health outcomes via the delivery of nutrition and health promotion services.<sup>116</sup> In 2009, through OAA Title IIIC, 149.1 million meals were delivered to 880,135 individuals and 92.5 million meals were served in a congregate setting to 1.7 million program participants.<sup>116</sup> This is an increase from the 241 million meals served in 2008 to 2.6 million people. In 2008, a majority of meals (61%) were served to frail, home-dwelling older adults and the remainder meals were served in congregate settings (39%). Home delivered meals increased by 44% between 1990 and 2008. This increase was attributed to a greater growth in federal funds as well as a greater state focus on increasing services delivered to frail community-dwelling elders.<sup>117-119</sup> Program evaluations completed to date have not met rigorous research standards to measure full efficacy; however, the absence of rigorous research does not equate to absence of effect. Current research reports document presence of positive program results on food and nutrition intake, food security, and clinical outcomes.

- **EAL Question:** *What are the nutrition-related outcomes for older adults who participate in OAA programs?* **EAL Conclusion Statement:** For older adults who participate in OAA programs, nutrition-related outcomes include improved food and nutrient intake, increased consumption of fruits and vegetables, or improved nutritional status. Limited research also reported improved outcomes related to food security or socialization, improved outcomes related to multivitamin supplementation, improved knowledge in food safety and nutrition, and increased physical activity among older adults participating in OAA programs. Continuing research on nutrition-related outcomes related to participation in OAA programs is needed.<sup>58</sup> **Grade II.**
- **EAL Question:** *What is the accessibility and participation in OAA programs by older adults?* **EAL Conclusion Statement:** Limited research reports the importance

of addressing racial, ethnic and religious concerns to increase program accessibility and participation by minority older adults. In addition, studies report that program participation decreases when meals do not meet the dietary recommendations for older adults and for those following therapeutic diets. Further research on accessibility and participation in OAA programs is needed.<sup>58</sup> **Grade II.**

### USDA Evidence Evaluation

Under the adage "No one should go hungry in America" the mission of the USDA's Food and Nutrition Service is to provide access to food, a healthy diet, and nutrition education to millions of Americans daily. In 2009, USDA spent 60% of its operating budget (\$80 billion) to fund the Food and Nutrition Service.<sup>120</sup>

USDA administers community-based food and nutrition assistance programs, including SNAP, the Senior Farmers Market Nutrition Program, the Child and Adult Care Food Program, the Emergency Food Assistance Program, and the Commodity Supplemental Food Program<sup>121</sup> for older adults to have access to food, a healthful diet, and nutrition education.<sup>120</sup> Each program functions as a distinct unit, having its own needs, income, and asset eligibility requirements. Different programs varying by state may target populations such as children and needy families as well as older adults.

- **EAL Question:** *What are the nutrition-related outcomes for older adults who participate in USDA programs?* **EAL Conclusion Statement:** Limited research of older adults who participate in USDA programs report increased calcium intake, improved access to fresh produce, increased fruit and vegetable consumption, stimulated interest in healthy foods, and improved quality of life. Further research on nutrition-related outcomes related to participation in USDA programs is needed.<sup>58</sup> **Grade III.**
- **EAL Question:** *What is the accessibility and participation in USDA programs by older adults?* **EAL Conclusion Statement:** Research reports race and ethnic

Program	Purpose	Services	Eligibility
<b>US Department of Health and Human Services Administration on Aging</b>			
<b>Older Americans Act Title I-VII</b>	Grants to state, tribal, and community programs on aging	Nutrition and other supportive and health services	Age is the sole requirement. There are no income requirements. Targets older adults with economic/social needs.
	Title III Nutrition services to older adults	Congregate and home-delivered meals. Nutrition screening, assessment, education, counseling.	Age is the sole requirement. There are no income requirements. Targets older adults with economic/social needs. Only home bound qualify for home delivered meals.
	Title VI Support tribal and native organizations' aging-related programs and services	Congregate and home-delivered meals; nutrition screening, education, counseling, and other supportive and health services	There are no income requirements. Age is the sole requirement. Age requirement determined by tribal organizations or native Hawaiian program.
Nutrition Services Incentive Program	Provides proportional share to states and tribes of annual appropriation based on number of meals served yearly		
<b>US Department of Agriculture Food and Nutrition Service</b>			
Supplemental Nutrition Assistance Program	Authorizes low-income families to buy food that is nutritionally adequate	Coupons or electronic benefits to purchase bread, cereal, fruit, vegetables, meats, fish, poultry, dairy products, seeds, or plants that produce food for households	US citizens and legal residents who are in need, gross income $\leq$ 130% of the federal poverty level; up to \$2,000 countable resources, \$3,000 if aged 60 y and/or disabled
Food Distribution Program on Indian Reservations	Provides US Department of Agriculture foods to low-income households living on or near Indian reservations. The program provides an alternative for households that do not have access to Supplemental Nutrition Assistance Program offices or authorized food stores.	Provides US Department of Agriculture-purchased foods and nutrition education to recipients	Low income American Indian and non-Indian households on a reservation and families living in approved areas near a reservation. Also includes homes in Oklahoma that have at least 1 person who is a member of a federally recognized tribe. Participants are certified based on income. Recertification occurs every 12 mo; however, elderly and disabled applicants may be qualified for up to 24 mo. Participants cannot participate in Supplemental Nutrition Assistance Program and Food Distribution Program on Indian Reservations during the same month.

**Figure 4.** Summary of federal food and nutrition assistance programs for older adults. Adapted from reference 115.

differences among older adults who participate in USDA programs. Although some eligible subjects believed they did not

need food assistance, others did not know that they were eligible or how to apply for the program. However, subjects with vision or

hearing difficulties, functional limitations, or disabilities had elevated odds of program use. Further research on accessibility and

Program	Purpose	Services	Eligibility
Commodity Supplemental Food Program	Food and administrative funds to states and tribes to supplement diets. Available in 23 states and 2 tribes.	Pregnant and breastfeeding women, mothers up to 1 y postpartum, infants, children aged $\leq 6$ y	Age $\geq 60$ y, $\leq 130\%$ federal poverty guidelines Women, infants, children $\leq 185\%$ federal poverty guidelines
Seniors' Farmers Market Nutrition Program	Grants to states and tribes to provide fresh foods and nutrition services while providing an opportunity for farmers to boost their business	Coupons or vouchers to be exchanged for fresh fruits and vegetables at local farmers markets	Low-income older adults aged 60 y with household income $\leq 185\%$ federal poverty guidelines
Child and Adult Care Food Program	Healthy, nutritious meals for children and adults in day care	Nutritionally adequate meals and snacks	$\leq 185\%$ federal poverty guidelines Children aged $\leq 12$ y, homeless children, migrant children aged $\leq 15$ y Disabled citizens regardless of age $\geq 60$ y, functionally impaired, reside with family members

**Figure 4.** (Continued) Summary of federal food and nutrition assistance programs for older adults. Adapted from reference 115.

participation in USDA programs is needed.<sup>58</sup> **Grade II.**

Although publicly funded programs play a vital role in helping to improve the nutritional status of older adults, access across all communities may be limited in part to availability of programs in all localities, eligibility requirements for participants, perceived social stigma, and limited funding. Less than one third of elderly persons who qualify for the SNAP program participate.<sup>122</sup> Reasons for low participation include: the potential participant was not aware of their eligibility to the program, thinking that they do not need the benefit, unhappy with the dollar amount that they are eligible, the application process is too complex, or believing that there is a stigma attached to receiving aid.<sup>123</sup> RDs and DTRs working in community settings can build partnerships to share information with colleagues and agencies regarding existing programs and resources as well as network to encourage referrals. They must understand the role of the different agencies responsible for food and nutrition programs so they can advocate for a safe and nutritious food supply while encouraging older adults to access existing programs.

Based on the above noted conclusion statements, the following are recommendations for RD related to the OAA and USDA programs for older adults.

- EAL Recommendation: Screen for USDA and OAA program eligibility.** RDs should screen all older adults for eligibility (or refer for screening) in USDA programs and the OAA Nutrition Services Program and identify potential barriers to participation, such as disability, functional impairment, attitude toward program use, and income level. Research reported racial and ethnic differences in program participation, as well as in subjects with vision or hearing difficulties, special dietary needs, functional limitations, or disabilities.<sup>64</sup> **Rating: Fair, Imperative.**
- EAL Recommendation: Encourage participation in USDA and OAA programs.** RDs should encourage eligible older adults to apply for and participate in the following USDA and OAA programs: USDA—SNAP, Senior Farmer's Market Nutrition Program, Child and Adult Care Food Program, Emergency Food Assistance Program, Commodity Supplemental Food Program; OAA—OAA Congregate Nutrition Program, OAA Home Delivered Nutrition Program. Research reported that participation in USDA and OAA programs improved food and nutrient intake, increased fruit and vegetable consumption, stimulated in-

terest in healthy foods, improved quality of life, and improved nutritional status. However, some subjects believed they did not need food assistance and some participants did not know that they were eligible or how to apply.<sup>64</sup> **Rating: Fair, Conditional.**

To aid older adults who may not know they are eligible or how to apply for food assistance programs, RDs and DTRs need to be familiar with USDA and OAA programs. As appropriate, discharge and transfer of nutrition care to community setting ought to include collaboration with and referral to the practitioners that administer these programs. Expert consensus and current research support the benefits of the OAA and USDA programs.

### Ensuring Good Nutrition at Any Age

Federal policy seeks to ensure that older adults in need of extended care have access to a wide range of noninstitutional options.<sup>124</sup> It is said, "today's hospitals are the intensive care units of the past; nursing homes are yesterday's hospitals; assisted living facilities are changing into nursing homes, and home and community-based care are the future nursing homes."<sup>115,125</sup>

The term *continuum of care* suggests that older adults move along a steady evolution from independence to de-

Community and transitional care models	Description
Geriatric Resources for Assessment and Care of Elders (GRACE)	Includes a nurse practitioner and a social worker who cares for low-income elders in partnership with the primary care provider and interdisciplinary team. The team develops an individualized care plan and determines the priority sequence for each component that includes protocols developed for the treatment of 12 targeted geriatric conditions (including protocol for malnutrition and weight loss). <sup>128</sup>
Program of All-Inclusive Care for the Elderly (PACE)	Capitated managed care benefit for elderly persons who use an adult day health center supplemented by in-house and referral services to meet participants' needs. <sup>129</sup> A registered dietitian is an integral member of the team.
The Guided Care Model	Targets older adults with chronic conditions and complicated health needs. Driven by a physician/nurse team and designed to focus on quality of life, improve the efficiency of use of health care resources, and reducing cost. <sup>130</sup>
Patient-Centered Medical Home (PCMH)	Provides comprehensive primary care for people of all ages and medical conditions. Registered dietitians "can be an integral part of the team that provides patient-centered care to individuals through the medical home." <sup>131</sup>
Accountable Care Organizations (ACOs)	New model of care under Health Care Reform (The Affordable Healthcare Act). This model of care is similar to PCMH in that it allows a group of providers to manage and coordinate the care of individual patients. As the recommended model within the framework of health care reform, ACO is perceived as the upcoming model for cost saving and patient care. ACO providers will be held to high quality standards and must secure better patient care and improved health outcomes. If ACOs do not meet the standards set, they will be required to pay back Medicare for failing to provide efficient cost-effective care. The ACO program is scheduled to begin January 1, 2012. <sup>132</sup> Food and nutrition practitioners must take the initiative in identifying ACO networks within their markets and ensure their inclusion within them.
Transitional Care Model (TCM)	This model provides in-hospital planning and home follow-up for older adults with chronic conditions hospitalized for common medical and surgical conditions. The American Geriatrics Society defines this care model as "a set of actions designed to ensure the coordination and continuity of healthcare as patients transfer between different locations or different levels of care within the same location." <sup>133</sup>
Community-based care	A wide range of resources and services is available to older adults in the community. This includes home care, services such as caregiver support, community-based services such as adult day care, home hospitals, and telemedicine; and community-based services that require a change of residence such as assisted living facilities, group homes, and continuing care communities.

**Figure 5.** Community and transitional care coordination models with aims to enable the access to and management of medical and social support services for high-risk populations across different providers and organizations to improve health and quality of life while driving down health care costs.

pendence and death in an organized fashion.<sup>126</sup> Instead, older adults go through declines and improvements in health status and functional capacity as they experience short-term swings from chronic to acute illness and are treated and cured or receive rehabilitative services that restore baseline functional status.<sup>126</sup> Given these fluctuations in conditions, programs and services must be flexible to accommodate change.<sup>126</sup> Medical professionals must understand that older adults have the capacity to recover if suitable services and treat-

ments are provided. Ensuring adequate nutrition services can contribute to restoring health and well-being.

To improve on the current standard of care and effect health care outcomes as well as providing long-term savings to the Medicare program through reducing hospitalizations and eliminating duplicate services, a number of care models that incorporate care coordination have been developed.<sup>127</sup> Refer to Figure 5 for a description of health models for delivering coordinated care.

**MNT and Improved Disease Management**

Diseases linked to unhealthy dietary habits rank among the leading causes of illness and death in the United States.<sup>134</sup> The important cost-effective role that MNT plays in the prevention and management of chronic diseases and conditions has been well documented.<sup>135</sup> Furthermore, the unique education and skills RDs have in helping older adults manage therapeutic nutrition modalities have been recognized.<sup>135</sup> In 2002, MNT became a cov-



Practice setting	Action
Assisted living	<ul style="list-style-type: none"> <li>● Advocate legislative change</li> <li>● Network among dietetic practice groups</li> <li>● Accept cross-functional leadership roles to change the availability of nutrition services and increased use of the dietetic professional</li> </ul>
Clinical setting	<ul style="list-style-type: none"> <li>● Implement a multidisciplinary approach to nutrition care; collaborate with other health professionals to develop, implement, monitor, and evaluate interventions that improve care of older persons and maintain or enhance quality of life</li> <li>● Evaluate the benefits of medical nutrition therapy</li> <li>● Develop case-management guidelines</li> <li>● Assist caregivers with implementation of nutritional interventions</li> <li>● Promote outcomes research validating the RD<sup>a</sup>/DTR<sup>b</sup> influence on positive clinical and quality-of-life outcomes in long-term care, home health</li> <li>● Sensitize interdisciplinary colleagues to terminology (eg, MNT<sup>c</sup>)</li> <li>● Supervise the production and delivery of nutritious meals</li> <li>● Accept cross-functional leadership roles to change the availability of nutrition services and increased use of the dietetics professional</li> <li>● Collaborate with home- and community-based long-term care agencies and programs</li> <li>● Develop individualized nutrition care discharge plans for transitioning to home and community</li> </ul>
Community setting	<ul style="list-style-type: none"> <li>● Expand roles in home care, and play a significant role in preparing individuals for caregiving responsibilities, especially for caregivers of patients receiving home parenteral and enteral nutrition</li> <li>● Initiate nutrition screening and assessment of older adults</li> <li>● Work with other health professionals to expand services to older persons, especially minorities</li> <li>● Create partnerships/coalitions with industry, national aging societies, advocacy organizations, and governmental agencies to promote nutrition, health education, and physical activities that respond to the needs of older adults</li> <li>● Create partnerships/coalitions with older adult organizations to develop programs that ensure quality of life</li> <li>● Advocate legislative changes and influence public policy affecting programs for adults at the local, state, and national levels and take proactive roles in garnering support for strengthened regulations/requirements at federal, state, and local levels</li> <li>● Integrate the nutrition care process into clinical and community nutrition</li> <li>● Work with discharge planners/facility based RDs/DTRs on individualized nutrition care plans from transition to home and community</li> </ul>
Academic setting	<ul style="list-style-type: none"> <li>● Mentor students about the opportunities available working with older adults</li> <li>● Design curriculum that develops critical thinking and effective listening and written and oral communication skills</li> <li>● Strengthen faculty and practitioners expertise in aging through various mechanisms including regional workshops, externships, certificate programs</li> <li>● Create dietetic education supervised practice programs to match the changing environment of health care and community supports for older adults</li> <li>● Design curriculum that addresses nutrition in aging throughout required courses for dietetic majors or develop independent courses focused on nutrition and older adults</li> <li>● Develop multidisciplinary continuing education/distance learning courses for dietitians and other health professionals to disseminate the current information about effective nutrition support and/or education programs targeted to older adults</li> <li>● Educate students on the value of comprehensive food and nutrition services and role of the dietetics professionals</li> <li>● Educate students on the legislative process</li> </ul>
Research	<ul style="list-style-type: none"> <li>● Conduct multidisciplinary research in the following areas:                             <ul style="list-style-type: none"> <li>◦ Identify of the predictors of malnutrition</li> <li>◦ Validate nutrition risk and nutrition-related quality-of-life assessment instruments</li> <li>◦ Develop evidence based practice guidelines and other resource materials for various resident settings</li> <li>◦ Document outcomes of food and nutrition programs using Dietetic Practice Based Research Networks to determine essential nutrient requirements</li> </ul> </li> <li>● Establish references for the evaluation of nutritional status assessment data</li> <li>● Explore relationship of lifestyle changes to quality of health and life for all racial ethnic groups, especially minority older adults</li> <li>● Explore the relationships between nutritional status and health of all racial ethnic groups</li> <li>● Evaluate the impact of food assistance and feeding programs, especially on minority older adults</li> <li>● Document the value (monetary value in health cost savings) of comprehensive food and nutrition services and role of the dietetics professionals</li> <li>● Communicate research findings</li> </ul>
<p><sup>a</sup>RD=registered dietitian.  <sup>b</sup>DTR=dietetic technician, registered.  <sup>c</sup>MNT=medical nutrition therapy.</p>	

**Figure 6.** Actions for food and nutrition practitioners to ensure quality food and nutrition services in promoting health and wellness for the older adult.

ered service through Medicare for patients with diabetes and renal disease. In 2006, the Ryan White Treatment and Modernization Act included MNT as a core medical service. The OAA provides nutrition screening, counseling, and education for OAA meal recipients.<sup>136</sup> Refer to [www.eatright.org/mnt](http://www.eatright.org/mnt) for detailed information on MNT reimbursement through Medicare and Medicaid Services.

**MNT in Home Settings.** A wide range of nutrition care services is provided in the home. The scope of general services includes conducting nutrition assessment, defining the nutrition diagnosis, selecting individualized interventions, including counseling to the management of parenteral nutrition and transition of patients to end-of-life care and monitoring and evaluating the plan of care.<sup>137</sup> In 2007, 68% of people requiring home health care were over the age of 65.<sup>138</sup> The most common primary diagnoses at time of admission were diabetes mellitus (10.1%), heart disease (8.8%), chronic obstructive pulmonary diseases, and essential hypertension (3.3%).<sup>138</sup> Medicare and Medicaid are the main government programs that provide coverage for home health care services. MNT can have an affect in management of these conditions and should be an integral part of the treatment. Unmanaged, these conditions can contribute to the physical and psychosocial decline of older adults. Unfortunately, MNT services are not billable services under Medicare part A. Nutrition therapy services are bundled with other services provided by home care agencies.<sup>137</sup> The Academy's practice paper "Home Care—Opportunities for Food and Nutrition Professionals"<sup>137</sup> provides more details on the financial coverage for nutrition services in home health settings.

Home care settings provide RDs with nutritional, technical, and supportive opportunities for involvement.<sup>137</sup> Cost-effective success stories in providing nutrition services to older adults have been documented.<sup>137</sup> Medicare Part B provides MNT reimbursement for eligible beneficiaries. The health care dollars saved by providing MNT for this population and the value of services performed by qualified food and nutrition practitioners must continue to be promoted. RDs and DTRs can advocate

at the state and local levels to influence policy and improve nutritional well-being of older adults. Data should be collected on nutrition-related health needs, and based on this evidence, suggest appropriate services to their respective state agencies.

**MNT in Residential Health Care Facilities.** Older adults living in residential health care facilities are among the frailest and require skilled nursing care and in-depth, ongoing, individualized nutrition assessments and therapies.<sup>89</sup> With the average length of stay in a nursing home being approximate 845 days, for many elders this is considered their home.<sup>139</sup> Poor health outcomes resulting from malnutrition and dehydration are common problems. Residents have the right to refuse treatment and services, and this has implications for the provision of food and MNT and for maintenance of quality of life. Although residents may be frail, the value of a therapeutic diet must be carefully weighed against its effect on a resident's quality of life.<sup>89</sup> Research supports the association between MNT and improved nutritional status to prevent unintentional weight loss.<sup>136</sup> MNT is strongly suggested for older adults with unintended weight loss. Personalized nutrition care, provided by an RD as part of the health care team, results in better outcomes associated with increased energy, better protein and nutrient intakes, enhanced nutritional status, better quality of life, or weight gain.<sup>140</sup>

### Food and Nutrition Regulations in Assisted Living Facilities

Assisted living facilities provide an alternate housing option for older adults who may need help with ADLs such as dressing, bathing, and eating yet do not require the structured medical services provided by nursing homes.<sup>141</sup> Although the majority of states regulate and inspect basic aspects of food safety on a regular basis, the nature and quality of the food and nutrition services provided to older adults residing in assisted living facilities settings is mostly unknown. The importance of providing MNT services in assisted living facilities remains to be defined.<sup>142</sup>

The scope and depth of regulations defining food and nutrition services provided in assisted living facilities

vary by state. A national survey of 50 states found that 45 had some food and nutrition regulations in place; however, states varied widely in the establishment of standards and level of regulation. Chao and colleagues<sup>142</sup> found variation in the level of foodservice regulation and general nutrition services. Forty of 50 states surveyed required for menus to follow nutrition standards. Wide ranges of nutrition standards are in use, including DRIs, the DGA, and the USDA MyPlate. Twenty-eight states require that facilities offering therapeutic diets must contract with an RD to plan menus and supervise production.<sup>142</sup> Assisted living facilities do not seem to provide the preventive health and nutrition services needed by older adults.<sup>142</sup>

### NUTRITION CARE OUTCOMES AND QUALITY OF LIFE ACROSS THE SPECTRUM OF AGING

Program performance and quality improvement/assurance mechanisms must evaluate older adults' positive health, independence, or quality-of-life outcomes. Nursing homes regularly collect assessment information about their residents' physical and clinical conditions and abilities as well as preferences and life care wishes using the Minimum Data Set assessment. All data collected via the Minimum Data Set assessment is reported to Medicare services. Medicare uses the information to develop quality measures. Data collected to develop quality measures includes information on the percent of long-stay residents who lose too much weight. Quality measures data are shared with the public at large via Nursing Home Compare. The quality measures are based on the best research currently available. As this research continues, scientists will keep improving the quality measures on Nursing Home Compare.<sup>143</sup> Through the implementation of the Nutrition Care Process and Model, RDs incorporate the scientific base that moves MNT from experience-based practice to evidence-based practice.<sup>144</sup> The common language used through the Nutrition Care Process and Model helps format data for comparison with standards or benchmarks, and the results are used to adjust and improve performance as well as supporting decision making regarding the cost and effectiveness of

various food and nutrition services to implement.<sup>144</sup> Older adults with a variety of chronic conditions and illnesses can improve their health and quality of life by receiving MNT.

### OPPORTUNITIES FOR POLICY IMPLICATIONS

Aging is identified as one of the Academy's Legislative and Public Policy Committee priority areas.<sup>145</sup> Nutrition plays a critical role in the prevention and treatment of disease across the spectrum of aging from independent and community-dwelling older adults to frail hospitalized and institutionalized elders.<sup>24</sup> Evidence demonstrates that targeted MNT in the treatment of chronic diseases and conditions prevalent in older adults achieve positive outcomes and reduce health-related costs.<sup>135</sup>

RDs and DTRs have the unique opportunity to be leaders in championing the health and well-being of older adults (Figure 6). Those working directly with older adults must be proactive in demonstrating the value of comprehensive food and nutrition services. The challenge of working with older adults is the heterogeneity of this population. Traditionally RDs and DTRs working with older adults were mainly found in nursing homes and hospitals; however, the scope of practice is expanding. The number of health care professionals specializing in geriatrics, and a well-coordinated delivery system of primary, secondary, and tertiary supportive and medical services across home, community, and acute long-term care settings provide exciting opportunities. Local, state, and national issues and problems affecting service coordination should first be identified. RDs and DTRs can work to change policies through their interdisciplinary orientation. Networking skills that cut across disciplines and bridge service gaps can be used to coordinate and expand the array of nutrition, health, and supportive services available to older adults and their families.

Nutrition care is most effective when it is integrated into comprehensive, interdisciplinary case/care management across all settings (Figure 6). Ideally everyone, especially older adults and their family/caregiver, is involved in the planning and decision making. Nutrition screening and assessment, label-

ing of nutrition diagnosis, planning nutrition interventions, and continuous monitoring and evaluation of the care plan are considered important functions within the interdisciplinary team. The methods of providing food and nutrition services are changing. Information technologies will increasingly influence how nutrition messages and MNT are provided to older adults and how progress is reported to interdisciplinary colleagues and funders.<sup>144</sup> The type of services traditionally provided in acute care facilities is shifting to home and community settings and reaching new audiences. The unique contributions by RDs should be driven by the use of the Nutrition Care Process and Model and evidence-driven nutrition assessment, nutrition diagnosis, nutrition intervention, and outcome evaluation while simultaneously integrating their professional knowledge and experience.<sup>144</sup> Educational experiences that include working with older adults in settings across the spectrum of aging should alert entry-level students to this growth area.

### ONGOING NUTRITION RESEARCH

The influence of diet and physical activity on the health, well-being, and quality of life are a primary interest of scientific investigation regarding older adults. Successful aging is a critical focus of nutrition research with increasing importance as the number of older adults continues to grow. Awareness of the differences in health disparities to ensure nutrition needs are met for all older adults, especially minority and ethnic populations, requires sensitivity to cultural and behavioral individuality. The influences of dietary patterns as well as the independent role of specific nutrients on disease prevention and treatment are areas of significant investigation. Body weight, weight management, and physical activity is an area of current research that has gained significant momentum and continues to expand our knowledge and understanding of the importance of helping older adults reach and maintain a body weight that promotes health and well-being. Prevention of sarcopenia, sarcopenic obesity, frailty, and functional decline and the roles of protein and physical activity also continue to augment the understanding of degenera-

tive disease prevention and successful aging. New dietary and physical activity recommendations for older adults promote an independent and healthy lifestyle; however, the successful implementation of these recommendations in older adults is met by unique challenges and barriers for food and nutrition practitioners to identify and overcome. Outcome research and data collection to determine the effectiveness of federally funded nutrition programs, as well as nutrition services including MNT, and the role of the food and nutrition practitioners in providing care to all older adults must continue to ensure successful delivery of these services.

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