

Position of the Academy of Nutrition and Dietetics: Food Insecurity in the United States



ABSTRACT

It is the position of the Academy of Nutrition and Dietetics that systematic and sustained action is needed to achieve food and nutrition security in the United States. To achieve food security, effective interventions are needed, along with adequate funding for, and increased utilization of, food and nutrition assistance programs; inclusion of nutrition education in such programs; strategies to support individual and household economic stability; and research to measure impact on food insecurity- and health-related outcomes. Millions of individuals living in the United States experience food insecurity. Negative nutritional and non-nutritional outcomes are associated with food insecurity across the lifespan, including substandard academic achievement, inadequate intake of key nutrients, increased risk for chronic disease, and poor psychological and cognitive functioning. Registered dietitian nutritionists and nutrition and dietetics technicians, registered, play key roles in addressing food insecurity and are uniquely positioned to make valuable contributions through competent and collaborative practice, provision of comprehensive food and nutrition education and training, innovative research related to all aspects of food insecurity, and advocacy efforts at the local, state, regional, and national levels.

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POSITION STATEMENT

It is the position of the Academy of Nutrition and Dietetics that systematic and sustained action is needed to achieve food and nutrition security in the United States. To achieve food security, effective interventions are needed, along with adequate funding for, and increased utilization of, food and nutrition assistance programs; inclusion of nutrition education in such programs; strategies to support individual and household economic stability; and research to measure impact on food insecurity- and health-related outcomes.

ACCCESS TO ENOUGH FOOD FOR an active, healthy life is a basic human need and fundamental right. Yet food insecurity, that is, the limited or uncertain availability of nutritionally adequate and safe foods, or limited or uncertain ability to acquire acceptable foods in socially acceptable ways,^{1,2} continues to affect millions of households across the United States.³ In this position paper, food insecurity and its related outcomes, spanning both individual and public health perspectives, highlight the necessity to promote, implement, and evaluate comprehensive approaches to achieve food security.⁴⁻⁶

The negative outcomes associated with food insecurity across the lifespan warrant attention. Multifaceted solutions across multiple sectors are being implemented in an effort to address this preventable public health issue. Food insecurity is being integrated into broader public health discussions and research efforts. For example, Healthy

People 2020 includes two nutrition and weight status–related objectives targeting food insecurity: eliminate very-low food security among children (nutrition and weight status 12) and reduce household food insecurity and, in doing so, reduce hunger (nutrition and weight status 13).

A number of objectives within Healthy People 2020 also emphasize the importance of improving healthy food access.⁷ For the first time, the 2015-2020 Dietary Guidelines for Americans⁸ acknowledged the connection between food insecurity and health outcomes. In its report,⁹ the Advisory Committee encouraged more-robust federal nutrition policies and equity in access to sustainable and healthy environments. This statement emphasizes a deeper understanding of the intimate connection between poor health and household food insecurity. It also reinforces the criticality of addressing food insecurity through holistic approaches to promote optimal health and well-being. Furthermore, in 2013, the Academy of Nutrition and Dietetics' House of Delegates created a Food and Nutrition Security Task Force to help outline and prioritize resources

and action steps specific to the profession. The final Task Force action plan emphasized the importance of addressing food insecurity across several specialties within the dietetics profession from public health to clinical practice.¹⁰

Although the safety, security, and sustainability of the global food and water supply are of utmost importance, other position papers of the Academy of Nutrition and Dietetics focus on these topics.^{11,12} In addition, some Position and Practice Papers include aspects of food insecurity within the scope of the paper.¹³ This Position Paper concentrates on US (domestic) food insecurity as defined by the US Department of Agriculture.¹⁴ Figure 1 summarizes key food-security–related terms.

FOOD INSECURITY: PREVALENCE AND CHARACTERISTICS

As illustrated in Figure 2,³ household food-insecurity rates spiked during the 2008-2011 recession to 14.9% of US households. Since 2011, food-insecurity rates have trended downward, with a cumulative statistically significant decline from 2011 to 2014 and a

Definitions
Food security^{1,14}
Food security for a household means access by all members at all times to enough food for an active, healthy life. Food security includes at a minimum:
<ul style="list-style-type: none"> • The ready availability of nutritionally adequate and safe foods. • Assured ability to acquire acceptable foods in socially acceptable ways (that is, without resorting to emergency food supplies, scavenging, stealing, or other coping strategies).
Food insecurity¹
Food insecurity is the limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways.
US Department of Agriculture Food Security Classifications¹⁴
Food security
<i>High food security:</i> No reported indications of food-access problems or limitations.
<i>Marginal food security:</i> One or two reported indications, typically of anxiety over food sufficiency or shortage of food in the house. Little or no indication of changes in diets or food intake.
Food insecurity
<i>Low food security:</i> Reports of reduced quality, variety, or desirability of diet. Little or no indication of reduced food intake.
<i>Very-low food security:</i> Reports of multiple indications of disrupted eating patterns and reduced food intake.

Figure 1. Food-security–related definitions and classifications.

statistically significant decline from 2014 to 2015. In 2016, 12.3% of all US households (15.6 million households) experienced food insecurity sometime during the year. Of these households,

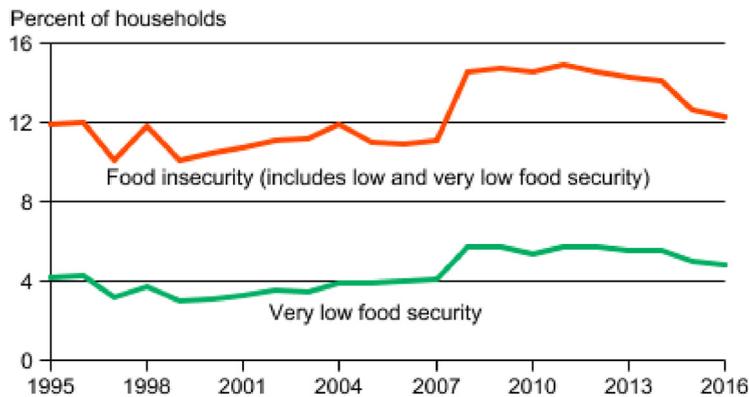
7.4% (9.4 million households) experienced low food security and 4.9% (6.1 million households) experienced very-low food security. Resources to access food-security estimates and trends in

the United States at the national, state, and county levels, as well as related information, are summarized in [Figure 3](#).

Consistent with previous US estimates, the 2016 data indicate that households struggling with poverty experience food insecurity at greater rates than other households.³ In fact, those with incomes below the income-to-poverty ratio (<1.00) were three times more likely to be food insecure (<1.00, 38.3% of households; <1.30, 35.7% of households; and <1.85, 31.6% of households), than the national average (12.3%). Income alone, however, is not the sole factor that contributes to household food insecurity. Characteristics of those who experience food insecurity at rates greater than the national average include households with children (16.5%); households with children and headed by a single female (31.6%) or single male (21.7%); households headed by a black non-Hispanic (22.5%) or Hispanic individual (18.5%); and households located in metropolitan (principal cities) areas (14.2%) or nonmetropolitan (rural) areas (15.0%).³

Although food insecurity remains a concern for many older adults (65

Trends in prevalence rates of food insecurity and very low food security in U.S. households, 1995-2016



Note: Prevalence rates for 1996 and 1997 were adjusted for the estimated effects of differences in data collection screening protocols used in those years.

Source: USDA, Economic Research Service, using data from Current Population Survey Food Security Supplement.

Figure 2. Food-insecurity prevalence trends in the United States.³ USDA=US Department of Agriculture.

years and older), their rates of household food insecurity (7.8% of households with an older adult; 8.9% of households with an older adult living alone) are lower than the national average.³ For seniors living with food insecurity, it is vital to recognize their unique health and social needs and implement targeted programs tailored to this vulnerable population.^{15,16}

Additional insight into food insecurity in the United States is gained from scientific research and studies conducted by organizations that examine segments of the population at risk for, or experiencing, food insecurity. The Feeding America network of food banks and hunger-relief programs, which serves more than 46 million people annually, conducted the 2014 Hunger in America study.¹⁷ Of the 60,000 network client households surveyed, 85% self-identified as food insecure. Of those served by the Feeding America network, 43% self-identified as white, 26% as African American, and 20% as Latino. Overall, this represents 1 in 7 people in the United States, including 1 in 4 African Americans, 1 in 6 Latinos, and 1 in 10 white non-Hispanics in the United States.¹⁷

The US Conference of Mayors Report on Hunger and Homelessness¹⁸ encompassed 32 American cities in 24 states and documented the characteristics of those requesting food assistance to be families (63%), employed (51%), elderly (18%), and the homeless (8%).¹⁸ Almost 14% of the demand for emergency food assistance was unmet across the survey cities.¹⁸ With chronically high poverty rates predicted to remain elevated,¹⁹ it is critical to identify the complex household circumstances that contribute to food insecurity, and implement immediate, sustained, and holistic approaches to achieve food security.

US households experiencing food insecurity are uncertain of having, or unable to acquire, enough food to meet the needs of all household members because of insufficient resources or other barriers to obtaining adequate food.³ Low and very-low household food security are characterized by varying attributes, as summarized in [Figure 1](#). Food insecurity remains distinct from hunger, which is a physiological response leading to physical discomfort associated with a lack of

food.¹⁴ This distinction is important because many coping strategies employed by food-insecure households to avoid the physical sensation of hunger can have both short- and long-term health implications.

Food insecurity is often an episodic, recurrent phenomenon. On average, a household remains food insecure for 7 months out of the year.²⁰ This results in times of the month and years when food is more readily available and accessible than others. Food availability is often unpredictable and cyclical for high-risk households, and this food instability is a distinct and understudied aspect of food insecurity that underlies many of the coping strategies observed in food-insecure households.²¹ Regardless of cause, individuals and households experiencing food insecurity often deploy coping strategies, such as seeking calorically dense and satiating foods that are often nutritionally inadequate, which can limit dietary variety or promote overeating when food is available.²¹ The subsequent risk factors and adaptive behaviors observed among many people struggling with food insecurity explain some of the associated health outcomes discussed here.

FOOD INSECURITY: POTENTIAL CAUSES AND CORRELATIONS

Household food insecurity often stems from limited resources. As such, poverty, underemployment or unemployment, and high housing costs are strongly associated with food insecurity.¹⁸ The literature also demonstrates that food insecurity is often triggered by inflation, food prices, or a specific event that stresses the household budget, such as losing a job or benefits (including Supplemental Nutrition Assistance Program [SNAP]), or gaining a household resident.^{22,23} Tuttle and Beatty²⁴ underscored the vulnerability of low-income households to food insecurity on expected increases in gasoline, natural gas, and electricity prices. A rise in price increases the probability of household food insecurity, and a decrease in prices lowers the probability.²⁴ Food-insecure households must make difficult tradeoffs, such as choosing between buying food and buying or paying for other items or needs, including medication,^{25,26} housing,²⁷ and utilities.^{28,29} Of those

relying on the Feeding America network, 69% report competing demands between paying for food and utilities, 66% between food and medicine/medical bills, and 31% between food and education.¹⁷

Many strategies are used by households experiencing food insecurity to obtain sufficient food resources. These include, but are not limited to, participating in federal food and nutrition assistance programs, obtaining food from charitable or emergency feeding systems (food pantries, soup kitchens, and shelters), gardening fruits and vegetables for home use, hunting/fishing for household food, receiving aid from family and friends, and purchasing less-expensive foods.¹⁷

FOOD INSECURITY: NUTRITIONAL AND HEALTH OUTCOMES AND ASSOCIATIONS ACROSS THE LIFESPAN

Food insecurity is a high priority for public health stakeholders, given its negative impact from both public health and economic perspectives.³⁰ Documented outcomes include physical impairments related to insufficient or inadequate dietary intakes, psychological issues related to a lack of consistent and adequate food access, and sociofamilial disturbances.²³ Across the lifespan, food insecurity often results in disrupted eating patterns that can lead to suboptimal nutritional status.^{27,30-34} These changes in dietary consumption contribute to negative physical and mental outcomes and an increased risk for disease. These nutrition-related health outcomes will be explained in detail in the sections that follow and are grouped according to lifespan.

Food Insecurity and Dietary Intake

Overall, the literature demonstrates that individuals residing in food-insecure households often follow dietary patterns that are inadequate in specific foods and nutrients. These nutritional inadequacies may contribute to malnutrition and increased risk of poor health, chronic disease, and other outcomes.^{33,35} One explanation for variations in consumption between food-secure and food-insecure households may be linked to food expenditures. In 2016,

Program	Website
Resources for food security estimates and trends	
Food Security in the United States	www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us.aspx
USDA ^a Food Atlas	www.ers.usda.gov/data-products/food-environment-atlas.aspx
Feeding America—Map the Meal Gap	http://map.feedingamerica.org
Federal nutrition assistance programs	
Child Nutrition Programs Child and Adult Care Food Program Fresh Fruit and Vegetable Program National School Lunch Program School Breakfast Program Special Milk Program Summer Foodservice Program	www.fns.usda.gov/school-meals/child-nutrition-programs
Food Distribution Programs Child Nutrition USDA Foods Program Commodity Supplemental Food Program Department of Defense Fresh Fruit and Vegetable Program Food Distribution Program on Indian Reservations The Emergency Food Assistance Program USDA Foods Processing	www.fns.usda.gov/fdd/food-distribution-programs
Supplemental Nutrition Assistance Program (SNAP)	www.fns.usda.gov/snap/supplemental-nutrition-assistance-program-snap
SNAP Nutrition Education	www.fns.usda.gov/snap/nutrition-education
The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)	www.fns.usda.gov/wic/women-infants-and-children-wic
WIC Farmers Market Nutrition Program	www.fns.usda.gov/fmnp/wic-farmers-market-nutrition-program-fmnp
Senior Farmers Market Nutrition Program	www.fns.usda.gov/sfmnp/senior-farmers-market-nutrition-program-sfmnp
Other federally funded programs and helpful sites	
Expanded Food and Nutrition Education Program	http://nifa.usda.gov/program/expanded-food-and-nutrition-education-program-efnep
Farm-to-School	www.fns.usda.gov/farmentoschool/farm-school
Community-based programs and other organizations/resources	
Congressional Hunger Center	www.hungercenter.org
Feeding America	www.feedingamerica.org , www.HungerandHealth.feedingamerica.org
Food Recovery (A Citizen’s Guide to Food Recovery)	www.usda.gov/news/pubs/gleaning/content.htm
<i>(continued on next page)</i>	

Figure 3. Resources to access food-security estimates and trends in the United States at the national, state, and county levels, as well as selected food-security–related resources, programs, and organizations.

Program	Website
Food Research and Action Center	www.frac.org
Mazon: A Jewish Response to Hunger	www.mazon.org
Meals on Wheels Association of America	www.mowaa.org/Page.aspx?pid=183
Share Our Strength	www.strength.org
WHY (World Hunger Year)	www.whyhunger.org

^aUSDA=US Department of Agriculture.

Figure 3. (continued) Resources to access food-security estimates and trends in the United States at the national, state, and county levels, as well as selected food-security–related resources, programs, and organizations.

the typical US household spent \$50 per person on food weekly, with a median food-secure household spending 29% more on food than the median food-insecure household.³ Furthermore, nearly 80% of recipients of charitable food programs reported purchasing unhealthy, less-expensive food as a strategy to stretch their food budget. Not surprisingly, people utilizing charitable food sources indicated that fruits, vegetables, lean proteins, and dairy were the most desirable items, foods that are often inaccessible, in terms of both availability and affordability for many people living with food insecurity.¹⁷

Child/Adolescent Health- and Development-Related Outcomes

Although children are typically protected from very-low food security in the United States, food insecurity and subsequent nutritional inadequacy is associated with lower overall dietary quality in children, especially older children.³⁶ Food insecurity has been associated with decreased consumption of vegetables, particularly nutrient-rich, dark green vegetables, among US children.³⁷ In contrast, Lorton and colleagues,³⁸ reported that, although total fruit and vegetable intakes of all US children were below recommended levels, intake did not vary among children from fully food-secure, marginally food-secure, low food-secure, and very-low food-secure households. At the same time, compared with their food-secure counterparts, the proportion of french fries consumed by children and adolescents living in food-insecure households accounted for a greater proportion of total vegetable intake.³⁸

Widome and colleagues³⁹ examined diet quality and food insecurity among middle and high school youth. Compared with youth living in food-secure households, youth living in food-insecure households consumed a greater percentage of calories from fat, ate fewer family meals and breakfasts, had less food availability at home, and perceived greater barriers to consuming a healthful diet.³⁹ Low dietary iron (in young children and adolescents) and low fruit intakes were also associated with food insecurity.³³

Gundersen and Kreider³⁰ reported that children living in food-insecure households had a greater risk for a myriad of health and related problems, including poor overall health, mental health and psychosocial issues, frequent stomach and headaches, more hospital admissions, and higher rates of iron deficiency, and they exhibited poorer developmental outcomes, including learning readiness. Furthermore, the authors suggested that previous studies may underestimate the negative causal impacts of food insecurity on health, due to, among others, the mismeasurement of household food insecurity. Chronic health conditions and behaviors, including anemia and asthma; childhood aggression; anxiety and depression; hyperactivity^{40,41}; dental caries⁴²; fracture risk (among males)⁴³; and reduced physical activity,⁴⁴ have all been associated with food insecurity.

The literature remains inconsistent related to food insecurity and increased risk for childhood/adolescent overweight and obesity.^{45–49} Nguyen and colleagues⁴⁸ reported that, in a nationally representative sample of children 9 to 17 years of age, body mass index was not significantly different among household food-security

groups. Yet, the relationship differed by participation in nutrition assistance programs (SNAP, National School Lunch), reinforcing the need for additional research.

In addition to chronic health conditions suffered by children living in food-insecure households, these children are also more likely to implement coping strategies that can increase their risk for chronic disease extending into adulthood. This includes erratic dietary patterns when food becomes available, such as bingeing eating and food hoarding.⁵⁰

Adult and Older Adult Chronic Disease Risk, Disease Management, and Environmental Contributors/Outcomes

Adults. Food insecurity among adults is associated with inadequate intakes of vitamin A and B-6, in addition to inadequate intake of vegetables, fruits, and dairy.³³ Poor nutrition outcomes were also documented in nationally representative samples of food-insecure adults and older adults.^{35,51} Still other studies have focused on SNAP participants.^{52,53} When compared with income-eligible non-SNAP participants, SNAP participants consumed more sugar-sweetened beverages and empty calories.⁵³ Overall, SNAP participants had lower diet quality for many components, yet reported consuming less saturated fat and sodium.⁵²

Among US adults, energy intakes did not differ between food-secure and food-insecure adults. Rather, meal and snack behaviors differed, with food-insecure adults consuming fewer, but larger, meals and more snacks. This eating behavior may have compensated for the reduced meal frequency.⁵⁴

Education and Practice

- Incorporate food-security–related concepts and experiential learning into dietetics education programs using creative pedagogy.
- Promote and encourage students to participate in education programs that have a food insecurity/food bank supervised practice experience and/or concentration.
- Learn about food insecurity and its consequences on individuals, households, and communities.
- Conduct screening and measure food security status in all settings. Screen clients for food insecurity using a screening tool, such as the following validated 2-item screener by Hager and colleagues,⁸² and refer clients to appropriate health care and community-based resources:
 1. Within the past 12 months we worried whether our food would run out before we got money to buy more. (Response choices: sometimes, never, always)
 2. Within the past 12 months the food we bought just didn't last and we didn't have money to get more. (Response choices: sometimes, never, always)
- Communicate food-insecurity–related information to other professionals, legislators, policy makers, and community members to increase awareness of food insecurity and its outcomes.
- Provide appropriate nutrition care by obtaining/considering food access- and availability-related information during assessments.
- Understand the culture of the local community to further assist in determining appropriate questions and/or information to include about food and nutrition security during the nutritional care process. Information to gather may include:
 - factors such as food and beverage intake (amount/variety/quality);
 - food planning and purchasing abilities and limitations, including availability of transportation;
 - food acquisition practices, including gardening, farming, gleaned, hunting/fishing, and/or begging, borrowing, scavenging, or stealing food;
 - cultural food habits;
 - preparation abilities and limitations, including availability of appliances and utilities;
 - food-safety practices;
 - federal and community food and nutrition assistance program utilization;
 - information related to building and utilizing social networks;
 - anthropometric measurements, including growth pattern and/or weight changes; and
 - nutrition education needs regarding meal planning, purchasing, and preparation, label reading, and food safety.
- Realize that food insecurity may make purchasing food difficult for the patient, thus preventing compliance to a prescribed diet.
- Implement strategies to decrease food loss and waste throughout the food system, from producer to consumer.^{83,84}
- Partner with other professionals to alleviate food insecurity (eg, pediatricians, physicians, and other health care professionals across specialty areas; public health professionals; school/child nutrition professionals; urban planners; and others).
- Network with organizations and stakeholders addressing food insecurity within the community. Examples include food and nutrition assistance programs, emergency food and meal programs, food recovery groups, farmers' markets, community-supported agriculture farms, community gardens, anti-hunger advocacy organizations, and food cooperatives.
- Educate eligible clients on the availability and benefits of federal and non-federal resources available in the community and make referrals or recommend participation.
- Develop innovative interventions and programs that provide nutrition education, training, and research to improve the food security of individuals, households, and communities.
- Create initiatives highlighting the benefits of local, seasonal, and sustainably grown foods, focusing on the development of effective household management strategies and food preparation, and creating food-based projects that foster economic development.

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Figure 4. Contributions that registered dietitian nutritionists and nutrition and dietetics technicians, registered, can make to improve food security in the United States.

Research

- Conduct, translate, and disseminate research associated with food security/insecurity and related program efficacy, including safe, secure, and sustainable food systems.¹¹ Examples include:
 - mapping and evaluating community processes;
 - documenting the nutritional value of emergency foods and donor practices;
 - investigating the causes and effects of food insecurity and its relationships with physical and mental health, nutritional status, and well-being of at-risk groups;
 - exploring the impact of food system issues, including seasonal variation in food availability on food insecurity;
 - assessing the travel distance between stores, farmers' markets, and other venues accepting Special Nutrition Assistance Program (SNAP) and participants' households and transportation availability; and
 - determining the effectiveness, such as cost–benefit analyses, of food recovery and other programs.
- Participate in evaluating community-based programs designed to address food insecurity.
- Partner with food security researchers, including those within the context of an interprofessional, integrated care team, and nonprofit organizations to determine what research gaps exist.

Advocacy and Public Policy

- Support legislative and regulatory processes that promote uniform, adequately funded food and nutrition assistance programs, nutrition education, and programs that support the economic stability of individuals and families.
- Serve as advocates for the nutritionally vulnerable individuals and groups at increased risk for food insecurity.
- Advocate to decrease the stigma of food assistance programs to increase participation rates.
- Eliminate barriers to healthy eating among those at risk for and experiencing food insecurity.
- Assist in efforts to improve food access and acquisition by individuals.
- Assist in efforts to reduce food loss and waste across the food system (eg, food recovery and gleaning).
- Partner with national, local, and state anti-hunger advocacy organizations.
- Serve on a local food policy council, which examines local food systems and provides recommendations for social and public policy changes.
- Advocate that stores accepting SNAP have nutrient-dense offerings for clientele.
- Participate with Academy-related groups and use associated resources, including Academy Political Action Committee and annual Public Policy Workshop.

Figure 4. (continued) Contributions that registered dietitian nutritionists and nutrition and dietetics technicians, registered, can make to improve food security in the United States.

These and similar studies underscore the importance of adequately assessing meal and snack behaviors, dietary patterns, and dietary supplement intakes, rather than focusing solely on energy intake when evaluating diet quality of adults living with food insecurity, especially among those participating in SNAP.

While the mechanisms remain poorly understood, adult food insecurity has been associated with poor physical and mental health status.³² Specific health conditions associated with food insecurity include inflammation, which is correlated with numerous chronic conditions,⁵⁵ sleep disorders,⁵⁶ kidney disease,⁵⁷ human immunodeficiency virus infection, diabetes, and depression (in women).³² Depression, while associated with food insecurity, may be reduced by SNAP participation⁵⁸ because some stressors can be alleviated through

SNAP participation. In a nationally representative sample, among working-age US adults living at or below 200% of federal poverty level, lower food insecurity is associated with high probability of 10 chronic diseases, including hypertension, coronary heart disease, hepatitis, stroke, cancer, asthma, diabetes, arthritis, chronic obstructive pulmonary disease, and kidney disease.⁵⁹ In fact, of those 10 conditions examined, food insecurity is predictive of all 10, while income is only predictive of 3.⁵⁹

While overweight and obesity coexist in those living in both food-secure and food-insecure households, food insecurity is associated with overweight and obesity among women from households experiencing marginal food security or low food security. Both food hoarding⁶⁰ and overconsumption of energy-dense, nutrient-poor foods may contribute to this phenomenon.^{61–63}

In a national sample of US individuals with low-incomes, self-reported hyperlipidemia, hypertension, and diabetes were associated with food insecurity.⁶⁴ More than half (58%) of households served by the Feeding America network reported that at least one household member had hypertension, and 33% of client households reported at least one member with diabetes.¹⁷ People living with food insecurity also have an increased risk of developing type 2 diabetes and also face many more challenges managing their disease.⁶⁵ In a nationally representative sample of adults with diabetes, Berkowitz and colleagues⁶⁶ report that food insecurity is associated with poor glycemic and cholesterol control, even after controlling for numerous demographic, socioeconomic, and clinical factors.

Other health-related behaviors, such as smoking, are also associated with

food insecurity.^{67,68} Although the literature remains limited, it is hypothesized that environmental factors also relate to or contribute to food insecurity. These factors, such as local food prices, availability of transportation, social capital, stress, and use of tobacco as an appetite suppressant, warrant additional research to better understand their relationship to, or impact on, food insecurity.⁴⁹

Olson⁶⁰ reviewed food insecurity in adult females and emphasized that managing family feeding increases vulnerability to inadequate eating patterns. With the threat of approaching food insecurity, fruits and vegetables are often sacrificed in the diet. Women might modify their own dietary intakes to spare dependent family members, especially children, from experiencing deprivation.⁶⁹ For US females who are pregnant, dietary iron intake is not significantly different between those living in food-secure and food-insecure households, yet food-insecure households consume less supplemental iron. This discrepancy results in a reduction in total iron intake, which increases the odds of iron deficiency by 2.9 times.⁷⁰

Older Adults. Food insecurity can have a more severe impact on older adults who may be in poor health and experience other physical, psychological, and social conditions that impact their food-security status. These conditions must be taken into account when addressing food insecurity within this vulnerable population. However, research regarding the effect of food insecurity on the nutrient intakes and health outcomes of older adults remains limited.⁷¹ Overall, there is an inverse relationship between age and food insecurity, even among older adults seeking assistance from emergency food sources.⁷² Yet, among those seeking charitable food assistance, households with older adults have some of the highest rates of hypertension and diabetes. Seventy-seven percent of households with a senior adult have at least one member with hypertension, and 47% had at least one member with diabetes.¹⁷ Among older Medicare beneficiaries, medication nonadherence can contribute to poor diabetes management.⁷³

Hernandez and colleagues⁷⁴ assessed the association between overweight and obesity among a nationally

representative sample of US adults aged 60 years and older with an income less 200% of the federal poverty level and a body mass index ≥ 18.5 (self-reported height and weight). While further research is needed to fully understand the relationship of food insecurity to overweight and obesity among older adults, unlike men, a significantly greater proportion of low-income, food-insecure women were obese (40%) compared with their food-secure counterparts (32%).⁷⁴ In addition, a significantly lower proportion of low-income, food-insecure women were normal weight (26%) compared with food-secure women (35%).⁷⁴

Food insecurity among older adults may not only impact the risk of chronic disease, but can also increase the risk of disability and, in turn, negatively impact physical, emotional, and financial status.⁷⁵ As such, food-insecure older adults have poorer dietary intake, nutritional status, and health status than food-secure older adults.⁷⁵ Proper nutrition among this population is imperative because older adults often have unique nutritional needs and sometimes require specific diets to manage their health conditions. Addressing the risks of being food insecure among older adults is important because adults older than 65 years are expected to almost double in the United States by the year 2050.⁷⁶

Adults and Older Adults. To date, most of the research on adults and older adults has examined health status using food insecurity as one predictor of outcomes. In a Canadian cohort, Tarasuk and others⁷⁷ reported that most chronic physical and mental health conditions, such as diabetes, cardiovascular disease, fibromyalgia, and depression, increased the odds of food insecurity, independent of household demographics. Although further investigation is needed due to differing health care environments and food-insecurity measurement classifications in Canada, this study underscores the possibility that chronic physical and mental health conditions may precipitate household food insecurity.

Health Care Utilization and Costs Because of the association between food insecurity and chronic disease, its

implications on the quality, utilization, and cost of health care have been explored. Regarding type 2 diabetes, adults without reliable and consistent food access also have poorer medication adherence and report higher diabetes distress, both predictors of poor glycemic control and likely contributors to the higher utilization of health care.⁶⁴ Unreliable access to food and the exhaustion of resources may also be responsible for the increase in hypoglycemia-related hospital admissions observed in low-income individuals when monthly benefits are depleted, a phenomena not observed among those with higher incomes.⁷⁸ Despite having a different health care system than the United States, further insights into the increased health care costs of food insecurity come from a Canadian study that documented that total and mean health care costs (including inpatient hospital care, emergency department visits, physician services, same-day surgery, home care services, and prescription drugs) systematically increased with lower household food security.⁷⁹ Further research is warranted to elucidate the health care costs associated with, and resulting from, food insecurity.

Consistent with other preventable health conditions and diseases, avoiding food insecurity or addressing it earlier in its cycle would be a wise and more cost-effective approach. The recent developments in the health care landscape have changed the incentive structures for health care providers, prioritizing both population and preventive health care.⁸⁰ These shifts create an opportunity to integrate food-security strategies into the broader health care movement to address the social determinants of health both within and outside of the traditional hospital and health care environments.

FOOD INSECURITY: STRATEGIES AND SOLUTIONS

A variety of strategies are utilized by households when faced with fiscal resource constraints competing with food purchases. Robust safety-net programs appear vital in bridging temporary fiscal gaps associated with short-term food insecurity often resulting from transitional periods during unemployment, illness, disabilities, or other unforeseen economic

stressors. Federal nutrition assistance programs, along with community-based programs, have been developed and implemented to improve food-security status. Although adequate funding for federal nutrition assistance programs is vital to maintain the integrity of the US nutrition safety net, it cannot be the sole response to this complex issue. Several federal and non-federal programs address a variety of aspects of food insecurity (Figure 3). In addition to these programs, state and local food-security centers, professional organizations, nonprofit organizations, including the charitable food system, and many foundations help support food-insecurity-related program responses and research. Overall, a long-term, systematic, broad-based approach is required to effectively sustain vital economic social systems to prevent and alleviate food insecurity.⁸¹

Federal and Nonfederal Food and Nutrition Programs

Additional research is needed to fully understand the breadth of benefits and long-term efficacy of federal and charitable food and nutrition assistance programs. Households with the highest levels of food insecurity are more likely to choose to participate in federal nutrition assistance programs, such as SNAP. This may explain why improvements in overall food-security rates are not greater for participants compared to nonparticipants of these programs.³⁶ However, there is evidence that supports the association between participation in SNAP and lower levels of food insecurity when controlling for program selection bias.⁸⁵

Multifaceted Responses to Food Insecurity

Long-term interventions and multifaceted initiatives are needed to positively impact and prevent food insecurity in the United States. These solutions should include connecting food-insecure households with adequate and nutritious food and providing nutrition education, while addressing the underlying causes of food insecurity, such as unemployment, underemployment, limited household resources/assets, unstable housing, poor health, low education, and

poverty. McCullum and colleagues⁸¹ recommend creating multisector partnerships and networks that include government and public health agencies, educational institutions, nonprofit organizations, and the volunteer sector in developing the necessary infrastructure to reduce food insecurity and promote nutritional stability. Examples of collaborative initiatives include: 1) food and benefit outreach assistance programs supported by local nonprofit organizations, which connect qualified individuals to available benefits, such as federal nutrition programs, Medicaid, earned income tax credit, and economic support; 2) food purchasing incentive programs to reduce fiscal barriers and encourage nutritious food purchases; 3) initiatives to promote access to fresh produce in low-income communities (eg, farmers' markets, gleaning programs, and community gardens); 4) farm-to-school or institution initiatives assisting local farmers in selling fresh produce directly to school meal programs, colleges/universities, and other organizations to bring local, fresh produce to consumers; 5) food recovery programs at schools, institutions, restaurants, and within communities to rescue wholesome food and distribute to those in need; 6) advocacy to ensure adequate funding for, and increased utilization of, food and nutrition assistance programs, including those providing innovative nutrition education and training; 7) widespread food-security screening in all settings and subsequent referrals to community assistance and health care providers; and 8) development of initiatives that promote and improve local food systems, such as charitable food and feeding programs, farmers' markets, community gardens, and farm-to-school programs.⁸¹

ROLES AND RESPONSIBILITIES OF REGISTERED DIETITIAN NUTRITIONISTS AND NUTRITION AND DIETETICS TECHNICIANS, REGISTERED

Registered dietitian nutritionists (RDNs) and nutrition and dietetics technicians, registered (NDTRs) across all areas of practice have a central role in addressing food insecurity and are uniquely positioned to lead and

support developing, implementing, and evaluating strategies to improve food security. Figure 4 summarizes key areas where RDNs and NDTRs can continue to make valuable contributions toward achieving food security through community-based education, practice, research, advocacy, and public policy. The Academy of Nutrition Dietetics' House of Delegates food-security action plan also outlines areas of action for RDNs and NDTRs.¹⁰ In 2015, to fill competency gaps, a Food Insecurity/Food Bank Dietetic Internship Concentration within the dietetic internship process was launched.⁸⁶ Because of the tremendous dietary and health implications associated with food insecurity, it is paramount that nutrition and dietetics practitioners take a leadership role in identifying, addressing, and preventing food insecurity within their scope of practice.

Immediate and sustainable responses by RDNs and NDTRs are warranted to achieve food security. Adequate funding for, and increased utilization of, nutrition assistance programs, as well as innovative programming to promote and support household stability, are paramount. Dietetics practitioners should capitalize on their translational professional training and expertise, as well as their professional networking through Academy of Nutrition and Dietetics' dietetic practice groups, member interest groups, state affiliates, and advocate for food-insecure households and programs aimed at alleviating food insecurity and its root causes.

RDNs and NDTRs should also advocate for the inclusion of dietetics practitioners in community-based initiatives and research. RDNs and NDTRs are uniquely positioned to address food loss and waste within the food system. In addition, RDNs and NDTRs can facilitate referrals, provide targeted education, and empower individuals struggling with food insecurity. Specifically, RDNs and NDTRs can help those struggling with food insecurity to access and connect with existing programs and social services aimed at improving food and nutrition security and other areas (eg, employment, housing, and transportation assistance). To build and sustain solutions

to achieve food security and promote health, RDNs and NDTRs should engage in outreach efforts to forge partnerships among clinicians, charitable food providers, community partners, food processors, food retailers, other stakeholders, and people living with food insecurity.

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