

Food and Nutrition Security as Social Determinants of Health: Fostering Collective Impact to Build Equity



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KEYWORDS

• Food insecurity • Urban agriculture • Community engagement • Obesity • SDoH

KEY POINTS

- The existence of food deserts in America is an injustice that we have not been able to correct despite decades of effort.
- There is a parallel obesity crisis directly caused by the standard American diet.
- A new generation of local, bottom-up solutions can correct the dual crises of obesity and food insecurity that are the direct result of policy decisions and infrastructure.

PRIMARY CARE PROVIDERS CAN SHAPE POPULATION HEALTH

Poor diet is responsible for one of the every five deaths worldwide, and represents a significant risk factor for a range of chronic medical conditions.¹ Approaches to address the consumption of unhealthy foods or food deprivation and improve nutrition are increasingly being integrated into healthcare systems for the prevention, management, and treatment of chronic conditions.^{2,3} Promising evidence indicates positive impacts of food and nutrition interventions for patient-provider relationship, patient satisfaction, healthcare costs, and health outcomes. However, substantial opportunities remain to optimize measurement, data integrations, effectiveness across diverse patient characteristics, scalability, reach, and sustainable implementation as a routine component of evidence-based care.^{4,5}

Primary care providers (PCPs) can accelerate achieving transformative improvements to patient-centered care and health outcomes, particularly within communities

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where healthy foods are scarce or difficult to obtain.⁶ The United States Department of Agriculture (USDA) defines the ability to access enough food for healthy life is termed *food security*.⁷ *Low food security* reflects reduced quality, variety, or desirability, but negligible change in the amount of food consumption. *Very low food security* is characterized as multiple indications of disrupted eating patterns and reduced food intake. Interactive visualizations on the USDA website⁷ indicate 10.2% of Americans live with food insecurity and 3.8% live with very low food security, and allow viewers to see trends over time and examine potential risk factors. Food security is a necessary, but not sufficient, driver for *nutrition security*, which further requires that the foods/beverages promote well-being, prevent disease, and, if needed, treat disease.^{8,9} There is a strong body of evidence demonstrating an array of negative health consequences for those living with food/nutrition insecurity.^{10,11} Disparities are most evident in communities where poverty rates are high (>20%), single-mother households, inner city or rural areas, and communities of color.^{12–15} PCP-led food/nutrition interventions represent pathways for the delivery of high impact solutions to reduce these preventable causes of death, lower quality of life, multiple comorbidities, healthcare costs, and health disparities.¹⁶

The importance and urgency of addressing the food and nutrition-related health crisis in the U.S. prompted the White House Conference on Food, Nutrition, and Health in September 2022,¹⁷ along with a series of listening and planning sessions across diverse stakeholders. Those with lived experience, healthcare providers, policy decision makers, researchers, and others from multiple sectors (government, private, academia, community-based organizations) contributed to a National Strategic Plan to end hunger and increase healthy eating and physical activity by 2030.

This article aims to: (1) document the impacts of food/nutrition insecurity on health outcomes; (2) examine factors that modulate food/nutrition security; (3) delineate opportunities for PCP impact; and (4) highlight innovative and promising multi-level approaches to the benefits of community health activism focused on SDoH.

FOOD & NUTRITION SECURITY AND HEALTH OUTCOMES

The significance of food is often overlooked. Food is a primary reinforcer that influences behavior across every animal on the planet, and is oftentimes a critical aspect of individual decision-making, sustained behavior, cultural norms, and historical events. We all are biologically driven to work in some manner to get food, and food consumption can strengthen the likelihood of doing the same work again. Unfortunately, underserved communities are required to “work” harder to obtain healthy foods, and this additional work may increase the reinforcement value, purchasing, and consumption of less nutritious but more easily accessible foods.

Location of residency can greatly impact food and nutrition security. *Food deserts*, as defined by the USDA, are areas with limited access to a variety of healthy and affordable food.^{14,18,19} due to factors such as a long distance (>1 mile in urban areas; >10 miles in rural areas) from the closest large grocery store.¹⁴ Oftentimes, these areas are also considered *food swamps* due to greater access, via higher density of small convenience stores, to unhealthy, calorie-dense, and inexpensive junk food and high sugar foods.²⁰ These environmental contexts represent social determinants of health. Moreover, the effects of these conditions produce a disproportional burden of diet-related chronic diseases observed across underserved populations, such as racial and ethnic minorities, low-income, and rural and remote populations including Tribal communities and insular areas.^{15,19,21}

Consider a household that does not own a vehicle and resides in an area saturated with convenience stores and devoid of places to buy nutritious foods. These family members must expend more time and effort to obtain nutrient-rich foods relative to households with closer proximity to healthy foods. Even when there is high interest and need for healthy foods, lack of access to resources (eg, money, time, childcare needs) that may be necessary to make a shopping trip add to the burden caused by transportation. After factoring in the other SDoHs commonly experienced by households in food limited areas (eg, poverty) may further limit capacity for meeting additional “work” demands, it becomes easier to understand rationale for decision-making sustained behaviors that are unhealthy and undermine health outcomes.

The U.S. population has a rising prevalence of diet-related chronic conditions such as type 2 diabetes, obesity, hypertension, and certain cancers. These largely preventable consequences disproportionately impact historically underserved communities. Obesity leads to a higher risk for poor health outcomes such as hypertension, diabetes, high cholesterol, heart disease, and stroke.²² Ultimately, being overweight or obese is associated with a higher risk of mortality. A large meta-analysis of over ten million participants across four continents and 239 studies found strong correlations between body mass index (BMI) and overall mortality,²³ with strongest associations observed among those considered overweight (>25 BMI).

Obesity has associations with several types of cancers due to the hormonal and inflammatory changes associated with the disease. These obesity-related cancers (eg, breast, colon, pancreatic, ovarian, thyroid) make up 40% of all diagnosed cancers and disproportionately affect women.²² Being overweight or obese has negative effects on the cardiovascular system, although these effects can be partially mitigated by regular exercise.²⁴ Obesity is associated with changes to cardiac tissue culminating in impaired function and increased atrial and ventricular mass.²⁵ Pulmonary function is also affected by obesity²⁶ via increased airway pressure and chronic inflammation leading to increased risk of obstructive sleep apnea, obesity-hypoventilation syndrome, and asthma.²⁵ Similarly, the chronic inflammation in obese individuals has been identified as a risk factor for Alzheimer’s disease.^{27–29}

Furthermore, diet can have deleterious effects on emotional and psychological outcomes. Adults living with food/nutrition insecurity have been found at greater risk for depression/anxiety and lower quality of life.³⁰ Food insecurity experienced during childhood may contribute to both acute and long-term mental health consequences. Reduced academic performance, deficits in impulse control, and exacerbated symptoms of attention-deficit hyperactivity disorder have been associated with nutrition deficits, likely due to disrupting neurocognitive development.^{31,32} During adulthood, there may be increased risk for depression, interpersonal violence, suicidal ideation, and substance use disorder.³³ The Mediterranean diet (as well as the “epigenetic diet”) has been shown to be protective for mental disorders.³⁴

RISK FACTORS AND PROTECTIVE BUFFERS: LONG-STANDING DISCRIMINATION

Disparities in food/nutrition security have been generated and perpetuated by structural racism embedded within policies and practices. Social, economic, and legal discrimination institutionalized by Black codes and Jim Crow laws continue to harm Black communities. For instance, the Southeastern U.S. (HHS Region IV) has the highest levels of food insecurity, as well as many other economic and health disparities. *Food apartheid* was coined to be distinct from food/nutrition by integrating intentional discrimination that has produced relevant environmental contexts (eg, food desert/swamp), alongside many other contributors to food insecurity: residential segregation,

deepened poverty, supermarket relocation, and ignorance among white populations of the foodways of Black, Brown, and Indigenous communities. Examples include limited urban farming due to zoning policies, economic and social impacts caused by historic redlining, or limited access to farm capital based on federal subsidy and loan programs. Higher food insecurity is found in neighborhoods in areas which were never industrialized or were de-industrialized.²¹ U.S. food insecurity is partially a consequence of regional and local infrastructural related to the economics of food distribution, and not an issue of the nation lacking the food necessary to feed all residents. Economic pressures lead to food distributors concentrating stores in high-wealth neighborhoods where selling food will be more profitable, resulting in food deserts/swamps.

Financial barriers at multiple levels of analysis impede equitable food/nutrition security. Households that are food secure spend nearly 20% more on food compared to food-insecure households, even after considering household size, composition, and federal assistance programs. Providing subsidized or free healthy food can reduce obesogenic diets, as well as taxation/prices increases for unhealthy foods. Interventions that address access to quality food only can overcome geographical barriers, such as high-quality food assistance.¹⁹ Low-income households that received housing vouchers for relocation to lower-poverty areas had lower rates of extreme obesity and diabetes over a 10-year follow-up, although household income had not increased compared to their counterparts.³⁵ There is an urgent need to overcome the cycle of diet-related disparities produced from social injustice and SDoH, such as the 10-fold higher transgenerational wealth observed in white versus black families that has persisted for over 70 years.

Inclusive food governance is another major issue undermining food/nutrition security.³⁶ U.S. National Strategic Plan represents an important collective impact initiative that promotes more inclusive approaches. Five pillars guide calls to action and over eight-billion-dollar federal budget were dedicated to eliminating diet-related diseases.

1. *Improving food access and affordability*, including by advancing economic security; increasing access to free and nourishing school meals; providing Summer Electronic Benefits Transfer (EBT) benefits to more children; and expanding Supplemental Nutrition Assistance Program (SNAP) eligibility to more underserved populations.
2. *Integrating nutrition and health*, including by working with Congress to pilot coverage of medically tailored meals in Medicare; testing Medicaid coverage of nutrition education and other nutrition supports using Medicaid section 1115 demonstration projects; and expanding Medicaid and Medicare beneficiaries' access to nutrition and obesity counseling.
3. *Empowering all consumers* to make and have access to healthy choices, including by proposing to develop a front-of-package labeling scheme for food packages; proposing to update the nutrition criteria for the "healthy" claim on food packages; expanding incentives for fruits and vegetables in SNAP; facilitating sodium reduction in the food supply by issuing longer-term, voluntary sodium targets for industry; and assessing additional steps to reduce added sugar consumption, including potential voluntary targets.
4. *Supporting physical activity* for all, including by expanding the U.S. Department of Health and Human Services' Centers for Disease Control and Prevention's (CDC) State Physical Activity and Nutrition Program to all states and territories; investing in efforts to connect people to parks and other outdoor spaces; and funding regular updates to and promotion of the Physical Activity Guidelines for Americans.

5. *Enhancing nutrition and food security research*, including by bolstering funding to improve metrics, data collection, and research to inform nutrition and food security policy, particularly on issues of equity and access; and implementing a vision for advancing nutrition science.

PRIMARY CARE PROVIDER-LED OPPORTUNITIES TO ACCELERATE FOOD/NUTRITION SECURITY

PCPs and associated clinic personnel have unique opportunities to enhance food/nutrition security. Patients speak to these healthcare providers about their health most frequently and provide care for extended durations. Key roles and major areas of leadership and involvement include the harmonization of assessment/data collection through the use of validated screening tools^{18,37} (Food Insecurity-HI7.org; SDOH & Practice Improvement) interoperability and outcome measurement standards; expansion of sites of care to increase reach and potential utilization; scale and disseminate interventions, including partnerships with community-based organizations. Standardization will allow all stakeholders to better communicate and address food/nutrition insecurity. Primary care clinics can serve as access points to food/nutrition interventions directly or as a pipeline to connect patients to the organizations/networks that provide them.^{4,38} Benefits to health outcomes have been observed after screening, intervening, or referring were added to PCP workflows designed to address SDOH.³⁹ This approach results in more personalized treatment plans and better meets unique patient needs and priorities, expanding beyond one-size-fits-all approaches. A review of approximately 200 studies across four chronic conditions found that illness and treatment burden combined with general demands and resources (eg, SDOH) predicts treatment engagement and health outcomes through perceived treatment fatigue. Personalized and patient-centered care that better meet patients' priorities and needs (eg, SDOH) may mitigate fatigue and increase sustained engagement and health outcomes.⁴⁰

PCPs should have the expertise to ask and counsel patients about food insecurity, and the capacity to refer and link patients to food assistance resources.⁴¹ Partnerships with community-based organizations can address potential barriers for clinic implementation (time, training, and access to resources). For example, health systems and neighborhood food pantries, farmers markets, and/or community gardens have enhanced patient care through produce prescription programs, nutrition education, and enrollment in federal assistance.

Knowledge of federal assistance programs and integrating referrals as part of a typical PCP visit can alleviate patient' financial barriers. The three largest federal nutrition assistance programs are Supplemental Nutrition Assistance Program (SNAP), Supplemental Nutrition Program for Women, Infants, and Children (WIC), and the National School Lunch Program. At least one of these programs is used each month by nearly 60% of food-insecure households. Referrals through primary care clinics as part of SDOH screening procedures have become more commonplace. However, it is important providers are aware of SNAP limitations,^{10,42} such as: strict means testing, funding that is inflexible in times of extreme need, difficulty of SNAP benefits alone in eliminating food insecurity. Ideally, information about complementary options can be shared, most of which will include local community-based organizations.

Food is medicine interventions are designed to improve health outcomes specifically and have been associated with better chronic disease management and lower hospital admissions.^{4,43} Medically-tailored meal, grocery (food pharmacies), and produce prescriptions are promising approaches, which may improve the ability to adhere to dietary recommendations by overcoming access and affordability

barriers.^{16,44} Benefits associated with this approach can be calculated via online tools⁴⁵ (<https://www.dietid.com/roi-calculator>) to provide objective metrics to monitor impact and further promote adoption or modifications. Training for providers can ensure adequate competencies, enhance the dissemination of shared resources, and standardize the delivery of SDoH-driven care (<https://lifestylemedicine.org/>). Promoting behavior change in other unhealthy behaviors can also support food security. For example, smoking cessation has been linked with lower food insecurity risk, likely due to reduced spending on cigarettes that can help alleviate financial barriers to healthy food purchases. Additionally, lifestyle changes consistent with longevity and wellbeing can be supported, such as stress management, healthy sleep, community building, activity, and sense of purpose ([Live Better, Longer - Blue Zones](#)).

PCPs can further shape population health through research collaborations that develop, evaluate, disseminate, and implement novel approaches. Later in discussion, we describe promising approaches that will benefit from PCP leadership and role as trusted messengers to raise awareness within communities regarding participation in ongoing research trials and community health activism efforts. Finally, PCPs can advocate for policies that support food/nutrition security and maintain workplace wellness programs to support staff and self-care.

Case Study Example

A 30-year-old single mother of two brings her two children in for routine immunizations. During the visit, she is screened for food insecurity as part of routine screening for SDoH as recommended by the AAP. The screening reveals the mother always feels anxious that her food supply will run out before her next paycheck. She further reveals that sometimes she is unable to make it to the grocery store – and she says she is just too tired to get off the bus – go to the store – then get back on the bus to travel the last 3 miles home. As a result, she often just orders pizza instead. The PCP, knowing that the new 2021 CMS billing guidelines allow for time-based billing, spends 30 minutes counseling about nutrition and food insecurity. At the end, the PCP provides a list of community-based resources including Second Harvest Food Bank, Nashville General Hospital's Food Pharmacy Program and Grow2Learn Community Co-op. The PCPs office has a “close the loop” system in place and will follow up at the next visit to see if the community referral was accepted.

PROMISING NEXT-GENERATION SOLUTIONS

Technology-based tools that complement standard care are emerging rapidly and may enhance the efficiency, effectiveness, and reach of evidence-based care. Smartphone ownership has jumped from 35% in 2011 to 85% in 2021 and may help mitigate the digital divide. Minority populations rely more on smartphone technology as a primary source for healthcare information due to disparities across other technologies. Empirically supported treatments through smartphone apps, after validated through rigorous trials, may offer the unprecedented capacity to automate and integrate data collection, support decision support tools, deliver treatment in real-time, and meet the dynamic needs of patients. PCPs can capitalize on the high reach this market affords and guide consumers to approaches that work, especially since this may increase access to treatment for those who may be unable or unwilling to seek it in person (eg, cost, distance, stigma).

The next generation of food assistance policy needs to facilitate both *access* and *affordability* of nutrient-rich food. Solutions will best meet community needs through approaches that integrate community input and are tailored to the infrastructure and

material conditions of the regions/neighborhoods in question. Bringing together leaders from diverse perspectives offers the opportunity to shed light on overlooked and practical solutions with high-impact implications for restoring trust, advancing care, and amplifying the voice of underserved communities. These approaches are often driven by “bottom-up” needs rather than “top-down” decrees. The phrase “nothing about us, without us” is a recommended guiding principle. Those with lived experience are typically left out of policy decisions despite being the ones that face associated consequences. Ameliorating the effects of America’s food governance must engage community members and involve more diverse stakeholders provided a seat at the table. Tools and opportunities to exert control over the production and distribution of their own food is a promising method to empower communities and overcome long-standing discrimination. Widespread local food production and distribution, especially in neighborhoods without legitimate grocery stores, overcomes barriers of affordability, access, transportation, and infrastructure. Potential to increase the sustainability of funding and scalability of the initiatives, by shifting from grant-based to cooperative investments based on mutually beneficial arrangements with long-term vision and an equity lens at the heart of the partnership. Just as the infrastructure for growing and distributing food benefits from locality, resilience and investment in this infrastructure is also strengthened by local partnerships and collaboration.

Existing models that incentivize business leaders to invest in co-operative initiatives may have potential utility to support food/nutrition security. For example, carbon offset credits trade on the measurable reduction of greenhouse gasses,⁴⁶ by directing funds to conservation and sustainable development efforts and reducing industry climate emissions. We are exploring potential parallels that can be supported via security offsets by reducing unhealthy food access and/or increasing healthy food access and reduce disparities, or potential for equity credits to compensate for other SDoH produces by various industries. For example, policies could be enacted to require organizations responsible for SDoH that produce or maintain food/nutrition insecurity to redirect funds (eg, social impact investments or offset credits) and promote population health. May offer avenue for sustainable funds for social profit entities, de-incentive pro-SDoH company behaviors, and foster investor incentives through market competition that applies return on investment strategies to non-profit sector operations.^{47,48} We are optimistic this paradigm shift may produce transformative impact by promulgating scalable and sustainable systems level change to increase healthy behavior and ameliorate SDoHs (stabilize housing, poverty), discrimination, trauma, and disparities.⁴⁶ Rigorous evaluations designed and led by cross-sector coalitions are underway to test these hypotheses.

Healing-centered design approaches shift conceptualizations from personal decrements to community solutions and use gain-versus loss-framed language to promote community empowerment and collective solutions. For example, “determinants of food *insecurity* and *patient* outcomes are difficult to change because they are caused by *deeply rooted, complex* interactions, across *multiple levels of analysis*” can be *reframed* to “the breadth of contributors to food *security* represents many *pathways to produce positive outcomes* (trust, quality, and quantity of care, engagement, outcomes, and cost savings) that can *benefit population health*.” Community-level SDoH stabilization is supported by improving local access to healthy food and neighborhood-driven interventions and governance.⁴⁹ Culture and restoration of identity are central elements used to build solid sense of meaning, self-perception, purpose, and belonging.⁵⁰ Food co-ops organize people to discover where food products come from and how food can facilitate connectedness and cultures of health. Cohesiveness within communities has been shown to mitigate food insecurity,

likely a result of shared resource allocation (eg, transportation).²¹ Food co-ops use immersive education, training, and employment programs to make agricultural experiences accessible for all.

The COVID-19 pandemic demonstrated the fragility of global supply chains. Local food infrastructure may be more likely to keep communities fed in times of crisis, rather than top-down responses that may be delayed or nonresponsive to community needs.^{51–53} To change the status quo, we encourage interactive approaches to both learn and teach (mentee-mentor; peer-based) integrative food systems, historical and cultural relevance, and collective capacity for growing, preparation, cooking, eating, entrepreneurship and celebrating the change we wish to see: innovative regenerative and resilient community-led economic models that build community resilience and expands instead of extracting resources and dissolving neighborhoods.

Food is our common ground, a universal experience.

—James Beard

DISCUSSION

A health equity lens is essential when examining food and nutrition security. People who experience food insecurity have higher risk for poor nutrition⁵⁴ and diet-related conditions,⁵⁵ including obesity, diabetes, hypertension, coronary disease, stroke, and cancer. These risks are founded in long-standing SDoH,⁵⁶ <https://www.ncbi.nlm.nih.gov/books/NBK425848/>, such as structural racism and other structural inequities based on income, education, age, sex, place of residence, and national geography.

We provide an overview of evidence that access is necessary but not sufficient to eliminate longstanding food apartheid (food insecurity) that disproportionately harms racial and ethnic minorities and other underserved communities. Disrupting the cyclical status quo caused by long-standing discrimination, SDoHs, and health disparities to accelerate transformative impact will require multi-level collective impact approaches, inclusive of diverse stakeholders/perspectives across multiple sectors. Successful food/nutrition security solutions will have transdiagnostic implications for SDoHs broadly and other domains/conditions.

Racial and ethnic minorities will most benefit from effective solutions to promote greater food & nutrition security necessary to reduce diet-related chronic conditions, complex comorbidities, and long-standing health disparities. Specific recommendations from current best practices and resources to support ongoing training and resource sharing provide actionable next steps and tools for objective measurement and tools to support population health. Innovative and promising future directions suggest an optimistic opportunity for PCPs and communities served to accelerate the elimination of disparities and broad variety of options to optimize outcomes for all. The benefits of community health activism approaches that engage and empower communities through local health programs can support cohesiveness, resource sharing, and sustainable solutions (eg, case studies, resources, videos, and more). Cross-sectoral, multi-level, approaches that are guided by community members are critical for sustainable solutions.

CLINICS CARE POINTS

- Primary care clinics offer high reach contexts to identify, assess, and intervene upon food/nutrition security needs.

- Supplemental Nutrition Assistance Program (SNAP) referrals are necessary but not sufficient. SNAP recipients still struggle with the reality of living in a food desert.
- Think of dietary choice as an environmentally dependent behavior. *Access to food and affordability of food* are both considerations when addressing an individual's case.
- Making connections with local community organizations can provide new sources of access for patients and overcome barriers caused by policy and infrastructure.
- Healthcare professionals and organizations can bolster the work being done by community organizations by entering multistakeholder partnerships that enhance the strength of communities and health equity.

FUNDING

This work was supported by the National Institutes of Health (K23DA041616, P50MD017347, P30AI110527) and the United States Economic Development Administration (ED22ATL3030041).

ACKNOWLEDGMENTS

The authors gratefully acknowledge Andrée LeQuire and Jafee Judah of the Grow2Learn Cooperative and Clinton Hopkins of Meharry Medical College for their support, advice, and encouragement in the development of this article.

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