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A Food is Medicine approach to achieve nutrition security and improve health

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Suboptimal nutrition is a leading cause of illness, healthcare spending and lost productivity, predominantly from diet-related chronic diseases but also from undernutrition[1,2]. These burdens are not evenly distributed, contributing to health disparities affecting people who have lower income, are less educated and are members of minority ethnic groups, who more often have poor diets, hunger and related diseases.

Healthy foods across the lifespan are critical to achieve health and well-being for all, but few sustained healthcare or policy interventions have considered this as a priority. This is now beginning to change in the USA, with promising healthcare-anchored strategies to address food security emerging at local levels[3], combined with mounting evidence about and attention to health burdens, costs and inequities attributable to poor diet quality. We highlight two major shifts toward addressing food and nutrition within health-related sectors, which are in need of acceleration.

The first shift is an evolution in public health and policy from food security to nutrition security[4]. The formal definition of food security includes health, but in practice food-security-related measurement systems and polices have largely focused on food quantity (calories) rather than quality (nourishing foods). One proposed definition of nutrition security, which is intended to be additive to existing food security metrics, is consistent access, availability and affordability of foods and beverages that promote well-being and prevent and, if needed, treat disease[4]. The United Nations Food and Agricultural Organization has updated its State of Food Security in the World reports to encompass nutrition, including a new metric on affordability of healthy, nourishing foods. The US Department of Agriculture and the Centers for Disease Control and Prevention (CDC) now emphasize the importance of nutrition security along with new strategies to increase availability and consumption of healthful foods[5,6].

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A second, related shift is the incorporation of food-based nutrition strategies into healthcare systems and population health. This can be conceptualized through the use of a Food is Medicine framework: a pyramid of food-based nutrition programs and interventions addressing specific health needs of different populations (Fig. 1). At the top of the pyramid are more intensive treatments for sicker patients, such as medically tailored meals (MTMs) for patients with complex nutrition-sensitive chronic diseases and high healthcare utilization (Table 1)[7]. Moving down the pyramid, medically tailored groceries and produce prescriptions are less intensive interventions for progressively larger subsets of patients with diet-sensitive conditions who are less ill[8]. Compared with MTMs, the latter strategies require more patient effort for cooking and meal preparation, but may offer greater reach, lower implementation costs and more flexibility for culturally relevant meals[9]. Healthcare systems are also starting to recognize their role and responsibility to screen and connect patients to government food assistance programs, which many eligible patients are unaware of or not enrolled in. Enrollment in these programs creates synergies between traditionally siloed government programs across healthcare and agriculture, advancing food security and regional food production while also supporting the nutrition security, health and economic resilience of low-income patients.

At the base of the Food is Medicine pyramid are population-level healthy food programs and policies. Access to convenient, affordable and nutritious foods depends not merely on individual choice but on where a person lives and works and on their socioeconomic circumstances. A range of evidence-based policy, systems and environmental interventions can advance nutrition security and health equity in communities (Table 1), promoting healthier foods such as fruits, vegetables, nuts, beans and whole grains and fewer unhealthy foods and beverages such as those that are highly processed and rich in refined starch, added sugars and sodium.

The US Centers for Medicare and Medicaid Services (CMS) is investing in Food is Medicine by piloting Medicaid prescriptions for MTMs in Massachusetts, North Carolina and California, together with interventions for housing and other social determinants of health, through healthcare investments of up to US$150 million, $650 million and several billion dollars, respectively, in these three states. Since 2020, CMS has allowed Medicare Advantage healthcare plans to cover a range of food-based interventions as Special Supplemental Benefits for the Chronically Ill. Private healthcare systems including Kaiser Permanente, Geisinger Health and others are also investing in projects to test and scale MTMs and produce prescription programs, while building technology-based campaigns to help patients enroll in appropriate federal nutrition programs. Some US medical schools are also beginning to incorporate nutrition into their curriculum, with strong public support demonstrated by a recent US congressional resolution calling for robust nutrition education for doctors and other healthcare providers across all levels of training, with warnings of remedial actions if nutrition education is not incorporated[10].

US government agencies are implementing efforts for greater transparency of information to help consumers, such as an updated Nutrition Facts label supported by the Food and Drug Administration (FDA) and a new FDA front-of-pack ‘healthy’ icon for food products (Table 1). The CDC’s Division of Nutrition, Physical Activity, and Obesity is supporting greater

healthy default food options in communities through guideline development, surveillance and monitoring, funding support for community programs and technical assistance for national partners and local organizations. Examples of CDC efforts include embedding nutrition standards within early child care and education systems, including by means of state licensing and quality-rating systems; leveraging state bulk food procurement policies and practices to prioritize more nutritious foods; strengthening nutrition standards within food service, including in municipal buildings, park and recreation centers, workplaces, hospitals, universities and charitable food networks; and supporting new restaurant and retail initiatives such as menu and nutrition facts labeling. Other fiscal interventions in the United States include tax credits to support access to healthier food within small stores and equity strategies whereby proceeds from sugar-sweetened beverage or junk food taxes support healthier food access in low-income neighborhoods. Cities are often crucibles for innovation. New York City, for example, is implementing Food is Medicine strategies such as robust new nutritional standards for all food procured by the city for schools, hospitals, prisons and government offices, as well as new lifestyle medicine clinics and nutrition education for doctors across city hospitals.

We believe the twin concepts of nutrition security and Food is Medicine provide a new foundation to accelerate the identification, prioritization and integration of healthcare- and population-based interventions that can collectively improve access to, affordability and convenience of nourishing foods, while promoting health equity and reducing the health burdens and economic costs of diet-related diseases. To maximize success, governments and private healthcare systems need to assess and understand the landscape of actors in this space; develop and apply screening and tracking tools to assess food and nutrition security and success of interventions; and employ, evaluate and scale improvements across each level of the Food is Medicine pyramid. It is time for these innovations to be adapted and extended to multiple diverse populations to increase access to nourishing foods across the lifespan and support nutrition security, health equity and wellness.

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Competing interests

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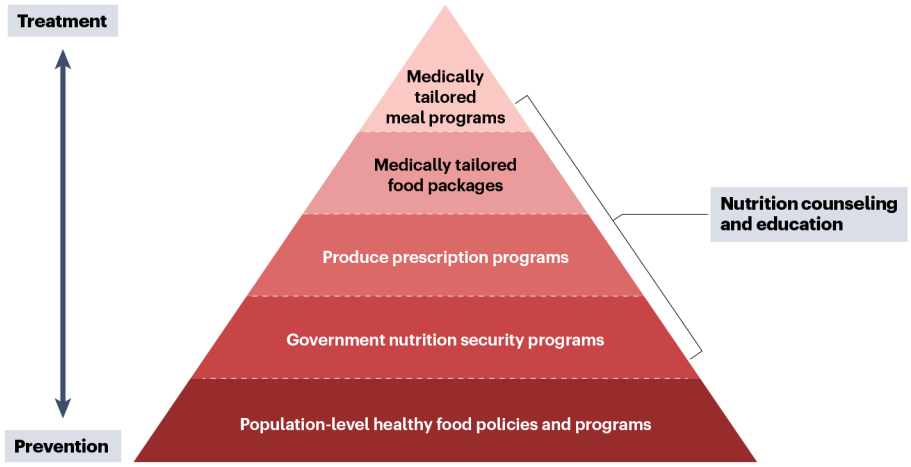

Fig. 1 |. The Food is Medicine pyramid.

An evolving framework of programs and interventions in healthcare and population health to integrate food-based nutrition interventions at multiple levels for specific health needs of different focus populations. Nutrition security programs include the Supplemental Nutrition Assistance Program (SNAP), Special Supplemental Nutrition Program for Women, Infants and Children (WIC), and school meals. Figure adapted and updated from Food is Medicine Massachusetts (https://foodismedicinema.org/food-is-medicine-interventions).

Table 1 |

Example interventions from the Food is Medicine pyramid

	Target population	Intervention	Examples of efficacy
Medically tailored meals [a]	Patients with severe, complex chronic conditions that limit activities of daily living and cause high burdens of disability, illness and healthcare utilization, such as poorly controlled diabetes, heart failure, cancer, kidney failure and HIV.	Prepared, medically tailored meals delivered to individuals living with severe illness through a referral from a medical professional or healthcare plan. Meal plans are tailored to the medical needs of the recipient by a registered dietitian nutritionist. Often provided as 10 (and up to 21) weekly meals, in combination with nutrition and culinary education.	Lower hospital, emergency room and nursing home admissions and net healthcare costs; increased medication adherence.
Medically tailored groceries [a]	Patients with one or more major diet-related health risks or conditions but who can still prepare and cook their own meals. Often, but not always, prioritizing people on low incomes and/or those who are food insecure.	Healthy food items that are preselected, often by a registered dietitian nutritionist or other qualified professional, and provided to eligible patients in combination with nutrition and culinary education.	Improved food security; inconsistent associations with health outcomes.
Produce prescriptions [a]	Patients with at least one diet-sensitive health risk or chronic condition, such as diabetes, prediabetes, hypertension, obesity or heart disease, as well as people on low incomes and/or who are food insecure.	Discounted or free produce such as fruits and vegetables (and sometimes also nuts, seeds, beans, whole grains, dairy and eggs) are provided by electronic benefit cards or paper vouchers redeemable at grocery stores or farmers' markets, picked up in the healthcare setting or home delivered, in combination with nutrition and culinary education.	Improved food security; lower hemoglobin A1c, blood pressure and body mass index.
Government nutrition security programs	Patients from low-income or other marginalized households with food and/or nutrition insecurity. Children from households with lower incomes.	Healthcare system screening, connecting and supporting enrollment of appropriate patients into government nutrition programs, such as the US Supplemental Nutrition Assistance Program and Special Supplemental Nutrition Program for Women, Infants, and Children; school breakfast and lunch programs; and nutrition programs for older adults.	Increased awareness and enrollment among eligible patients who were not familiar with or had not been enrolled in such programs; improved food security.
Population-level healthy food programs and policies	Children and adults within the general population at risk for poor metabolic health.	Programs and policies to address systems and environmental barriers to equitable healthy food in communities. Examples include consumer education strategies such as package, menu and warning labels; nutrition standards for institutional procurement, including charitable food; employer-based wellness programs with education and incentives for healthier eating; fiscal approaches or incentives to support the affordability of healthful foods; disincentives such as taxes for unhealthful foods or beverages; and regulatory approaches to food additives and marketing.	Increased health literacy, increased community availability of healthier foods and beverages, industry reformulation of packaged foods and restaurant items, improved nutritional habits of consumers.

[a]For medically tailored meals, medically tailored groceries and produce prescriptions, clinicians or other health system staff including registered dietitian nutritionists, social workers and community health workers screen and refer eligible patients to appropriate services as part of their treatment plan.