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Chairman Corey Booker, Ranking Member Mike Braun, and members of the Senate Agriculture, Nutrition, and Forestry Subcommittee on Nutrition, Agricultural Research, and Specialty Crops, thank you for the opportunity to testify on behalf of the American Heart Association and its more than 40 million volunteers and supporters. My name is Dr. Kevin Volpp, and I currently serve as the leader of the planning committee for The Rockefeller Foundation and American Heart Association Food is Medicine Research Initiative and as a volunteer member of the American Heart Association's Advocacy Coordinating Committee. I am also the founding Director of the Penn Center for Health Incentives and Behavioral Economics (CHIBE) and the Mark V. Pauly President's Distinguished Professor at the University of Pennsylvania's Perelman School of Medicine and Health Care Management at the Wharton School.

For 20 years, I served as a part-time primary care doctor and hospitalist taking care of patients at the Philadelphia Veterans Affairs Medical Center. Many of my patients struggled with chronic diseases such as diabetes and congestive heart failure, which were exacerbated by their challenges finding affordable healthy food. As a behavioral economist, my work has largely focused on testing innovative ways of applying insights from behavioral economics in improving patient health behavior and clinician performance. Through my work with a variety of health plans, health systems, consumer companies, and individual patients, I have developed a deep understanding about what physicians, individuals, and families need to promote health, prevent disease, cure illness, and manage chronic health conditions. As a member of the American Heart Association's advocacy committee, I have worked to advance the organization's mission to be a relentless force for a world of longer, healthier lives for all. I am also proud to represent the American Heart Association as a major advocate for population health at the federal, state, and local levels, as a supporter of healthy communities, and as a champion for improving heart health for all.

Next to the federal government, the American Heart Association is the largest nonprofit funding source for cardiovascular and cerebrovascular disease research. For decades, the American Heart Association has supported legislative and regulatory proposals at all levels of government that

help improve nutrition and food security. Our focus has always been on ensuring that we use food policies in our nation to improve diet quality and subsequently the heart health of all.

Cardiovascular disease is the leading cause of death in the United States and chronic diseases affected by nutrition including cardiovascular disease, stroke, and diabetes account for most of the nation's \$3.8 trillion in annual health care costs.¹ Cardiovascular disease alone accounts for 12 percent of total U.S. health expenditures, considerably more than any other disease.² Heart disease and stroke cost the U.S. health care system \$216 billion annually and cause \$147 billion in lost job productivity.³ Nutrition insecurity and unhealthy diets—characterized by a high intake of calories, sodium, added sugars, and saturated fat, and low intake of vegetables, fruits, and whole grains—significantly contributes to the development of cardiometabolic disease and chronic diseases more broadly. There are significant equity disparities as well, with higher rates of chronic disease mortality among those with low income, less education, and across different racial/ethnic populations. Black, Latino, and Native populations and low-income households,⁴ have higher rates poor diet quality compared with the overall population.⁵ The COVID-19 pandemic has only exacerbated these disparities.

The connection between chronic disease and nutrition is undeniable. Our diets not only play a role in our risk of developing chronic diseases, but also can prevent, manage, and treat these diseases. Stable availability, access, affordability, and use of nutritious foods across the lifecycle can help reduce the risk of chronic diseases and help treat and manage chronic diseases. Unfortunately, many individuals in the United States are nutrition and food insecure⁶ and do not have access to affordable, nutritious food.

There is a growing body of evidence that the health care system can be utilized to help patients access and consume healthy foods. To help address unhealthy diets and nutrition insecurity, evidence-based, cost-effective nutrition and food programs can be integrated into the health care system. “Food is Medicine” refers to a medical treatment or preventive intervention for patients with a diet-related health risk or condition and/or nutrition and food insecurity, to which they are referred by a health care provider, health care organization, or health insurance plan.⁷ Evidence indicates that incorporating Food is Medicine programs into the health care system is associated

¹ Buttorff C, Ruder T, Bauman M. *Multiple Chronic Conditions in the United States*. Santa Monica, CA: Rand Corp.; 2017 and Martin AB, Hartman M, Lassman D, Catlin A. *National Health Care Spending In 2019: Steady Growth for The Fourth Consecutive Year*. *Health Aff.* 2020;40(1):1-11.

² Tsao CW, Aday AW, Almarzooq ZI, Alonso A, Beaton AZ, Bittencourt MS, Boehme AK, Buxton AE, Carson AP, Commodore-Mensah Y, Elkind MSV, Evenson KR, Eze-Nliam C, Ferguson JF, Generoso G, Ho JE, Kalani R, Khan SS, Kissela BM, Knutson KL, Levine DA, Lewis TT, Liu J, Loop MS, Ma J, Mussolino ME, Navaneethan SD, Perak AM, Poudel R, Rezk-Hanna M, Roth GA, Schroeder EB, Shah SH, Thacker EL, VanWagner LB, Virani SS, Voecks JH, Wang N-Y, Yaffe K and Martin SS. Heart Disease and Stroke Statistics—2022 Update: A Report From the American Heart Association. *Circulation.* 2022;145:e153-e639

³ Centers for Disease Control and Prevention. *Health and Economic Costs of Chronic Diseases*. Accessed online December 7, 2022.

⁴ Centers for Disease Control and Prevention. About underlying cause of death, 1999–2018.

⁵ Tsao CW, Aday AW, Almarzooq ZI, Alonso A, Beaton AZ, Bittencourt MS, Boehme AK, Buxton AE, Carson AP, Commodore-Mensah Y, Elkind MSV, Evenson KR, Eze-Nliam C, Ferguson JF, Generoso G, Ho JE, Kalani R, Khan SS, Kissela BM, Knutson KL, Levine DA, Lewis TT, Liu J, Loop MS, Ma J, Mussolino ME, Navaneethan SD, Perak AM, Poudel R, Rezk-Hanna M, Roth GA, Schroeder EB, Shah SH, Thacker EL, VanWagner LB, Virani SS, Voecks JH, Wang N-Y, Yaffe K and Martin SS. Heart Disease and Stroke Statistics—2022 Update: A Report From the American Heart Association. *Circulation.* 2022;145:e153-e639.

⁶ Coleman-Jensen A, Rabbitt MP, Gregory CA and Singh A. Household Food Security in the United States in 2020. Economic Research Report No (ERR-298) 55 pp. 2021.

⁷ Harvard University Center for Health Law and Policy Innovation. <https://chlp.org/project/food-is-medicine/>

with improved health outcomes, reduced health care use and cost, reduced health disparities, and reduced nutrition and food insecurity for patients living with chronic diseases.

For decades, the American Heart Association has advocated for policies that improve heart health across the U.S. population. The Association supports efforts to increase equitable access to nutritious, affordable food in the health care delivery system and to connect under resourced patients with community resources that will enable consumption of healthy eating patterns. While the ultimate desire is to advance nutrition and food programs that improve health and well-being for all in America, we must start by strengthening the existing evidence base for Food is Medicine. To build the case for widespread integration of Food is Medicine programs in the health care delivery system, there needs to be more robust, generalizable research that conclusively demonstrates effectiveness and value of such programs when delivered using scalable platforms. I am pleased to testify today about why Food is Medicine programs are promising and why more evidence is needed.

In the past decade, Food is Medicine approaches have gained interest and momentum, especially as the COVID-19 pandemic raised public consciousness about nutrition security. Expanding availability and use of nutrition services at scale could be a key to supporting better health and health equity and reducing preventable health care expenditures. To unlock the full potential of Food is Medicine, we must build on the existing scientific evidence. Further research is needed to determine and support the best approaches to increase availability, access, affordability, and consumption of nutritious foods via health care integration.⁸ The research must be purpose-built to help decision-makers across the country—including private, public, and nonprofit sectors that are currently working in silos—prioritize policies and programs that integrate nutrition incentives into health care delivery, create clinic-community linkages, and develop programs that are sufficiently cost effective to merit benefit coverage and reimbursement for patients. For many populations, especially those with lower incomes and people of color, healthy food is often less accessible. Factors that impact accessibility include cost barriers, geographical location, personal cognitive and physical capacity factors (i.e., dementia, disability, etc.), and inadequate matching with cultural and personal preferences. Households that do not have access to healthy foods are at a higher risk of consuming calorie-dense, nutrient deficient foods, which increases the risk for chronic diseases. New research can help inform the development of more impactful health care policies that improve individual health markers, lower health care costs, and are feasible and scalable from both an implementation and cost perspective.

The interest in Food is Medicine programs and their increasing use within health care has been in part ahead of the research, driven in large part by organizations and advocates who have worked to develop service delivery programs to meet the nutritional needs of people living with chronic diseases. Within the past several years, health care integration of Food is Medicine interventions has become increasingly common. A new wave of interest and investment in exploring the full impact of these programs offers opportunities to sustainably support and scale access to the most effective programs.

⁸ Thorndike AN et.al. Strengthening US Food Policies and Programs to Promote Equity in Nutrition Security: A Policy Statement from the American Heart Association. *Circulation*. 2022; 145:e1077-e1093

There are distinct approaches that are described broadly as Food is Medicine, including but not limited to:

- **Medically Tailored Meals.** Medically tailored meals (MTM) are utilized to address diet-related diseases and food access among higher-risk individuals. MTM provide home delivery of fully prepared meals designed by a registered dietician to meet the specific dietary needs of an individual living with one or more chronic diseases. This intervention is ideal for patients living with chronic diseases who are unable to shop for or prepare meals for themselves, such as patients following a hospitalization for congestive heart failure who are frail and have difficulty ambulating.
- **Healthy Food Prescription Programs.** Food prescription programs (also called produce prescription programs) incorporate food access directly into the patient-provider relationship which better enables patients to follow their providers' dietary advice. In these programs, providers "prescribe" fruits and vegetables, or other healthy foods, to at-risk patients in the form of coupons or vouchers for local farmers' markets, grocery stores, or mobile markets. These programs are also typically accompanied by nutrition education and/or counseling and can be paired with services provided by registered dietitians or community health workers. Food prescription programs are typically offered to people living with chronic diseases that are exacerbated by unhealthy food and who have nutrition and food insecurity. Some food prescription programs have been funded through the farm bill reauthorization process. The 2018 farm bill provided \$250 million of mandatory funding for the Gus Schumacher Nutrition Incentives Program (GusNIP), some of which is allocated for produce prescription pilots.

These programs have commonly been evaluated as part of small-scale studies and pilot projects conducted using local resources that are generally not scalable. Of the studies on Food is Medicine programs, the literature on medically tailored meals is the most well-developed, with a number of rigorous study designs and results that examine clinical outcomes and health care utilization and spending. MTM are associated with improved health outcomes for people living with chronic diseases such as diabetes, heart failure, HIV, and chronic liver disease. Patients on medically tailored meals have reported higher quality of life scores, lower rates of food insecurity, and improved diet quality.^{9,10} MTM are also associated with reduced hospital admissions and overall health care costs.^{11,19,12}

⁹ Ishaq O, Vega RM, Zullig L, Wassung A, Walters D, Du NBL, Ahn J, Leichman CG, Cohen DJ, Gu P, Chachoua A, Leichman LP, Pearl K and Schiff PB. Food as medicine: A randomized controlled trial (RCT) of home delivered, medically tailored meals (HDMTM) on quality of life (QoL) in metastatic lung and non-colorectal GI cancer patients. *Journal of Clinical Oncology*. 2016;34

¹⁰ Berkowitz SA, Delahanty LM, Terranova J, Steiner B, Ruazol MP, Singh R, Shahid NN and Wexler DJ. Medically Tailored Meal Delivery for Diabetes Patients with Food Insecurity: a Randomized Cross-over Trial. *J Gen Intern Med*. 2019;34:396-404.

¹¹ Berkowitz SA, Terranova J, Randall L, Cranston K, Waters DB and Hsu J. Association Between Receipt of a Medically Tailored Meal Program and Health Care Use. *JAMA Intern Med*. 2019;179:786-793.

¹² Berkowitz SA, Terranova J, Hill C, Ajayi T, Linsky T, Tishler LW and DeWalt DA. Meal Delivery Programs Reduce The Use Of Costly Health Care In Dually Eligible Medicare And Medicaid Beneficiaries. *Health Aff (Millwood)*. 2018;37:535-542.

The research suggests that produce prescription programs are effective at increasing fruit and vegetable consumption^{13,14} and reducing household food insecurity.¹⁵ The studies conducted on food prescription programs have found that some of these programs are associated with improved health outcomes and reduced health care burden including decreased hemoglobin A1C levels¹⁶ and lower body mass index.¹⁷ While modeling studies have suggested that food prescription programs may prevent cardiovascular disease and diabetes, these have typically had to make assumptions about the longer term effects of short-term interventions that may or may not end up being confirmed.¹⁸

In general, many of the Food is Medicine studies that have been conducted using pre-post examination of a group that received an intervention without comparison groups; the measured impact of such interventions may be overstated since they do not account for the general tendency of measured outcomes to regress to the mean. Furthermore, only a small number of randomized controlled trials have been done and those that have been done with few exceptions are small and typically not tested using a scalable infrastructure. More broadly, there are important questions to answer regarding the intensity of Food is Medicine interventions, the duration, delivery, the role of patient preferences and choice, the incorporation of educational or behavioral strategies or coaching in addition to food permission, the testing of comparative effectiveness of ways to change behaviors and habits, and of cost effectiveness. More testing using infrastructure that can be replicated and scaled will be particularly important in determining ways to create solutions that could be deployed widely across the United States.

Growing recognition of the importance of unmet social needs and widespread health inequities is helping to drive further interest in developing and testing Food is Medicine programs. Changes in payment reforms to Medicare and Medicaid has signaled openness to regulatory pathways that can be leveraged to impact provider behavior and patient outcomes. Recently, the Centers for Medicare and Medicaid Services for the first-time required hospitals to screen patients for needs related to food insecurity, housing, transportation, and other social determinants of health. State Medicaid agencies may currently apply for waivers (i.e., Section 1115 demonstration waiver and 1915(b) waiver) to test new Food Medicine approaches, including MTM and produce prescription programs, and states have begun to take advantage of these opportunities for innovation. These policy pathways have created momentum and an environment that allows for more researchers to assess the effectiveness of the implementation of different Food is Medicine approaches.

¹³ Bhat S, Coyle DH, Trieu K, Neal B, Mozaffarian D, Marklund M and Wu JHY. Healthy Food Prescription Programs and their Impact on Dietary Behavior and Cardiometabolic Risk Factors: A Systematic Review and Meta-Analysis. *Advances in Nutrition*. 2021.

¹⁴ Marcinkevage J, Auvinen A and Nambuthiri S. Washington State's Fruit and Vegetable Prescription Program: Improving Affordability of Healthy Foods for Low-Income Patients. *Prev Chronic Dis*. 2019;16:e91.

¹⁵ Ridberg RA, Bell JF, Merritt KE, Harris DM, Young HM and Tancredi DJ. A Pediatric Fruit and Vegetable Prescription Program Increases Food Security in Low-Income Households. *J Nutr Educ Behav*. 2019;51:224-230.e1.

¹⁶ Bryce R, Guajardo C, Iarraza D, Milgrom N, Pike D, Savoie K, Valbuena F and Miller-Matero LR. Participation in a farmers' market fruit and vegetable prescription program at a federally qualified health center improves hemoglobin A1C in low-income uncontrolled diabetics. *Prev Med Rep*. 2017;7.

¹⁷ Cavanagh M, Jurkowski J, Bozlak C, Hastings J and Klein A. Veggie Rx: an outcome evaluation of a healthy food incentive programme. *Public Health Nutr*. 2017;20:2636-2641.

¹⁸ Lee Y, Mozaffarian D, Sy S, Huang Y, Liu J, Wilde PE, Abrahams-Gessel S, Jardim TdSV, Gaziano TA and Micha R. Costeffectiveness of financial incentives for improving diet and health through Medicare and Medicaid: A microsimulation study. *PLoS Med*. 2019;16:e1002761.

Several organizations, including the American Heart Association, have conducted comprehensive analyses of programs and efforts in the Food is Medicine space and have provided recommendations for programs, research, and policy solutions. A common challenge and barrier to system transformation has been that among the wide variety of programmatic interventions at the intersection of food and health, most exist on a small and siloed scale. Different hospitals, payers, and health care providers have approached these programs in various ways, without any clear or standardized set of implementation approaches likely to be capable of scaling nationally. To create more generalizable approaches, there would ideally be coordination between the Department of Health and Human Services (HHS) and the United States Department of Agriculture (USDA) with support for research from the National Institutes of Health (NIH) and involvement of public-private partnerships both to facilitate the testing of scalable ideas and to provide financial support. Current Food is Medicine interventions do not consistently include the perspectives and voice of community beneficiaries, which has further limited engagement by those who are offered the programs and thereby diminished their impact. In all these studies, careful assessment of cost effectiveness, particularly in relation to already covered health care services, should be conducted as this will be important in informing decisions about public or private health insurance coverage.

In conjunction with the White House Conference on Hunger, Nutrition, and Health, which came to fruition thanks to the work of the Chair and Ranking Member of this subcommittee, The Rockefeller Foundation and the American Heart Association have committed to mobilize \$250 million to build a national Food is Medicine Research Initiative, which is planned to launch in Spring 2023. This transformative research initiative will generate evidence and tools to help the health sector design and scale programs that increase access to nutritious food, with the goal of generating evidence on what works for whom that can be used to convince public and private sector payors to cover different types of interventions that could vary based on the level of patient need and the likely cost of inaction. Working with patients and partners in government, academia, health care, industry, and community-based organizations, the Food is Medicine Research Initiative will accelerate the rate of innovation as we will build the public-private partnerships necessary to unlock solutions to some of our most complex challenges

As the pandemic has demonstrated, chronic diseases and unhealthy diets are inextricably linked, and health disparities remain all too pervasive. Continued federal support for nutrition research, including Food is Medicine programs, will be necessary to support efforts to prevent and treat chronic diseases, lower health care costs, and improve quality of life. I thank you for the opportunity to offer my perspective today and for your continued leadership to improve cardiovascular health and wellness by increasing access to healthy food. I look forward to your questions.