Philip R. Nader Legacy of Health Lectureship
UTHealth Houston School of Public Health

Food as Medicine in Pediatrics:

A Necessary Responsibility

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Food as Medicine Program Director
Elevance Health
Community Pediatrician, Children's National Hospital
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October 3, 2024

Nothing to Disclose

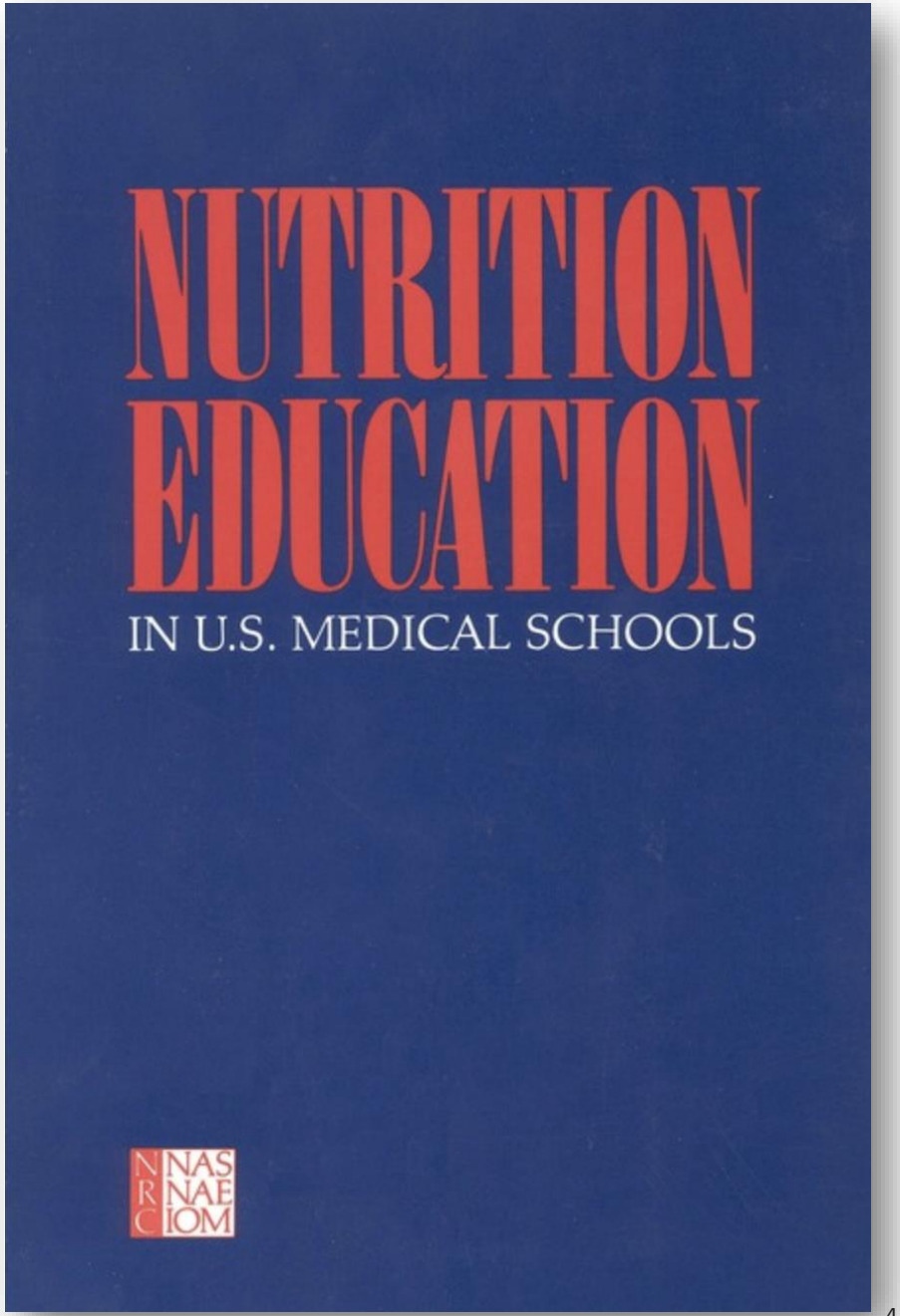
Learning Objectives

1. Describe the growing movement of ”food as medicine” in healthcare
2. Determine gaps in current trends in “food as medicine”
3. Describe practical examples of incorporation of “food as medicine” in pediatric clinical settings

1985 National Academy of Sciences, National Research Council Report

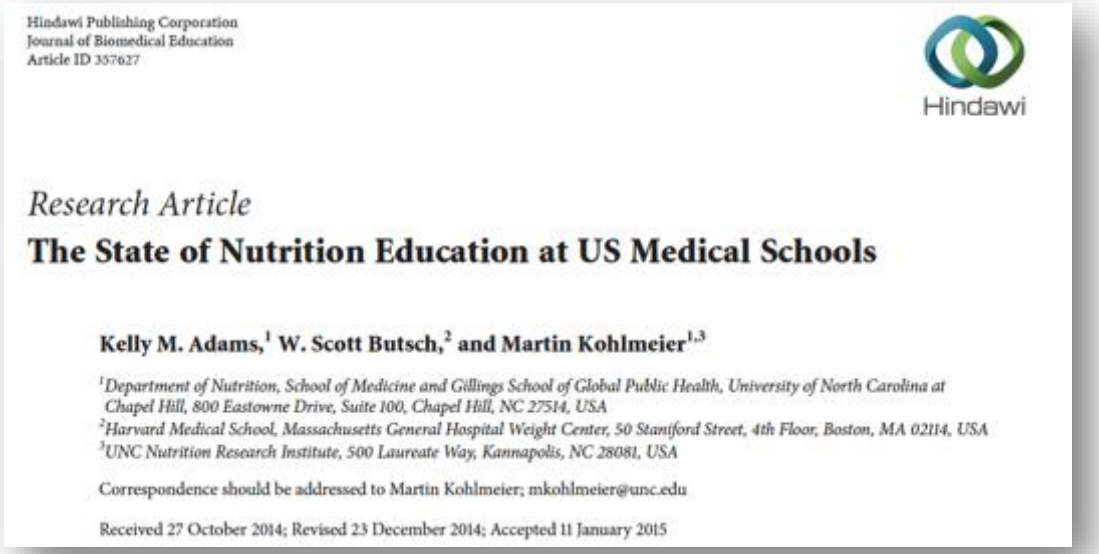
- ”The committee concluded that nutrition education programs in U.S. medical schools are **largely inadequate to meet the present and future demands of the medical profession**”

Recommendation: Minimum of **25-30 hours** in medical school curriculum



Limited Medical Training on Nutrition

- Majority of medical schools failed to provide the minimum of 25hrs on nutrition (71%, 86/121)
- 36% provided less than ½ of 25hrs of minimum education



Hindawi Publishing Corporation
Journal of Biomedical Education
Article ID 357627

Hindawi

Research Article

The State of Nutrition Education at US Medical Schools

Kelly M. Adams,[1] W. Scott Butsch,[2] and Martin Kohlmeier[1,3]

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[2]*Harvard Medical School, Massachusetts General Hospital Weight Center, 50 Staniford Street, 4th Floor, Boston, MA 02114, USA*
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Received 27 October 2014; Revised 23 December 2014; Accepted 11 January 2015

Residency and specialties training in nutrition: a call for action[1–4]

Carine M Lenders, Darwin D Deen, Bruce Bistrian, Marilyn S Edwards, Douglas L Seidner, M Molly McMahon, Martin Kohlmeier, and Nancy F Krebs

Nutrition in medical education: a systematic review

Jennifer Crowley, Lauren Ball, Gerrit Jan Hiddink

J Am Coll Nutr. 2008 April ; 27(2): 287–298.

What Do Resident Physicians Know about Nutrition? An Evaluation of Attitudes, Self-Perceived Proficiency and Knowledge

Marion L. Vetter, MD, RD, Sharon J. Herring, MD, Minisha Sood, MD, Nirav R. Shah, MD, MPH, and **Adina L. Kalet, MD, MPH**
Division of General Internal Medicine, Section of Primary Care, Department of Medicine, New York University School of Medicine, New York, New York (M.L.V., S.J.H., M.S., N.R.S., A.L.K.), Department of Medicine, University of Pennsylvania, Philadelphia, Pennsylvania (M.L.V.), Department of Ambulatory Care and Prevention, Harvard Medical School and Harvard Pilgrim Healthcare, Boston, Massachusetts (S.J.H.)

Nutrition Education in Internal Medicine Residency Programs and Predictors of Residents' Dietary Counseling Practices

Journal of Medical Education and Curricular Development
Volume 5: 1–10
© The Author(s) 2018
DOI: 10.1177/2382120518763360
SAGE

Stutee Khandelwal[1,2], Sarah E Zemore[1,3] and Anke Hemmerling[1]
[1]School of Public Health, University of California, Berkeley, Berkeley, CA, USA. [2]Fresno Medical Education Program, Department of Medicine, University of California, San Francisco, Fresno, CA, USA. [3]Alcohol Research Group, Public Health Institute, Emeryville, CA, USA.

Summary: *Residents, Fellows, practicing Clinicians* ***don't feel prepared*** *to effectively discuss nutrition with patients for disease prevention or management.*

Why is it important that Clinicians be better trained in engaging this topic?

US Adults w/at least 1 Chronic Disease:

National Center for Chronic Disease Prevention and Health Promotion

Hypertension:

Prediabetes/Diabetes:

Overweight/Obesity:

National Center for Chronic Disease Prevention and Health Promotion

The Rockefeller Foundation reports ***$1.1 Trillion dollars of Health Care costs are attributed to poor nutrition and diet-related disease each year.***

True Cost of Food, Rockefeller Foundation , 2021

The State of US Health, 1990-2016: Burden of Diseases, Injuries, and Risk Factors Among US States

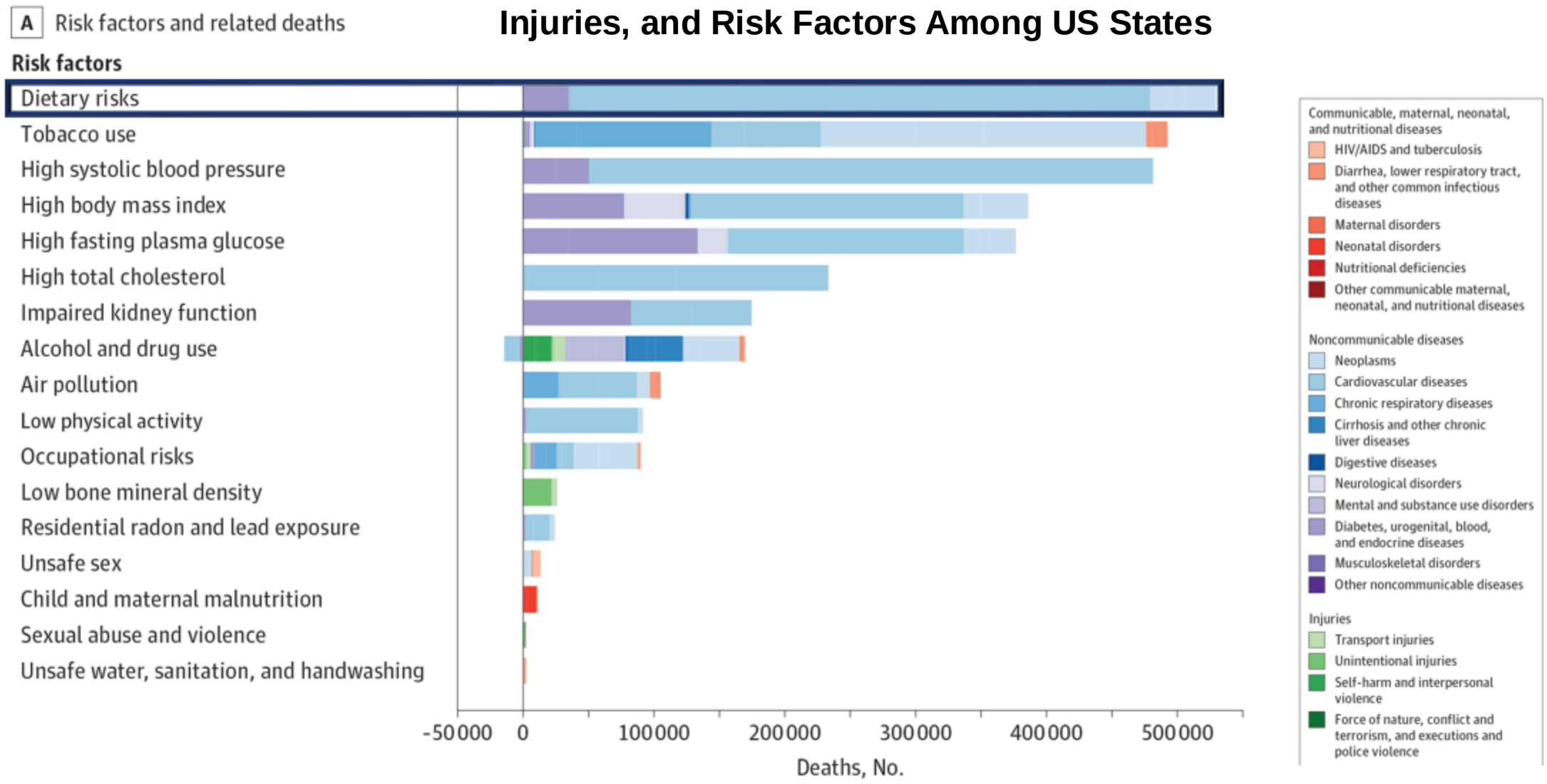

Figure: Number of Deaths and Percentage of Disability-Adjusted Life-Years Related to the 17 Leading Risk Factors in the United States, 2016

Meaning of Food in Life Questionnaire(MFLQ)

Moral

Aesthetic

Social

Sacred

Health

Food Quality and Preference 59 (2017) 35–45

Contents lists available at ScienceDirect

Food Quality and Preference

journal homepage: www.elsevier.com/locate/foodqual

Development and validation of the meaning of food in life questionnaire (MFLQ): Evidence for a new construct to explain eating behavior

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[b] The University of Pennsylvania, Department of Psychology, 3720 Walnut St., Philadelphia, PA 19104-6241, USA

ARTICLE INFO

Article history:
Received 23 June 2016
Received in revised form 31 January 2017
Accepted 2 February 2017
Available online 6 February 2017

Keywords:
Food choice
Meaning
Psychology
Diet
Morals
Health psychology

ABSTRACT

Herein we present the development and validation of an assessment tool for empirically measuring the meaning of food in life (MFL), a construct which has been shown through repeated qualitative, ethnographic and quantitative analyses to exert influence over food choice but which has never before been systematically operationalized for empirical investigation. In this investigation we operationalize the MFL and generate a 22-item tool for its assessment. The items were tested in an online format in three empirical studies (n = 560), and participants were recruited through MTurk. Exploratory factor analyses and item analysis were conducted to confirm the psychometric characteristics of the item pool. Overall, five distinct domains of food meanings emerged: moral, sacred, health, social, and aesthetic. Each dimension of food meaning was associated with different dietary intake outcomes, providing evidence for criterion validity. Further, each dimension of food meaning displayed associations with psychologically similar, yet distinct constructs from the literature in a manner concordant with the theoretical specifications of each construct, providing further validity evidence. The strong associations between the different domains of food meanings and behavioral outcomes suggest that this construct may be an important and clinically relevant aspect of people's relationship to food which has heretofore lacked systematic investigation.

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1. Introduction

1.1. The role of food meanings in eating behavior

Food choices are laden with meanings that figure importantly in humanity's symbolic, social, ecological and economic worlds. Many traditional cultures explicitly believe that "you are what you eat," thinking that in some capacity, the essence of a thing is consumed along with its substance. In most developed countries this adage is strongly denied, given an understanding of the process of digestion, in which food is reduced to a small set of rather simple molecules. However, research has demonstrated that even American college undergraduates, who deny "you are what you eat", retain this belief implicitly (Nemeroff & Rozin, 1989). Furthermore, there are stable differences between developed countries in how people relate to their food, oft tied to the worldview and value system of a unique culture. As Rozin, Remick, and Fischler (2011) demonstrated, the emphasis in American culture on individualism and abundance, on quantity over quality, and on variety of choice over traditional values, lead Americans to relate to and consume food in very different ways from the French. Food is more central in the lives and identity of the French, and eating is more ritualized and commensal. Moreover, within countries, socio-cultural values and eating patterns are highly interrelated, and research demonstrates that even in the postmodern food era people continue to use their food choice to communicate values and preferences, albeit in newly defined ways. Food from one's heritage culture plays a central role in the lives of immigrants, and is probably more resistant to change than any other cultural feature. Research into food attitudes in the USA, for example, found that food is considered an important part of family traditions, a significant source of pleasure in life, and an expression of love (Bellows, Alcaraz V, & Hallman, 2010). Further, Lindeman and Sirelius (2001) found that food choice is an avenue through which people embody and express their life philosophies. While the mechanisms through which meanings and values translate into observable dietary behaviors have not yet been thoroughly elucidated, research is mounting to indicate that values prioritizing alternative modes of production are significantly related to dietary behavior outcomes

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http://dx.doi.org/10.1016/j.foodqual.2017.02.002
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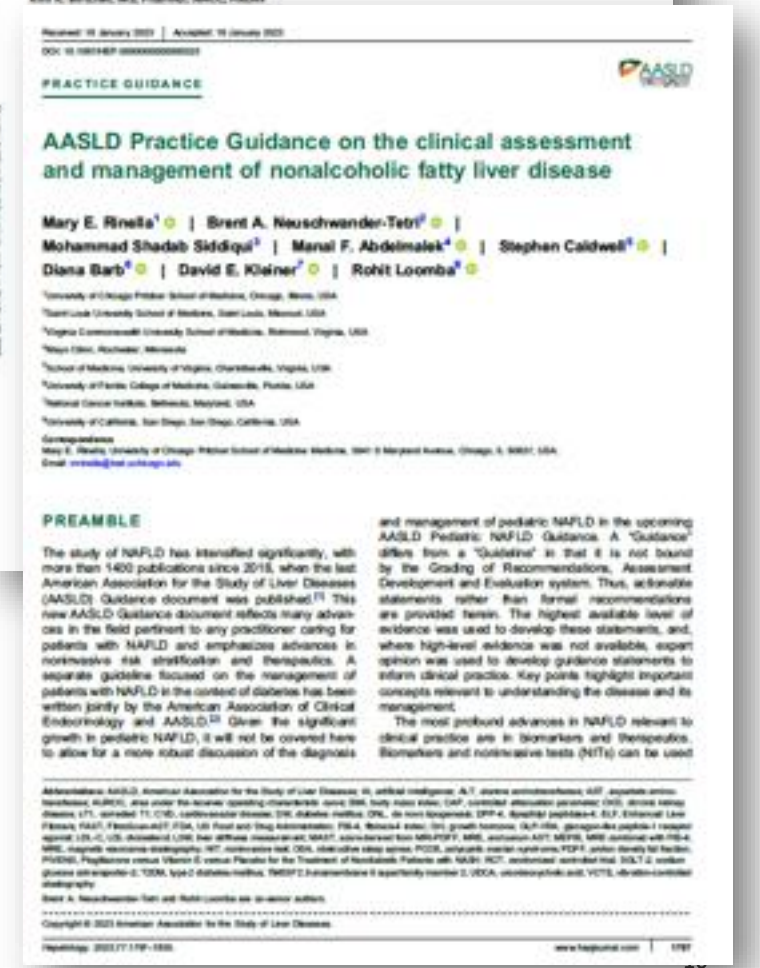
Diabetes Care
Supplement 1


Behavioral Counseling Interventions to Promote a Healthy Diet and Physical Activity for Cardiovascular Disease Prevention in Adults With Cardiovascular Risk Factors
US Preventive Services Task Force Recommendation Statement


Circulation
CHOLESTEROL CLINICAL PRACTICE GUIDELINES
2018 AHA/ACC/AACVPR/AAPA/ABC/ACPM/ADA/AGS/APhA/ASPC/NLA/PCNA Guideline on the Management of Blood Cholesterol
A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines


REPORT
A Review of Current Guidelines for the Treatment of Obesity


ESH Guidelines
2023 ESH Guidelines for the management of arterial hypertension
The Task Force for the management of arterial hypertension of the European Society of Hypertension
Endorsed by the International Society of Hypertension (ISH) and the European Renal Association (ERA)


PRACTICE GUIDANCE
AASLD Practice Guidance on the clinical assessment and management of nonalcoholic fatty liver disease
PREAMBLE


SUMMER

Clinical Nutrition Internship Program(CNIP)

American Society for Nutrition
Excellence in Nutrition Research and Practice

Food as Medicine Director

Food as Medicine

Food as medicine consists of the strategies and interventions that work as part of healthcare to improve access to nutritious food to prevent, manage, or even
treat disease.

Food Insecurity

Food insecurity describes “the limited or uncertain availability of nutritionally adequate and safe foods, or limited, or uncertain ability to acquire acceptable foods in socially acceptable ways.”

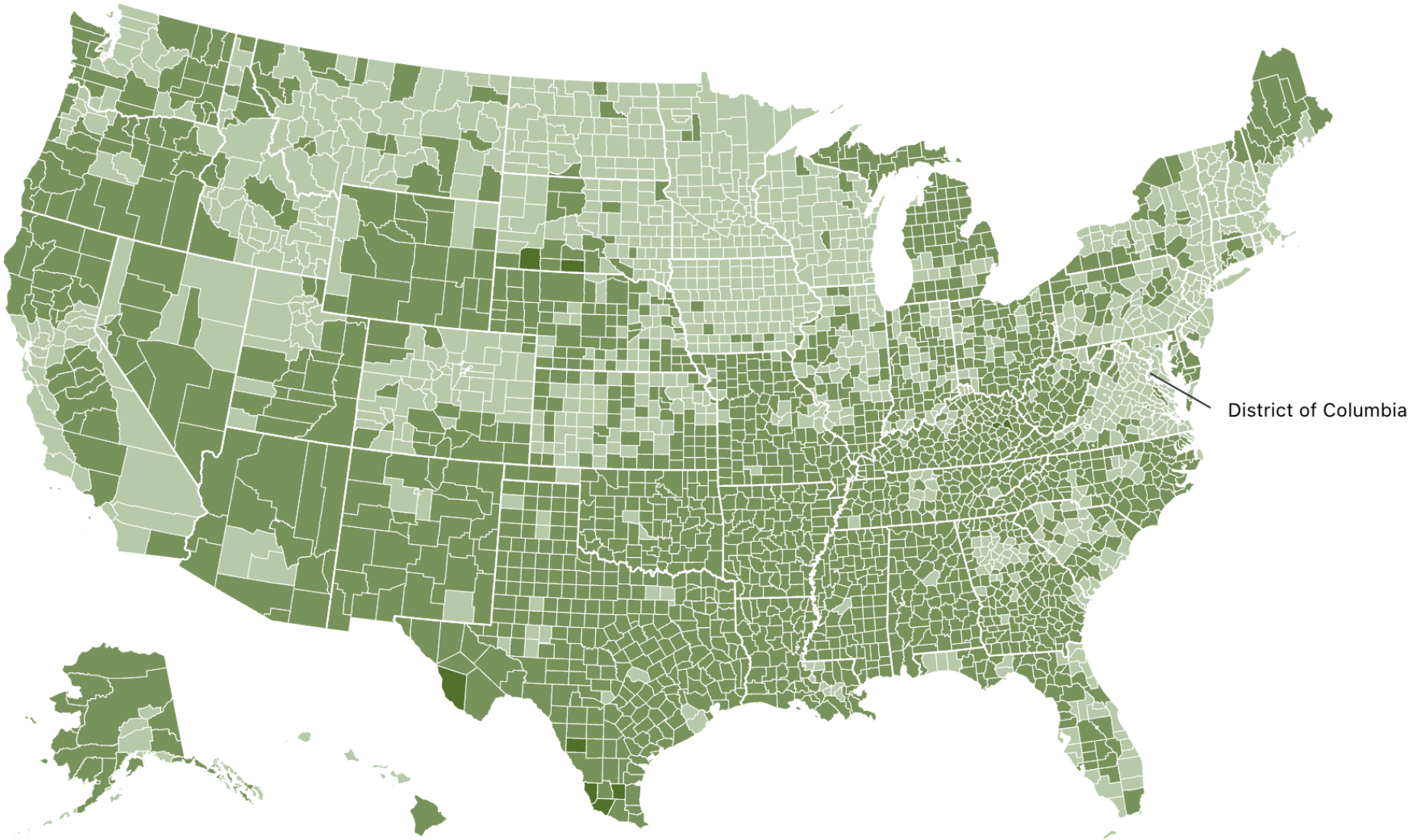
- Core Indicators of Nutritional State for Difficult to Sample Populations, 1990

Food security is when “all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life.”

- World Food Summit, 1996

“Food insecurity is as much about the threat of deprivation as it is about deprivation itself: **A food-insecure life means a life lived in fear of hunger**, and the psychological toll that takes.”

- New York Times, Brenda Ann Kenneally, 2020

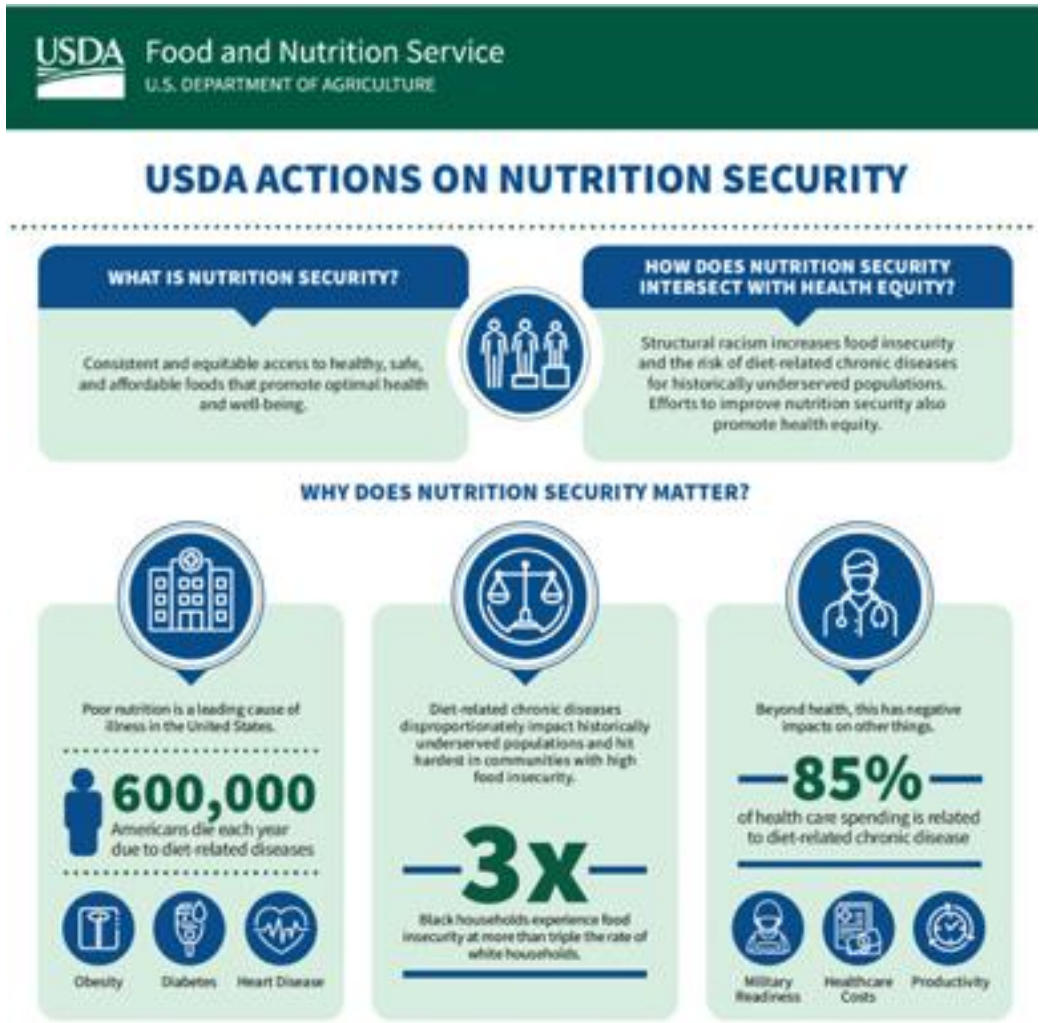


Food Insecurity Rates

No Data	0-13.0%	13.1-26.0%	26.1-39.0%	39.1-52.0%	52.1-65%

Map the Gap, Feeding America, 2022

Nutrition Insecurity Complements Food Insecurity



Nutrition Insecurity: Lack of consistent and equitable access to healthy, safe, and affordable foods that promote optimal health and well-being.

Correspondence

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

Food as Medicine Pyramid

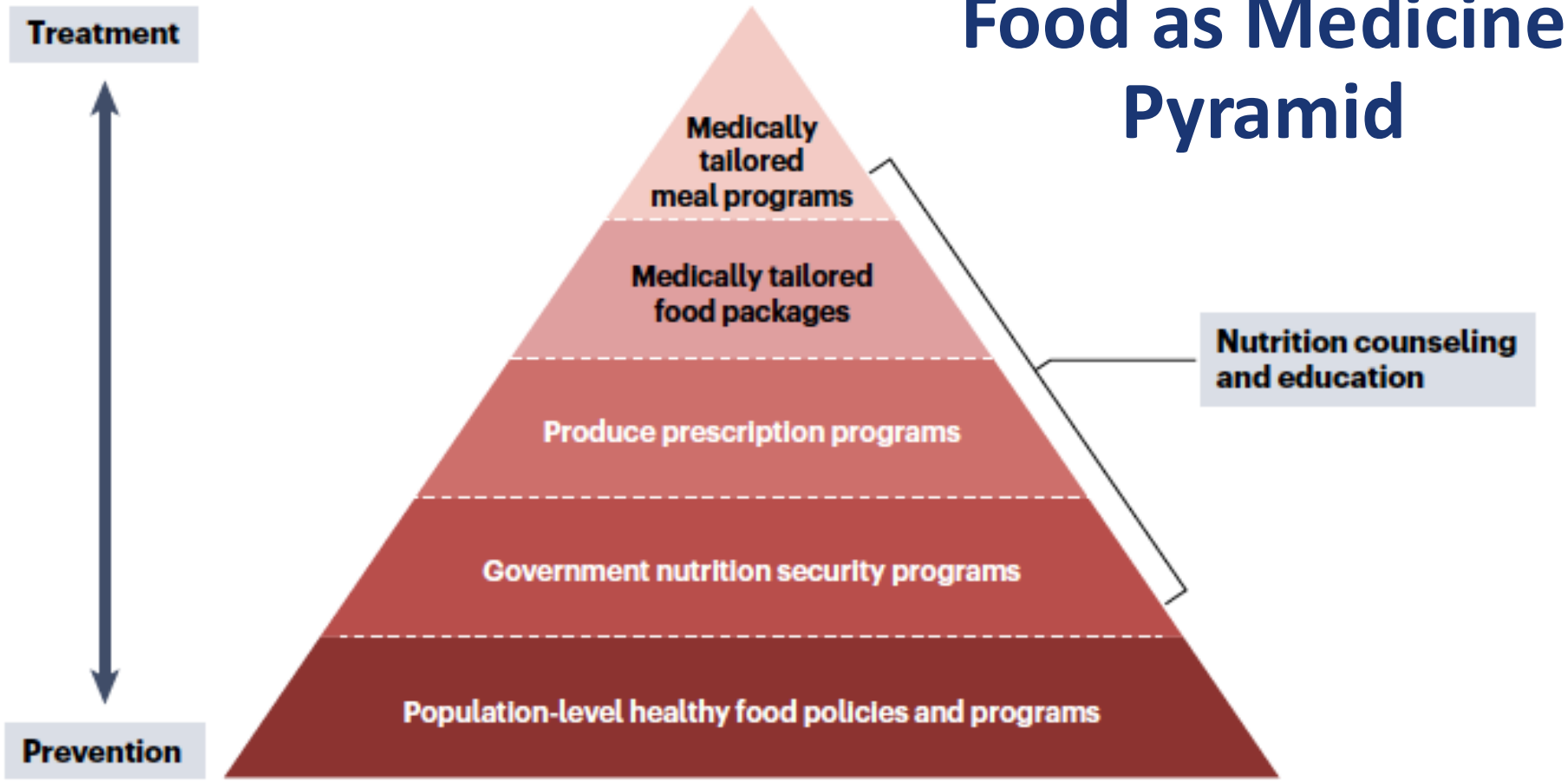


Fig. 1 | The Food is Medicine pyramid. An evolving framework of programs and interventions in healthcare and population health to integrate food-based nutrition interventions at multiple levels for specific health needs of different focus populations. Nutrition security programs include the Supplemental 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).

Fischer, et. al, 2024, Mozafarrian, et. al, 2022

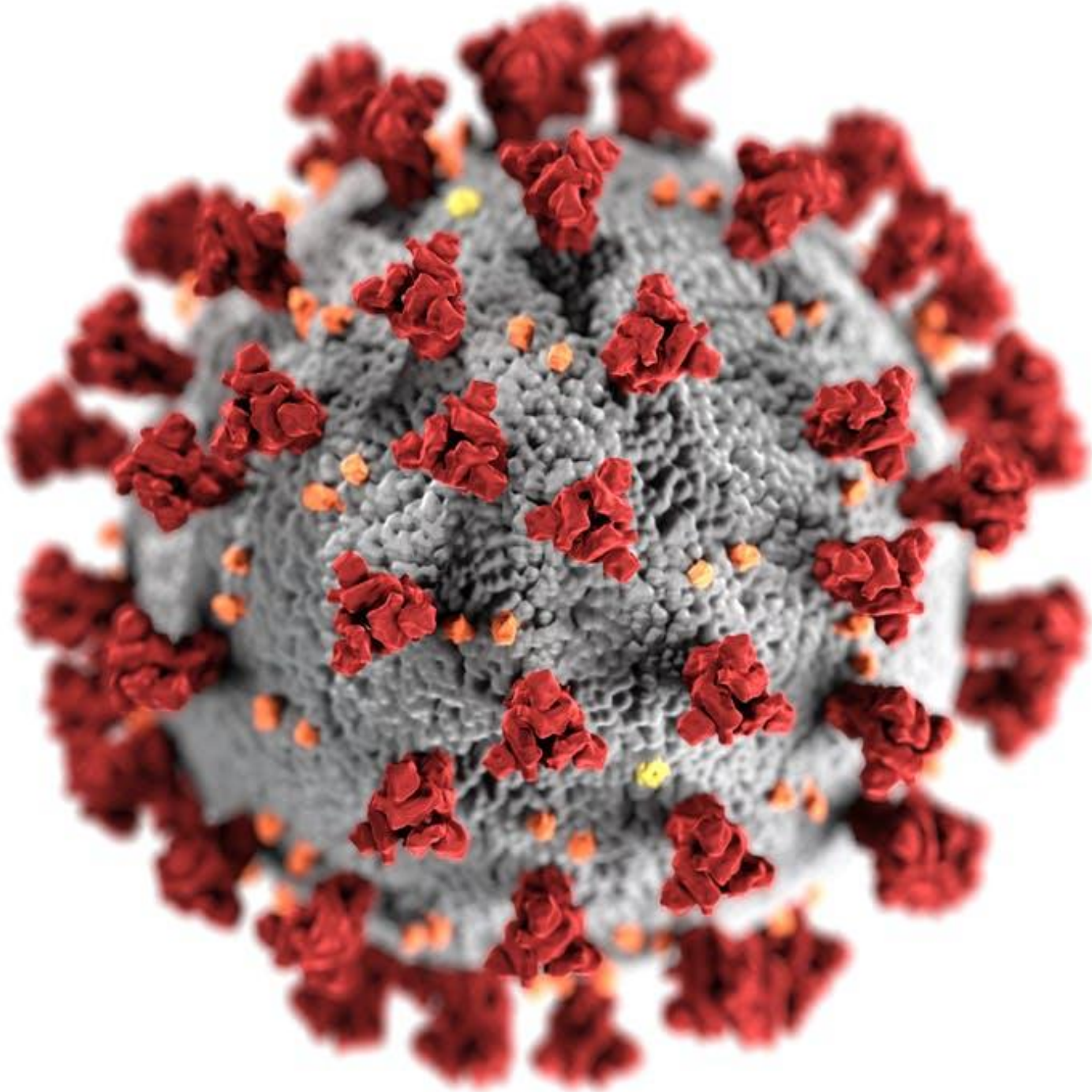
Top 3 Approaches

1	Medically Tailored Meals	• >50% of caloric needs covered • Preprepared meals ready to go • Designed by dietitian	$$$$
2	Medically Tailored Groceries	• Amount of food varies • Provides mixture of produce and other grocery items	$$
3	Produce Prescriptions	• Amount of food varies • Provides fresh, frozen, or canned fruits and vegetables	$$

FAM Findings in the Literature

- Decrease Emergency Department visits
- Decrease hospital readmissions
- Improve dietary intake
- Decrease blood pressure
- Decrease in hemoglobin A1c
- Improve overall health status
- Decreased mental health risk
- Decrease food insecurity
- *And much more…*

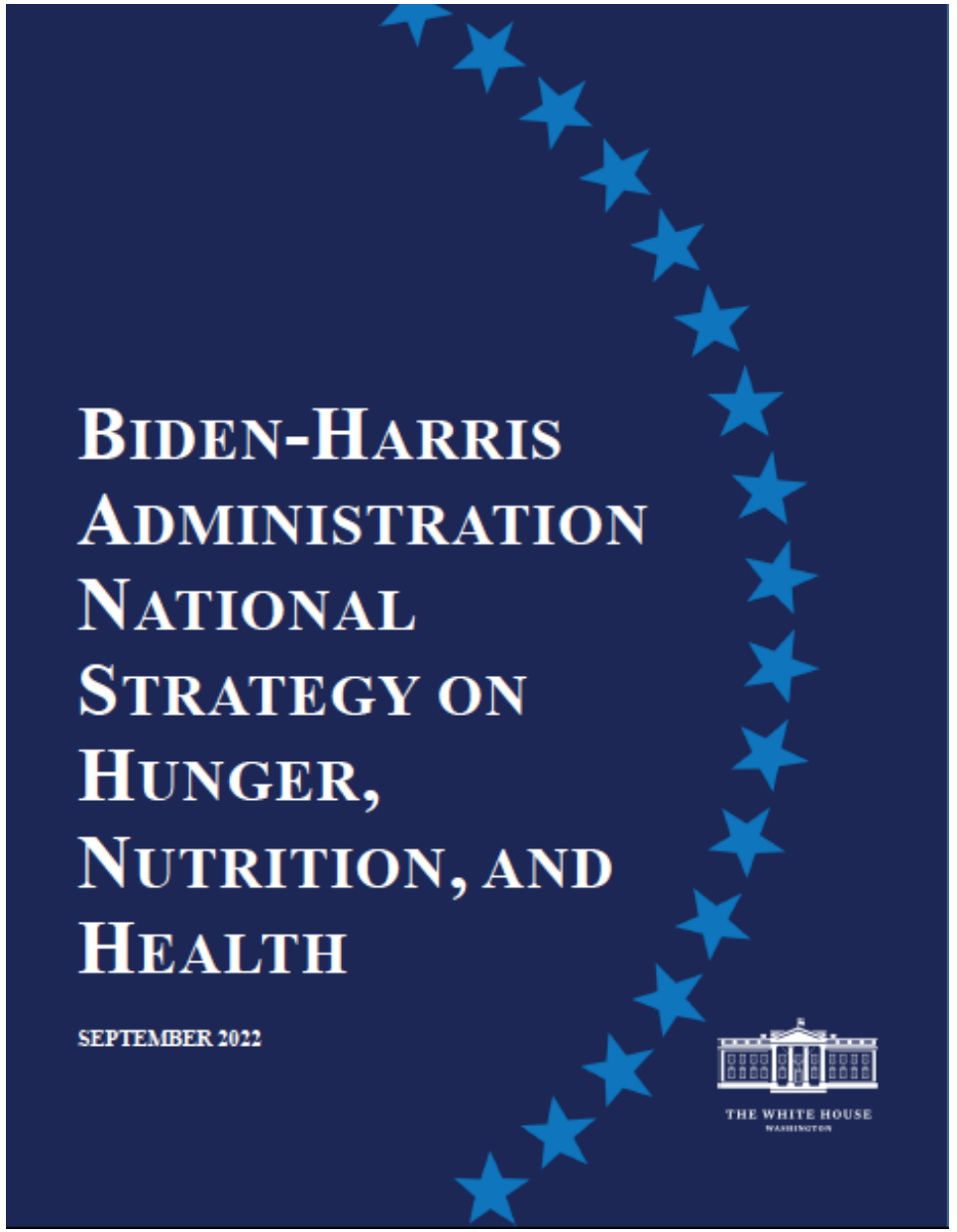
Where is the FAM momentum coming from?



March 11, 2020

WHITE HOUSE
CONFERENCE ON
**HUNGER,
NUTRITION,
& HEALTH**

>8 billion dollars in commitments



Department of Health & Human Services(HHS) Food is Medicine Summit

HHS 5 FAM Principles:

1.Recognizing that **nourishment is essential** for good health, wellbeing, and resilience.

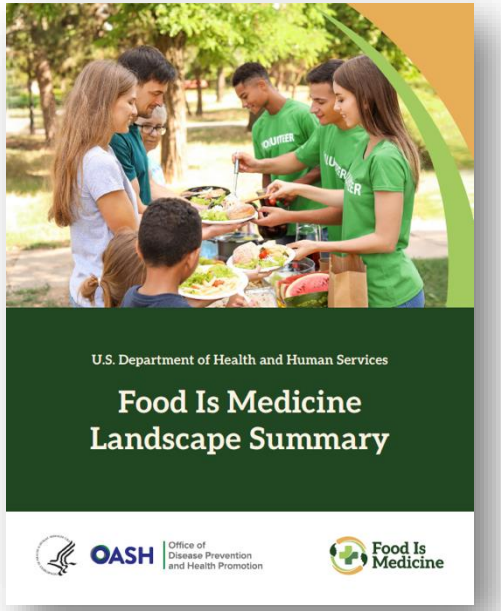
2.Facilitating easy access to healthy food across the health continuum in the community.

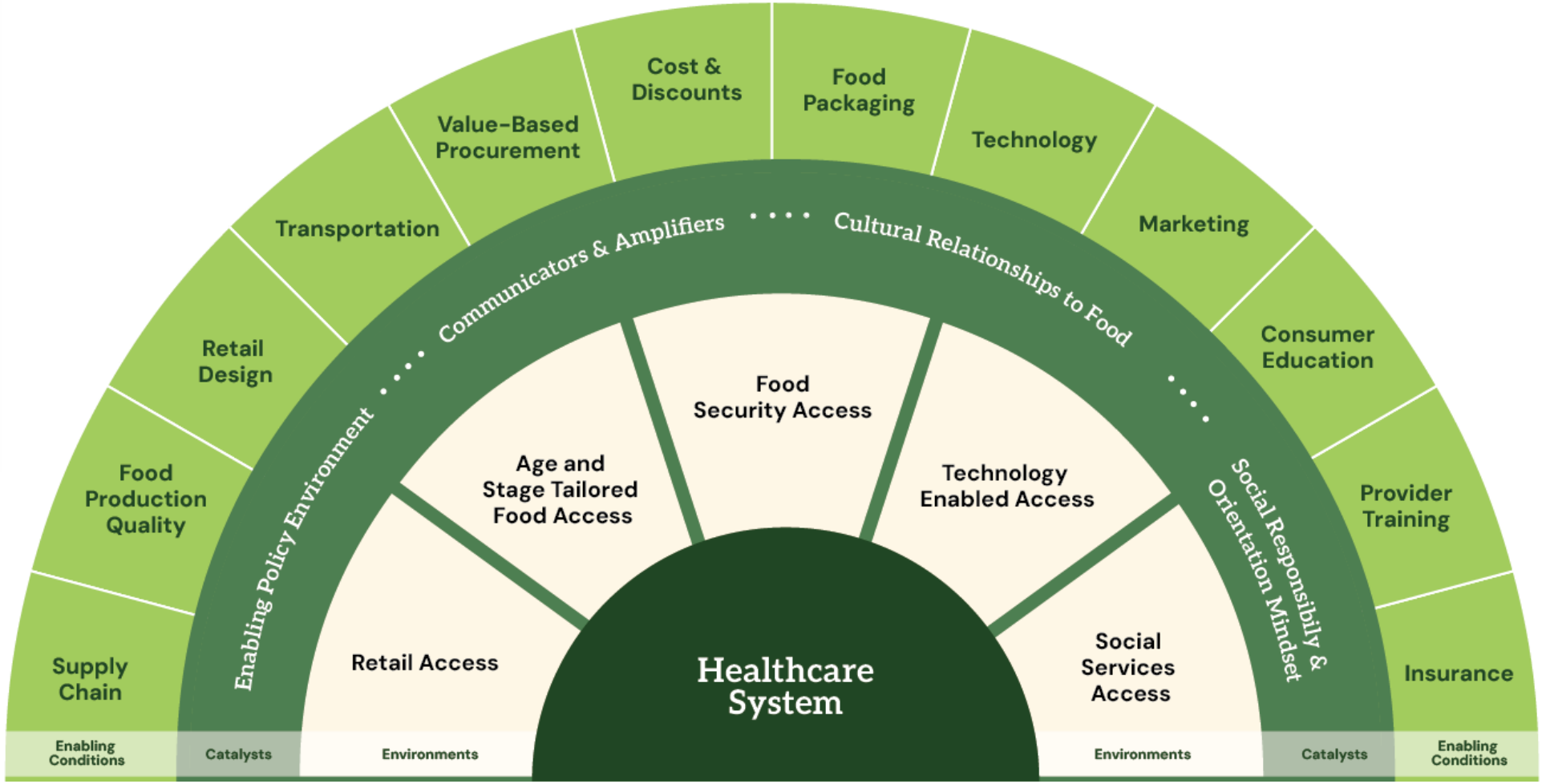
3.Cultivating understanding of the relationship between nutrition and health.

4.Uniting partners with diverse assets to build sustained and integrated solutions.

5.Investing in the **capacity of under-resourced communities**.

HHS Launches new Food is Medicine Toolkit





- Adults carry the Majority of Costs in healthcare
- Adults carry the greatest Disease Burden
- Adults carry the Greatest Risk for healthcare system

Prevent, Manage, & Treat Chronic Diseases

Improve Learning and Academic Achievement

Support Brain Development

Deter Picky Eating & Expand the Palate

Support Growth & Development

Support Immune System

Support Mental Health

With Food as Medicine, the whole household matters…

Lived Experiences of Households with Children Experiencing Food/Nutrition Insecurity

"Food Anxiety"

Basic anxiety or worry about food. Preoccupation with access to enough food.

"Monotony of Diet"

Decrease in Nutritional Quality, Variety, and/or Desirability of diet

"Adult intake decreases"

Food shortage experience and adults decrease intake

"Child intake decreases"

Food intake of children decreases, and adults acquire food in 'socially uncomfortable' ways

Nord, J Hunger Env Nut, 2013; Fram et. al, J Nutrition, 2011; Alaimo, Top Cli Nut, 2005; Essel et. al, Springer 2018

Opinion

VIEWPOINT

HEALTH AND THE 2024 US ELECTION

Food Insecurity Is a Source of Toxic Stress

Cindy W. Leung, ScD, MPH
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Division of Nutritional Sciences, Cornell University, Ithaca, New York.

Kofi Essel, MD, MPH
George Washington University School of Medicine & Health Sciences, Washington, DC; and Elevance Health, Indianapolis, Indiana.

Food insecurity is a pervasive and persistent issue in the United States that disproportionately affects families with children and Black, Indigenous, and other people of color.[1] Food insecurity has been associated with psychological, cognitive, and behavioral health consequences in children, contributing to lifelong socioeconomic and health inequities.[2] Identifying pathways by which food insecurity affects children's health is critical to informing intervention efforts to eliminate childhood food insecurity. We posit that toxic stress is a prominent pathway underlying food insecurity and children's health and advocate for research, clinical, and policy approaches to better address the root causes of food insecurity and promote lifelong health.

Toxic stress refers to the biological response to experiencing a strong, frequent, or prolonged stressor without the buffering effect of a supportive environment. Risk factors of toxic stress have traditionally focused on adverse childhood experiences (ACEs) but have recently been expanded to include poverty, discrimination, and other chronic exposures.[3] These experiences of adversity can lead to permanent changes in children's brain structure and function, leading to impaired cognitive development, behavioral disorders, and sustained activation of the body's stress responses, resulting in systemic inflammation and immune dysregulation.

Food insecurity meets all the criteria of a toxic stressor. Food insecurity is strong; despite caregivers' efforts to shield them, children not only demonstrate awareness of food insecurity but also can attribute multiple negative psychological states (eg, anxiety, shame, sadness) directly to their experience.[4] Food insecurity can be frequent and prolonged. Many families with children experience cyclical episodes of food insecurity for several months of the year,[1] and food insecurity has been shown to track across the life course and generations.[5] Food insecurity also disrupts caregivers' abilities to create a positive and supportive environment by increasing their anxiety and depression and negatively affecting their interactions with children.[6]

The framing of food insecurity matters. The national discourse has largely emphasized food insecurity as a nutritional concern, focusing on the reductions in diet quality and quantity that occur as food resources become scarce. As a result, interventions to address food insecurity typically work through direct or indirect food provision. While this nutrition safety net has been instrumental in stabilizing food insecurity during economic recessions, more efforts are needed to meet the national goal of eliminating childhood food insecurity.

Framing food insecurity as a toxic stressor not only better underscores children's experiences of food insecurity[4]—on par with other ACEs known to invoke a toxic stress response—but also provides a plausible mechanism for explaining why food insecurity affects children's health and development beyond nutritional intake. The Table describes examples of research, clinical, and policy approaches for addressing food insecurity as a toxic stressor to complement current nutrition-focused efforts.

Research Approaches

Stress is a potential pathway connecting food insecurity and health outcomes, but few studies have empirically examined this in children. Mechanistic studies are needed to complement epidemiological and other observational studies. For example, laboratory studies that incorporate cognitive assessments, cortisol, inflammatory markers, cardiovascular reactivity, and neuromodulation can be used to measure children's biological stress responses during acute or chronic food insecurity. These studies can also explore factors that might buffer the stress response and contribute to resilience. Second, research is needed to examine epigenetic alterations of the hypothalamic-pituitary-adrenal axis from early-life exposure to food insecurity that constitute risk factors for later-life health. Third, promising biomarkers to capture toxic stress (eg, cortisol, interleukins) can be incorporated into nutrition program evaluation plans as outcome measures, complementing traditional metrics to appraise program success. Fourth, applying relevant theories and frameworks, such as syndemic theory[7] and the behavioral science framework[8] in research and program evaluation studies focused on capturing and addressing structural and systemic barriers to food security, is critical to assess the impact of chronic food insecurity (a toxic stress) on child health outcomes throughout life.

Clinical Approaches

Several major medical organizations recommend clinical screening for food insecurity using the Hunger Vital Sign. These efforts are often paired with clinical-community partnerships to address food provision and connect patients to federal food assistance. However, pediatricians must also recognize and treat food insecurity as a source of toxic stress, which may require training in therapeutic interventions that can be paired with existing nutrition-focused approaches. Existing models to treat ACEs can also be adapted in the context of food insecurity, including trauma-informed mental health care or stress-reduction interventions, promoting supportive relationships between children, caregivers, and other trusted adults and providing community referrals to address families' other unmet social needs. Extending existing nutrition-focused clinical interventions (eg, Food as Medicine programs) to address the

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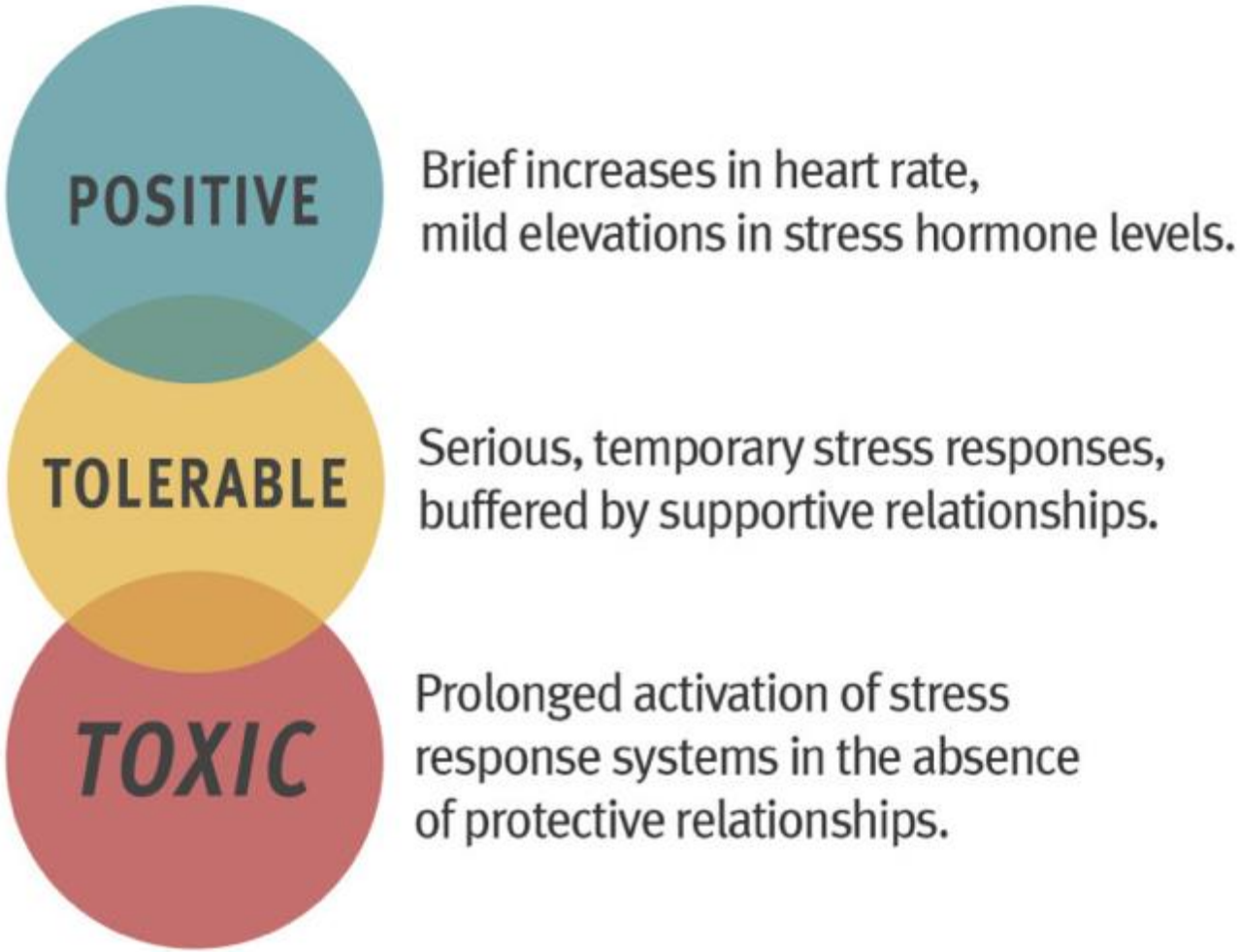
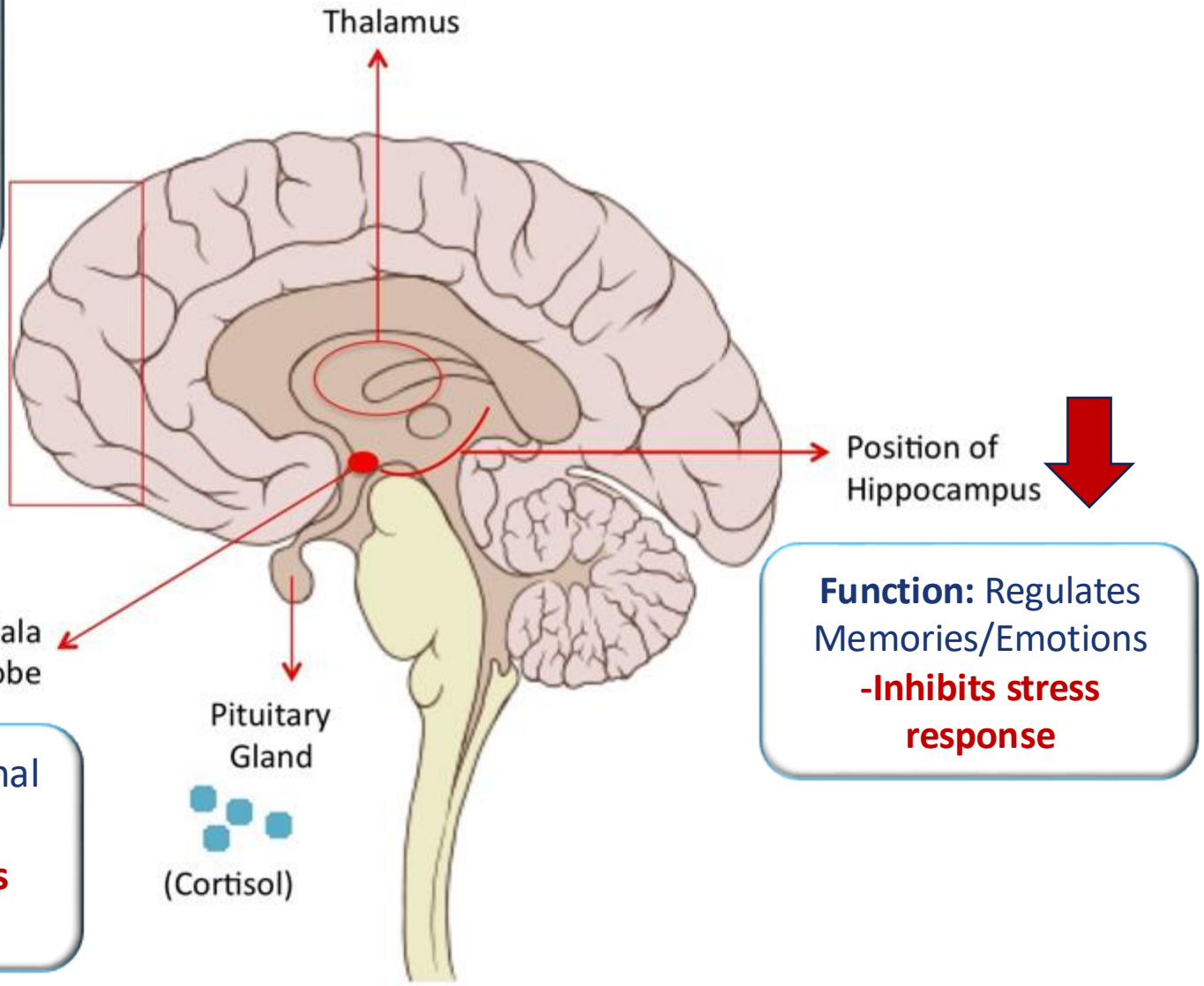


Source: Center on the Developing Child at Harvard University

Function: Top-down regulation, executive function, impulse control
-Inhibits stress response



Function: Regulates Memories/Emotions
-Inhibits stress response

Function: Emotional Center
-Activates Stress Response

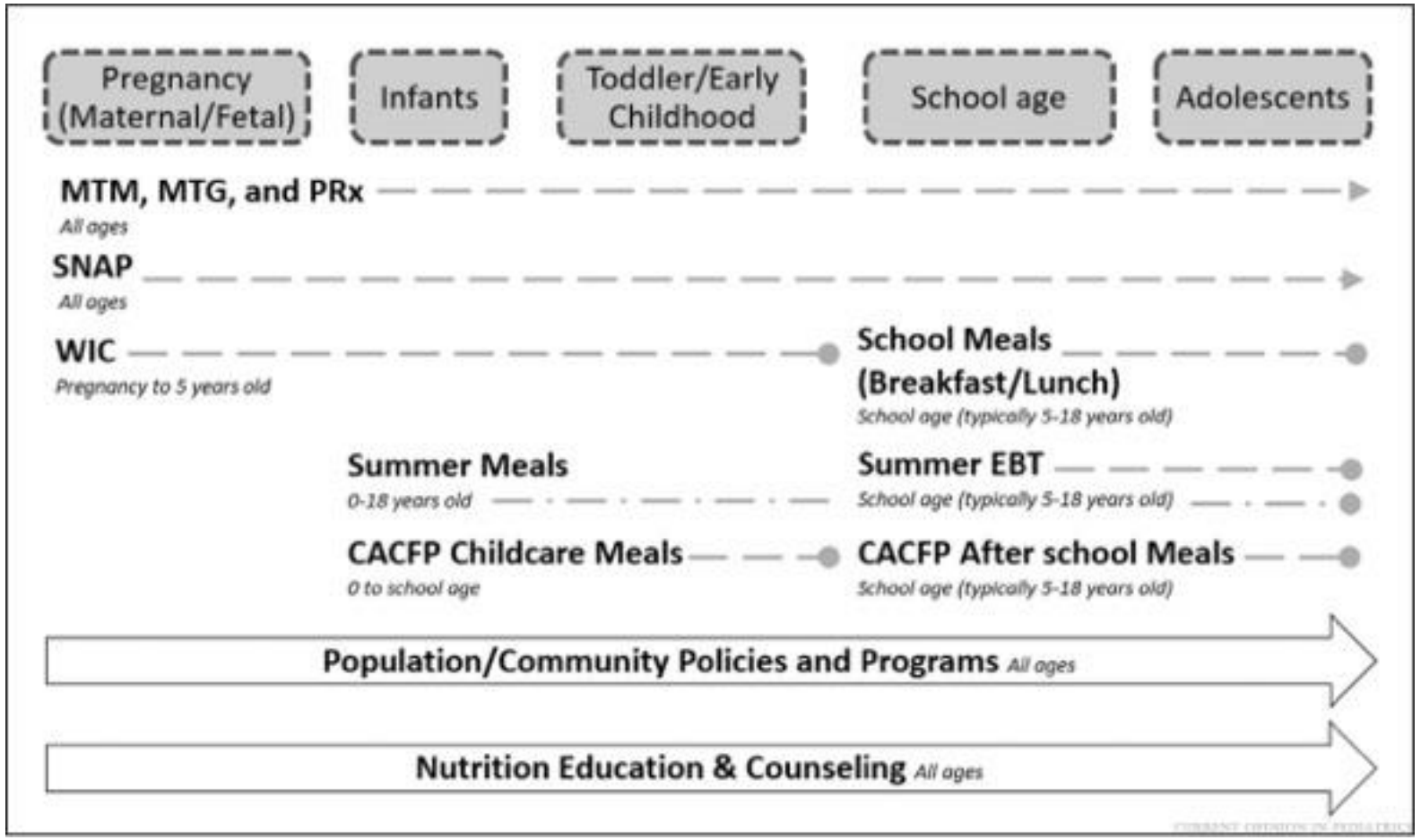
Child Consequences

1. Children more reactive to mild adverse experiences (PTSD-like)
2. Poor coping with future stress
3. Functional changes in ability to learn, use memory, and perform executive functions

Shonkoff, et. al, 2011, Pediatrics

What can be done to better support children and households using FAM?

FIGURE 1: Food as Medicine Pediatric Implementation Continuum



REVIEW

OPEN ACCESS

Narrative review: food as medicine across the pediatric age continuum

Laura Fischer, Hernan Mujeta and Kofi Essel

Purpose of review
Poor diet and food insecurity contribute to the dramatic rise in diet-related chronic disease and increasing cost of healthcare. The Food as Medicine (FAM) framework describes food-based interventions designed to prevent, manage, and treat diet-related disease. However, FAM interventions have not been widely implemented or evaluated in pediatric populations, as critical questions remain about their optimal delivery and design, efficacy, and funding opportunities. We have reviewed the recent literature and offer insights into potential funding and implementation strategies for pediatric healthcare providers.

Recent findings
Data from adult and population-level interventions provide evidence that FAM interventions positively impact diet quality, food security, health outcomes, and healthcare utilization and cost in adults and households with children. Evidence from recent pediatric-based FAM interventions and population data from recent changes to federal nutrition programs support the use of food-based interventions to improve child diet quality, food insecurity, and potentially impact long-term health and healthcare utilization and cost.

Summary
Applying the entire spectrum of evidence-based FAM interventions in pediatric settings from prenatal to adolescent stages will offer the greatest opportunity to ensure all children have access to enough healthful food so they can achieve their highest potential in life.

Keywords
diet quality, diet-related chronic disease, food insecurity, health-related social needs, nutrition security

INTRODUCTION

A background on food and nutrition security

In addition to managing clinical disease, healthcare providers – who for the purposes of this review include individual clinicians, health systems, and health insurance systems – may play a critical role in addressing a variety of health-related social needs. One social need that can have a serious impact on health is food insecurity, which occurs when the household struggles to afford adequate quality and quantity of food for every person in the household to live an active, healthy life [1]. Households that experience food insecurity may progress and cycle through a series of maladaptive coping behaviors related to stress responses, food purchasing, and adaptation of consumption patterns. An early coping stage of food insecurity is food anxiety, and preoccupation with food access, along with mental distress. Subsequently, the family may begin purchasing cheaper, convenient, and highly-palatable foods to stretch dollars, decrease stress, limit waste, and ease decision making [2–4]. These coping strategies often result in an overall reduction in food quality and variety. Lastly, adult members of the household will cope by decreasing the quantity of food eaten to offset the limited availability of food. Eventually, children begin decreasing food consumption as well. The toxic impacts of food insecurity likely

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Curr Opin Pediatr 2024, 36:33–40
DOI:10.1097/MOP.0000000000001213

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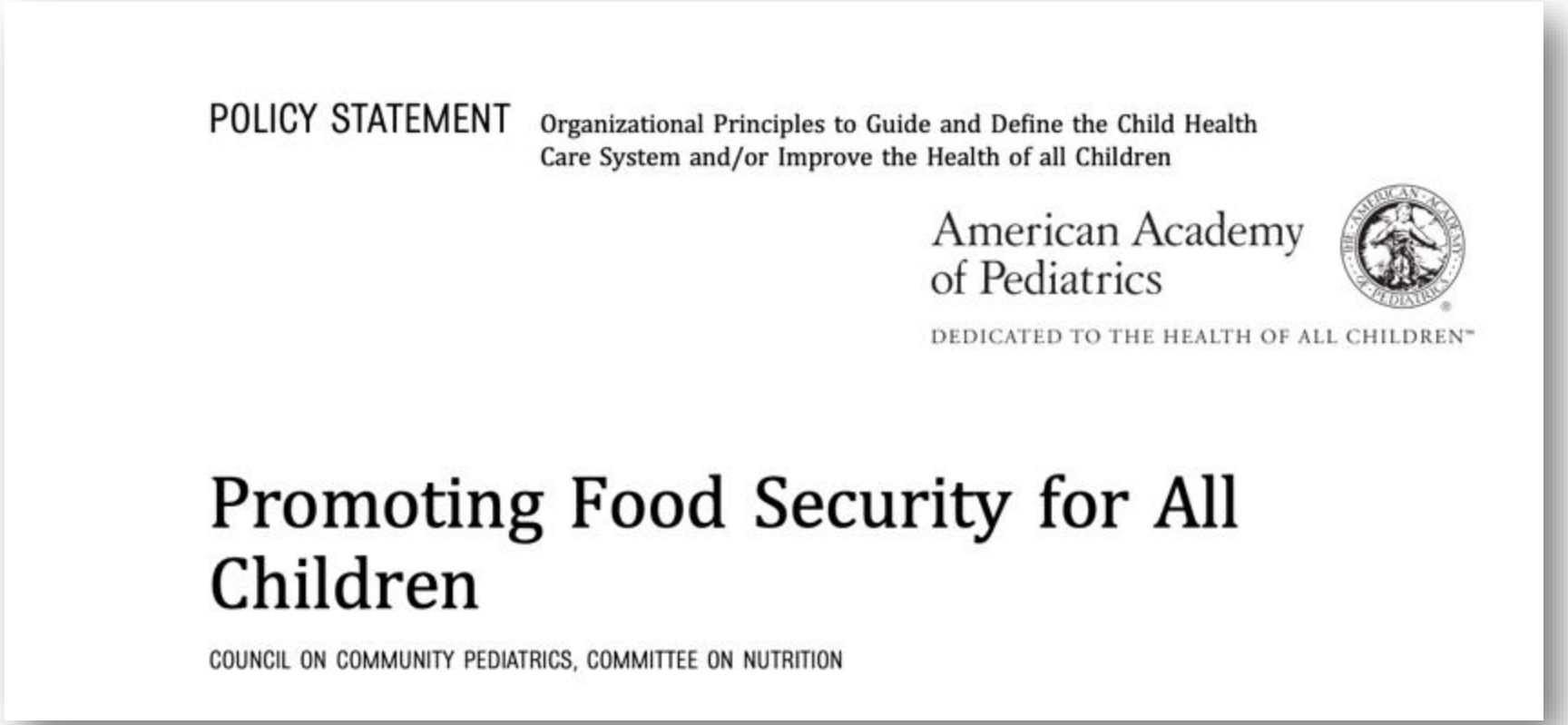
Pediatric Food as Medicine Salient Points

- FAM in children **deserves to be part of the national conversation**
- FAM within children appears to be **lower on the priority list in the national dialogue**, but has great potential
- Majority of FAM pediatric research is underpowered and exploratory
- FAM with children may likely show greater impact in **prevention** of disease, **addressing food/nutrition insecurity**, as compared to disease treatment with cost effectiveness/savings
- **Federal Nutrition Programs(FNPs)** are incredibly important within FAM for children and families and have a **proven track record**
- **FNPs, Produce Prescriptions, Medically Tailored Groceries, & Nutrition education** have built the greatest pediatric evidence base thus far
- FAM in children may also find a natural integration through **household based interventions** to not water down solutions for adults and caretakers

Case Study


POLICY STATEMENT Organizational Principles to Guide and Define the Child Health Care System and/or Improve the Health of all Children

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™

Promoting Food Security for All Children

COUNCIL ON COMMUNITY PEDIATRICS, COMMITTEE ON NUTRITION

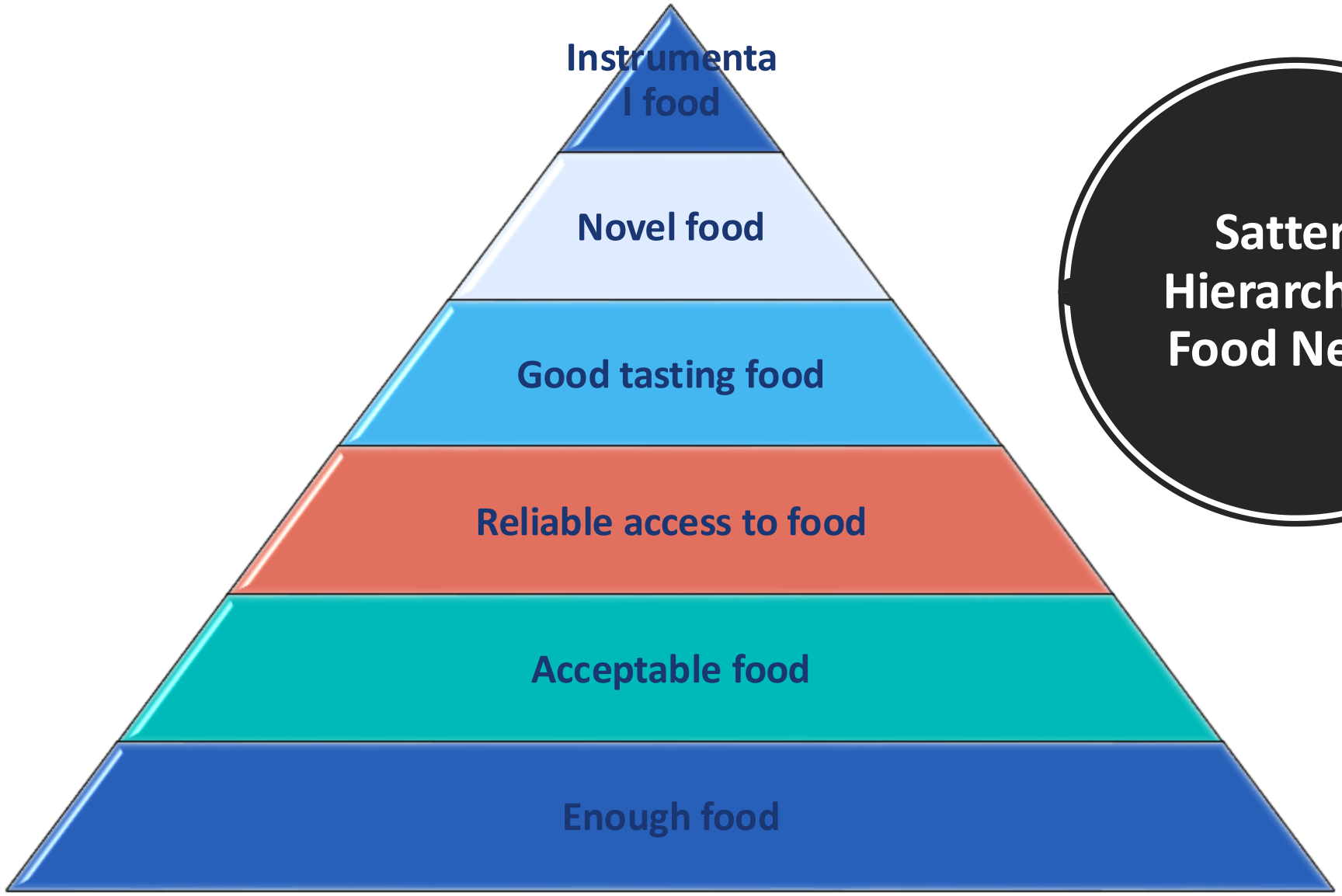
"Pediatricians can play a central role in screening and identifying children at risk for food insecurity and in connecting families with needed community resources. ***Pediatricians should also advocate for federal and local policies that support access to adequate healthy food for an active and healthy life for all children and their families."***

AAP, 2015

Universal Food Insecurity Screening 2016

Children's National

45



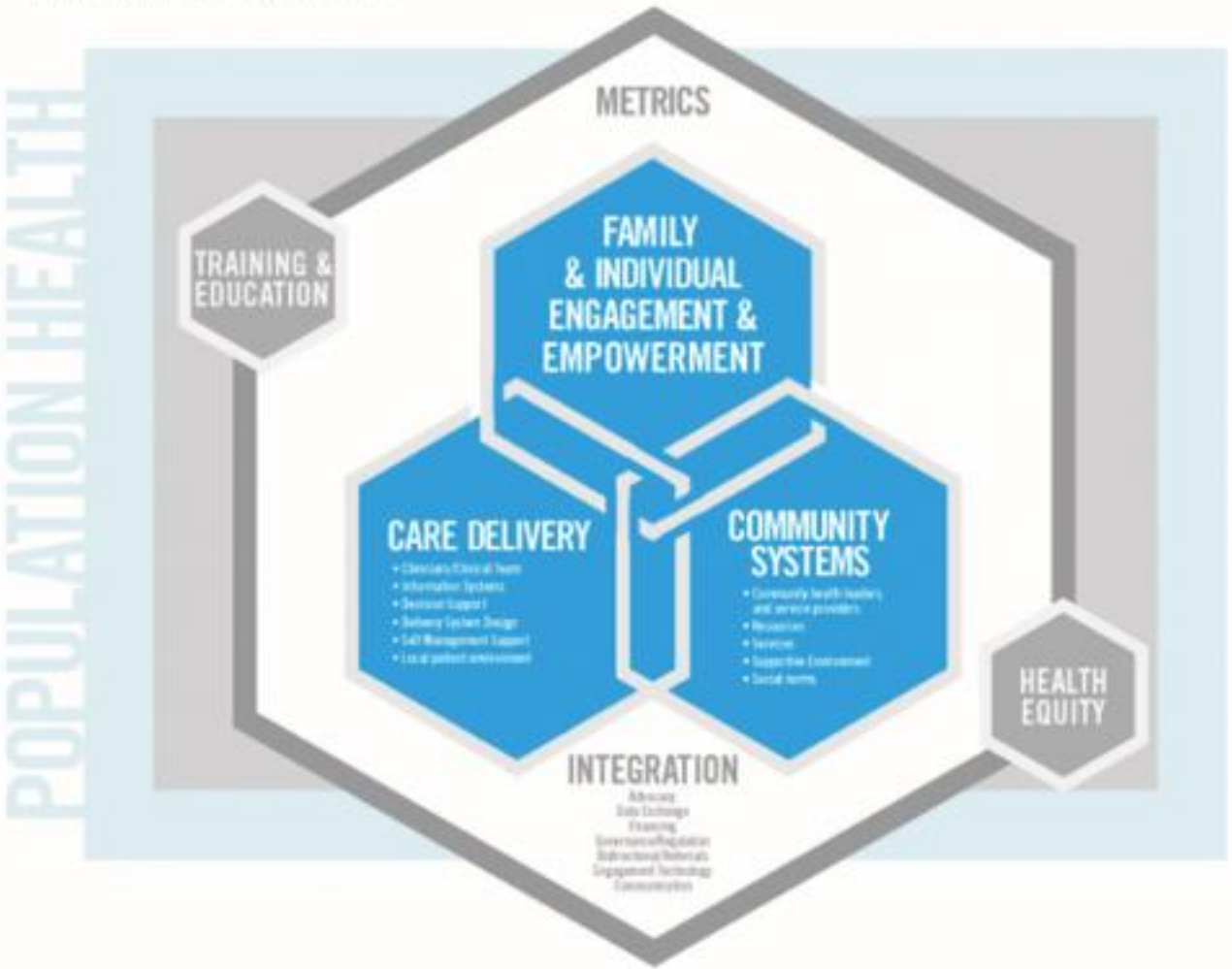
Satter's Hierarchy of Food Needs

Adapted from Ellyn Satter's Hierarchy of food Needs pyramid. Satter, JNEB, 2007

CLINICAL-COMMUNITY INTEGRATION TO ACHIEVE HEALTHY PEOPLE & COMMUNITIES:

A FRAMEWORK TO OPTIMIZE THE PREVENTION AND TREATMENT OF OBESITY AND IMPROVE POPULATION HEALTH

People are more likely to engage in a healthcare system integrated within their community, where settings and resources reinforce healthy behaviors, provide person-centered care, and undergo continuous evaluation and improvement. Stakeholders recognize their interdependency and act in a coordinated and collaborative fashion to improve health and achieve health equity. This drives behavior change and ultimately helps to prevent and treat obesity and improve population health.



Dietz, et. Al, NAM, 2017

FLiP FAMILY LIFESTYLE PROGRAM

Our Vision:

A District that supports family health and wellness.

Our Mission

To connect residents to a family-centered lifestyle program that promotes physical activity, nutrition education, and links residents to community resources. We're here to support lasting health for all residents.

Established in 2018 through funding from DCHealth as a family centered community-clinical collaborative focused on the prevention and reduction of food/nutrition insecurity and diet related chronic diseases amongst families in the District.

Community Advisory Board

Families
Community Based Organization Key Stakeholders
Dietitians
Researchers
Pediatricians

49

Correspondence

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

nature medicine

REVIEW

Narrative review: food as medicine across the pediatric age continuum

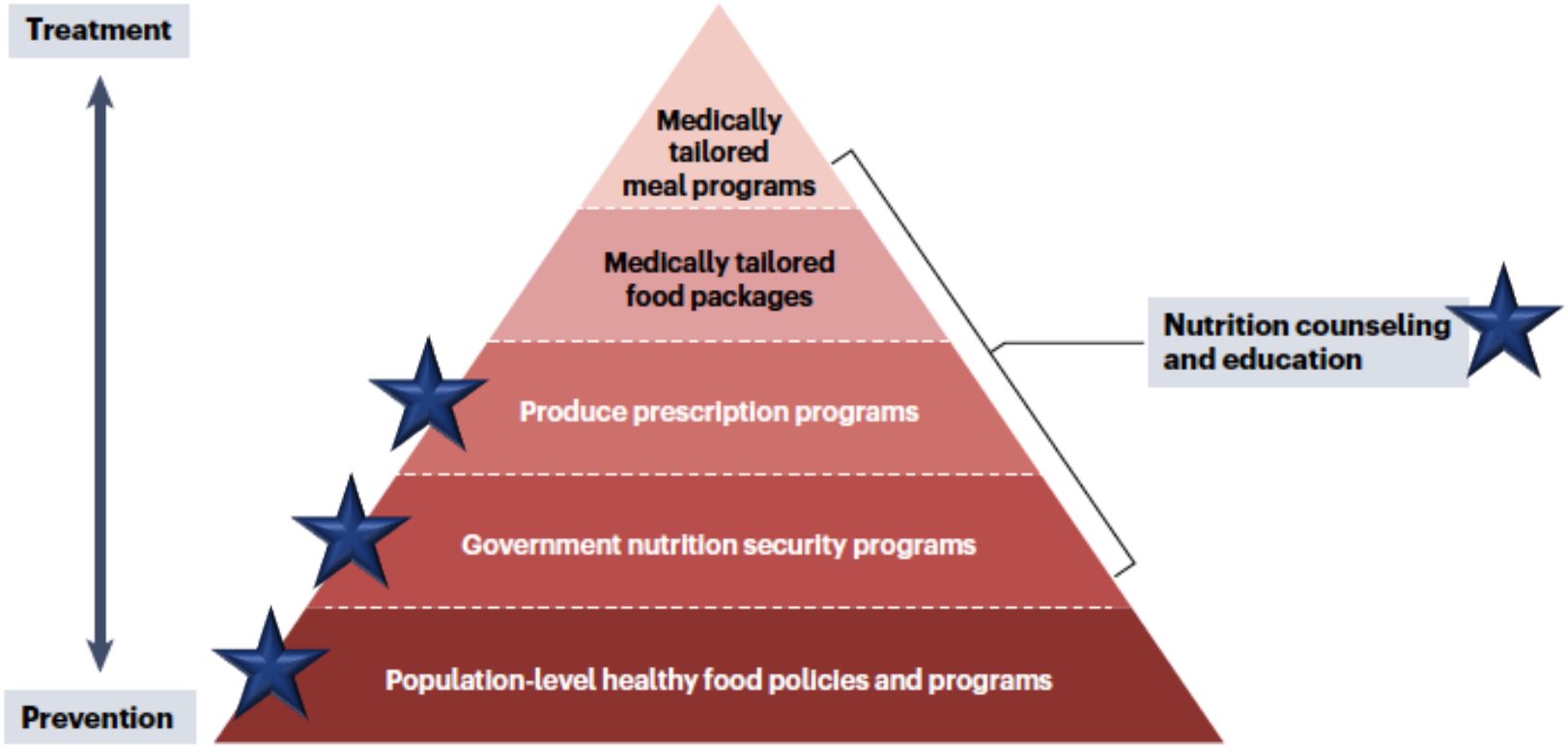


Fig. 1 | The Food is Medicine pyramid. An evolving framework of programs and interventions in healthcare and population health to integrate food-based nutrition interventions at multiple levels for specific health needs of different focus populations. Nutrition security programs include the Supplemental 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).

Fischer, et. al, 2024, Mozafarrian, et. al, 2022

FLiP FAMILY LIFESTYLE PROGRAM

4PFOODS

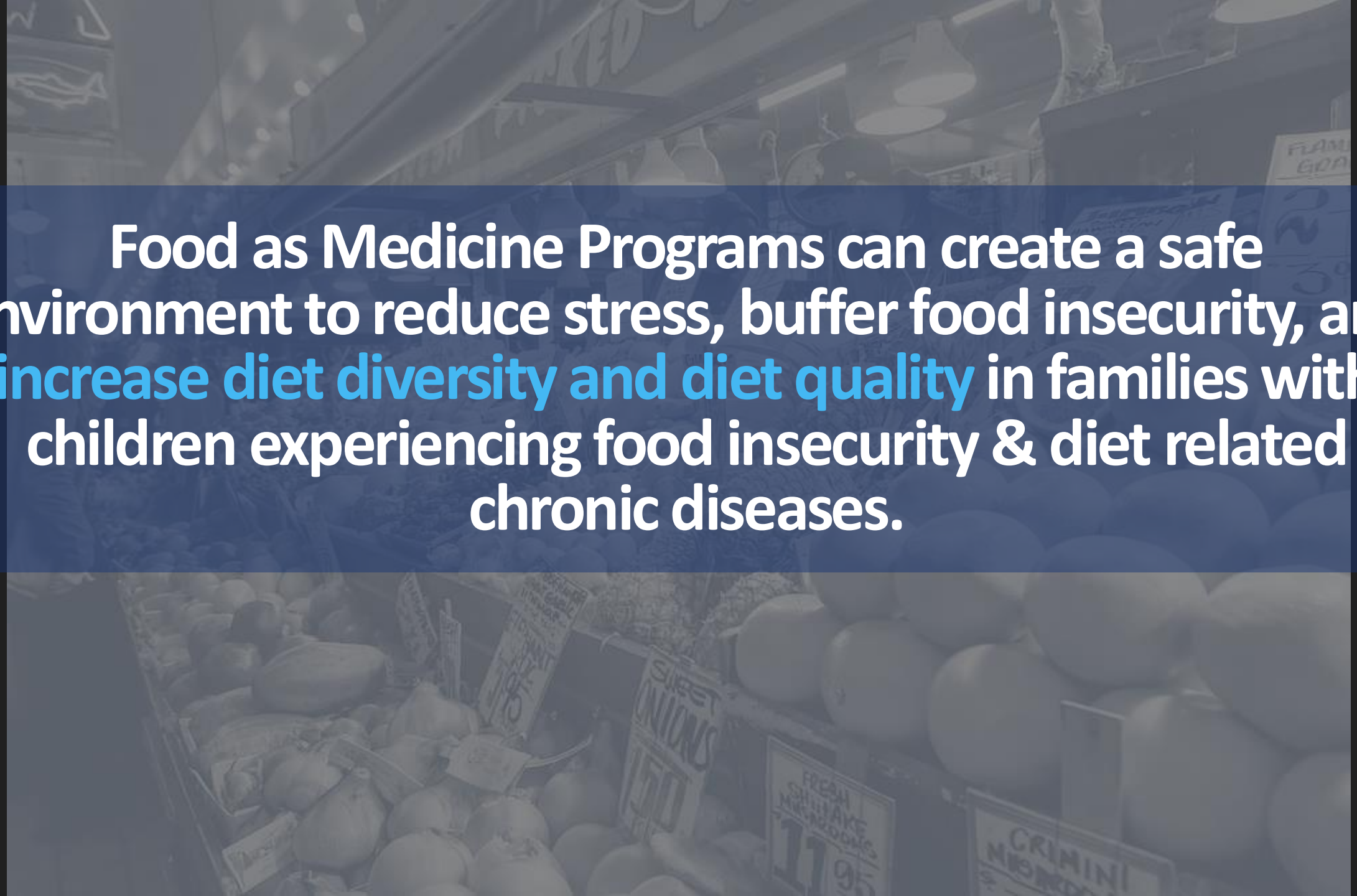
FLiPRx

Produce Prescription Initiative

Vitamix FOUNDATION

Nutrition Incentive Hub
CREATED BY GUSNIP NTAE CENTER

NO KID HUNGRY
by SHARE OUR STRENGTH



Food as Medicine Programs can create a safe environment to reduce stress, buffer food insecurity, and increase diet diversity and diet quality in families with children experiencing food insecurity & diet related chronic diseases.

Our Charge to You…

1. Develop and test **robust measures**
2. Conduct more **high-quality research**
3. Tap into **novel feedback**
4. Consider a variety of **different conditions & diseases**
5. Incorporate more interactions with **federal programs**
6. Support **community-based organizations for sustainability**
7. Advocate, advocate, **advocate**

Thank You!

Elevance Health

References

For more information on this subject, see the following publications:

Addressing Food Insecurity: A Toolkit for Pediatricians (available at https://frac.org/aaptoolkit)

Alaimo K. Food insecurity in the United States. Top Clin Nutr. 2005;20(4):281.

American Diabetes Association. Economic costs of diabetes in the US in 2017. *Diabetes Care*. 2018;41(5):917–928.

Berkowitz SA, Basu S, Gundersen C, Seligman HK. State-Level and County-Level Estimates of Health Care Costs Associated with Food Insecurity. *Preventing chronic disease*. 2019;16:E90-E90. doi:10.5888/pcd16.180549

Coleman-Jensen, Alisha, Matthew P. Rabbitt, Christian A. Gregory, and Anita Singh. 2020. Household Food Security in the United States in 2019, ERR-275, U.S. Department of Agriculture, Economic Research Service.

COUNCIL ON COMMUNITY PEDIATRICS, COMMITTEE ON NUTRITION, Benjamin A. Gitterman, Lance A. Chilton, William H. Cotton, James H. Duffee, Patricia Flanagan, Virginia A. Keane, Scott D. Krugman, Alice A. Kuo, Julie M. Linton, Carla D. McKelvey, Gonzalo J. Paz-Soldan, Stephen R. Daniels, Steven A. Abrams, Mark R. Corkins, Sarah D. de Ferranti, Neville H. Golden, Sheela N. Magge, Sarah Jane Schwarzenberg; Promoting Food Security for All Children. *Pediatrics* November 2015; 136 (5): e1431–e1438. 10.1542/peds.2015-3301

Crook CK. Taste perception in the newborn infant. *Infant Behav Dev*. 1978;1:52–69. doi: 10.1016/S0163-6383(78)80009-5.

Fitzpatrick T, Rosella LC, Calzavara A, et al. Looking Beyond Income and Education: Socioeconomic Status Gradients Among Future High-Cost Users of Health Care. *American journal of preventive medicine*. 2015;49(2):161-171. doi:10.1016/j.amepre.2015.02.018

References

For more information on this subject, see the following publications:

Hartline-Grafton, H., & Hassink, S. G. (2020). Food Insecurity and Health: Practices and Policies to Address Food Insecurity among Children. *Academic pediatrics*, S1876-2859(20)30426-5. Advance online publication. https://doi.org/10.1016/j.acap.2020.07.006

Health Research & Educational Trust. (2017, June). Social determinants of health series: Food insecurity and the role of hospitals. Chicago, IL: Health Research & Educational Trust. Accessed at www.aha.org/foodinsecurity

Kersten, Hans; Beck, Andrew; and Klein, Melissa, "Identifying and Addressing Childhood Food Insecurity in Healthcare and Community Settings" (2018). *Faculty Bookshelf*. 120. https://hsrc.himmelfarb.gwu.edu/books/120

Mozaffarian, D., Blanck, H.M., Garfield, K.M. *et al.* A Food is Medicine approach to achieve nutrition security and improve health. *Nat Med* 28, 2238–2240 (2022). https://doi.org/10.1038/s41591-022-02027-3

Nord M. Youth are less likely to be food insecure than adults in the same household. J Hunger Environ Nutr. 2013;8(2):146–63.

Palakshappa, D., Goodpasture, M., Albertini, L., Brown, C., Montez, K., & Skelton, J. (2019). Written Versus Verbal Food Insecurity Screening in One Primary Care Clinic. Academic Pediatrics, 20(2), 203–207. https://doi.org/10.1016/j.acap.2019.10.011

Palakshappa D, Vasan A, Khan S, Seifu L, Feudtner C, Fiks AG. Clinicians' perceptions of screening for food insecurity in suburban pediatric practice. Pediatrics [Internet]. 2017 Jul 20 [cited 2017 Oct 8];140(1):e20170319. Available from: http://www.ncbi.nlm.nih.gov/ pubmed/28634247

References

For more information on this subject, see the following publications:

Palakshappa D, Doupnik S, Vasan A, Khan S, Seifu L, Feudtner C, et al. Suburban families' experience with food insecurity screening in primary care practices. Pediatrics [Internet]. 2017 Jul 20 [cited 2017 Oct 8];140(1):e20170320. Available from: http://www.ncbi.nlm.nih.gov/ pubmed/28634248

Promoting Food Security for All Children. (2015). Pediatrics (Evanston), 136(5), e1431–e1438. https://doi.org/10.1542/peds.2015-3301

Rosenstein D, Oster H. Differential facial responses to four basic tastes in newborns. Child Dev 1988;59:1555–68.

Serchen, Atiq, O., & Hilden, D. (2022). Strengthening Food and Nutrition Security to Promote Public Health in the United States: A Position Paper From the American College of Physicians. *Annals of Internal Medicine*, *175*(8), 1170–1171. https://doi.org/10.7326/M22-0390

Schwartz C, Issanchou S, Nicklaus S. Developmental changes in the acceptance of the five basic tastes in the first year of life. *Br J Nutr.* 2009;102:1375–79. doi: 10.1017/S0007114509990286.

Sulmasy LS, Bledsoe TA; ACP Ethics, Professionalism and Human Rights Committee. American College of Physicians ethics manual: seventh edition. Ann Intern Med. 2019;170:S1-S32. [PMID: 30641552] doi:10.7326/M18-2160

References

U.S. Department of Agriculture, Food and Nutrition Service, Office of Research and Analysis, “Benefit Redemption Patterns in the Supplemental Nutrition Assistance Program,” by Laura Castner and Juliette Henke. Project officer: Anita Singh, Alexandria, VA: February 2011.

U.S. Department of Agriculture and U.S. Department of Health and Human Services. Dietary Guidelines for Americans, 2020-2025. 9th Edition. December 2020. Available at DietaryGuidelines.gov.

https://www.brookings.edu/blog/up-front/2020/07/09/about-14-million-children-in-the-us-are-not-getting-enough-to-eat/

https://www.feedingamerica.org/about-us/press-room/feeding-america-statement-house-introduction-heroes-act-1

https://frac.org/wp-content/uploads/food-insecurity-screening-algorithm-pediatric-patients.pdf

https://frac.org/wp-content/uploads/frac-aap-toolkit-10-actions-for-advocates.pdf