

Healthy  
Eating  
Research



**NOPREN**

Nutrition & Obesity  
POLICY RESEARCH & EVALUATION NETWORK

# Summer Speaker Series for Students 2026

*The contents and findings of this presentation are those of the speakers and do not represent the official views of the Centers for Disease Control & Prevention or Department of Health and Human Services.*

# Getting Started!

- Update your name on Zoom, if needed
  - *Right click on your Zoom box, click “rename”*
- Type your name and institution into the chat box!
  - *Question: Which best describes you?*
    - *Ex. Undergraduate Student, Dietetic Intern, Masters Student, Doctoral Student, Post Doc, Public Health Practitioner, Researcher/Professor, Other*
- Remember to keep yourself on mute.
- Type your questions into the chat box.

# NOPREN HER Summer Series for Students

- Explore various public health topics related to:
  - Food and nutrition security
  - Federal, state, and local policy
  - Strategies to support young children's health
  - ***And more!***
- This series is a collaborative effort of Healthy Eating Research (HER) and Nutrition and Obesity Policy Research and Evaluation Network (NOPREN).

# NOPREN HER Summer Series for Students

## Schedule and Topics

- June 10: Policy, Systems, and Environmental (PSE) Strategies to Support Young Children's Diet and Health
- ***June 24: Interventions to Improve Food and Nutrition Security***
- July 8: Federal, State, and Local Nutrition Policy Updates
- July 22: Food Policies in Schools
- August 5: Career Paths in Public Health Nutrition
- August 12: Student Presentations

The series will take place on Wednesdays **from 4:00 - 5:00 pm EST**

For more information or to register:

<https://nopren.ucsf.edu/content/her-nopren-summer-speaker-series-for-students-2026>

# Student Presentations!

**The HER/ NOPREN Summer Speaker Series will end with Student Presentations and Poster Sessions on August 12.**

Applications are due **July 17th**. To apply, scan the QR code below:



Selected students will give a presentation on a nutrition-related project or research they worked on over the summer.

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## Session 2: Interventions to Improve Food and Nutrition Security

# Interventions to Improve Food & Nutrition Security

August 6, 2025

**Hilary Seligman MD MAS**

Professor of Medicine and of Epidemiology & Biostatistics, UCSF



Action Research Center  
for Health  
Department of Medicine

## **I do not have commercial conflicts of interest to disclose.**

I receive research funding from USDA, CDC, NIH, American Heart Association, The Wonderful Company, and Feeding America.

The produce prescription program I run receives funding from the City and County of San Francisco, USDA, Hellman Foundation, and Crankstart Foundation.

*Disclosure: Views are my own and do not necessarily reflect the views of my funders.*

# Dietary intake and chronic disease in the US

- US ranks last on key health measures compared with other high-income nations
- People in the US have really poor diets
  - 1 in 10 meet recommended F&V intake
  - 9 of 10 exceed recommended sodium intake
  - Only 2% of Americans meet whole grain targets
- Poor diets are a key driver of obesity, diabetes, and heart disease
  - 42% of US adults are obese
  - Almost half (45%) of deaths related to heart disease are due to poor diet
- 77% of Americans would like to eat a healthier diet
- #1 barrier to eating a healthy diet reported is the cost of food (60%)

## Agenda for Today:

## Interventions that Address Food & Nutrition Security

Policy

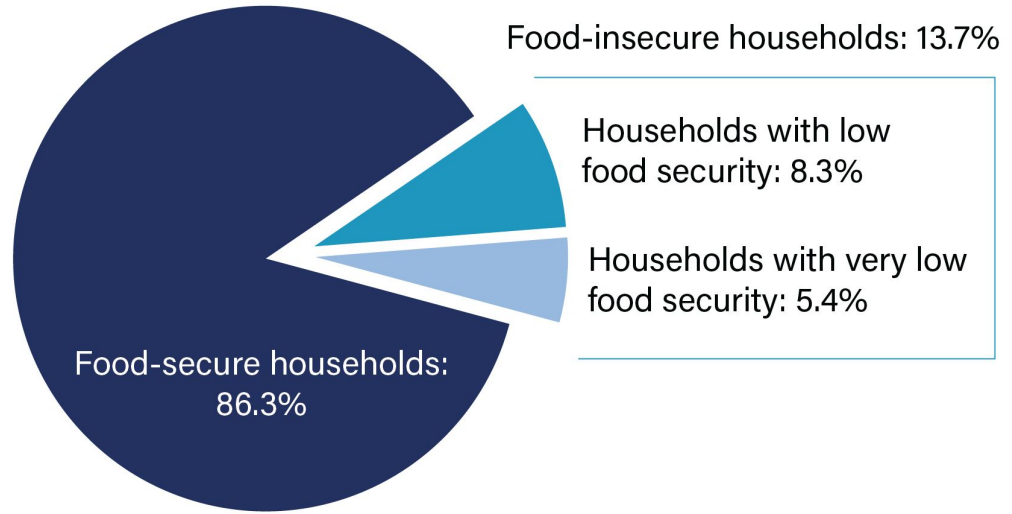
Programs

Rural Context

Implementation Science

# 1 in 7 US Households Food Insecure in 2024

**U.S. households by food security status, 2024**

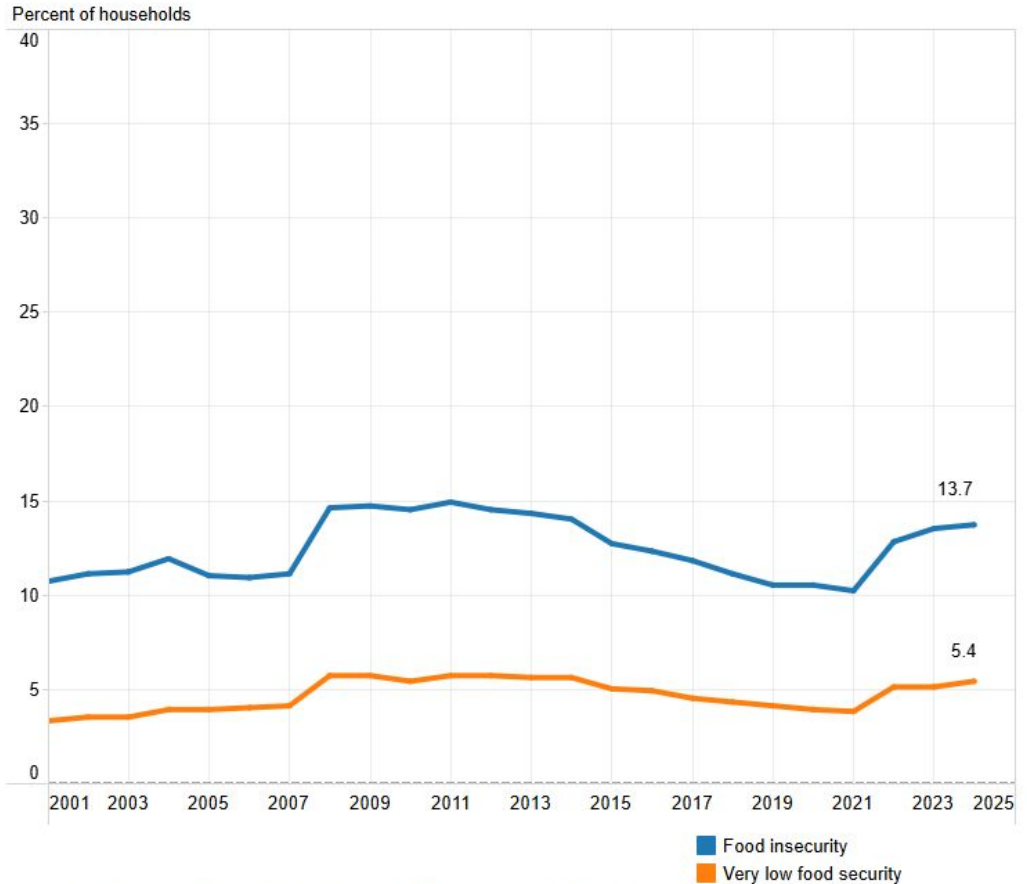


Source: USDA, Economic Research Service using U.S. Department of Commerce, Bureau of the Census, 2024 Current Population Survey Food Security Supplement data.

Pandemic era  
programs and  
policies were  
likely highly  
effective

Does this  
surprise you?

Trends in the prevalence of food insecurity and very low food security in U.S. households, 2001–24

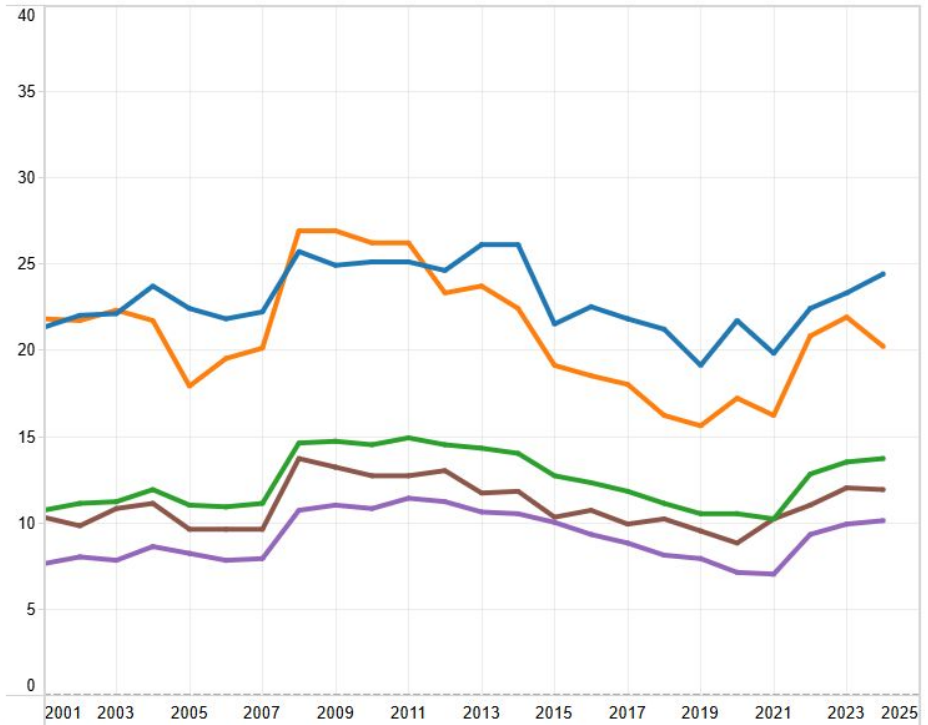


Source: USDA, Economic Research Service using U.S. Department of Commerce, Bureau of the Census, Current Population Survey Food Security Supplements data.

# Food insecurity rates by race/ethnicity, 2001-2024

Trends in food insecurity by race and ethnicity, 2001–24

Percent of households



Note: The "Other, non-Hispanic" category for the race and ethnicity of a household reference person includes non-Hispanic adults that identify as multiple races or ethnicities including American Indian, Alaskan Native, Asian, Native Hawaiian, or Pacific Islander. There are not sufficient respondents in the Current Population Survey Food Security Supplement to present reliable estimates for these individual groups for all outcomes, so they are grouped together into the "Other, non-Hispanic" category.

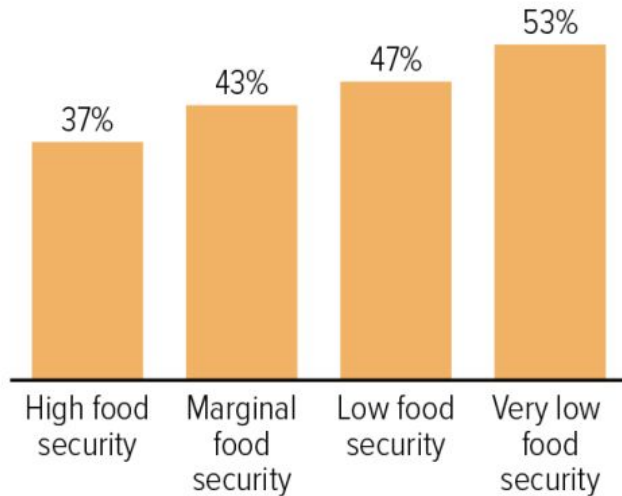
- All households
- Black, non-Hispanic
- Hispanic
- Other, non-Hispanic
- White, non-Hispanic

Source: USDA, Economic Research Service using U.S. Department of Commerce, Bureau of the Census, Current Population Survey Food Security Supplements data.

FIGURE 1

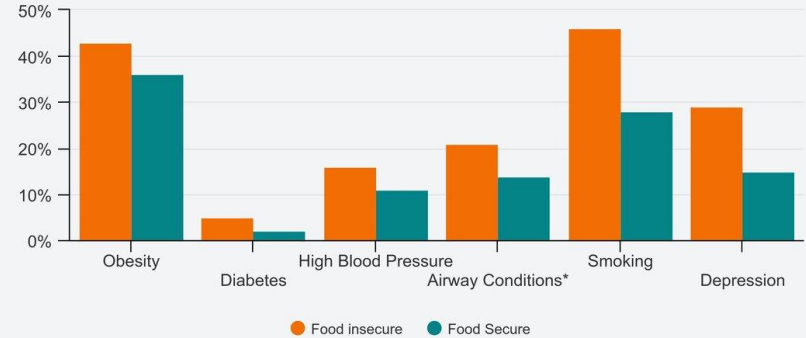
## Adults in Households with Less Food Security Are Likelier to Have a Chronic Illness

Probability of any chronic illness



Source: Christian A. Gregory and Alisha Coleman-Jensen, "Food Insecurity, Chronic Disease, and Health Among Working-Age Adults," U.S. Department of Agriculture, July 2017. Adjusted for differences in demographic, socioeconomic and other characteristics. Sample includes working-age adults in households at or below 200% of the federal poverty level.

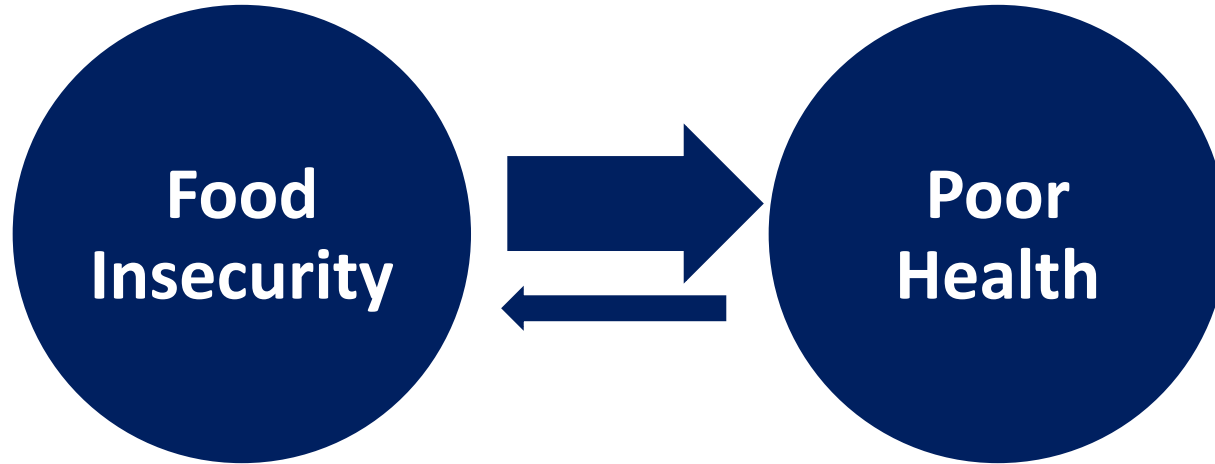
## Chronic Conditions of Food-Secure Vs. Food-Insecure Young Adults



\*asthma, chronic bronchitis, emphysema

Source: *Food Insecurity and Chronic Disease in U.S. Young Adults: Findings from the National Longitudinal Study of Adolescent to Adult Health, JGIM. Food Insecurity is Associated with Poorer Mental Health and Sleep Outcomes in Young Adults, JAH.*

# Food insecurity and poor health



# Nutrition Security vs Food Security (simplified)

What kinds of programs or interventions could improve nutrition security, not just food security?

## HOW DOES NUTRITION SECURITY BUILD ON FOOD SECURITY?

Food security is having **enough** calories.  
Nutrition security is having the **right** calories.

<https://www.fns.usda.gov/resource/usda-actions-nutrition-security>

*Note that this citation is provided for historical reference. It does not represent the official position of USDA.*

# Mis-Alignment Between Health Care & “Social Care” in the US

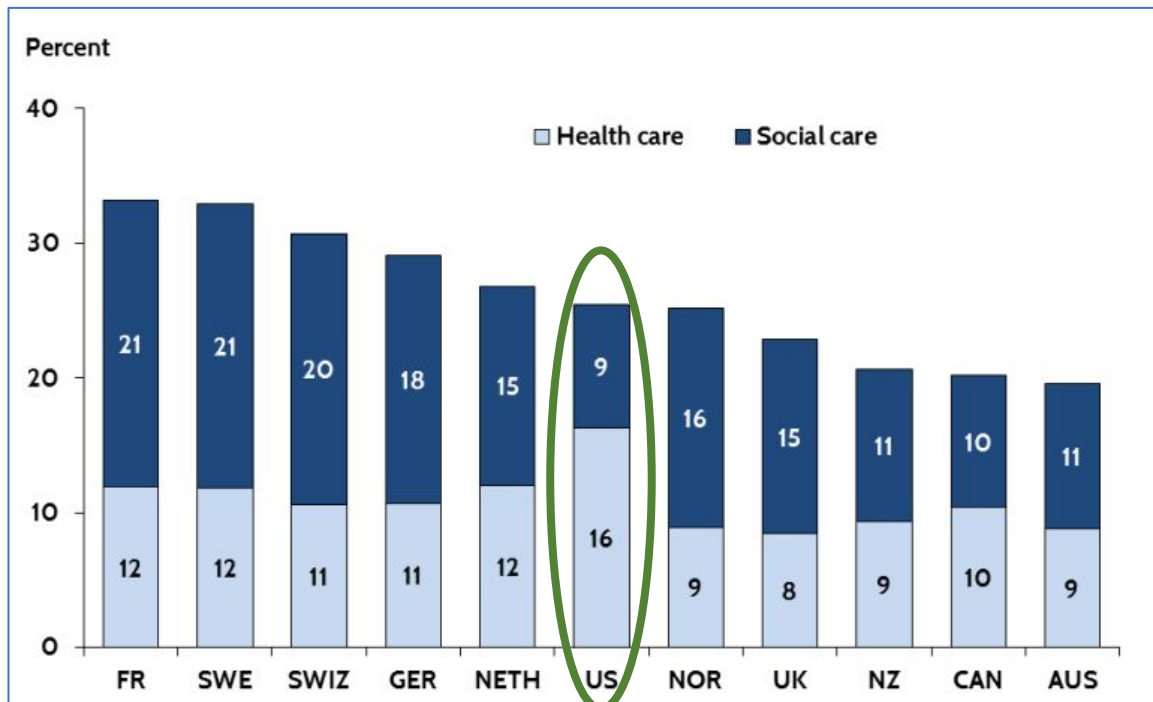


Figure 1. Health and Social Care Spending as a Percentage of GDP

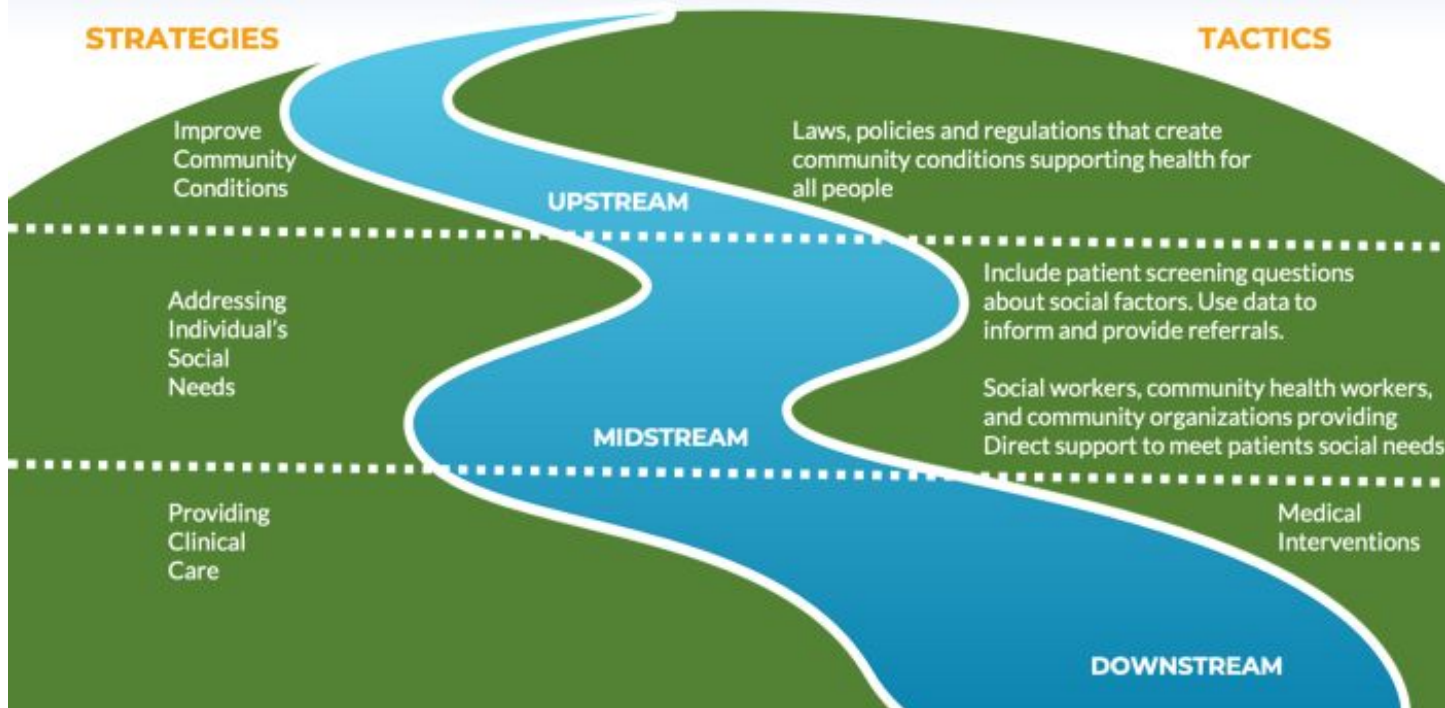
Rebalancing Social & Medical Spending to Promote Health. Butler et al. Brookings Institution. 2017



<https://www.cdc.gov/public-health-gateway/php/about/social-determinants-of-health.html>. Accessed 8/1/2025.

**These are the downstream impact of policies.**

## SOCIAL DETERMINANTS AND SOCIAL NEEDS – MOVING UPSTREAM



Social Drivers of Health

Social Needs

“Meeting Individual Social Needs Falls Short Of Addressing Social Determinants Of Health,” Health Affairs Blog, January 16, 2019. DOI: [10.1377/hblog20190115.234942](https://doi.org/10.1377/hblog20190115.234942)

If a clinic helps a patient with food insecurity to afford food, will it make a difference in their health?

*Evidence from SNAP*



# Adults Enrolled in SNAP Report Better Health

## SNAP Participants Report Better Health Than Eligible Non-Participants

Percent more or less likely to describe health as:

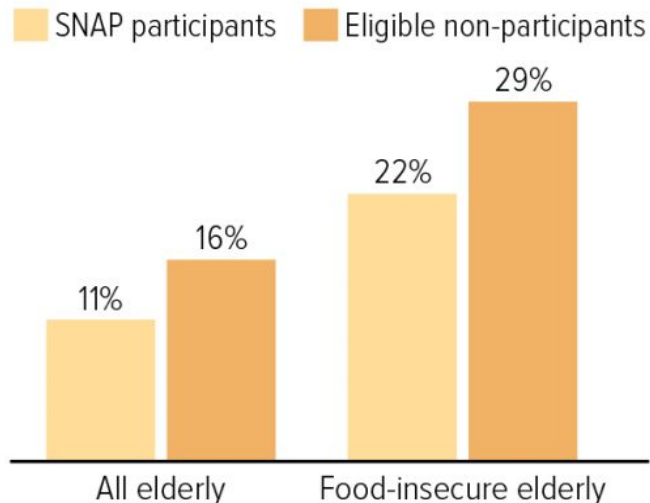


Source: Christian A. Gregory and Partha Deb, "Does SNAP Improve Your Health?" Food Policy, 2015. Adjusted for differences in demographic, socioeconomic and other characteristics. Sample includes adults aged 20 to 64 in households with income at or below 130% of the federal poverty level.

# Older Adults Enrolled in SNAP Have Better Access to Medication and Use Less Health Care

## Elderly SNAP Participants Less Likely to Skip Needed Medications

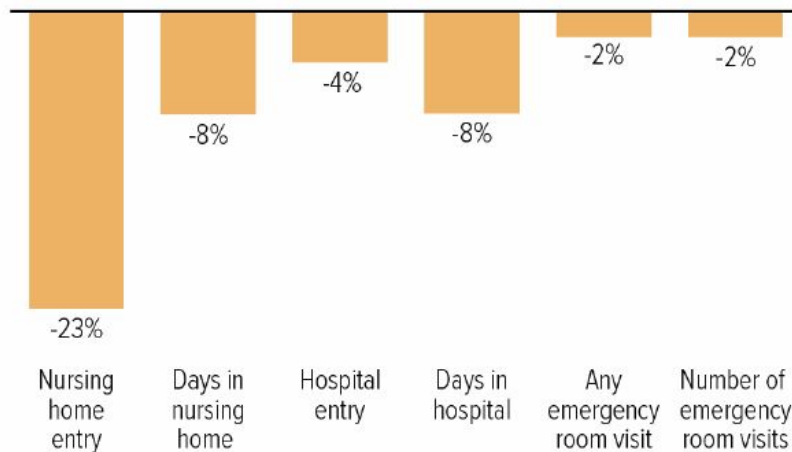
Percent who skip or stop medications, take smaller doses, or delay a prescription due to cost



Source: Mithuna Srinivasan and Jennifer A. Pooler, "Cost-Related Medication Nonadherence for Older Adults Participating in SNAP, 2013–2015." *American Journal of Public Health*, December 2017

## Elderly SNAP Participants Are Less Likely to Use Health Care Services

Percent relative to low-income elderly non-participants



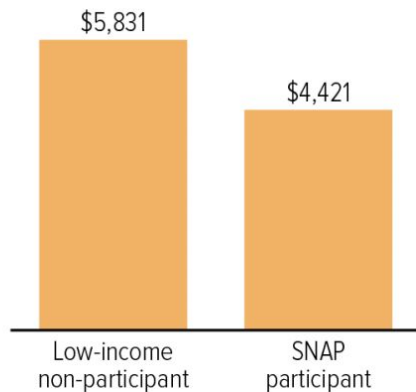
Source: Sarah L. Szanton et al., "Food assistance is associated with decreased nursing home admissions for Maryland's dually eligible older adults," *BMC Geriatrics*, July 2017; and Laura J. Samuel et al., "Does the Supplemental Nutrition Assistance Program Affect Hospital Utilization Among Older Adults? The Case of Maryland," *Population Health Management*, 2017. Adjusted for differences in demographic, socioeconomic and other characteristics. Results for hospital and emergency room visits adjust for proportion of the year on Medicaid. Sample includes adults age 65 and older eligible for both Medicare and Medicaid in Maryland.

# Adults Enrolled in SNAP Have Lower Health Care Costs

FIGURE 10

## A SNAP Participant Incurs \$1,400 Less for Health Care

Estimated annual per-person health care spending



Note: Health care spending includes out-of-pocket expenses and costs paid by private and public insurance, including Medicare and Medicaid.

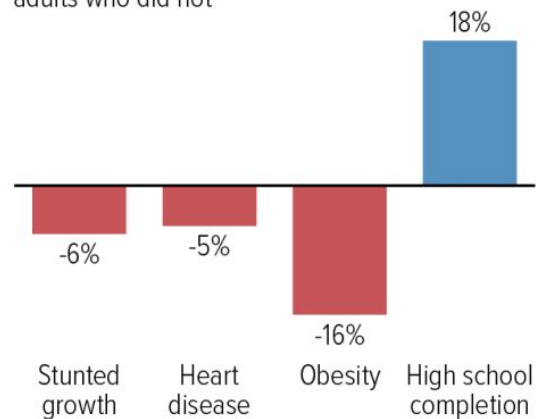
Source: Seth Berkowitz, Hilary K., Seligman, and Sanjay Basu, "Impact of Food Insecurity and SNAP Participation on Healthcare Utilization and Expenditures," University of Kentucky Center for Poverty Research, 2017.

# SNAP Improves Long-Term Health Outcomes for Children Too

FIGURE 7

## Children With Access to SNAP Fare Better Years Later

Percentage-point change in outcomes for adults who received SNAP as children, compared to adults who did not



# So SNAP improves health...

---

but it doesn't reach everyone...  
and benefit levels are not enough for many of the  
households it does reach...  
and it covers all kinds of foods (not just healthy ones).



# Food is Medicine



What challenges might come with integrating food and nutrition interventions into healthcare?

- Integration of specific food and nutrition interventions in, or in close collaboration with, the health care system
- Target population
  - People with or at high risk for certain health conditions (often diet-related)
  - People with or at high risk of food insecurity

# Theory of Change

Identification of  
food insecurity  
by positive  
clinical screen



Referral to FIM  
program



Enrollment in  
FIM program



Improved diet  
quality, food  
security, and  
satisfaction

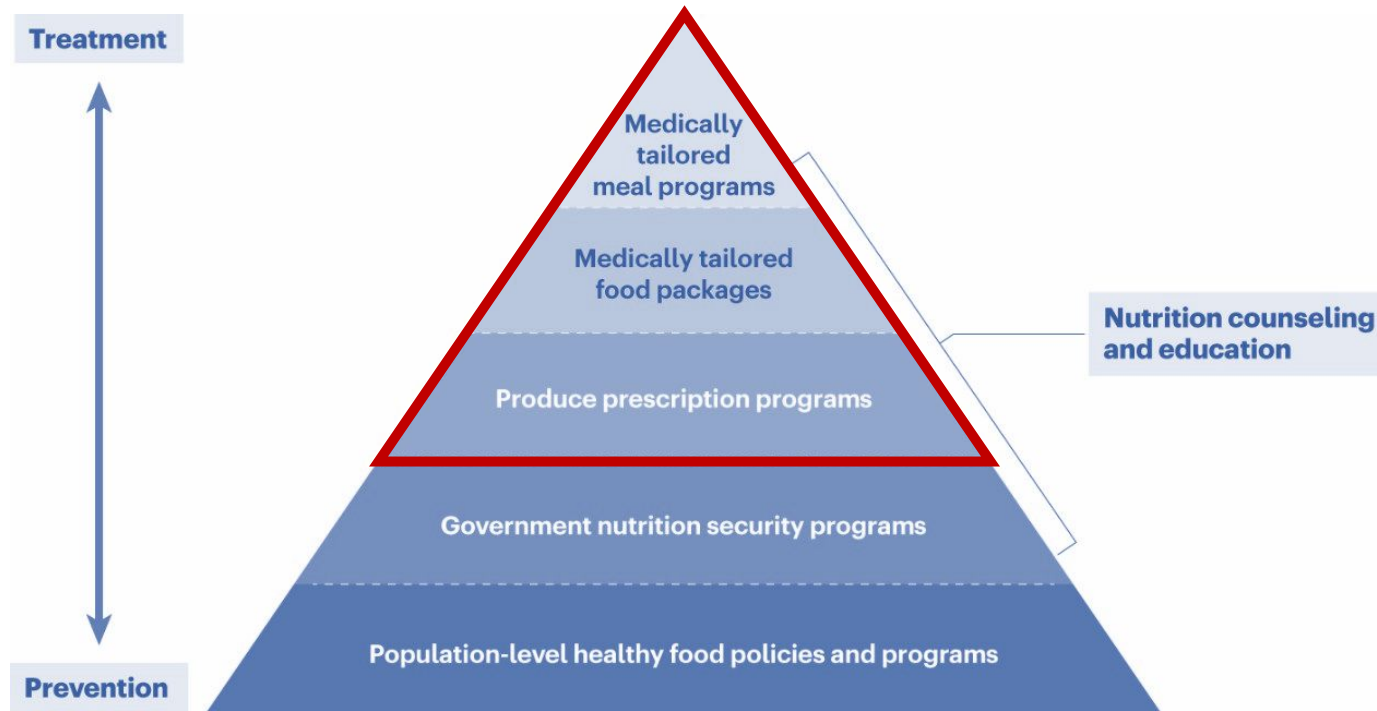


Improvement of  
health and  
utilization  
outcomes



# Food is Medicine

*From the perspective of population health*



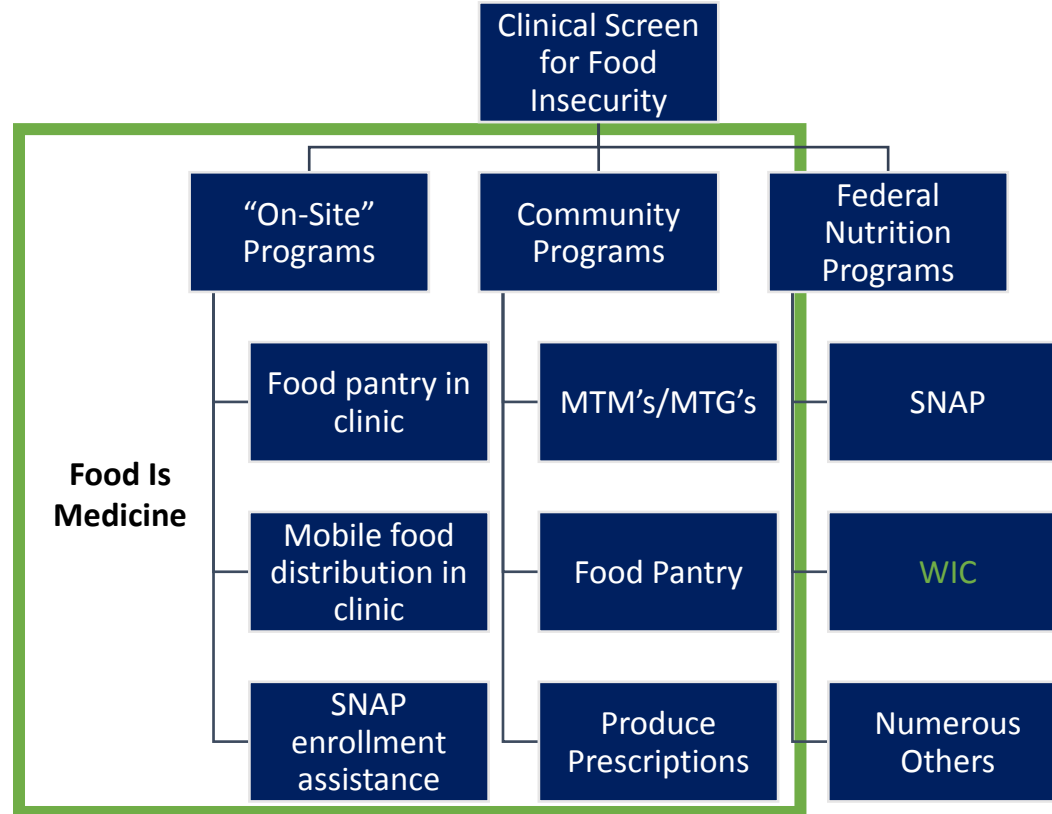
# Food is Medicine


*From the perspective of health care*

*MTM=Medically Tailored Meals*

*MTG=Medically Tailored Groceries*

*SNAP=Supplemental Nutrition Assistance Program*



 = "food is medicine"

# Sneak Peek!



**Can FIM programs be  
scaled?**

**Can FIM programs impact  
short and long term health  
outcomes?**

# WIC: The Original FIM Program



Can FIM programs be scaled?

Can FIM programs impact short and long term health outcomes?

## WIC: BUILDING A HEALTHY FOUNDATION



### What is WIC?

The Special Supplemental Nutrition Program for Women, Infants, and Children – also known as WIC – supports maternal and child health by providing nutritious supplemental foods, nutrition education, breastfeeding promotion and support, and referrals to important health care and other social services.



Healthy foods



Nutrition education



Breastfeeding support



Referrals

# WIC: The Original FIM Program

Have you ever  
thought about WIC  
as a FIM program?



Can FIM programs be  
scaled?

**PROVEN**

Can FIM programs impact  
short and long term health  
outcomes?

**PROVEN**

## WIC: BUILDING A HEALTHY FOUNDATION



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Healthy foods



Nutrition education



Breastfeeding support



Referrals

**What do we know about  
the impact of FIM  
programs?**

# Observational & Mixed Methods Studies

**Growing body of evidence of strong feasibility, high participant satisfaction, and positive impacts on diet quality, FV intake, and some clinical outcomes.**

- Produce prescriptions
  - Improvements in FV intake by ~0.5 – 1 serving/day, especially when engagement is sustained
- Medically tailored groceries
  - Improvements in food security and clinical outcomes, especially when integrated with clinical care
- Medically tailored meals
  - Improvements in dietary intake and reduced health care utilization among high-risk populations



**Health Care  Food™**  
Accelerating the Integration of Food Is Medicine in Health Care

## **ADVANCES IN THE FOOD IS MEDICINE FIELD**

**Annual Report 2025**



*Presented by Health Care by Food™,  
a food is medicine initiative of the American Heart Association*



**AHA SCIENTIFIC STATEMENT**

A Systematic Review of “Food Is Medicine”  
Randomized Controlled Trials for  
Noncommunicable Disease in the United States:  
A Scientific Statement From the American  
Heart Association

Hilary K. Seligman, MD, MAS, Chair; Sonia Y. Angell, MD, MPH; Seth A. Berkowitz, MD, MPH; Mitchell S.V. Elkind, MD, MS, FAHA;  
Kurt Hager, PhD; Nathalie Moise, MD, MS, FAHA; Hannah Posner, AB; Jen Muse, MS, RD; Angela Odoms-Young, PhD;  
Ronit Ridberg, PhD, MS; Andrea B. Troxel, ScD; Amy L. Yaroch, PhD; Kevin G. Volpp, MD, PhD, Vice Chair

- As of Aug. 2024, 14 RCTs of FIM
- Mostly early-stage, smaller studies or pilots

**Table 2. Summary of RCTs by Type of FIM Intervention and National Institutes of Health Stage Model for Behavioral Intervention Development**

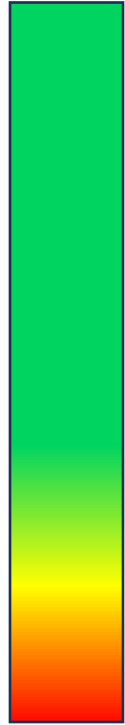
Stage	MTM, n	MTG, n	PRx, n	Total, n
1	2	1	2	5
2	0	3	1	4
3	4	1	0	5
4	0	0	0	0
5	0	0	0	0

- Highly variable in populations, specifics of intervention studied, and outcomes
- Generally consistent with observational literature
  - Positive impacts on diet quality and food security
  - Still need more data on clinical outcomes

**Key Take-Away**

We do not yet have a robust RCT evidence base for FIM.

# Studies of FIM Programs Show Improvements in Some, but Not All, Outcomes



Resource Use

Food Security

Health behaviors (inc Diet Quality)

Clinical outcomes

Cost & utilization

What are some reasons it is particularly difficult to “prove” a FIM intervention improves clinical outcomes, cost, and utilization?

# Modelling Studies Have Limitations but Can Fill in Some Gaps

## Prescribing healthy food in Medicare/Medicaid is cost effective, could improve health outcomes

New study finds that health insurance coverage for healthy food could improve health, reduce healthcare costs, and be highly cost-effective after five years

### Medicare/Medicaid: Healthy food prescriptions



Fruits



Nuts/  
Seeds



Vegetables



Whole  
grains



Seafood



Plant oils

Insurance covers  
30% of cost of eligible  
food



**\$100** billion

less in healthcare  
utilization over  
model population's  
lifetime



Cost-effective after  
**5 years**

Less diabetes

**120**  
thousand cases  
prevented or  
postponed

Less cardiovascular disease

**3.28**  
million cases  
prevented or  
postponed

As or more cost-  
effective than  
many currently  
covered medical  
treatments



For more information, see "Cost-effectiveness of financial incentives for improving diet through Medicare and Medicaid: A microsimulation study" by Lee et al. (2019).  
<https://doi.org/10.1371/journal.pmed.1002761>

Gerald J. and Dorothy R. Friedman  
School of Nutrition Science and Policy at  
Tufts University

Lots of FIM innovation is happening in Medicare Advantage & in commercial insurers too!

# State Medicaid Landscape

## • 1115 Demonstration Waivers

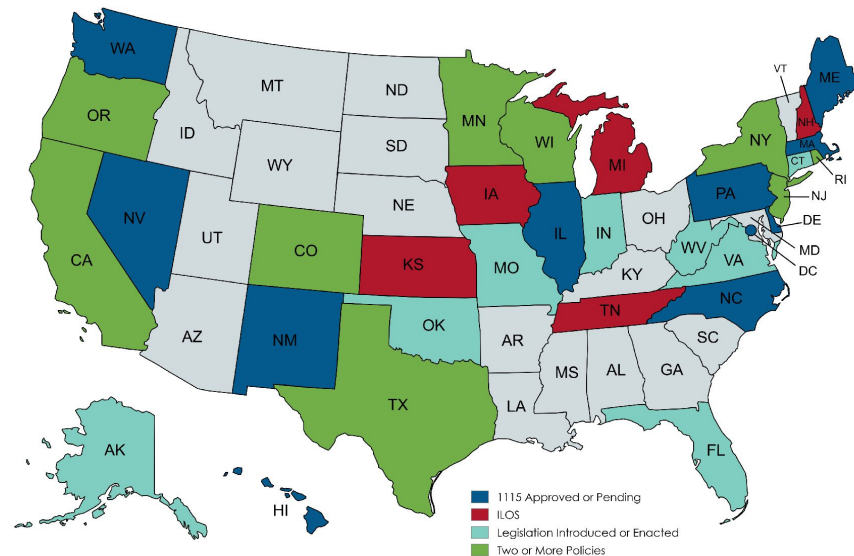
- **Thirteen** states have approved 1115 demonstration waivers that include coverage for the direct provision of food (CA, CO, DE, HI, IL, MA, NC, NJ, NM, NY, OR, PA, WA)
- **Three** states are awaiting approval (DC, ME, NV)

## • In Lieu of Services (ILOS)

- **Twelve** states offer nutrition supports via ILOS (CA, IA, KS, MI, MN, NH, NY, OR, RI, TN, TX, WI)

## • Legislation

- 2026: **Twelve** states have enacted or introduced bills to advance FIM Medicaid financing this session (CA, CT, FL, IN, MN, MO, NJ, NY, OK, RI, VA, WV)
- 2023-24, 2024-25: **Six** states enacted legislation to advance FIM Medicaid financing (AK, CO, MN, OK, TX, WI)



### SOURCES:

CMS, State Waivers List, <https://www.medicaid.gov/medicaid/section-1115-demo/demonstration-and-waiver-list>.

Kathryn Garfield et. al., States' Use Of Medicaid Managed Care 'In Lieu Of Services' Authority To Address Poor Nutrition, 44(4) Health Affairs 422, <https://doi.org/10.1377/hlthaff.2024.01349>.

Erika Hanson et al., The Evolution and Scope Of Medicaid Section 1115 Demonstrations To Address Nutrition: A US Survey, 2(2) Health Affairs Scholar 1, <https://doi.org/10.1093/haschl/gxae013>.

Map made on mapchart.net with data as of April 14, 2026.

## But there are tensions in implementation....



- Local vs national food provider
- Focus on treatment or prevention
- Choice vs pre-selection
- Target programs toward food insecurity or chronic disease
- How to allocate a limited amount of funding
- Demonstrating an ROI in the one-year time frame of a HC budget

# Food is Medicine: Summary

- FIM programs support food security and healthy diets
- FIM programs likely support better clinical outcomes
- Tremendous momentum toward implementing & evaluating FIM programs across the US
- Implementation and evaluation of FIM programs is hard

# Interventions to Improve Food & Nutrition Security

## *Rural Context & Implementation*

**Kate Garrity, PhD, RD**

*Assistant Professor*

Department of Food Science & Human Nutrition

Michigan State University

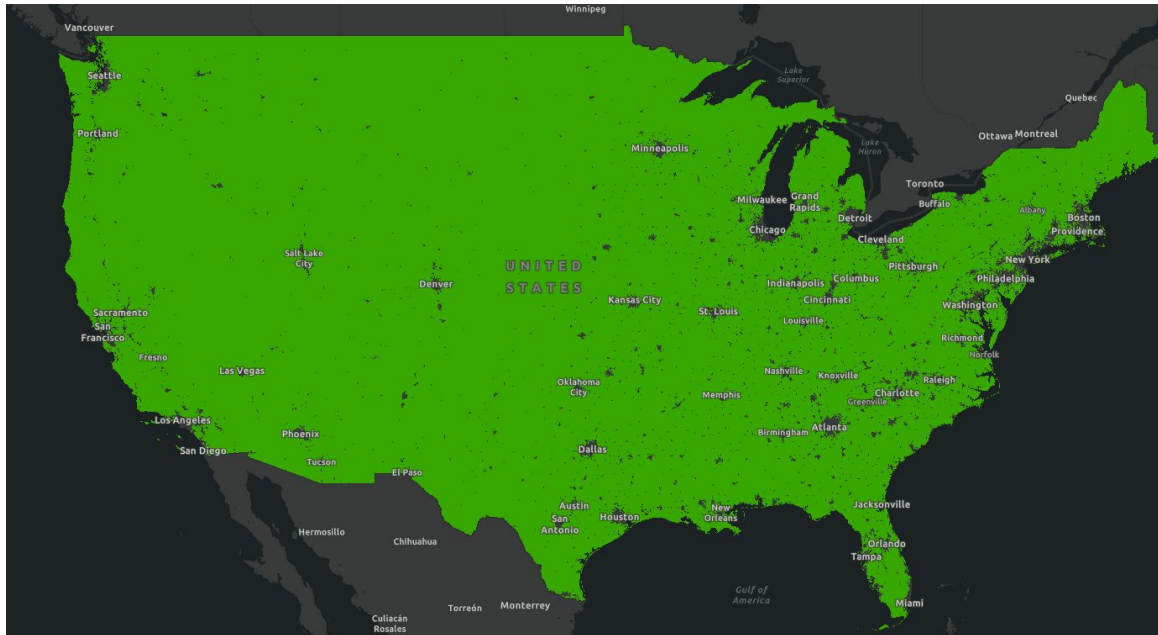
***NOPREN Rural Food Access Working Group Co-Chair***

HER NOPREN Summer Speaker Series | June 24<sup>th</sup>, 2026

# Rural Context

Poll: Did you grow up in a rural area?

- What is “rural”? Multiple definitions exist.

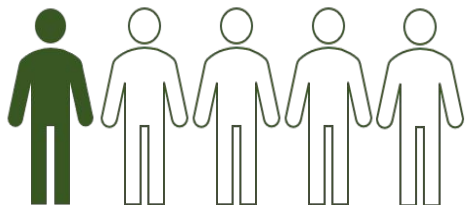


United States Census  
Bureau – Rural America

# Rural Context



- **One in five Americans** live in rural areas
- **Food insecurity is higher** in rural U.S. households (15.9%) than the national average (13.7%)
- **Premature mortality, all-cause mortality, and poor health outcomes** are higher in rural vs. urban counties
- **Rural health disparities** are driven by interconnected social, structural, and environmental factors



What drives these health disparities and higher food insecurity rates? Share your thoughts in the chat.

# Barriers and Facilitators to Food and Health Care Access in Rural Communities

## Barriers

- Lack of public transportation
- Low and underemployment
- Geographic isolation
- Higher rates of poverty
- Stigma in food assistance
- Less access to healthcare and health insurance

## Facilitators

- Strong cultures of hunting, gardening, foraging, and preserving
- Extension services
- Access to farmers markets and farm shares
- Rural resiliency

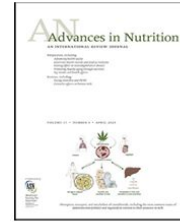


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Nutrition Research  
and Practice

# Advances in Nutrition

AN INTERNATIONAL REVIEW JOURNAL

journal homepage: <https://advances.nutrition.org/>



## Review

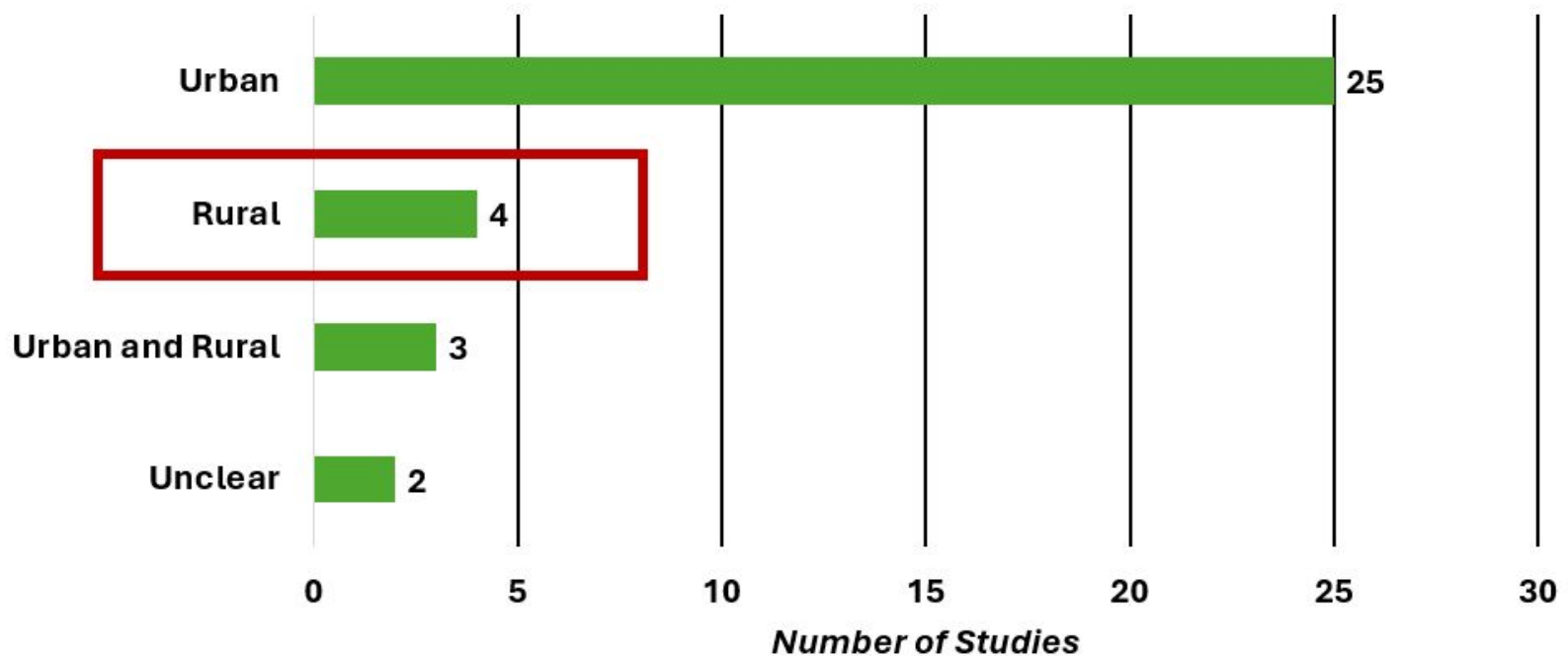
### Local Food System Approaches to Address Food and Nutrition Security among Low-Income Populations: A Systematic Review

Katharine Garrity<sup>1</sup>, Kathleen Krzyzanowski Guerra<sup>2</sup>, Hannah Hart<sup>3</sup>, Khawlah Al-Muhanna<sup>1</sup>, Emily C Kunkler<sup>1</sup>, Ashlea Braun<sup>4</sup>, Kathryn I Poppe<sup>3</sup>, Kara Johnson<sup>1</sup>, Emma Lazor<sup>1</sup>, Yang Liu<sup>1</sup>, Jennifer A Garner<sup>1,2,\*</sup>

<sup>1</sup> Division of Medical Dietetics, School of Health and Rehabilitation Sciences, College of Medicine, The Ohio State University; <sup>2</sup> John Glenn College of Public Affairs, The Ohio State University; <sup>3</sup> College of Public Health, The Ohio State University; <sup>4</sup> Department of Nutritional Sciences, College of Education and Human Sciences, Oklahoma State University



# Rural communities need greater focus and investment.



# How? Implementation Matters.

- Evidence-based programs don't always translate to real-world settings
- Rural contexts add unique challenges

Why might a program that works in an urban setting NOT work in a rural one? Share your thoughts in the chat.



vs.





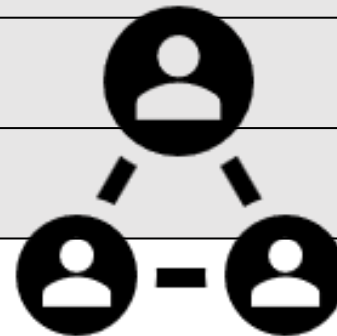
Quick raise of hands – who has heard of implementation science?

# Implementation Science

- Focuses on **how** to deliver programs effectively in real-world settings
- Goes beyond “**Does it work?**” and instead asks:
  - Can we **reach** people?
  - Will organizations **adopt** it?
  - Can it be **sustained**?

# A Practical Framework: RE-AIM

<b><u>R</u>each</b>	Who is being served?
<b><u>E</u>ffectiveness</b>	Does the intervention improve outcomes?
<b><u>A</u>doption</b>	Who delivers it?
<b><u>I</u>mplementation</b>	How is it delivered?
<b><u>M</u>aintenance</b>	Is it sustained over time?



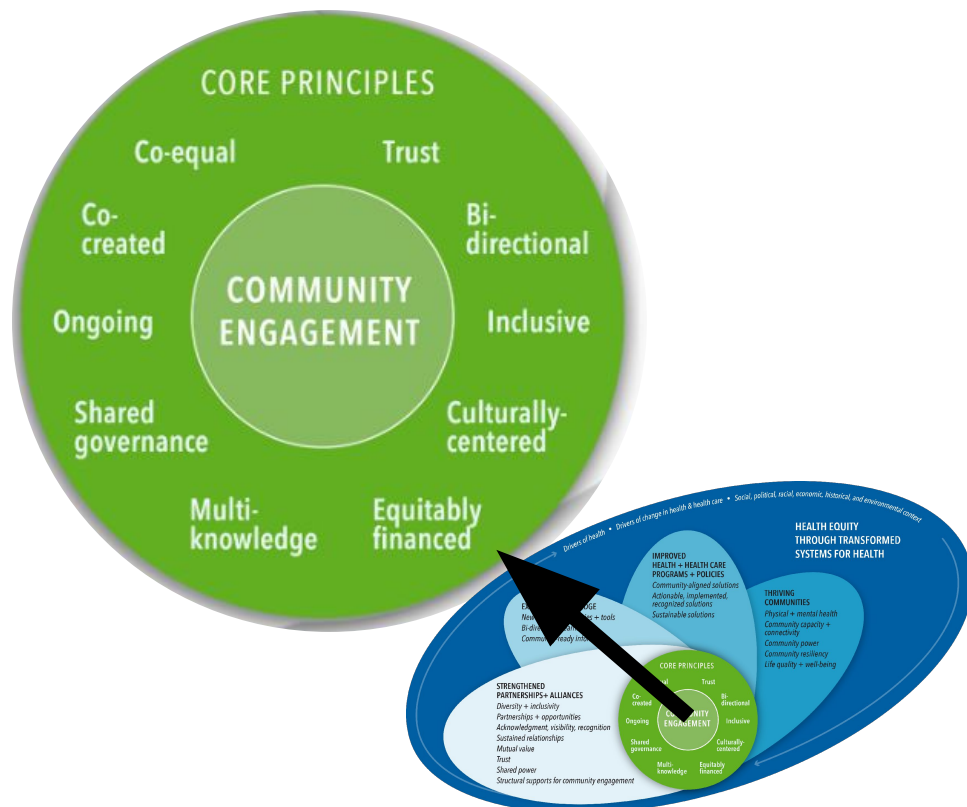
# Let's Apply This

Think about a produce prescription program. What is one RE-AIM challenge in a rural setting? Feel free to come off mute or share your answer in the chat.



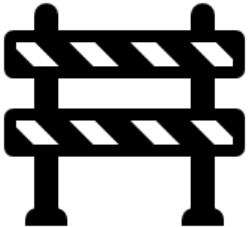
# Centering Community in Implementation

- **Community engagement is essential** for relevance, trust, and uptake
- **Local partnerships** improve reach, adoption, and sustainability
- **Communities bring critical context** and lived experiences
- **Co-designed interventions** are more feasible and effective in real-world settings



# Key Takeaways

- **Unique barriers, yet fewer interventions** in rural areas
- **Implementation is just as critical** as intervention design
- **RE-AIM and similar frameworks** help ensure programs are feasible, scalable, and sustainable in real-world settings
  - *If interested: CFIR, EPIS, PRISM*
- **Community engagement and partnership** are imperative



Healthy  
Eating  
Research



**NOPREN**  
Nutrition & Obesity  
POLICY RESEARCH & EVALUATION NETWORK

Q & A

## Join us for the next session of the speaker series!

- Wednesday, July 8 from 4:00 - 5:00 PM ET
- Title: Federal, State, and Local Nutrition Policy Updates