

Penn State Food-As-Medicine Initiative: Utilizing Health System-Academic-Community Partnerships to Improve Healthy Food Access

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Learning Objectives

- Recognize the potential of health system-academic-community partnerships in obtaining evidence and driving transformation in healthcare
- Analyze the use of geocoding in both determining potential food access locations as well as understanding impact of community outreach programming around food as medicine.
- Identify potential areas for community outreach research and its importance in Academic Integrative Medicine



Poor diet is the leading contributor to early death globally



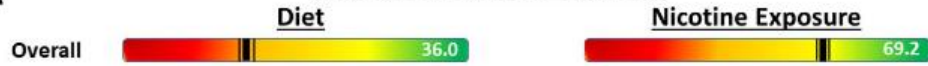
Global Burden of Disease Collaborators, (2019). Health effects of dietary risks in 195 countries, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017. <https://www.thelancet.com/action/showPdf?pii=S0140-6736%2819%2930041-8>



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A**Health Behaviors - Adults****36%****F****69%****D****52%****F****85%****B****B****Health Factors - Adults****57%****F****57%****F****67%****D****70%****C**

Lloyd-Jones et al. (2022). Circulation. Status of Cardiovascular Health in US Adults and Children Using the American Heart Association’s New “Life’s Essential 8” Metrics: Prevalence Estimates From the National Health and Nutrition Examination Survey (NHANES), 2013 Through 2018 | Circulation (ahajournals.org)



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Current dietary intakes for adults

Figure 4-1

Current Intakes: Ages 19 Through 30

Healthy Eating Index Score
(on a scale of 0-100)

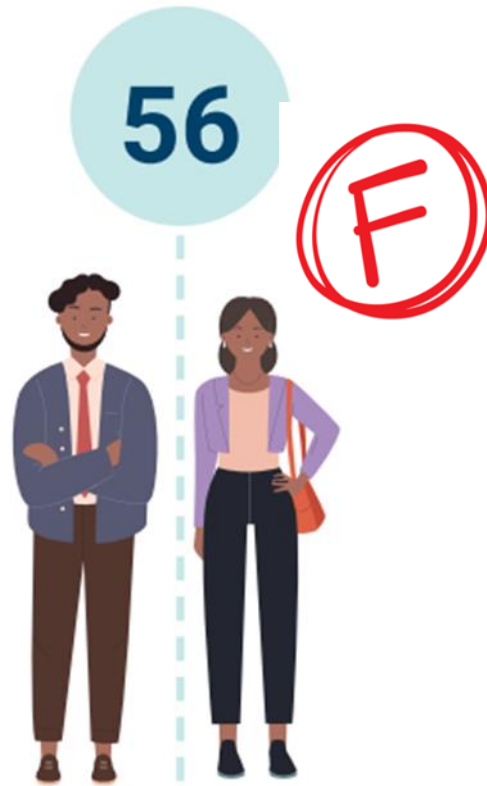


Figure 4-3

Current Intakes: Ages 31 Through 59

Healthy Eating Index Score
(on a scale of 0-100)



Figure 6-1

Current Intakes: Ages 60 and Older

Healthy Eating Index Score
(on a scale of 0-100)

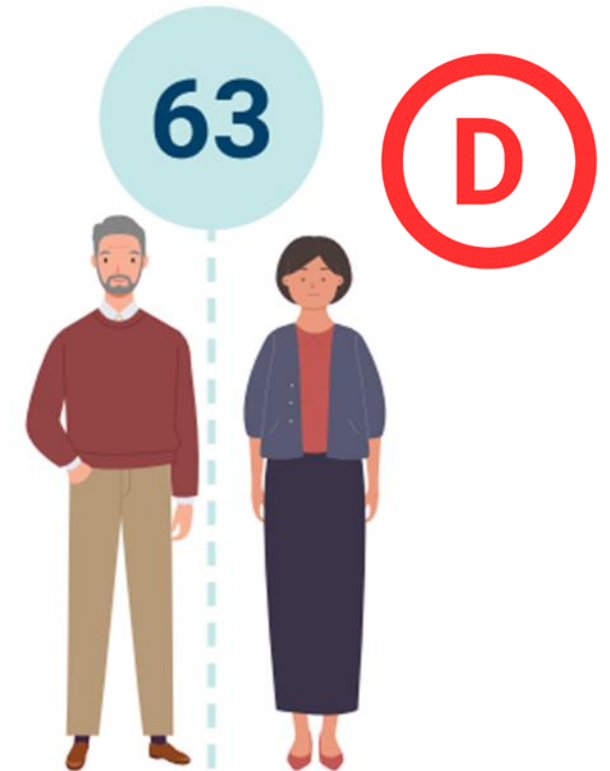
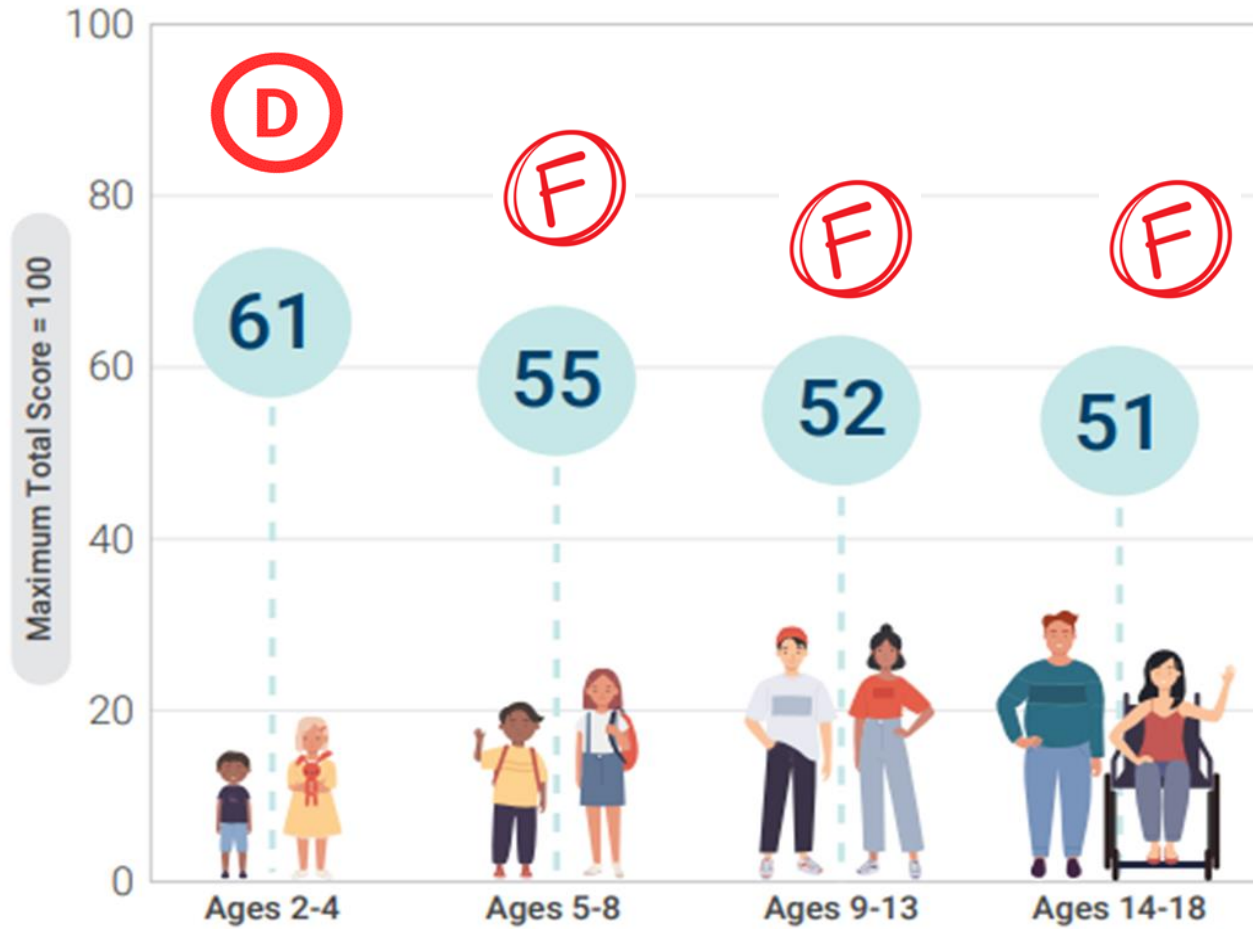


Figure 3-1

Healthy Eating Index Scores Across Childhood and Adolescence



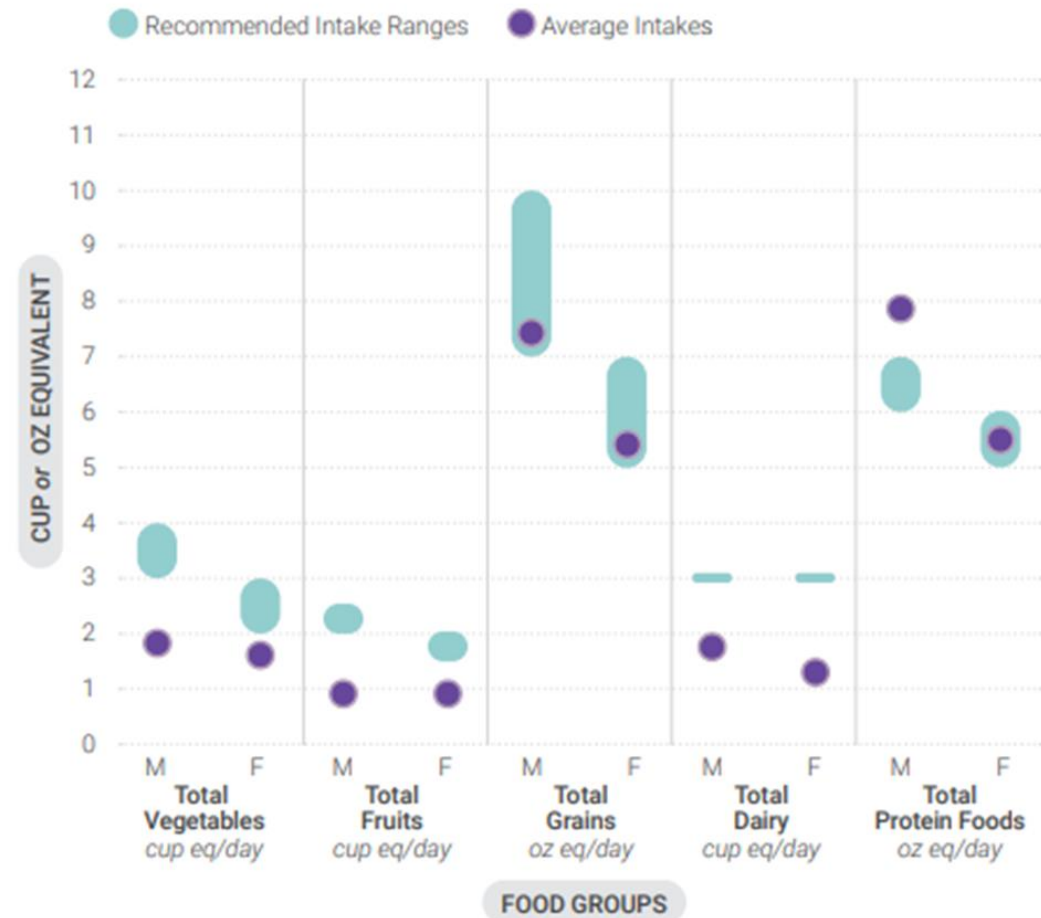
Data Source: Analysis of What We Eat in America, NHANES 2015-2016, ages 2 through 18, day 1 dietary intake, weighted.



Figure 4-3

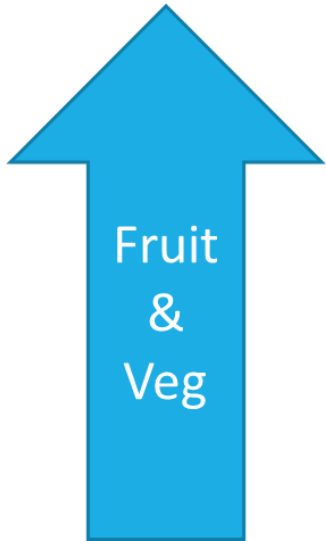
Current Intakes: Ages 31 Through 59

Average Daily Food Group Intakes Compared to Recommended Intake Ranges



Healthy Eating Index Score
(on a scale of 0-100)





CANCER



Mozaffarian D. Mediterranean diet for primary prevention of cardiovascular disease. N Engl J Med 2013;369:673-4.

Siervo M, Lara J, Chowdhury S, Ashor A, Oggioni C, Mathers JC. Effects of the Dietary Approach to Stop Hypertension (DASH) diet on cardiovascular risk factors: a systematic review and meta-analysis. Br J Nutr 2015;113:1-15.

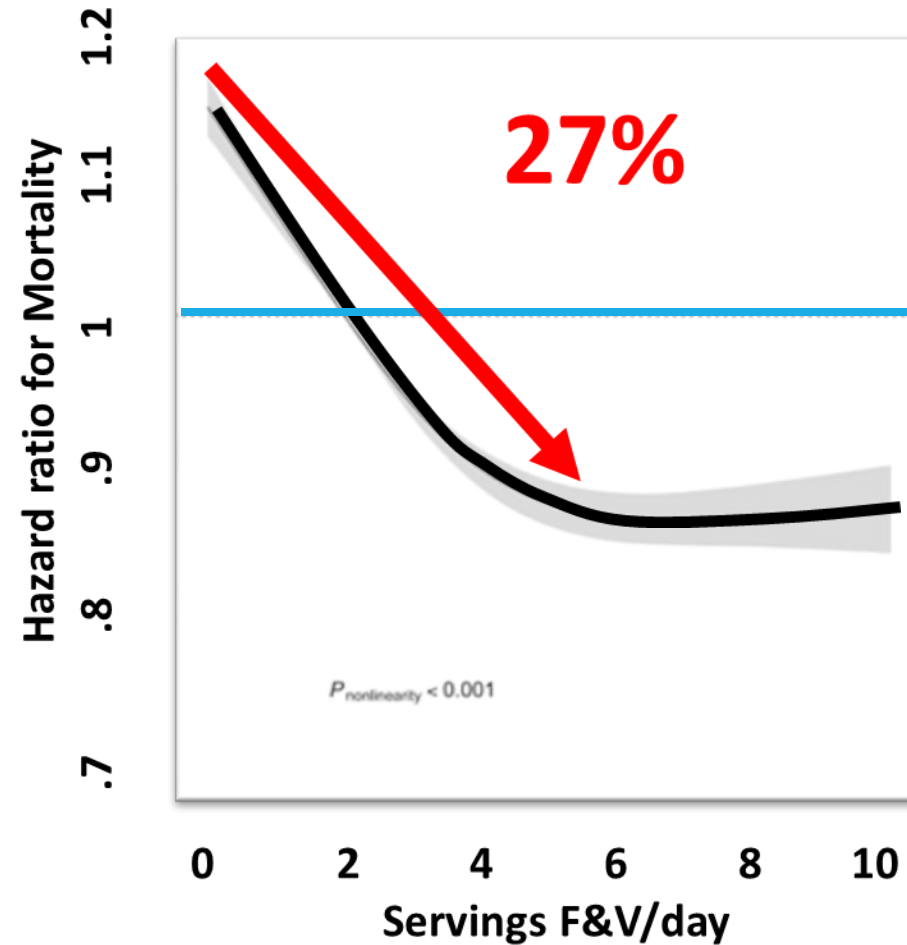


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Dose relationship between F&V intake and mortality



Wang et al., 2021. Circulation. Data from 2 prospective cohorts and 26 cohort studies



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Food As Medicine

Utilizing the power of nutrient rich foods to restore homeostasis and aid the body in healing and wellness.



History

Since the earliest written language around healing has included information around the use of foods as medicine

- Ayurvedic practices in India 2nd Century BC
 - Food is the most superior medicine¹
- Traditional Chinese medicine 3rd Century BC
 - Food Therapy (Balanced Diet) and Medicinal Diet Therapy (Specific to balance Yin and Yang)
- Even Hippocrates
 - “Let food be thy medicine and medicine be thy food”

Then in the 19th and 20th centuries more focus on macro then micronutrients
21st century microbiome, nutrigenomics

1. National Ayurvedic Medical Association



The evidence is...

Consistent
Compelling
Enough to take action
But How?

MANY VOICES, ONE THEME



AMERICAN COLLEGE OF
Lifestyle Medicine

#EATMOREPLANTS

For optimal health, major scientific and
medical organizations agree:
eat more unrefined plant foods!



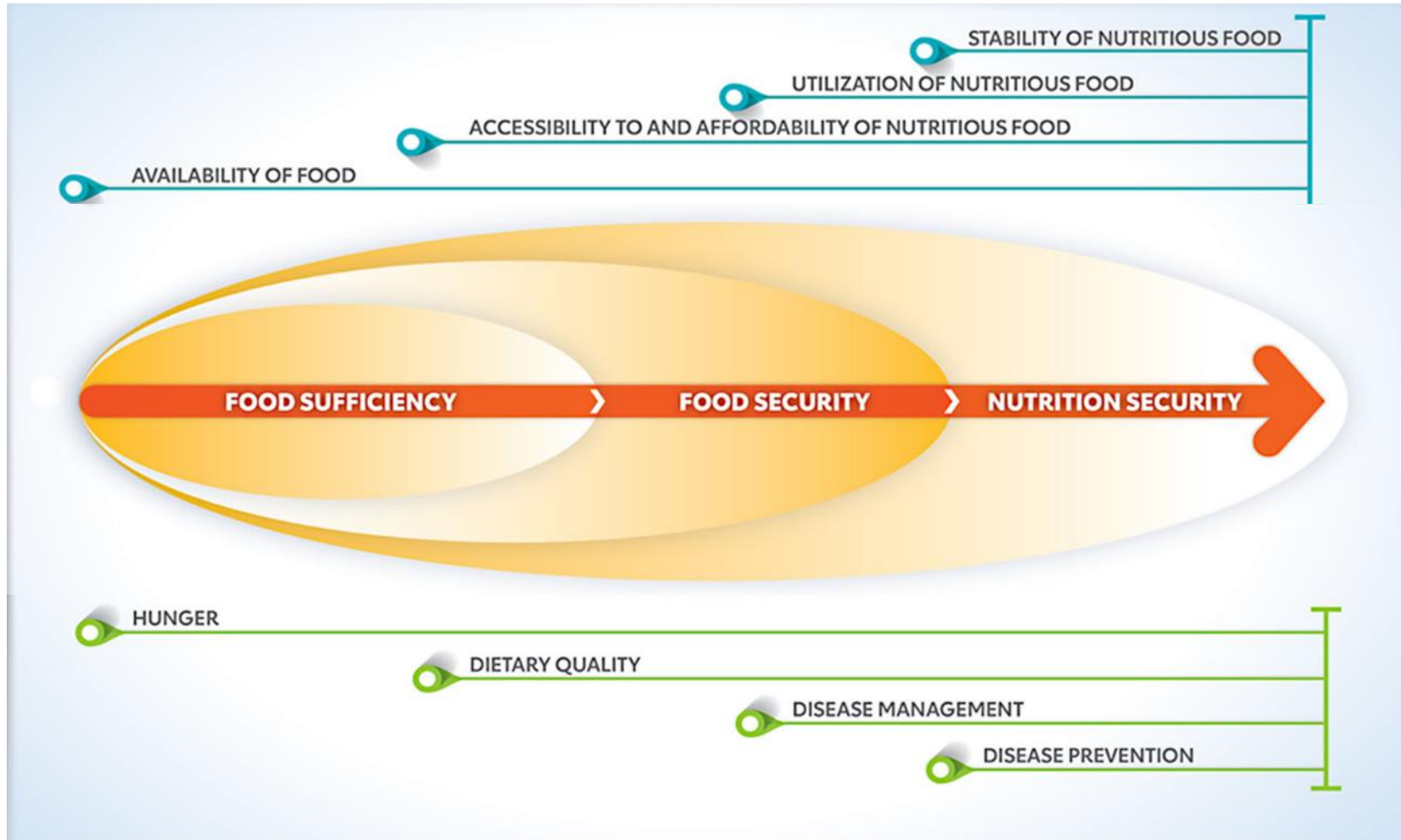
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Moving from Food Sufficiency to Nutrition Security

HEALTH DISPARITIES



HEALTH EQUITY

<https://www.ahajournals.org/doi/full/10.1161/CIR.0000000000001072> Nutrition security is more than food security | Nature Food



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Screening for Food Insecurity

AAP recommends routine screening for food insecurity beginning in 2015

By 2017, Penn State Health (PSH) is screening all children in the Academic General Pediatric Division at every well child check.

PSH utilizes the SEEK form, which uses the USDA Food Insecurity Questions

- Within the past 12 months, we worried whether our food would run out before we got money to buy more. (Yes or No)
- Within the past 12 months, the food we bought just didn't last and we didn't have money to get more. (Yes or No)

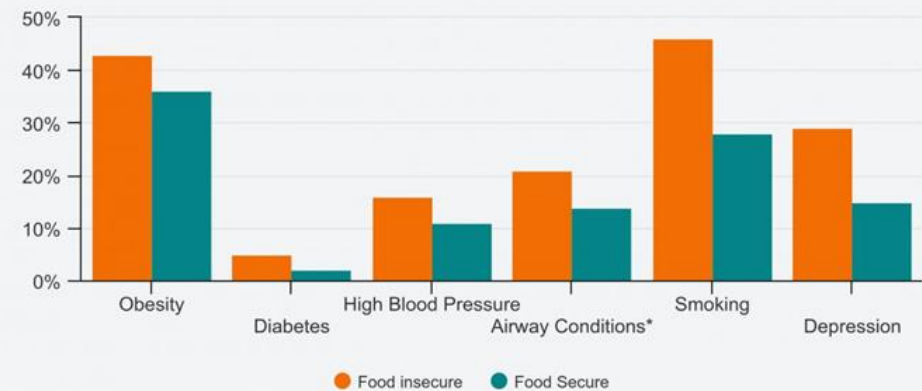


Food Insecurity and Health

Adults

- Obesity
- Chronic Diseases
 - Diabetes -OR 2.2 even when controlling for BMI in those with severe food insecurity¹
 - Mental Health Disorders –OR 1.67 Depression, OR 1.47 Anxiety, OR 2.67 Suicide²

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.



1. Seligman, H.K., Bindman, A.B., Vittinghoff, E. *et al.* Food Insecurity is Associated with Diabetes Mellitus: Results from the National Health Examination and Nutrition Examination Survey (NHANES) 1999–2002. *J GEN INTERN MED* **22**, 1018–1023 (2007). <https://doi.org/10.1007/s11606-007-0192-6>
2. Nagata, J.M., Parlar, K, *et al.* Food Insecurity Is Associated With Poorer Mental Health and Sleep Outcomes in Young Adults. Volume 65, Issue 6, *Journal of Adolescent Health* 65.6, 805-811 (2019)ISSN 1054-139X. <https://doi.org/10.1016/j.jadohealth.2019.08.010>.

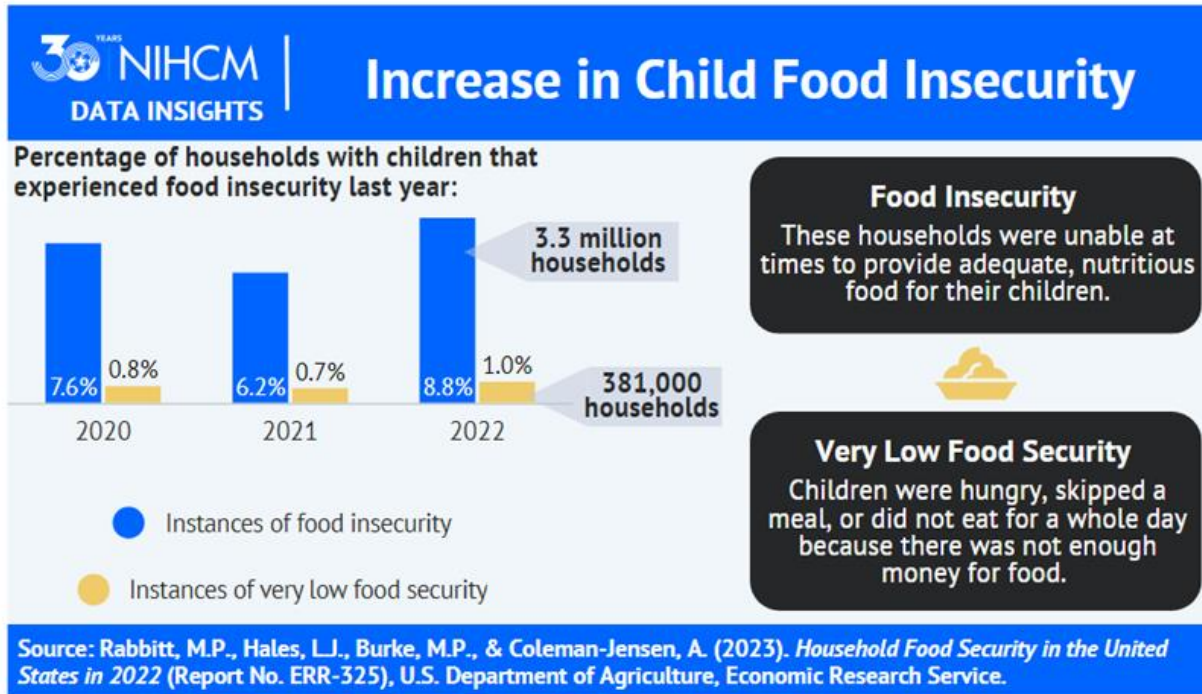


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Food Insecurity and Children



Children

- Obesity
- Neurodevelopmental Concerns
- Mental Health Concerns

Shankar P, Chung R, Frank DA. Association of Food Insecurity with Children's Behavioral, Emotional, and Academic Outcomes: A Systematic Review. *J Dev Behav Pediatr.* 2017 Feb/Mar;38(2):135-150. doi: 10.1097/DBP.0000000000000383. PMID: 28134627



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Cycle of Food Insecurity & Chronic Disease



Source: Adapted from Feeding America, New England Journal of Medicine

[The State of Food Insecurity: An UrbanFootprint Report | UrbanFootprint](#)

It Starts with Questions

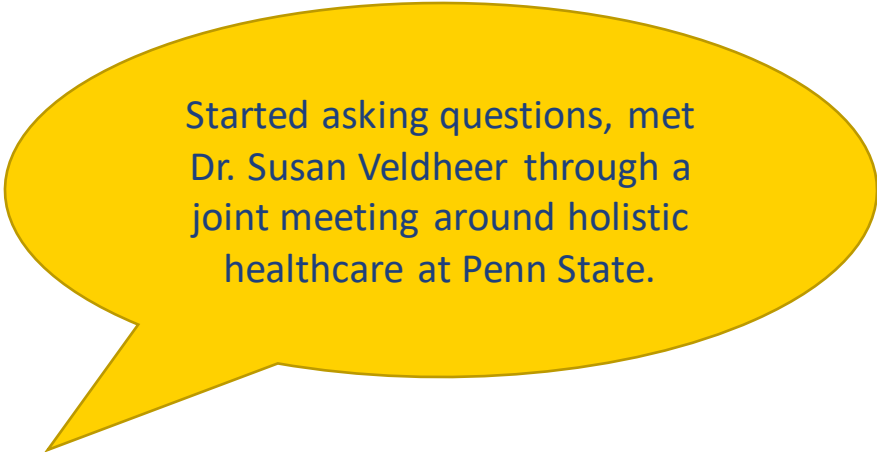
Our research questions:

How many people in our office are food insecure?

Are we offering nutritious food access points near our patients with food insecurity?

Can Community Gardens be a tool to improve food or nutrition security?

What else can we do?



Started asking questions, met Dr. Susan Veldheer through a joint meeting around holistic healthcare at Penn State.



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Survey Research and Geocoding

Applied for an internal grant that I did not get, but they got me in touch with Ashley Visco to discuss my interests.

Together we

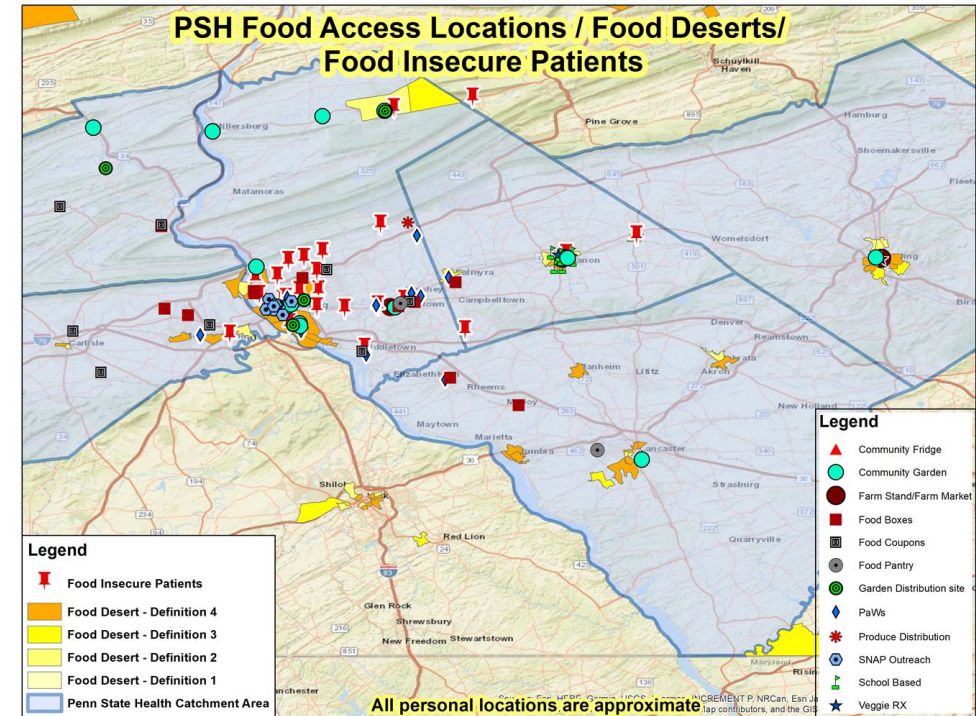
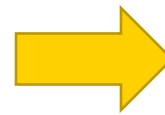
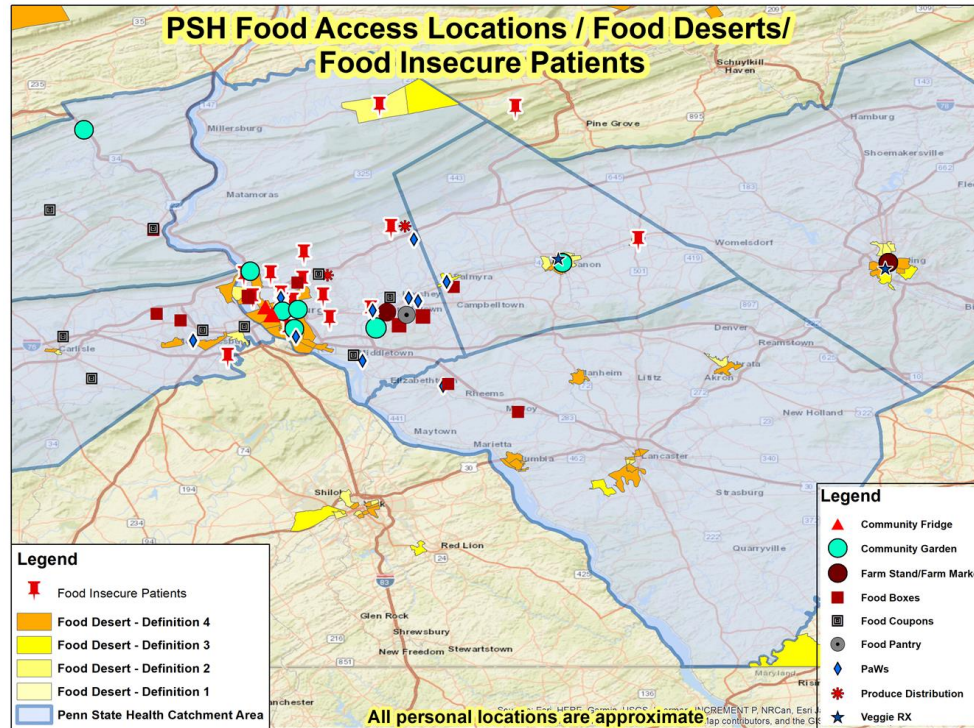
Screened all patients in 2021 for Food Insecurity using USDA food Insecurity questions

Reached out to families who identified as food insecure with surveys about current food security, resource utilization, and gardening interest

Utilized Geocoding to identify portions of our coverage area with gaps in food access locations



Geocoding results



Millersburg Outcomes from Survey data

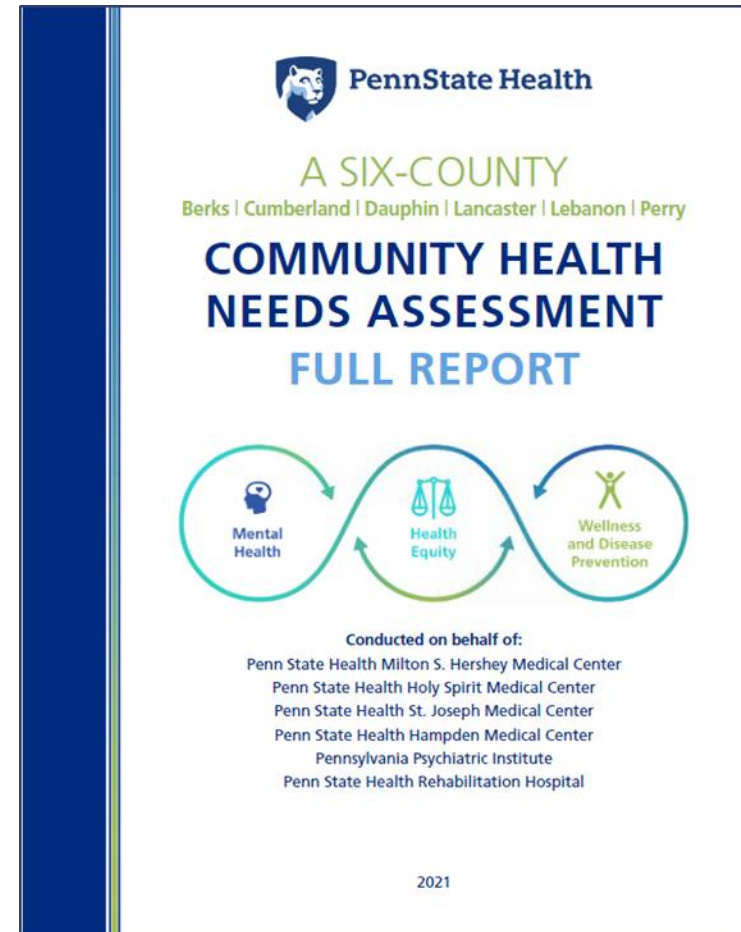
Garden Follow up Data		
Distance from Home	<1 mile(mi.)	1 (4%)
	1 to 5 mi.	22 (88%)
	11+mi	2 (8%)
Is it easy to buy Fresh Fruits and Vegetables in your neighborhood	Strongly Agree or Agree	2 (7.7%)
	Neither Agree or Disagree	1 (3.9%)
	Somewhat or Strongly Disagree	23 (88.5%)
Food Insecure	Yes	22 (84.6%)
	No	9 (15.4%)





Community Health Needs Assessment

- Non-profit hospitals
- CHNA – every 3 years
- Must include community input
- Implement plan to address identified needs
- Must be made public
- Completed in conjunction with other local partners
- Defined community
- Mandated by the Affordable Care Act 2012



Prioritized Community Health Needs 2021





Nutrition and Food Access

Address issues related to obesity and food insecurity by promoting access to and consumption of healthful diets, and determine impact of nutrition education and improved access.

Expand Reach of Nutrition and Food Access Programs

- Evaluate current Veggie Rx Program and expand into Lebanon County.
- Reach at least 10,000 participants across all nutrition and food access programs.

Develop a Regional Collaborative to Increase Communication and Develop a Nutrition/Food Access Resource Guide

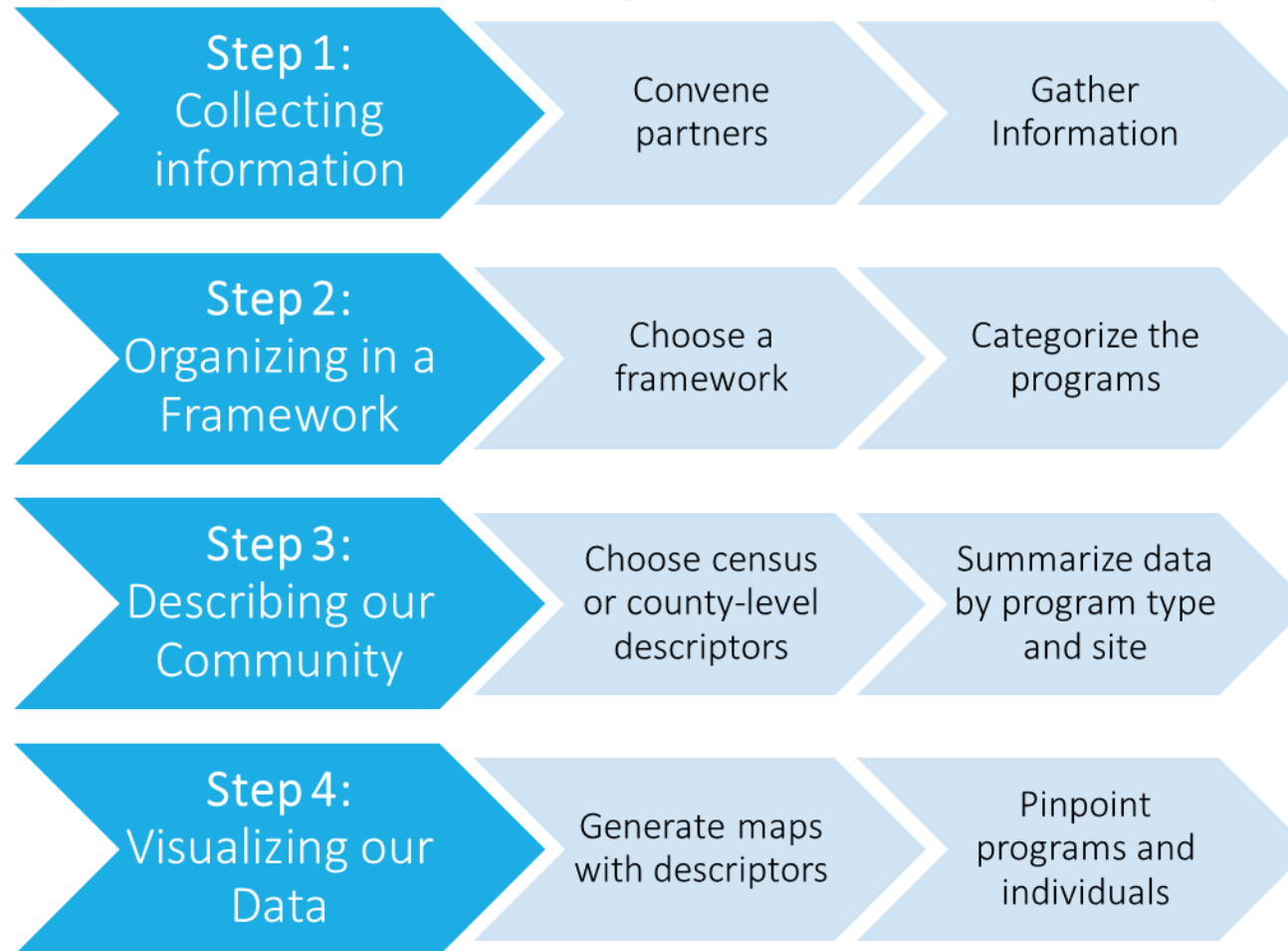
- Distribute resource guide through collaborative and additional partners in underserved communities.

Improve Access to Fruits and Vegetables, and Nutrition Education within our Service Area

- Plant 2-3 community/sensory gardens in service area.
- Offer education programs at Community Gardens on nutrition and gardening.



Conducting a Community Food Security Assessment



<https://www.ers.usda.gov/publications/pub-details/?pubid=43179> & <https://www.cdc.gov/obesity/downloads/hfrassessment.pdf>



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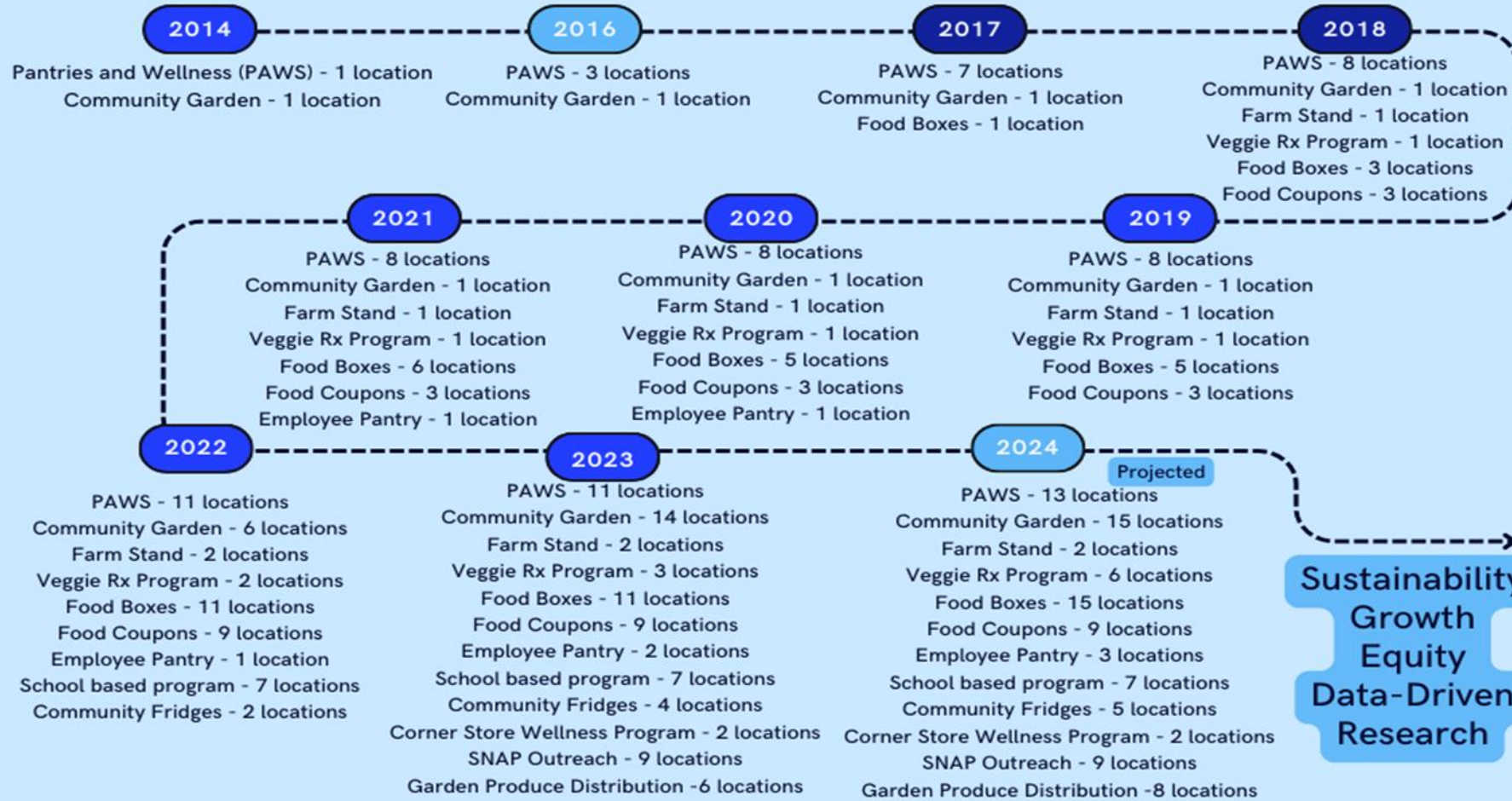
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Penn State Health Food Access Initiative Timeline 2014-2024

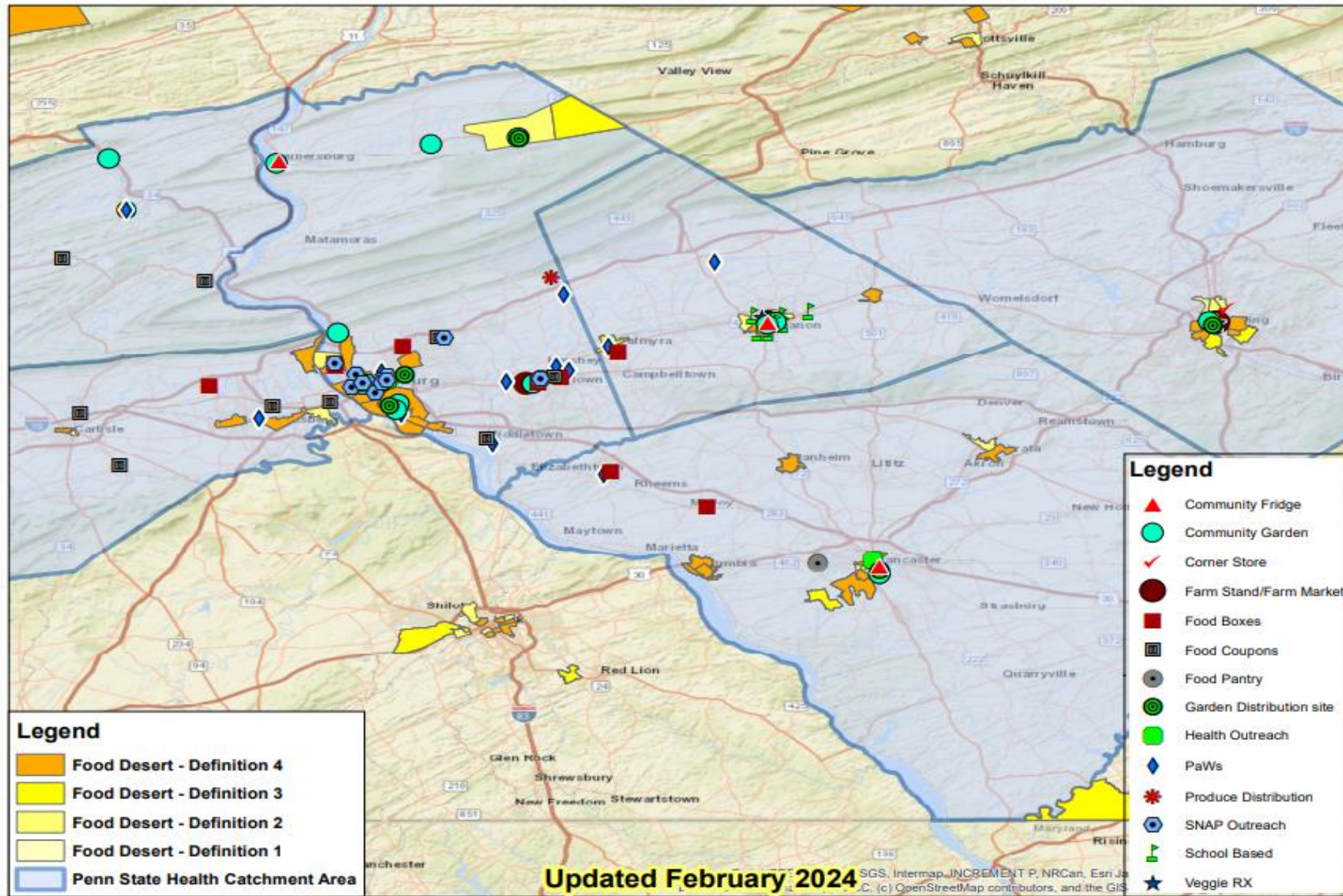


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Partnership and Progress



July 2017

Ashley implements SDoH screening in Pediatric practice and Emergency Food Boxes

August 2018

Susan meets Ashley to discuss SDoH work, they work on assessment of the programs



August 2021

Terrah submits grant for Food Access & is not awarded. Instead, she is connected to Ashley.

2022

Together, Susan, Terrah and Ashley submit the Rite Aid Grant & are awarded. Work expands, hiring Laurie to manage the grant.



2024 - TOGETHER, WORK CONTINUES WITH THE PENN STATE COLLEGE OF MEDICINE REACH GRANT AND OTHER PENN STATE HEALTH PROGRAMS.



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Penn State Food Access and Community Garden Program Manager

Role of the Manager

- Build Community Partnerships
- Support Nutrition and Food Access task force work in each county
- Encourage food access interventions within organizations working in community health
- Educate, collaborate and support community leaders to advance food access initiatives.
- Build sustainability plans for projects and funding



Community Gardens

Penn State project manager supports Gardens by

- Identifying Sites
- Building Partnerships
- Planning and Installation
- Reporting and Connections
- Providing Education
- Expanding Food Access Resources



10,000 pounds of produce or 16,667 servings of fruits and vegetables from 14 gardens in 2023



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Urban, school, library gardens



2675 hours of volunteer time in the gardens 2023



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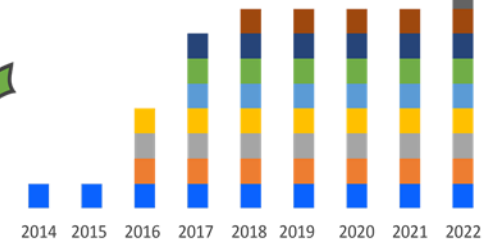
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Pantry Gardens and PAWS Program



PANTRIES ADDED TO PAWS PROGRAM BETWEEN 2014 - 2022

- Mary's Helpers
- Hummelstown
- Penbrook United Church
- Caring Cupboard
- Cocoa Packs
- Hershey Plaza
- Faith United Church of Christ
- Middletown
- Berks Farm Stand
- Community Cupboard
- New Hope Ministries



PAWS: Served 7,121 individuals resulting in 91 referrals from 19 locations in 2023



Community Fridges, Seed Libraries, Aerogardens

4 community fridges with year round produce



6 schools serving 500 children in the aerogarden program.



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Garden Education & Veggie Rx

Veggie Rx
Toolkit



150 people container gardening class

65 people cooking class

40 people small gardens class

125 People Veggie Rx classes in 3 locations

SNAP Nutrition and Garden Education at 3 locations



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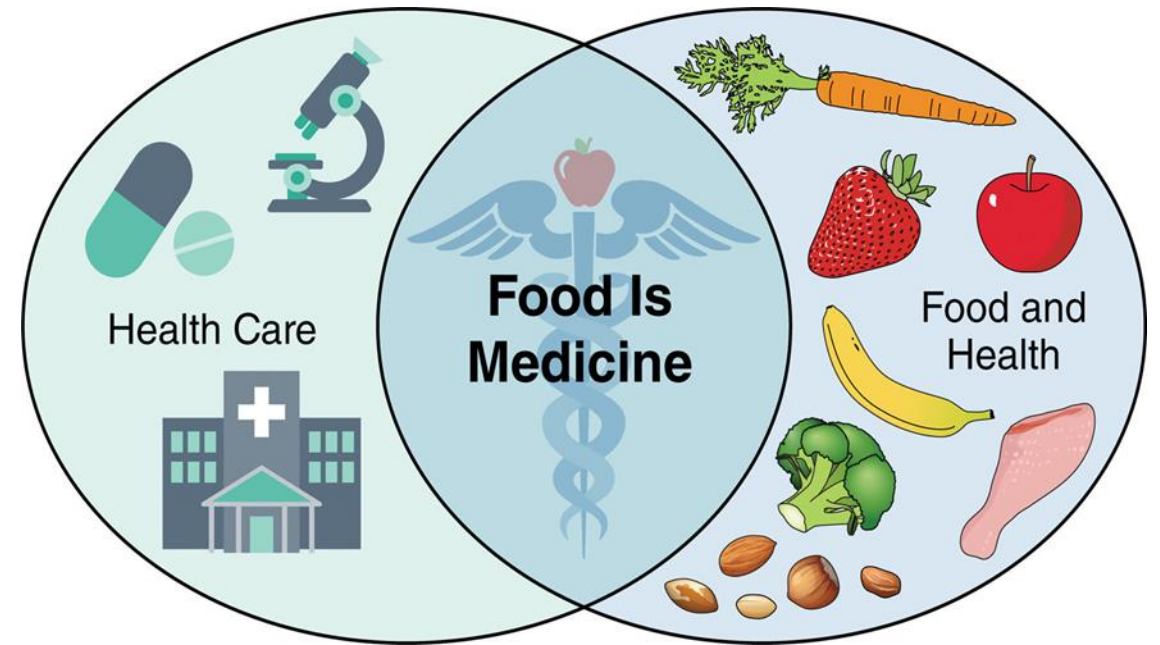
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What is Food as Medicine?

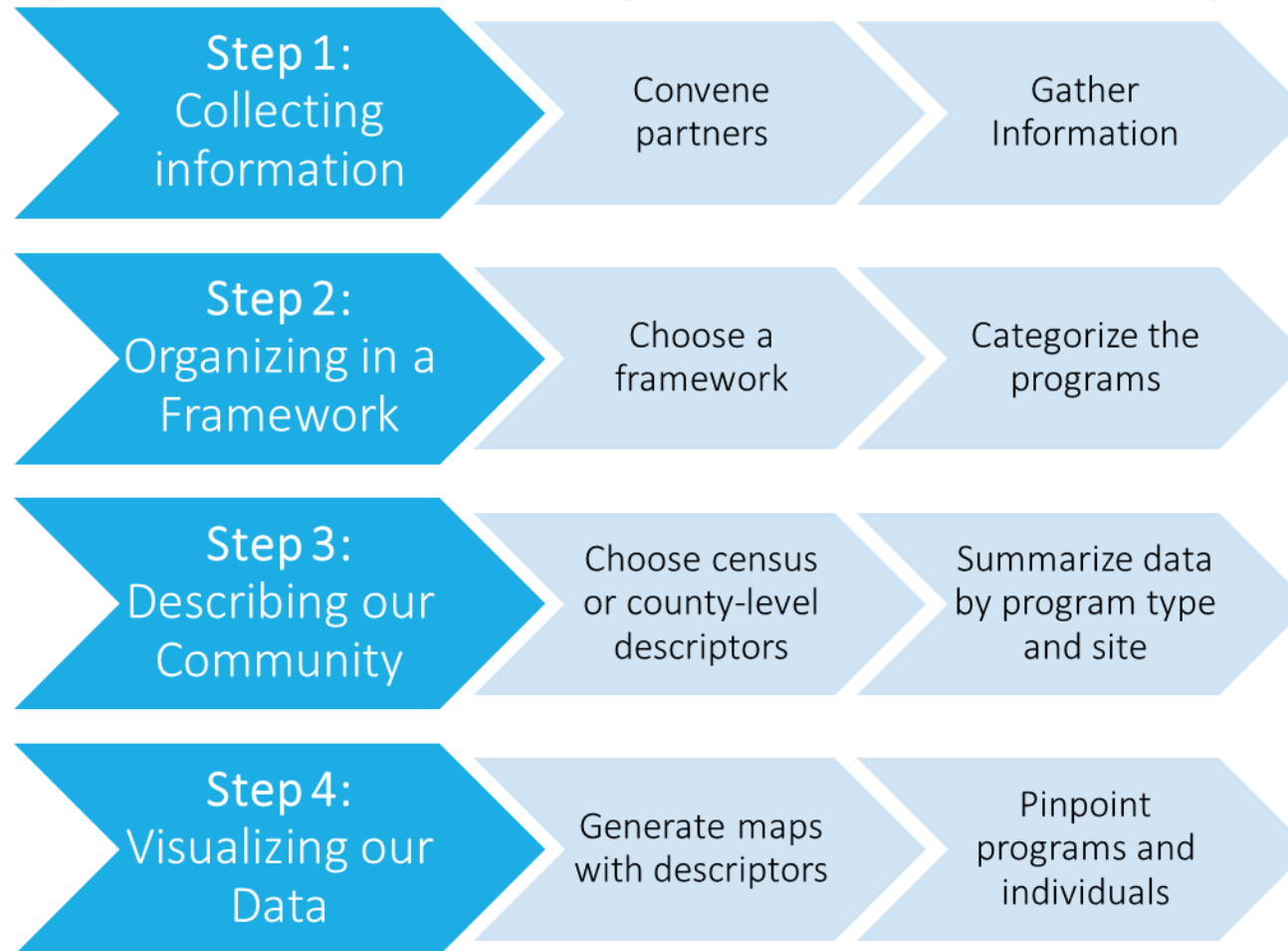
Has a healthcare partnership

Is translational (could also say clinically relevant here instead since this is a clinical group):

- Into clinical practice (T2 to T3)
- Out to populations (T3 to T4)



Conducting a Community Food Security Assessment



<https://www.ers.usda.gov/publications/pub-details/?pubid=43179> & <https://www.cdc.gov/obesity/downloads/hfrassessment.pdf>



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Step 1: collecting Information

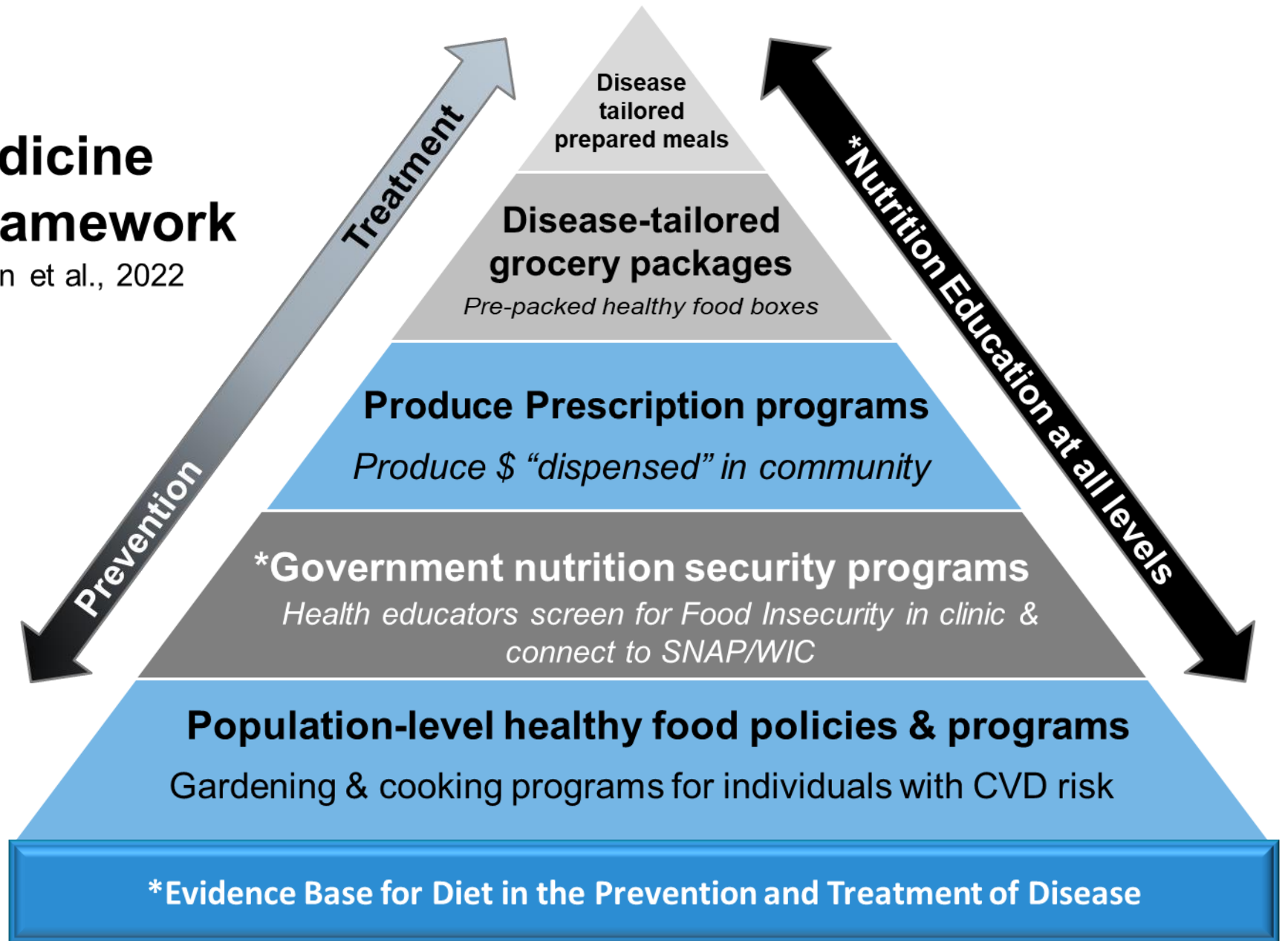
- Convene partners
- Gather Information

Our Programs and Sites		
<u>Program type</u>	<u>n</u>	<u>[%]</u>
Food boxes	11	12%
Veggie Rx	2	2%
SNAP Outreach	15	16%
Wellness Screenings	13	14%
Farmer's markets	2	2%
Community Garden	15	16%
Community Fridge	4	4%
Produce/Garden Distribution	8	8%
Food Pantry	3	3%
Food Coupons	9	9%
School-based Aerogardens	9	9%
Health Outreach	2	2%
Garden Distribution	6	6%
Corner store initiatives	2	2%



Food as Medicine Intervention Framework

Adapted from Mozaffarian et al., 2022



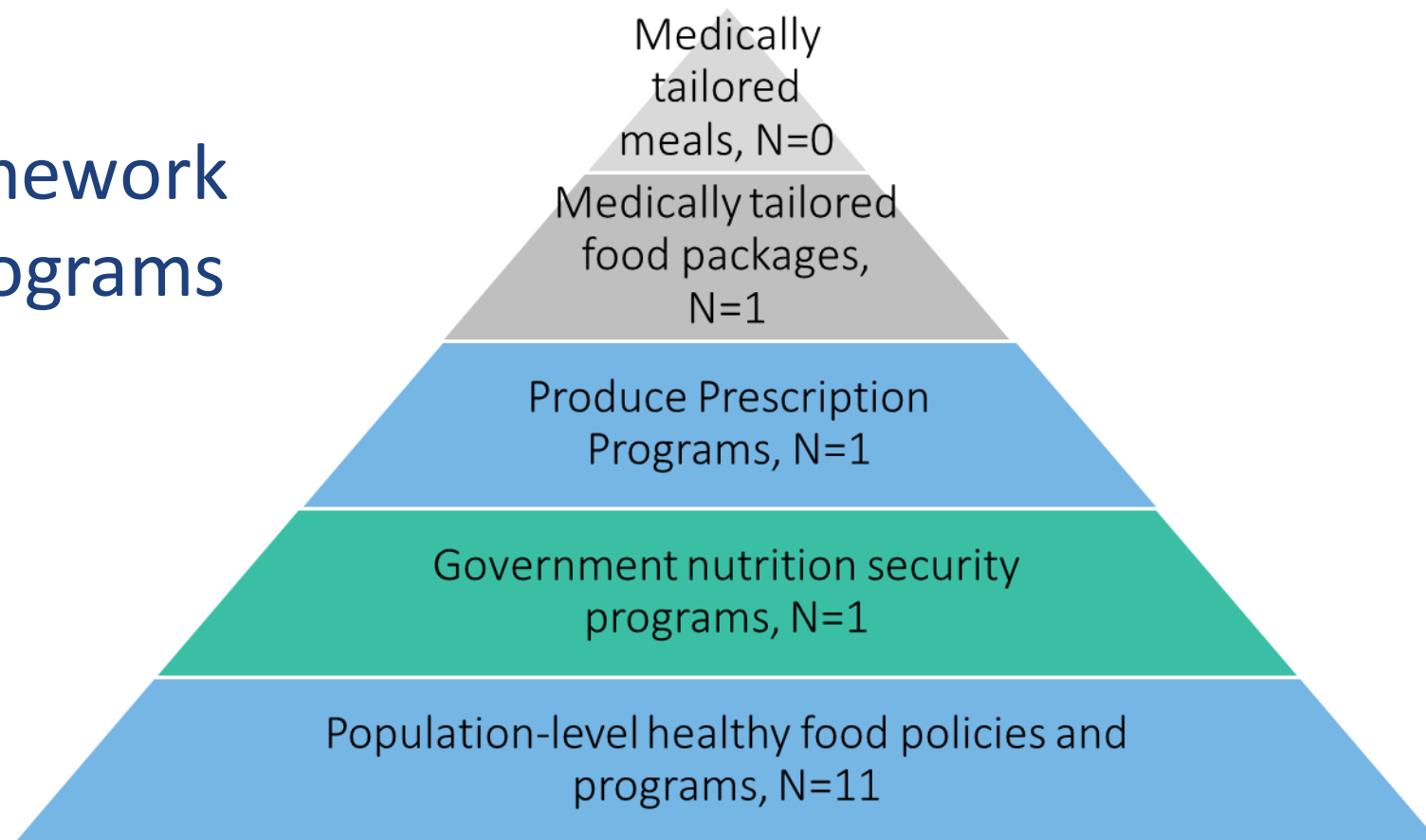
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Step 2: Organizing in a Framework

- Choose a framework
- Categorize programs



Step 3: Describing our Community

- Choose census or county-level descriptors
- Summarize data by program type and site

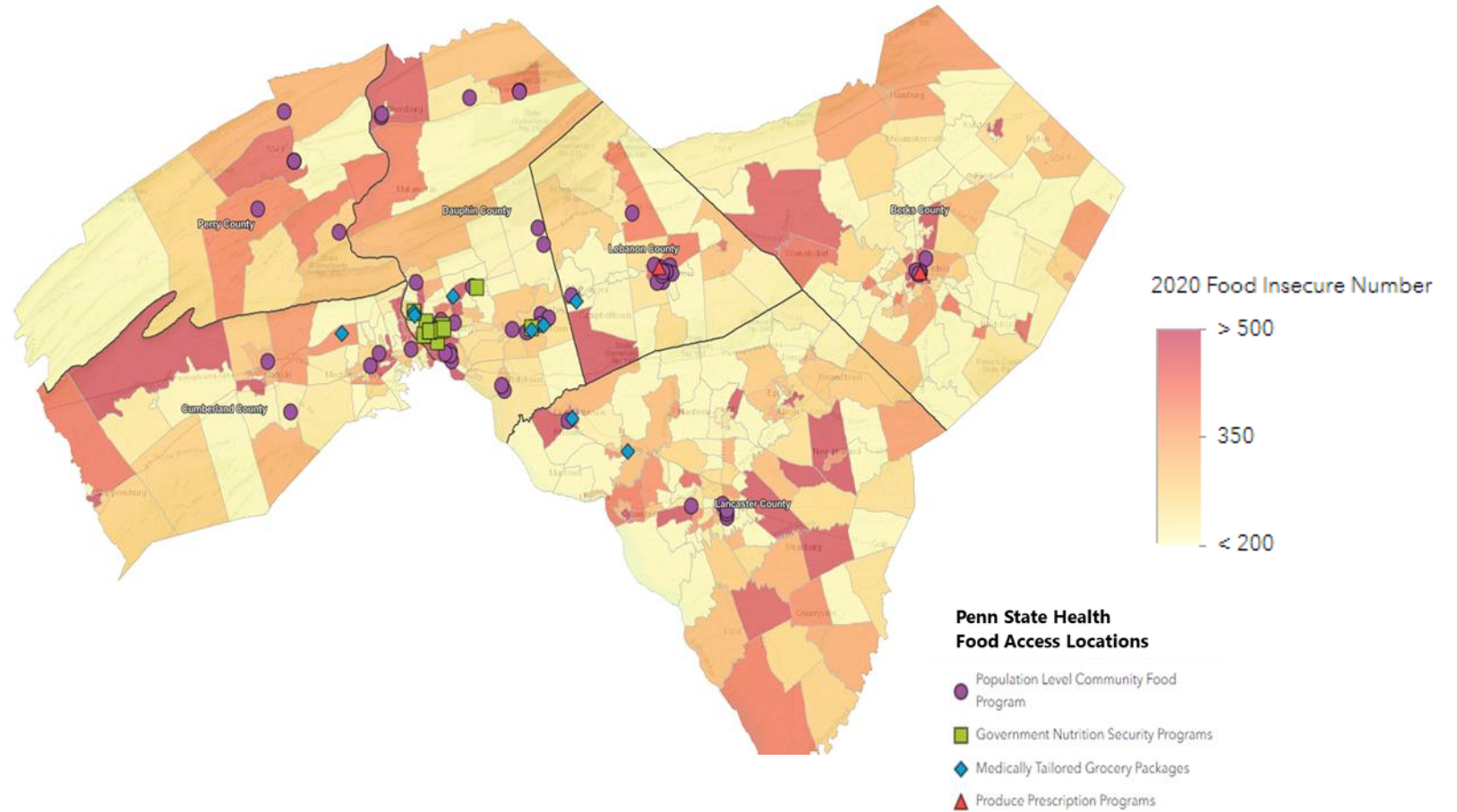
Census Level Descriptors by Framework Program Type						
Community-Level Characteristic	PA	US	Medically-tailored food packages (n=11)	Produce prescription programs (n=2)	Gov't nutrition security programs (n=15)	Population-level healthy food policies and programs (n=67)
SNAP Enrollment (%)	14.1	12.5	10.7	12.45	12.8	11.79
In Poverty (%)	11.8	11.5	9.7	28.22	21.7	16.72
Household-ownership (%)	69.2	64.6	53.94	42	36.7	51.06
High School Graduation (%)	91.4	88.9	90.03	76	83.1	85.28
College Graduation (%)	33.1	33.7	31	10.7	24.3	22.77
Uninsured (%)	6.5	9.3	6.15	11.15	9.3	8.11
Household Income (\$)	67,587	69,021	59,595	40,560	46,417	55,024
Diabetes (%)	11.1	11.3	8.26	14.75	10.2	10.8
Food Environment Index	8.4	7	8.26	8.4	7.9	8.2



Step 4: Visualizing our Data

Penn State Health Food Access Locations with Food Insecurity by Census Tract

- Generate maps with descriptors
- Pinpoint programs an individuals



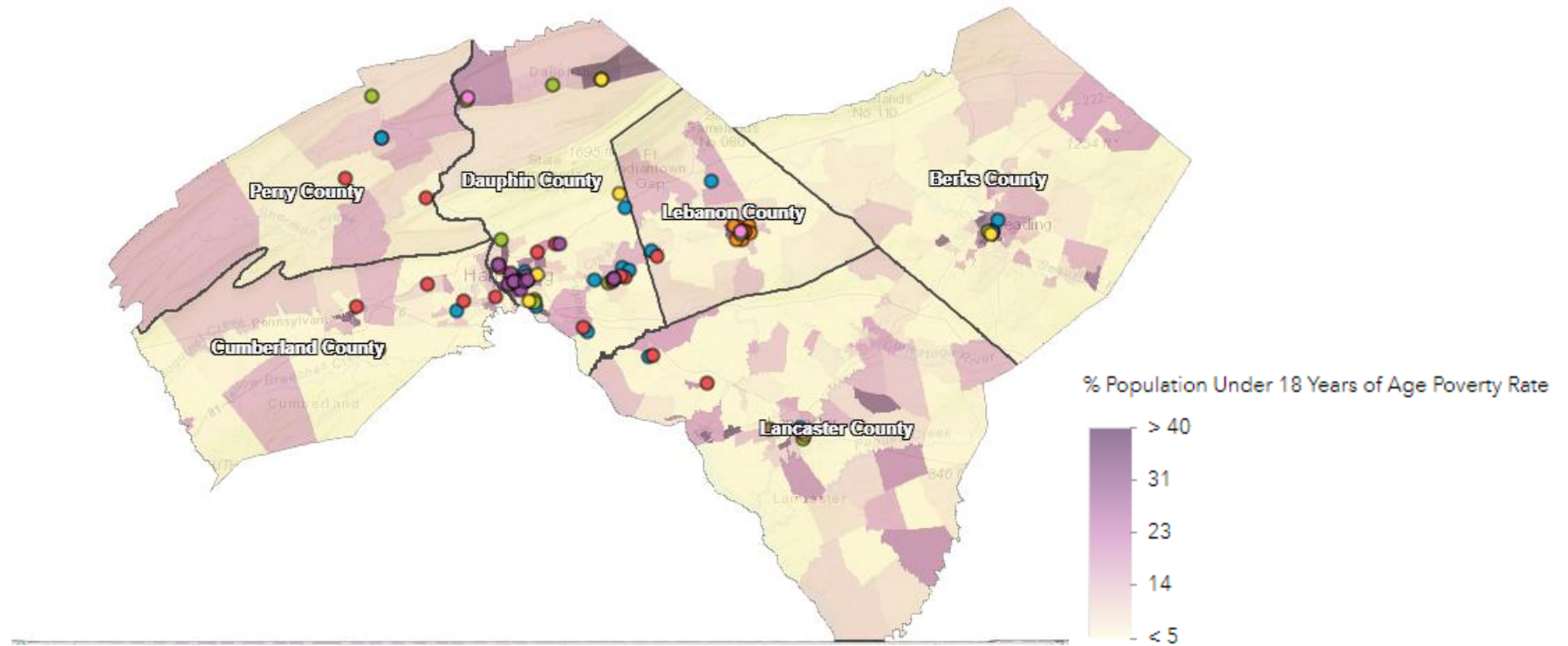
Where are we going?



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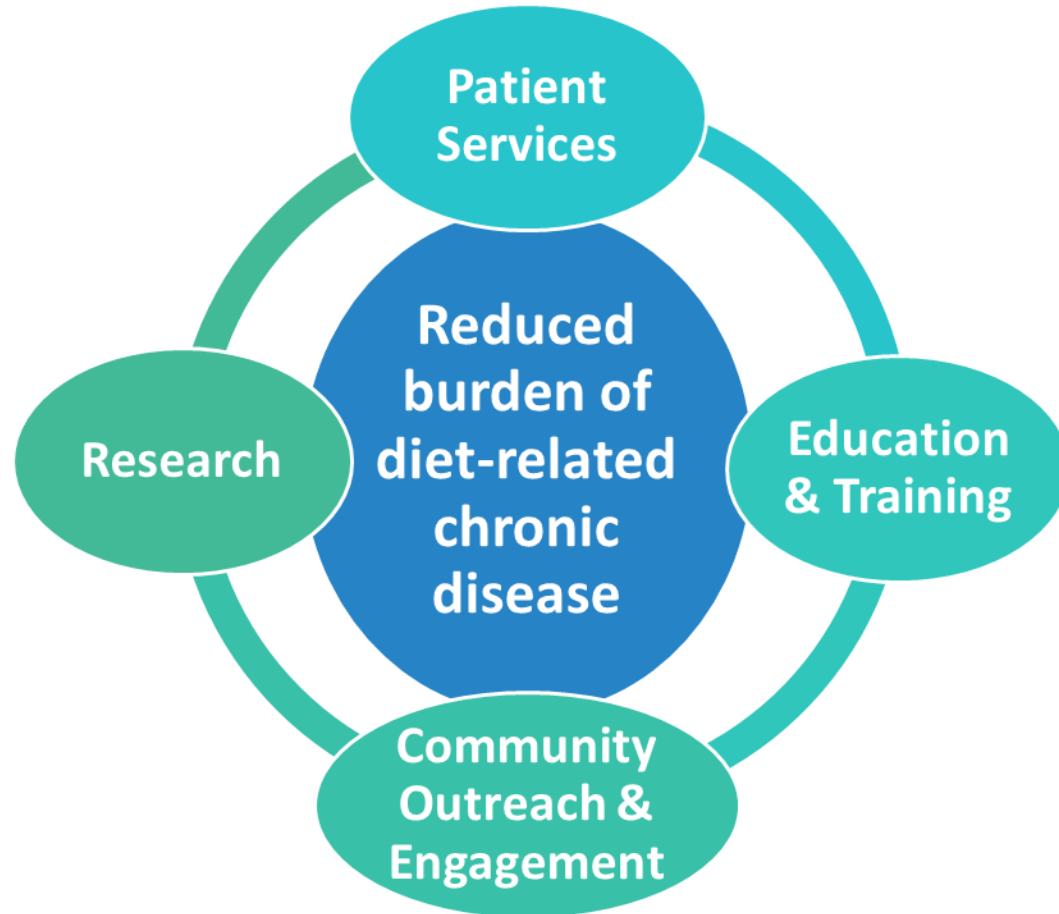


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[https://cpfb.maps.arcgis.com/apps/webappviewer/index.html?id=c963d1d9b14741ecaa03dd8f57fa967d__!!Ls64Rlj6!xw2860YwHOjPX4GoluhbiDpJqZrzq9qujwJrn5MG3333nWFkmCLWNRHB0XteW2yMoHU46PZdO7OTvxh8O5DWRcEgU7BH VQ7BCg\\$](https://cpfb.maps.arcgis.com/apps/webappviewer/index.html?id=c963d1d9b14741ecaa03dd8f57fa967d__!!Ls64Rlj6!xw2860YwHOjPX4GoluhbiDpJqZrzq9qujwJrn5MG3333nWFkmCLWNRHB0XteW2yMoHU46PZdO7OTvxh8O5DWRcEgU7BH VQ7BCg$)

Food As Medicine Core Areas



Research

- Intervention development
- Behavioral science
- Implementation science

Patient Services

- Identification
- Assessment
- Service provision

Education and Training

- Undergrad and Graduate
- Medical school & Residency
- Allied health professionals

Community Outreach & Engagement

- Partner
- Engage & communicate
- Execute!

Lynch 2023, AJCN, [A Concept for Comprehensive Food is Medicine Networks or Centers of Excellence - PubMed \(nih.gov\)](#)



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- Identify potential areas for community outreach research and its importance in Academic Integrative Medicine



Questions?

Penn State Health Contacts:

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