Key Drivers to Improve Food Security and Health Outcomes

AN EVIDENCE REVIEW OF FOOD BANK - HEALTH CARE PARTNERSHIPS AND RELATED INTERVENTIONS

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Connecticut Food Bank / Foodshare is the food bank of Connecticut, a member of the national Feeding America network, and provides nearly 40 million meals each year through a network of more than 700 community-based hunger relief programs. The Institute for Hunger Research & Solutions at Foodshare was founded in August 2019 with the goal to serve as a resource for food banks and community partners by providing strategies for holistic solutions to hunger. The Institute develops innovative and evidence-based programs that promote health and address the root causes of hunger. We research different approaches to identify what works and provide trainings and services so that others can implement best practices within the charitable food network.

Feeding America

Feeding America® is the largest domestic hunger-relief organization in the United States. Through a network of 200 food banks and 60,000 food pantries and meal programs, we provide meals to more than 40 million people each year. Feeding America also supports programs that prevent food waste and improve food security among the people we serve; educates the public about the problem of hunger; and advocates for legislation that protects people from going hungry. Individuals, charities, businesses, and government all have a role in ending hunger.

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EXECUTIVE SUMMARY

Food insecurity impacts health across the lifespan and can lead to increased risk for chronic diseases. Compounding this, Black, Latino, and Native American households have higher rates of food insecurity and experience worse health outcomes compared to white households. The COVID-19 pandemic has exacerbated both food insecurity and health disparities. Food banks and health care organizations are increasingly working together to address the links between food insecurity and health and to address health disparities to improve the lives of the clients and patients they collectively serve.

Over the past several years, Feeding America has embarked on a process of reviewing evidence to inform decisions and investments. Feeding America developed the Levels of Evidence Framework to assess and compare rigor and effectiveness across a range of tested interventions. This evidence review uses the Framework to identify the core interventions that food banks and health care systems are engaged with as partners. Examples include food insecurity screenings in health care settings followed by referrals to food pantries, referrals to produce distribution programs, or diabetes self-management programs in food pantries.

We sought to review and assess existing evidence to quantify the benefits of these programs for the specific outcomes of **food security, diet quality, and health outcomes**. While a few interventions are rated as promising, there is tremendous room, and need, for additional research and evidence related to food bank - health care partnerships. The review includes detailed descriptions of the interventions, research and evaluation opportunities, and case studies to highlight examples and lessons learned from the various interventions.

Health care providers and systems vary tremendously across the country, and partnerships take time to develop. This review is not intended to be a blueprint for implementation, but rather a tool to better understand the types of partnerships that exist between food banks and health care, where more evidence is needed, and which interventions are most promising. In light of the COVID-19 pandemic, partnerships between food banks and health care are more important than ever to improve the health and wellbeing of the people in their communities.

Table of Contents

Introduction

Food insecurity, or not having sufficient resources to obtain enough food to support an active, healthy life, can lead to serious negative implications for health, including increased risk for chronic diseases, poor management of those diseases, and mental health challenges.

Adults experiencing food insecurity have increased risk of diabetes, hypertension, obesity, depression and anxiety.[1-3] Additionally, food insecurity is disproportionately higher in Black, Latino, and Native American populations, and health inequities between racial and ethnic groups – and other marginalized groups – are widespread.[4-5]

Food banks and health care organizations are increasingly working together to address the link between food insecurity and health, to improve the lives of the clients and patients they collectively serve, and to address inequities in food insecurity and health. According to internal Feeding America data, over 70% of food banks in Feeding America's network are engaging in partnerships with health care organizations, and the remaining food banks have expressed interest in developing such partnerships. Partnerships range from informal programs to robust, long-term relationships that may include formal agreements, co-planning of interventions, sharing funding and resources, and other activities.

The economic consequences of the COVID-19 pandemic exacerbated both food insecurity and health inequities, an impact that is likely to be felt for several years. Partnerships between food banks and health care are more important than ever to improve the health and wellbeing of the people in their communities.

While interest in food bank - health care partnerships is increasing, evidence is needed to quantify the benefits of these partnerships and related programs for food banks, health care providers, and—most importantly—individuals living in food insecure households.

Other evidence reviews have been conducted in recent years based on the growing recognition that food insecurity is associated with negative health outcomes. Reviews have focused on food insecurity interventions in health care settings – such as food referrals and food provision,[6-7] as well as the specific ways health care organizations are facilitating access to fruits and vegetables.[8-9] Other reviews look specifically at disease prevention and management interventions in the charitable food system,[10-11] and one looks at the food is medicine movement – such as medically tailored meals, medically tailored food packages, and nutritious food referrals.[12]

While prior reviews provide important information related to health care partnerships, none have specifically looked at the role of partnerships between food banks and health care organizations to address food insecurity and health. **This evidence review seeks to address that gap by reviewing existing research specific to such partnerships and programs implemented within food banks and the charitable food system.**

INTENDED AUDIENCE

This evidence review is primarily intended for food banks interested in learning about and creating partnerships and programs with health care organizations. Health care systems seeking to address food insecurity by partnering with food pantries and food banks can also use this review to better understand both the types of programs to consider and the state of evidence underpinning those programs. Academic researchers hoping to measure the impact of food bank - health care partnership interventions should also benefit from this review.

The goals of this evidence review are to:

- Document the impact of food bank - health care partnerships and related interventions on food insecurity and health
- Highlight encouraging interventions that could be adopted and considered for implementation
- Identify where more research is needed
- Serve as a catalyst for food banks and health care organizations to work together to improve the health and food security of the people they serve.

This evidence review is not a blueprint for programming decisions, but rather a tool for better understanding the current evidence around partnership activities and the potential impact and effectiveness they may have.

This review should be considered alongside other implementation and capacity factors important to your food bank, such as internal strategy, staffing, cost, feasibility, sustainability, the populations you serve, equity, and other dynamics. You can use this information to explore innovative ways to partner with local health care organizations or to adapt or expand current partnerships.

Local context matters greatly and should be considered when reviewing the evidence. What works in one place might not work somewhere else. Explore what would work best for your clients, your community partners, and your food bank through a participatory process that engages clients and residents to collectively identify strategies based on local priorities, concerns, capacities, and data.

Methods

FEEDING AMERICA'S LEVELS OF EVIDENCE FRAMEWORK

Over the past several years, Feeding America has embarked on a process of reviewing evidence to inform decisions and investments. Feeding America developed the Levels of Evidence Framework to assess and compare rigor and effectiveness across a range of tested interventions.

There are four objectives of the Framework:

1. Provide a systematic approach to assessing and describing **how well an intervention or program works** towards achieving a specified outcome;
2. Identify interventions and initiatives where effectiveness still **needs to be evaluated**;
3. Develop a **shared language** so that practices can be placed on a continuum of known effectiveness; and
4. Provide food banks and Feeding America information to inform decision-making around broader **implementation and dissemination across the network**.

Since developing the Levels of Evidence Framework, Feeding America commissioned an evidence review focused on interventions that improve food security.[13]

Focus of this Evidence Review

Due to the growing interest in health care partnerships, Feeding America commissioned this evidence review to better understand the impact of food bank and health care interventions on food insecurity and health. This review examines the impact of interventions conducted through:

- food bank and health care partnerships
- food banks without a health care partner
- health care providers without a food bank partner but where potential for partnerships exist

The review particularly focuses on the impact of these interventions on outcomes related to:

1. food security
2. diet quality
3. health outcomes
   (e.g., diabetes-related outcomes, blood pressure control, health care utilization, etc.)

Evidence from previous research on food insecurity may demonstrate an intervention's effectiveness in addressing other important outcomes (e.g., housing stability), but for this evidence review, interventions are only included and rated based on the evidence of impact on the three target outcomes of food security, diet quality, and health outcomes. The evidence review is limited to studies in the health and public health literature. Only research that evaluates direct impact of an intervention on the outcomes of interest are included. While research exists showing likely indirect impact on food security, diet quality, and health outcomes, this evidence review focuses on the causal pathway from intervention to outcome.

About The Framework:

This evidence review also utilizes the Levels of Evidence Framework. Our methodology reflects the quality and quantity of accumulated research to examine the effectiveness of different interventions. The image on the right represents the four rating levels as a filtered funnel.

Ratings of "not yet evaluated," "emerging," and "promising" do not indicate that an intervention does not work or suggest an intervention may not be helpful. Rather, these ratings suggest that more research is needed to understand whether or not the intervention has an impact on the target outcome. Partnerships between food banks, academic researchers, and health care organizations can bolster the available evidence.

RATING	EVIDENCE OF IMPACT	NEXT STEPS FOR RESEARCH
PROVEN	Multiple high-quality studies demonstrate a causal impact on the target outcome(s).	Continue to monitor for performance and fidelity.
PROMISING	One or more well-conducted studies show persuasive evidence of an intervention's impact on the target outcome(s).	Testing for scalability and generalizability is the next step needed to fill a gap in the existing literature.
EMERGING	One or more studies suggest the intervention may impact the target outcome(s).	Impact evaluations – including Randomized Control Trials (RCT) – can be conducted to contribute to the existing literature.
NOT YET EVALUATED	Not enough evidence to determine an intervention's impact on the target outcome(s), but preliminary practice data suggest potential for impact.	Preliminary impact evaluations can be conducted to contribute to the existing literature.

CONSIDERATIONS WHEN REVIEWING EVIDENCE:

While the number of studies in a category reflects interest in an intervention, study quality was a primary metric used to rate the evidence in this review. Study design and methodology, sample size and inclusion criteria, and length of intervention are some of the metrics considered in evaluating study quality. See the Appendix for additional details on each study included in the evidence review.

The evidence reviewed in this document represents a snapshot in time. The ratings will likely need to be reassessed and updated over time as new evidence is published. Even within the same intervention categories, programs differ in how they are designed, delivered, and evaluated. Determination of the final ratings involved a degree of subjectivity. The authors worked closely with staff members from Feeding America and members of Feeding America's Technical Advisory Group along with fellow food bank staff for their advice and input. Despite best efforts, experts in the field may disagree with these ratings.

Historically, populations of color, women, and other marginalized groups have been underrepresented or treated unethically in research, as evident in the Tuskegee Study of Untreated Syphilis. Research does not happen in a vacuum, and it is a challenge to assess how structural and institutional inequities and biases may have influenced the design and results of each study included in this evidence review.

Impact On Health

FEDERAL NUTRITION PROGRAMS ARE DESIGNED TO BE THE FIRST LINE OF DEFENSE AGAINST HUNGER.

Previous Feeding America evidence reviews have included federal nutrition programs and evaluated the evidence on their impact on food security, but not their direct impact on health outcomes. While the scope of this review is focused on food bank and health care programs, it is important to touch briefly on the potential impact of federal nutrition programs on health outcomes. Previous studies have explored the impact of certain federal nutrition programs on health outcomes, particularly the Supplemental Nutrition Assistance Program (SNAP), Special Supplemental Nutrition program for Women, Infants and Children (WIC), National School Lunch Program (NSLP), and School Breakfast Program (SBP).

FEDERAL NUTRITION PROGRAMS	LEVEL OF EVIDENCE, BY OUTCOME	
INTERVENTION	**FOOD SECURITY**	**HEALTH OUTCOMES**
Supplemental Nutrition Assistance Program (SNAP)	**PROVEN**	**PROVEN***
Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)	**PROVEN**	**PROVEN***
National School Lunch Program (NSLP)	**PROVEN**	**EMERGING**
School Breakfast Program (SBP)	**PROVEN**	**EMERGING**
Summer Food Service Program	**PROMISING**	**NOT YET EVALUATED**

** Rating the impact of SNAP and WIC on health outcomes is challenging; many studies use econometric and other research techniques that infer causality, but due to ethical considerations (for example it would not be ethical to randomize someone to not receive SNAP) other research approaches to demonstrate causality are not appropriate. A rating of 'proven' was assigned to SNAP and WIC in account of the significant amount of research and evidence that exists demonstrating strong linkages to health outcomes.*

SNAP: IMPACTS ON HEALTH OUTCOMES

There is an extensive literature examining the impact of SNAP on health outcomes. Participation in SNAP is associated with the following, among other outcomes:

- improvements in self-assessed health[14]
- lower likelihood of a child being underweight or in poor/fair health[15]
- lower risk for obesity, heart disease, and diabetes[16-20]
- fewer low-birth-weight infants among pregnant women[21]
- lower likelihood of skipping needed medications and nursing home admissions among seniors[22]
- fewer hypoglycemia-related hospital admissions[23]
- higher utilization of preventative health care and lower health care costs[24-25]

An increase in SNAP benefits is associated with reduced likelihood of hypertension-, asthma-, hypoglycemia-, and pregnancy-related emergency room visits,[26-29] and hospitalizations of older adults.[30] In addition to the direct impacts of SNAP on health outcomes, the indirect effects are also worth emphasizing. Namely, given the proven fact that SNAP leads to reductions in food insecurity and the extensive literature showing the negative impacts of food insecurity on health (for reviews, see Gundersen and Ziliak (2015; 2018)), SNAP also leads to improvements in health through its role in reducing food insecurity.

WIC: IMPACTS ON HEALTH OUTCOMES

WIC participation is linked to improved health outcomes, particularly improved pregnancy and birth outcomes.[31] Participation in WIC during pregnancy is associated with the following:

- higher infant birth weights, fewer premature births, and fewer infant deaths[32-35]
- increased use of preventive care, diagnosis, and treatment of illness for children[36-37]
- a reduction in health care costs for newborn medical care[35,38]

NSLP AND SBP: IMPACTS ON HEALTH OUTCOMES

Participation in the NSLP has been shown to improve diet quality, and a robust literature documents the positive impact that NSLP and SBP have on food security.[13, 39-41] Studies examining the impact of NSLP on health outcomes show an association with reduced rates of obesity while others show mixed or inconclusive results on health outcomes.[42-44] Participation in SBP is associated with lowered body mass index.[45-46] Additional research is needed to understand what direct impacts participation in these programs have on health outcomes.

INCLUSION / EXCLUSION CRITERIA

For this review, literature was searched using PubMed, Scopus, and other platforms for academic articles, as well as Google for grey literature describing food bank and health care partnership interventions.

Search terms included:

- food bank, food pantry
- hospital, clinic, health care provider, health insurance, health care use
- food insecurity, diet quality, fruit and vegetable consumption, health outcome, BMI, diabetes, obesity, hypertension, healthy days

To be included in this review, articles had to feature interventions conducted by either a food bank/pantry or by a health care partner that sought to impact food insecurity, diet quality, and/or health outcomes. Studies measuring only associations with no interventions were largely excluded, though some relevant examples are included within this review's narrative. Research explored in newspaper articles, editorials, dissertations, commentary, or book reviews was excluded. Other inclusion criteria included:

CATEGORY	VARIABLE	ELIGIBLE IF...
STUDY DETAILS	Geography	Conducted in the U.S.
	Language	English
	Date of Publication	Published 1998 to June 2020
	Source Type	Published journal articles, academic research, technical reports, unpublished research
POPULATION	Age	All available studies; no exclusions
	Race / Ethnicity	
	Socioeconomic Status	
	Geography	

ARTICLES EXCLUDED FROM REVIEW

In some cases, articles that fit the search criteria were excluded because they did not fit within the scope of this review.

Excluded articles primarily fit into three categories:

- *No Intervention*

  There were a number of articles that are relevant to this evidence review, provide background knowledge or guidance on food bank and health care partnerships, but provide no clear intervention in the research presented. Additionally, a number of published articles describe findings from process evaluations when a health care provider screens for food insecurity with no intervention that follows. For the purposes of this evidence review, screening alone is not considered an intervention.

- *Nutrition Education*

  Food banks, food pantries, and health care settings may provide educational support to clients and patients on healthy eating, improving dietary quality, and/or appropriate dietary intake for managing a specific chronic disease. While these interventions are important, programs that include nutrition education alone fall outside the scope of this review.

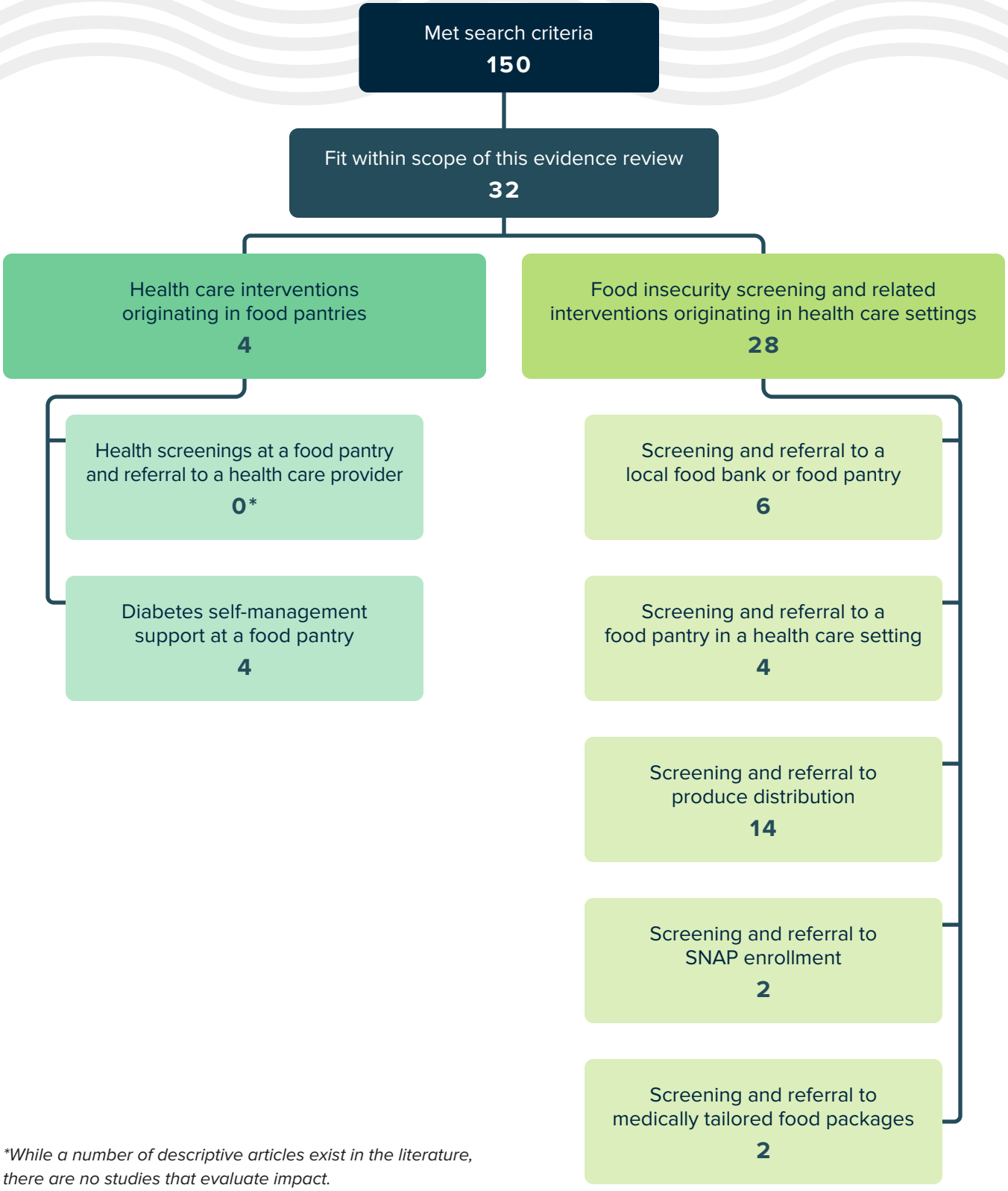
- *Medically Tailored Meals*

  Health care organizations sometimes partner with organizations to provide medically tailored meals to patients with certain chronic diseases. While this is a growing field in health care, interventions typically do not include the charitable food system. You can explore an evidence review of medically tailored meals through the ASPEN Institute.[11]

Many food banks and food pantries are involved in partnerships with health care organizations but may not have published research on their work, leading to exclusion from this review. Their work should not be overlooked, and there are many opportunities for further research and evaluation in this space.

Approximately 150 articles fit the initial search criteria, including peer-reviewed articles, abstracts, and gray literature, 32 of which fit the scope of this review and were included. The studies were then grouped into seven intervention categories, described in detail below. The evidence was reviewed in depth within each of the intervention categories to determine a rating for each.

Flowchart of Evidence Reviewed



**While a number of descriptive articles exist in the literature, there are no studies that evaluate impact.*

Results

The intervention categories included in this evidence review are divided into two different groups based on where clients/patients would likely first engage with a specific program: either at a food bank/food pantry or in a health care setting. There is no overlap in data between the two categories. The table below highlights the interventions included in this review with their ratings. The following pages provide more in-depth descriptions and case studies for each intervention.

HEALTH CARE INTERVENTIONS ORIGINATING IN FOOD PANTRIES

INTERVENTION	LEVEL OF EVIDENCE, BY OUTCOME		
	FOOD SECURITY	DIET QUALITY	HEALTH OUTCOMES
Health screenings at a food pantry and referral to a health care provider	NOT YET EVALUATED	NOT YET EVALUATED	NOT YET EVALUATED
Diabetes self-management support at a food pantry	PROMISING	PROMISING	EMERGING

Results *(cont.)*

FOOD INSECURITY SCREENING AND RELATED INTERVENTIONS ORIGINATING IN HEALTH CARE SETTINGS

INTERVENTION	LEVEL OF EVIDENCE, BY OUTCOME		
	FOOD SECURITY	DIET QUALITY	HEALTH OUTCOMES
Food insecurity screening and referral to a community food bank or food pantry	EMERGING	NOT YET EVALUATED	EMERGING
Food insecurity screening and referral to a food pantry in a health care setting	EMERGING	NOT YET EVALUATED	NOT YET EVALUATED
Food insecurity screening and referral to produce distribution	PROMISING	PROMISING	EMERGING
Food insecurity screening and referral to SNAP enrollment	NOT YET EVALUATED	NOT YET EVALUATED	NOT YET EVALUATED
Food insecurity screening and referral to medically tailored food packages	NOT YET EVALUATED	NOT YET EVALUATED	EMERGING

INTERVENTIONS INCLUDED IN REVIEW

Below we detail each of the intervention types with brief descriptions of the programs included, followed by detailed evidence based on the three target outcomes of this review. If a study examined more than one target outcome, that study's evidence will be included for each of the target outcomes, so there may be duplication.

Health Care Interventions Originating In Food Pantries

This section covers programs run by food banks/pantries that seek to raise awareness of the link between health and food insecurity and connect clients to health care services, health insurance, and other health-related services. Interventions seek to positively impact the health of people visiting the food pantry.

HEALTH SCREENINGS IN A FOOD PANTRY AND REFERRAL TO A HEALTH CARE PROVIDER

Some food pantries and other food distribution settings incorporate health screenings for their clients, including the following: blood pressure, cholesterol, blood glucose, and/or hemoglobin A1c (HbA1c), and body mass index (BMI). The goals for many screening programs are to inform clients as a means to encourage healthy eating and engagement with formal health care services or to describe prevalence of chronic disease risk factors among a food pantry population.[47-48] Health screenings are a first step in identifying unmet health care needs, and interventions to address those needs typically include referrals to a local health clinic for clients whose screening results show a possible need for clinical evaluation and care.[49-51]

Ratings By Outcome:

FOOD SECURITY: NOT YET EVALUATED

DIET QUALITY: NOT YET EVALUATED

HEALTH OUTCOMES: NOT YET EVALUATED

Several studies describe health screening programs in food pantry settings. However, a review of the evidence found no research published on the impact of health screenings in a food pantry on food security, diet quality or health outcomes. Published research is particularly focused on documenting prevalence of chronic disease and associated risk factors among people experiencing food insecurity.[47-48, 50]

Research and Evaluation Opportunities:

Research is needed to understand the impact that health screenings with referrals to health care have on health outcomes, food security, and diet quality. If your food bank or food pantry implements such a program, consider designing a preliminary impact evaluation. This could be done independently, if there is appropriate staff capacity and expertise in-house, or in partnership with health care and/or academic institutions.

You can start by looking at the percentage of completed referrals, then expand to assess changes over time in blood pressure, blood glucose, and/or other health metrics. You might even conduct a survey of clients to examine barriers they may face to receiving needed health care so that your program can address those challenges by bolstering your partnership with health care providers. Explore feasible opportunities to share relevant data between the food bank and the health care partner to better understand impact. Reach out to the Research or Health and Nutrition team at Feeding America for additional tools. ■

Know Your Numbers

In greater Bridgeport, Connecticut, a coalition of over 60 organizations created the Health Improvement Alliance in 2003 to improve health across the region through a collective impact approach. Led by St. Vincent's Medical Center and Bridgeport Hospital, the Alliance launched Know Your Numbers in 2014, a campaign to offer free health screenings to people visiting local food pantries. Know Your Numbers began as a way to educate individuals in the community about their own health and has since evolved to become a multifaceted approach to improve the health of food pantry clients.

Know Your Numbers brings local nursing students, hospital staff, and hospital volunteers to 10 food pantries to conduct health screenings, primarily in February each year.[52] Health screenings include BMI, waist circumference, blood pressure, and HbA1c.[53] Initially, health screenings were paired with a listing of local health clinics where individuals could receive primary care. While 58% of clients were provided with the clinic list for follow-up services, the referrals were not always utilized or completed.[51] In 2018, the Know Your Numbers team collaborated with Southwestern Area Health Education Center (AHEC) to connect clients with community health workers to make sure clients connect with a health care provider, and provide follow-up and assistance accessing appointments.

The Know Your Numbers partnership between health care providers and food pantries has deepened in recent years. Nutrition education was added as a part of the screening process, and clients are able to take home tape measures to record their waist circumference and blood pressure cuffs to monitor their blood pressure at home. Some food pantries have implemented nutrition rating systems to provide access to healthier foods for their clients. What started as a way to provide information to clients about their health risks has evolved to connect clients with services to improve health.

DIABETES SELF-MANAGEMENT SUPPORT AT A FOOD PANTRY

Several food pantries and food banks offer diabetes self-management education and support programming. Interventions vary and may include access to additional food or diabetes-appropriate food packages, nutrition education, blood sugar monitoring, and referrals to health care.[54-56] The Feeding America Intervention Trial for Health-Diabetes Mellitus (FAITH-DM) was a randomized control trial that included many of these components. The program consisted of formal diabetes self-management education classes, one-on-one check-ins with educators, twice-monthly food packages containing diabetes-appropriate food, and referrals to primary care for clients who reported not seeing a regular primary care provider.[57] Four studies, including FAITH-DM, were included in this evidence review for this category.[54-57]

Ratings By Outcome:

FOOD SECURITY: PROMISING

Three studies showed improvement in food security.[54-55, 57]

DIET QUALITY: PROMISING

Four studies examined the impact of the interventions on diet quality, finding:

- an increase in consumption of **fruits and vegetables**,[54-57] and
- a decrease in frequency of **consumption of foods higher in fats**.[55]

HEALTH OUTCOMES: EMERGING

Three studies examined the impact on health outcomes.[55-57]

- Two studies showed improvements in **HbA1c** levels,[43-44] while the FAITH-DM randomized control trial found no statistically significant improvement in HbA1c outcomes.[57]
- One study found a decrease in **BMI** from pre- to post-intervention.[55]

Research and Evaluation Opportunities:

People who experience food insecurity are at higher risk for type II diabetes and have additional challenges and barriers to effective self-management of chronic disease.[58] Diabetes self-management programs that take place in food pantries aim to assist individuals in improving their diabetes control and food security. The evidence included in this review regarding impact on HbA1c levels is emerging, and there are opportunities to further explore how such programs may contribute to changes in health outcomes.

Food pantries and food banks can conduct additional evaluations (either independently, if there is appropriate staff capacity and expertise in-house, or in partnership with health care and/or academic institutions) of current programs to contribute to the evidence. For example, an exploration of barriers to diabetes control among people visiting food pantries may shed additional light on challenges people living with diabetes struggle to overcome despite education, access to healthy food, and nutrition counseling. Within the health care field, there has been a focus on interventions that target people with uncontrolled diabetes (i.e., those with very high HbA1c levels) with the goal to show significant impacts on health outcomes, including cost savings. However, at the population level there may also be value in interventions that serve more people over a longer period of time but demonstrate less pronounced improvements. Programs focused on prevention or smaller improvements across the population may also improve outcomes and reduce health care costs. More research is needed to examine these types of interventions over time. ■

FAITH DM | Feeding America Intervention Trial For Health Diabetes Mellitus

Diabetes Self-Management at Three Food Banks

Feeding America partnered with the Center for Vulnerable Populations, University of California San Francisco, and the Urban Institute on a randomized control trial called the Feeding America Intervention Trial for Health – Diabetes Mellitus (FAITH-DM).[59] The study took place in 2015-2017 and explored the impact of food bank interventions on outcomes for adults with uncontrolled type 2 diabetes.[60] The primary intervention was six-months long and included bi-monthly diabetes-appropiate food packages, diabetes self-management education classes, blood sugar monitoring, and referrals to primary care.

Three food banks (Alameda County Community Food Bank, Gleaners Community Food Bank, and Houston Food Bank) took part and collectively enrolled 568 adult participants. The study found participants experienced significant improvements in dietary intake, food security, and tradeoffs between food and diabetes supplies. There were no differences between groups, however, in any diabetes self-management or clinical outcomes, including HbA1c. Why? Possible explanations cited by the study team include: the intervention may not have been lengthy enough or comprehensive enough, food bank - health care connections could have been strengthened to increase participants' engagement with clinical care in parallel with their engagement in food bank programming, and barriers (e.g., transportation, timing, etc.) to participant engagement could have been better addressed.

The study authors also suggest that food banks consider creating "tighter linkages and feedback loops" with health care partners to create more comprehensive interventions and support referrals and follow-up. Food banks could include hosting distributions at clinic locations to increase access to nutritious foods for food insecure patients living with diabetes or other chronic illnesses. Developing partnerships with health care and other community-based organizations that specialize in addressing a range of health and social needs ultimately may be more effective for improving health outcomes than food bank programs alone.

Food Insecurity Interventions Originating In Health Care Settings

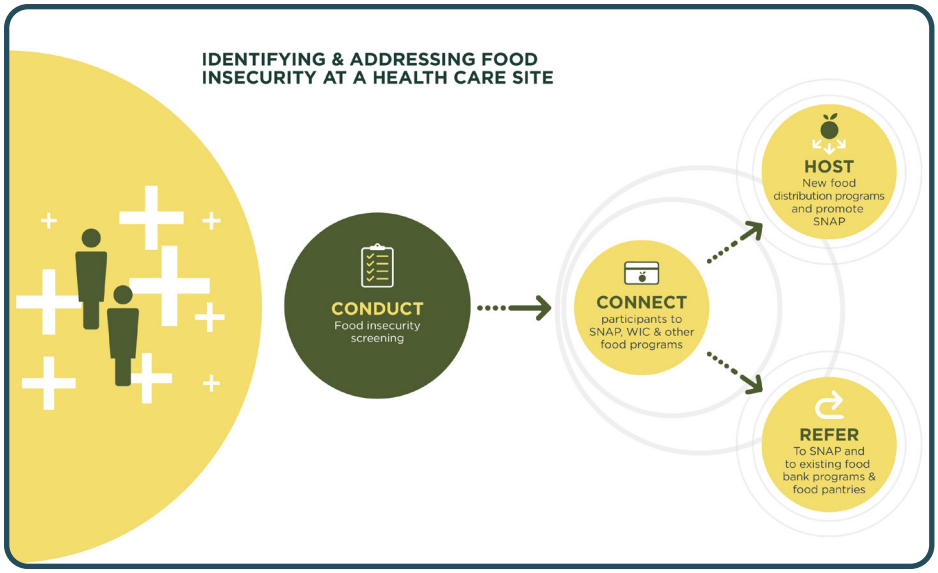
This section focuses on programs and interventions that take place in health care settings and seek to reduce food insecurity among patients. The health care sector is becoming more aware of the impact of social needs on health outcomes and is seeking new ways to holistically address health.

With the passing of the Affordable Care Act in 2010, non-profit hospital systems are required to conduct community health needs assessments every three years and create an implementation plan outlining how they could use community benefit dollars to address the identified community health needs. Additionally, the health care system is exploring new ways to pay for services (e.g., through Medicaid 1115 waivers), including payment structures that may reimburse health care providers, and even social service organizations, for their actions to address social needs and improve health outcomes.

The first step that many health care providers are taking is to screen their patients for unmet social needs, such as food insecurity, housing instability, and transportation-related challenges. Providers and health care organizations such as the American Academy of Pediatrics and the American Diabetes Association have supported the development and clinical integration of brief tools to screen patients for food insecurity. However, health care systems are taking different approaches to screening for food insecurity, and there is heterogeneity across health care systems and providers on utilization of food insecurity screening tools. Some providers use screening as a means to assess prevalence and better understand the needs of their population[61-64] while others use screening as the first step toward additional referrals, clinical care, and services.

Some health care organizations use a one question hunger screen,[65] for example, while others use the Hunger Vital Sign™, a two-item food insecurity screener based on the USDA Food Security Module and promoted by the American Academy of Pediatrics.[66-68] The Hunger Vital Sign™ is one of the only food insecurity screening tools used in a health care setting that has been validated.[66-69]

As health care providers implement food insecurity screenings in their systems, what happens after screening differs and is based on multiple factors including local context. This section highlights interventions in which a health care provider screens patients for food insecurity and then refers patients with a positive screen to a resource meant to help meet their food needs. Referrals differ and could be to a community food pantry or food bank, a food pantry located in the health care setting, programs to increase access to fresh produce, SNAP enrollment, or even medically tailored food packages.



FOOD INSECURITY SCREENING AND REFERRAL TO A COMMUNITY-BASED FOOD BANK OR FOOD PANTRY

This category includes interventions where a health care provider refers a patient to a community food pantry or food bank for assistance with food after a positive screening for food insecurity. There is a great deal of variability among programs, and the research describes numerous different approaches to how a referral occurs. A clinician may provide a list of local food assistance programs and referral options to a patient.[70-74] A provider may directly enroll a patient into a formal

program the health system runs in partnership with a food bank.[75] Other health care providers may send a referral directly to the food bank, and food bank staff then call the patient to connect them with services.[76-79] Six studies were included in this evidence review for this category.[70, 74-75, 79-81]

Ratings By Outcome:

FOOD SECURITY: EMERGING

One study found an increase in food security following the intervention.[79]

DIET QUALITY: NOT YET EVALUATED

No published studies examined the impact on diet quality.

HEALTH OUTCOMES: EMERGING

Three studies examined the impact on various health outcomes.[75, 79, 81]

- One study found improvements in **blood pressure** for families enrolled in the intervention.[81]
- One study found no change in **blood glucose levels** for families enrolled in the intervention.[81]
- Two studies explored the impact on **health care utilization**, including higher completion of pediatric preventative care services,[75] and reductions in both hospital readmissions and emergency department visits among food pantry users.[79]

OTHER OUTCOMES ASSESSED:

Utilization rate of referrals: Mixed outcomes, likely the result of differences in each intervention's components and processes.[74, 80]

Provider satisfaction: High levels of satisfaction were reported because the intervention fit into the clinical flow with patients completing the screening form before seeing the provider.[70]

Programming Opportunities:

Opportunities are abundant for food banks to engage with health care providers on making referrals to local food pantries and food bank programming. If a health care provider in your area is currently not screening for food insecurity, this is a good place to start, and the food bank can help provide training. If there is a health care provider in your food bank's region that is already screening for food insecurity but not yet making referrals, you could offer your services and begin a partnership that can evolve over time. Check out Feeding America's Health Care Partnerships Toolkit as well as the Health Care Partnership Community of Practice. You can find resources on how to assess readiness and capacity to support new referrals of clients from a health care partner, as well as steps for developing shared referral processes. Research is needed to monitor the impact of the intervention, so consider whether or not an impact evaluation is appropriate and work with a trained researcher to develop the evaluation as part of your planning process.

Since the Hunger Vital Sign™ has been validated and is currently available in at least one Electronic Health Records software system (EPIC) already in use by many health care organizations, we recommend that clinicians who plan to screen for food insecurity use this tool. ■

Strong Referrals From Clinic To Food Bank

Roadrunner Food Bank of New Mexico has an extensive Health and Wellness Initiative partnering with numerous health care organizations throughout their service area. The Healthy Foods Center, launched in 2015, is a food pantry located within the food bank's distribution center.[73] The Healthy Foods Center provides access to fresh produce and healthy food items and a nutrition education curriculum to people experiencing food insecurity and a chronic health issue such as diabetes, high blood pressure, or obesity. The program is accessed through medical referral only with partnerships with local primary care providers, the University of New Mexico hospital system, and a local Medicaid managed care insurance plan. Clients can visit periodically for up to two years.

The Healthy Foods Center offers a comprehensive, person-centered approach that goes beyond food distribution and includes nutrition education; assistance with SNAP, Medicaid, and Medicare enrollment; access to immunizations; and more. Recognizing that food alone will not eradicate chronic health issues, the food bank has a team of retired social workers and registered nurses who provide outreach to clients to address other social needs and reduce barriers. They help clients access charitable health care programs to reduce medical debt and partner with a prescription assistance program to help clients reduce their prescription drug costs.

Jessica Ossenbrügge, Community Initiatives Manager at Roadrunner Food Bank, recommends food banks think outside the box when it comes to partnerships with health care organizations. She advocates that food bank staff should work to understand the local/state health care landscape and be willing to adjust processes to work better for clients. For example, health care organizations initially provided patients with paper referrals to the Healthy Foods Center, but the partnership found that many patients did not follow up on the referral. Now, there is an electronic referral process that eliminates the need for the patient to take the extra step of calling the food bank. The Healthy Food Center gets the patient information directly.

FOOD INSECURITY SCREENING AND REFERRAL TO A FOOD PANTRY IN A HEALTH CARE SETTING

This category explores interventions where a referral is made to an onsite food pantry at the health care facility or a food pantry within the health care system. Some food pantries in this category are partnerships where the food bank provides food for the food pantry.[82-83] Pantries may offer additional services, too, such as cooking classes, meetings with a nutritionist or dietician, and referrals to additional community resources and services.[84-85] Four studies were included in this evidence review for this category.[82-83, 85-86]

Ratings By Outcome:

FOOD SECURITY: EMERGING

One study examined the impact on food security, finding intervention participants were less likely to experience very low food insecurity.[85]

DIET QUALITY: NOT YET EVALUATED

No published studies assessed the impact of this intervention on diet quality.

HEALTH OUTCOMES: NOT YET EVALUATED

One study explored the impact on **health care utilization**, particularly completion of pediatric preventative services, and found no relationship.[83]

OTHER OUTCOMES ASSESSED:

- One study found an increase in **self-sufficiency for the intervention group**.[85]
- One study assessed **patient and provider satisfaction**:
  - Patients reported experiencing less stigma at the hospital-based pantry compared to community pantries.
  - Providers reported that insufficient training on food insecurity was a barrier to providing referrals.[86]

Research and Evaluation Opportunities:

Additional research is needed to understand the impact of food pantries located in health care settings on food security, diet quality, and health outcomes. If your food bank currently distributes food to health care-based food pantries, consider conducting an evaluation with your health care partner to assess impact. If you are in the process of working with a local health care provider to open an onsite food pantry, introduce an evaluation plan as part of your implementation process. You could explore changes in food security through pre- and post- intervention food security screenings, for example. Health care providers have access to patient medical data that can be used to assess changes in clinical measures (HbA1c, blood pressure, etc.) among patients who visit the food pantry. Academic researchers can help design and conduct a study using such data in combination with qualitative data from food pantry clients to gauge their satisfaction with the pantry and any barriers to use. ■

Co-Locating Food Pantries In Clinics

Food pantries in community-based health care settings can be valuable new partners to a food bank's traditional network of agencies and partner programs. For example, Food Gatherers, the food bank serving Washtenaw County, Michigan, distributes food to a number of pantries in local safety net health clinics in their service area. This work began more than a decade ago as organizations like Hope Medical Clinic and The Corner Health Center in Ypsilanti worked with Food Gatherers to expand access to healthy food.[87] Additional partnerships with health care organizations have grown since.

Food Gatherers partners with nonprofit clinics that provide medical care alongside services to support basic needs, a key indicator that they would be strong partners to host onsite food pantries. The clinics follow the same process for operating a pantry as Food Gatherers' more traditional partner pantries. Some clinic pantries are open only to patients with a referral from a health care provider, while others operate more like a community pantry, open to anyone in need. Most pantries operate as choice models. Often, the clinics do not have a lot of space to include a pantry but with help from the food bank they have found innovative ways to use what little space they have – such as a refrigerator in the lobby for all patients to see!

Partnerships with health care and other anchor institutions (such as universities and long existing local nonprofits) are a crucial strategy for hunger relief. As rates of food insecurity rise in the wake of the COVID-19 crisis,[88] health care organizations may be more receptive to partnerships with food banks. Shaira Daya, Nutrition Projects Manager at Food Gatherers, considers this a window of opportunity for food banks to explore new partnerships, including the expansion of food pantries in health care settings. There are many layers to gain buy-in from a health care partner, especially those that are very large, but investing in these partnerships and supporting food access at health care sites may reach more community members in need.

FOOD INSECURITY SCREENING AND REFERRAL TO PRODUCE DISTRIBUTION

This category explores interventions where a referral for fresh produce is made by a health care provider following a positive food insecurity screen, and this is a comparatively robust area of research and evaluation. Some such programs are called “Produce Rx,” “Veggie Rx,” or “Fresh Rx” and may be referred to as prescription programs.[89-92] Many interventions in this category include a voucher or discount for fresh fruits and vegetables at a farmers’ market.[93-97] There are variations to this type of intervention, though, such as a partnership with a local grocery store chain,[98-99] a produce market held directly at the local health center,[100] and membership to a community supported agriculture program, or CSA, at a local farm.[101] Food banks have partnered with health care providers on fresh produce interventions, too, by operating a mobile market that is held at a health center.[91-92, 102] Many programs that fit in this category focus specifically on patients with a chronic disease diagnosis such as diabetes, hypertension, or obesity.[89-91, 93-95, 97, 99-101] Fourteen studies were included in this evidence review for this category.[89-95, 97-98, 100-101, 103-105]

Ratings By Outcome:

FOOD SECURITY: PROMISING

Four studies assessed an impact on food insecurity and found a decrease.[89, 91, 97, 101]

The evidence is rated "promising" rather than "proven" given the variability in interventions and the lack of control groups in three of the four studies included.

DIET QUALITY: PROMISING

Five studies examined the impact on diet quality and found improvement in **consumption of fruits and vegetables**.[92-93, 101, 103-104]

HEALTH OUTCOMES: EMERGING

Four studies explored the impact on health outcomes.[90-91, 100-101]

- One study found improvement in **HbA1c**,[100] while two studies found no improvement in HbA1c.[91, 101]
- Two studies found no change in **blood pressure,**[91, 100] while a randomized control trial found improvements in diastolic blood pressure for the intervention group compared to the control group.[101]
- One study found a reduction in **BMI** between comparison groups,[90] while one study found no changes.[101]

OTHER OUTCOMES ASSESSED:

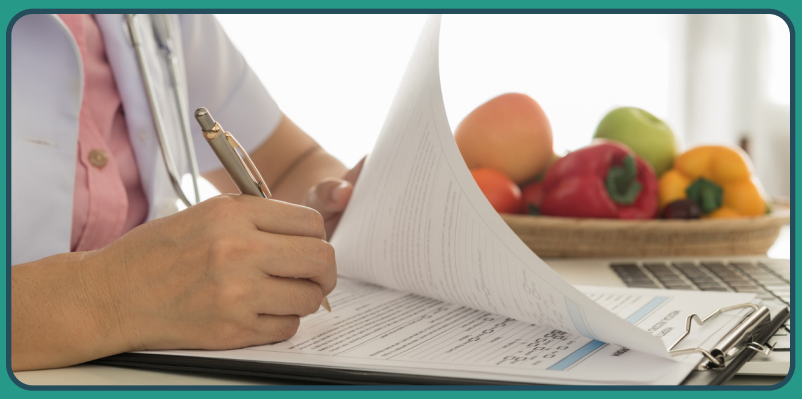
Studies also explored **patient satisfaction** and experience with the intervention,[94] **barriers** to participation for patients,[105] and **program utilization**.[89-90, 95, 98]

Programming Opportunities:

Not all produce voucher programs are created equally, as is evident in the conflicting data for health outcomes outlined above. If you plan to explore this type of intervention in partnership with a local health care provider, we suggest you talk to others who have implemented such programs, starting with the evidence included in this report, to see what works best for patients and what barriers need to be overcome for the program to be successful. Even though many programs are based in

farmers' markets, this does not mean farmers' markets are necessarily better options for partnership than retail programs or other ways to increase access to produce.

While most programs described in this category are not partnerships with a food bank, there are opportunities for food banks to co-locate produce distributions within a health care setting. One example is The Greater Boston Food Bank's monthly mobile market that is set up similar to a farmers' market in different health care locations.[93] Explore Feeding America's Health Care Partnerships Toolkit and the Health Care Partnership Community of Practice for helpful tips, key considerations, food banks currently engaged in this work, and more. ■



Naming Programs

It is recommended that rather than using the term "prescription" when describing or promoting these programs, use a different term like "voucher." Providing an item for a patient with a "prescription" could be considered the provision of health care services. Use of the term "prescription" could lead a food bank to be classified as a health care provider and subject to more stringent privacy regulations in accordance with HIPAA, the Health Insurance Portability and Accountability Act, that deems certain personal information as protected. Feeding America recommends that food banks consult with an attorney before using the term "prescription" in a health care partnership or as part of the food bank's operations. You can find more information in Feeding America's resource titled "Food Banks as Partner in Health Promotion: Navigating HIPAA."[106]

FOOD INSECURITY SCREENING AND REFERRAL TO SNAP ENROLLMENT PROGRAM

This category includes interventions in which a health care provider refers a patient for SNAP enrollment/application assistance after a positive food insecurity screen. Health care providers may have onsite benefits coordinators who assist in enrolling patients,[107] refer patients to a community partner,[108-109] or refer patients to a local food bank to assist patients with the SNAP enrollment process.[78, 110-111] Two studies were included in this evidence review for this category.[109, 111]

Ratings By Outcome:

FOOD SECURITY: NOT YET EVALUATED

Both studies measured food insecurity at the time of referral, but neither assessed food insecurity post-intervention. Rather, these studies and others examined **utilization of the referral and enrollment in SNAP**. Results vary in how many people potentially eligible for SNAP actually enrolled as a result of the intervention.[78, 108-111]

DIET QUALITY: NOT YET EVALUATED

No published studies examined impact on diet quality.

HEALTH OUTCOMES: NOT YET EVALUATED

No published studies examined impact on health outcomes.

Research and Evaluation Opportunities:

Evidence is clear that participation in SNAP improves food security.[13] Likewise, participation in SNAP is linked to improvements in health outcomes and health care savings, as mentioned earlier in this report.[14-30] The ratings of "not yet evaluated" for referrals to SNAP enrollment are not meant to suggest otherwise. Rather, "not yet evaluated" indicates that there is not enough evidence that the intervention itself – referral from a health care provider to a SNAP enrollment/application assistance program – can be linked to improving food security, diet quality, or health outcomes. Food banks

have an opportunity to contribute to the evidence through evaluation of their SNAP Application Assistance partnerships with health care organizations and their impact on SNAP enrollment. Mixed methods evaluations that use both quantitative and qualitative data collection can help illuminate challenges and barriers patients face in enrolling in SNAP as well as key facilitators that increase the chance of enrollment. ■

Strong Referrals To SNAP

Many food banks offer SNAP Application Assistance, a valuable tool for increasing enrollment in SNAP and improving food security. The limited research outlined above is not an evaluation of application assistance programs, but of the referral processes between a health care organization and a food bank. An ideal referral process would be very active and could include a clinician, case manager, or social worker sitting with a client to support completion of a SNAP application online or talking to a service provider at a SNAP Application Assistance program. Health care staff, however, often have limited time with patients and are typically unable to offer such active assistance. Passive referrals, such as a clinician providing a patient a phone number to call, are often not very effective. A study that looked at a partnership between Kaiser Permanente and Hunger Free Colorado saw an increase in their referral utilization rate from 5% to 75% when they adjusted their process from a client calling Hunger Free Colorado to a representative from Hunger Free Colorado calling the patient.[78]

Look for ways to reduce barriers to SNAP enrollment when you design a partnership with a health care organization. Explore Feeding America's toolkit Food for Tomorrow: SNAP Application Assistance in Health Care Settings for key considerations, different intervention models, and ideas for program evaluation.

FOOD INSECURITY SCREENING AND REFERRAL TO MEDICALLY TAILORED FOOD PACKAGES

This category includes interventions where a health care provider, following a positive food insecurity screening, refers a patient to a food bank or food pantry for medically appropriate food packages. Interventions typically target patients with diabetes,[112-116] and one intervention was an augmentation of the Centers for Disease Control's Diabetes Prevention Program lifestyle change program.[117] Interventions vary in length and amount of food provided. Some programs include nutrition education, either with a nutritionist or through educational materials.[112-113, 115-116, 118] There are also examples where a health care system partners with a local farm rather than a food bank or food pantry.[116] Two studies were included in this evidence review for this category.[112, 115]

Ratings By Outcome:

FOOD SECURITY: NOT YET EVALUATED

One study found no change in the percentage of patients experiencing food insecurity.[115]

DIET QUALITY: NOT YET EVALUATED

One study explored impact on diet quality and found a nominal increase in **fruit and vegetable intake**.[115]

HEALTH OUTCOMES: EMERGING

Two studies explored the impact on health outcomes. [112, 115]

- A randomized control trial found a decrease in **HbA1c** levels among patients with diabetes in the intervention group when compared to the control group.[112]
- One study found an improvement in **diastolic blood pressure** only.[115]

Research and Evaluation Opportunities:

While the evidence shows positive trends for the outcomes, additional research is needed to more fully understand what impact medically tailored food packages have on food security, diet quality, and health outcomes and to document the program costs. Furthermore, interventions included in this category vary in length from 12 weeks to one year. Future research should explore if length of the intervention and/or frequency of food distribution contribute to any impact on the target outcomes, as well as program sustainability and what happens (e.g., potential maintenance of any observed improvements) after the intervention ends. ■

Things To Consider

Consider the costs a food bank may incur when preparing and distributing medically tailored food packages – including costs for food and time. The published evidence showed positive results regarding the impact of such interventions on food security, diet quality, and health outcomes. However, it is likely that such a program costs more than other intervention types included in this evidence review. Be creative and strategic if your food bank decides to explore this option.

Looking Forward

CONSIDERATIONS WHEN EXPLORING PARTNERSHIPS:

Health care organizations and food banks operate in different spaces, with different organizational languages and different approaches to serving clients and patients, even though both are working to broadly improve individual- and population-level outcomes and address social needs. Consider differences in organizational language like the following:

- **Metrics:** Primary metrics for food banks/pantries when tracking and evaluating programs and interventions have historically prioritized the number of people served and the amount of food distributed. Increasingly, improvements in food security and diet quality are included. Health care organizations often focus first on health outcomes, cost per patient, and utilization.
- **Cost Savings:** Food banks will likely strengthen their case for health care partnerships when they use language like “prevention,” “cost savings,” and “improved care utilization” (i.e., increased use of primary care, decreased use/need for emergency care and hospital admission) when talking with health systems. Investing in prevention of chronic disease—or improved chronic disease management—and improving food security is likely to save more in the long-term than treatment of disease and related complications after the fact.

Health care providers and systems vary tremendously across the country and by state, so it is challenging to suggest specific organizations for food banks to partner with or specific programs to implement. **Local context matters.** Food banks interested in partnering with health care providers should first become familiar with their local health care systems and landscape. Some states are home to Medicaid managed care organizations that provide additional funding for health care providers to address social needs. For example, Massachusetts' Medicaid program, MassHealth, provides some funding for health care providers to address health-related nutrition needs.[119] Michigan created Community Health Innovation Regions to address social determinants of health.[120] Explore what types of health care organizations exist in your area – from large hospital systems to small community health clinics – and gain an understanding of any city, county/parish, and statewide initiatives to address social needs. Research if your state's Medicaid program has the ability to pay for nutritional support services through a Medicaid 1115 waiver from the federal government.

Keep in mind that **partnerships take time to develop**. Food banks and pantries should be ready to articulate a value proposition of the proposed partnership and the needs of the population served by both entities. Explore what assets each partner brings to the table; this list may grow longer once partnership conversations begin. Develop a clear set of goals and benchmarks you hope to achieve before meeting with a potential partner, but be sure to remain flexible in order to develop a win-win partnership for all parties – first and foremost the client/patient populations. Building a strong partnership over time will illuminate commonalities and lead to successful, shared strategic decisions. Feeding America's Health Care Partnerships Toolkit and the Health Care Partnership Community of Practice include a wealth of information outlining more key considerations, how to identify partners, important questions to consider, and tips for developing processes within your partnership.

CENTERING EQUITY IN YOUR WORK

This review examines existing research and highlights possible partnerships and new opportunities for food banks, food pantries, and health care organizations to work together to reduce health inequities and improve health outcomes for clients. The COVID-19 pandemic has further highlighted societal inequities and has underscored the importance of health care organizations and food banks working together. Due to a long history of structural and institutional racism within health care, health research, and social systems broadly in the U.S., it is imperative that we focus on racial equity as we embark on partnerships.

Food insecurity has increased across the country as a result of the COVID-19 crisis and has impacted communities and demographic groups differently. Feeding America projects that 42 million people, including 13 million children, may experience food insecurity in 2021. Food insecurity had already been disproportionately high within Black, Latino, and Native American populations. Black households were 2.4 times as likely as white households to be food insecure, and Latino households were almost twice as likely as white households to experience food insecurity prior to the pandemic.[4] The COVID-19 crisis has deepened these disparities.[121-122]

COVID-19 is also disproportionately impacting communities of color. There are large disparities in both cases and deaths among Black, Latino, and Native American individuals compared to their white counterparts, and those disparities exist across the country.[123] Black and Latino individuals are more likely to work in the service industry, increasing their risk of exposure to the coronavirus.[124] Black and Latino households are also more likely to be uninsured, report not seeing a doctor due to cost, and say they do not have a usual source of care.[124] Racial and ethnic disparities in health existed long before the COVID-19 crisis, and the pandemic has pushed health care organizations to think more critically about how they approach equity.

Food banks and health care partners should also examine community data to identify groups who may be at higher risk of food insecurity and poor health outcomes and less likely to utilize health care (e.g., LGBTQ individuals and immigrant households). In addition to racial and ethnic

disparities, it is important to know your local context. Collaborate with community-based organizations to best understand the specific needs of the community, identify who is underserved, and engage community members to share their ideas and co-create solutions.

Given the racial and ethnic disparities both in health and food security, it is crucial to center equity in partnerships with food banks and health care organizations. Suggestions for incorporating an equity lens include:

- Host focus groups with clients, especially clients of color, to understand barriers they face to health care and food security. Co-create innovative strategies to overcome the barriers they identify.
- Provide outreach to clients to help them enroll in health insurance, particularly during the Affordable Care Act open enrollment periods.
- Research additional resources that help individuals pay medical bills and access affordable prescriptions to reduce barriers to getting adequate care.
- Work diligently with your health care partners to understand what they know about their patients and to share what you know.
- For food banks with research capacity (or who have established relationships with research / academic institutions), when designing an evaluation, employ a community-based participatory research (CBPR) approach in which members of the community are full and equal partners in all phases of the research process. If CBPR is not feasible, work to authentically include client voices and perspectives in programming and evaluation activities.

Once you implement your partnership, continue to gather input from the community about how it is working, what's missing, and what additional supports people will need to succeed. Progress, improvements, and knowledge generation take time: allow for an iterative process.

Summary

Food banks and food pantries can serve as opportune settings to reach clients in need, increase food security, and help reduce health disparities. Food insecurity is a key social determinant of health; beyond being a basic need, food can serve as a tool to promote health equity and improve patient and population health outcomes.

Numerous food banks and food pantries have created partnerships with health care organizations, and new cross-sector partnerships continue to evolve in this space. This review highlights existing research and evidence on key interventions and identifies areas where more research is needed. The case studies and analysis should provide helpful context and considerations for those getting started in or expanding this work. Food banks, food pantries, hospitals, and health clinics serve overlapping populations in their communities. COVID-19 has exposed disparities for food security and health outcomes among communities of color and highlights the need for food bank - health care partnerships to promote health equity.

This review has identified multiple interventions and approaches for food banks and health care organizations to consider as they work together to improve the health and food security of people in need. The results are intended to inform the Feeding America network and the charitable food sector to identify new initiatives to fill the gap in research and gather more evidence on the impact of important programs to improve health and food security.

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Appendix – Evidence Table

CITATION	INTERVENTION CATEGORY	DESIGN TYPE	STUDY DETAILS	SETTING	INTERVENTION DESCRIPTION	TARGETED OUTCOMES	FINDINGS
Adams, E., Hargunani, D., Hoffmann, L., Blaschke, G., Helm, J., & Koehler, A. (2017). Screening for Food Insecurity in Pediatric Primary Care: A Clinic's Positive Implementation Experiences. *Journal of Health Care for the Poor and Underserved, 28*(1), 24–29. https://doi.org/10.1353/hpu.2017.0004	Referral to community-based food bank or food pantry	Qualitative (focus groups)	Length: Ongoing Sample: Faculty and resident pediatric primary care providers (about 50) Inclusion criteria: Primary care provider at pediatric clinic of particular academic medical center	Pediatric primary care clinic in an academic medical center in Oregon	Providers screened patients for food insecurity using the Hunger Vital Sign™. If a patient screened positive for food insecurity, providers included a comprehensive paper list of community resources for the patient to take home. The list included information on local food distribution programs, access to federal food assistance programs, emergency food boxes, and community resource referral phone number. If the provider believed the food insecurity to be an urgent crisis, a clinic social worker was contacted.	Primary: Provider experience and satisfaction with implementation	Provider experience and satisfaction with implementation: Providers expressed the screen-and-intervene model fit into clinical flow, with patients completing the screening form and a list of community resources at the ready when needed. Providers requested a shorter resource list, stating the current list was so comprehensive it was cumbersome to patients.
Aiyer, J. N., Raber, M., Bello, R. S., Brewster, A., Caballero, E., Chennisi, C., Durand, C., Galindez, M., Oestman, K., Saifuddin, M., Tektiridis, J., Young, R., & Sharma, S. V. (2019). A pilot food prescription program promotes produce intake and decreases food insecurity. *Translational Behavioral Medicine, 9*(5), 922–930. https://doi.org/10.1093/tbm/ibz112	Referral to produce distribution	Pre-post study (without control)	Length: 6 months Sample: Adult patients and parents of pediatric patients (242); a total of 172 (71.1%) redeemed vouchers Inclusion criteria: Food insecure; 18 years of age or older; residing in one of three targeted zip codes	Two school-based clinics and one Federally Qualified Health Center in Houston, Texas	Providers screened patients for food insecurity with 2-item screener. If a patient screened positive for food insecurity, providers supplied them with a "Food Rx" card to access a healthy client-choice food pantry every two weeks for up to 6 months, 12 times total. Clients also received nutrition education booklets in English and Spanish. Patients could select up to 30 pounds of fruits and vegetables and 4 nonperishable "Food Rx-friendly" items during each visit.	Primary: Food insecurity Secondary: Redemption dosage; participant experience and satisfaction; program costs; provider satisfaction	Food insecurity: There was a 94.1% decrease in food insecurity from baseline ($p<.01$), with 10.2% of participants screening food insecure at visit 3, and 5.9% at visit 12. Redemption dosage: Patients redeemed an average of 6.5 out of 12 available opportunities (39%). Participant experience and satisfaction: 94.4% of participants said the fruits and vegetables were helpful in improving dietary behaviors. 65.7% said they used the nutrition education booklets. Program Costs: Average cost of $12 per family per redemption

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Beck, A. F., Henize, A. W., Kahn, R. S., Reiber, K. L., Young, J. J., & Klein, M. D. (2014). Forging a pediatric primary care-community partnership to support food-insecure families. *Pediatrics, 134*(2), e564–e571. https://doi.org/10.1542/peds.2013-3845	Referral to community-based food bank or food pantry	Prospective time-series analysis	Length: Eligible until child is 14 months old Sample: Families with infants (1042) Inclusion criteria: Food insecure families with infants	Pediatric primary care clinic in Cincinnati, Ohio	Families were screened using Hunger Vital Sign™. If a patient screened positive for food insecurity, they were automatically eligible for Keeping Infants Nourished and Developing (KIND). Providers supplied them with infant formula, provided tailored education, and connected them to clinic and community resources or public benefit programs. Families were eligible for infant formula at any well-child or sick visit.	Primary: Reasons for eligibility Secondary: Completion of preventative care services	Reasons for eligibility: The most common reasons for distribution among patients were food insecurity or running out of or stretching formula (92%), and failure to thrive or need for formula supplementation (6%). Completion of preventative care services: KIND recipients were significantly more likely than non-KIND recipients to have a completed lead test and to have received a full set of well-infant visits by 14 months. Children receiving KIND were significantly more likely to be connected to additional clinic resources, including social work.
Berkowitz, S. A., O'Neill, J., Sayer, E., Shahid, N. N., Petrie, M., Schouboe, S., Saraceno, M., & Bellin, R. (2019). Health Center-Based Community-Supported Agriculture: An RCT. *American Journal of Preventive Medicine, 57*(6 Suppl 1), S55–S64. https://doi.org/10.1016/j.amepre.2019.07.015	Referral to produce distribution	Randomized control trial	Length: 24 weeks Sample: Adults (122; 56 in intervention) Inclusion criteria: BMI > 25kg/m2 in the year before study; age 18 or older	A Federally Qualified Health Center and neighboring community in central MA	Patients in the intervention group were provided $300 towards a CSA membership for a local farm worth $690 or $480 which entitled them to a weekly share of the farm's produce from June to November. Patients had to pick up the boxes each week. Two recipes were provided each week.	Primary: Healthy Eating Index 2010 score Secondary: Food insecurity; health outcomes: BMI, blood pressure, serum lipids, serum glucose, HbA1C	Healthy Eating Index: Scores were significantly higher for the intervention group, and there were significant changes in total fruit, total vegetables, and whole fruit consumption. Food insecurity: Food insecurity decreased from 31% to 11% for the intervention group. Health outcomes: There were no statistically significant differences except in diastolic blood pressure.
Bryce, R., Guajardo, C., Ilarraza, D., Milgrom, N., Pike, D., Savoie, K., Valbuena, F., & Miller-Matero, L. R. (2017). Participation in a farmers' market fruit and vegetable prescription program at a federally qualified health center improves hemoglobin A1C in low income uncontrolled diabetics. *Preventive Medicine Reports, 7*, 176–179. https://doi.org/10.1016/j.pmedr.2017.06.006	Referral to produce distribution	Pre-post study (without control)	Length: 4 weeks Sample: Adults (65) Inclusion criteria: Type 2 diabetes diagnosis; HbA1c>6.5 within three months prior to program; non-pregnant	A Federally Qualified Health Center in Detroit, Michigan	Providers referred patients to the Fresh Rx program, a farmer's market at the federally qualified health center. Patients were allotted up to $40 ($10/week for up to four weeks) for purchase of fresh fruits and vegetables at the FQHC's farmers' market. A $5 incentive was also offered to patients that completed a health goals sheet.	Primary: HbA1c Secondary: Blood pressure, weight	HbA1c: There was a statistically significant decrease in HbA1c among patients. Blood pressure and weight: There were no statistically significant changes in blood pressure or weight.
Cassidy, K., & Bernhardt, C. (2019). Adventist Health and Rideout Food Insecurity Program. *Journal of the Academy of Nutrition and Dietetics, 119*(9), A62. doi:10.1016/j.jand.2019.06.177	Referral to community-based food bank or food pantry	Pre-post study (without control)	Length: 3 days Sample: Adults (404) Inclusion criteria: Hospital patient at Rideout Health	Acute care hospital in California	Providers screened patients for food insecurity. If a patient screened positive for food insecurity, they were referred to a local food bank where they received a three-day supply of food upon discharge from the hospital.	Primary: Hospital readmissions and emergency department utilization Secondary: Food insecurity	Hospital readmissions and ED utilization: There was a reduction in readmissions for food insecure patients by 24% and ED visits by 38%. Food insecurity: 86% of patients were no longer food insecure upon readmission.

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Cavanagh, M., Jurkowski, J., Bozlak, C., Hastings, J., & Klein, A. (2017). Veggie Rx: an outcome evaluation of a healthy food incentive programme. *Public Health Nutrition, 20*(14), 2636–2641. https://doi.org/10.1017/S1368980016002081	Referral to produce distribution	Retro-spective case-control	Length: At least 13 weeks Sample: Adults (54) Inclusion criteria: Low-income; obese, hypertension, and/or diabetes diagnosis	Local health clinic and community-based organization in upstate New York	Patients who met inclusion criteria met with a nutritionist and enrolled in the program. Providers supplied patients with a Veggie Rx prescription coupon booklet of 13 - $7 coupons, one for each week, to be redeemed at a mobile produce market. Patients received an additional coupon booklet if all coupons were redeemed at the end of the initial 13-week period, and they met with the nutritionist and primary care provider.	Primary: BMI Secondary: Coupon redemption	Body mass index: There was a significantly different change in BMI compared to control group, with a mean decrease of 0.74 kg/m2. Coupon redemption: A mean of 22 coupons were redeemed, with a range of 5-87.
Cheyne, K., Smith, M., Felter, E. M., Orozco, M., Steiner, E. A., Park, Y., & Gary-Webb, T. L. (2020). Food Bank-Based Diabetes Prevention Intervention to Address Food Security, Dietary Intake, and Physical Activity in a Food-Insecure Cohort at High Risk for Diabetes. *Preventing Chronic Disease, 17*, E04. https://doi.org/10.5888/pcd17.190210	Diabetes self-management support at food pantry	Pre-post study (without control)	Length: 12 months Sample: Adults (244) Inclusion criteria: clinical history of prediabetes or a high score (>=9) on CDC's Prediabetes Risk Test; existing or new food pantry client; age 18 or older; English or Spanish fluency	Food pantries near Oakland, California	Staff offered food pantry clients a monthly distribution of diabetes-appropriate food packages, text-based health promotion education addressing physical activity and nutrition, text-based administrative and engagements messages, and referrals to health care.	Primary: Food insecurity Secondary: Physical activity; consumption of healthy foods	Food insecurity: There was significant improvement from the baseline (low or very low - 68.8% to 62.5% at midpoint). Dietary intake: There was significant improvement from the baseline in consumption of fruit and vegetables and whole grains. Physical activity: There was a significant improvement from the baseline, including minutes of physical activity per week and percent of participants that reported regular physical activity at least once per week. Improvement found at the 6-month midpoint were maintained at the 12-month endpoint, but there were no differences between outcomes at the 6- and 12-month points.
Chrisinger, A., & Wetter, A. (2016). P125 Fruit and Vegetable Prescription Program: Design and Evaluation of a Program for Families of Varying Socioeconomic Status. *Journal of Nutritional Education and Behavior, 48*(7), S57. https://doi.org/10.1016/j.jneb.2016.04.153	Referral to produce distribution	Pre-post study (without control)	Length: 16 weeks Sample: Families (353) Inclusion criteria: Families from pediatricians' offices	Pediatrician offices in Wisconsin	Providers gave patients a $10 voucher for produce at a local famers' market and access to online support materials as well as recommendations for fruits and vegetables.	Primary: Fruit and vegetable consumption Secondary: Fruit and vegetable purchasing behaviors; voucher redemption	Fruit and vegetable consumption: There was a significant improvement in children's consumption of fruits and vegetables. Fruit and vegetable purchasing behaviors: No changes were observed. Voucher redemption: 36% of participating families redeemed their voucher at the farmers' market.

CITATION	INTERVENTION CATEGORY	DESIGN TYPE	STUDY DETAILS	SETTING	INTERVENTION DESCRIPTION	TARGETED OUTCOMES	FINDINGS
Ferrer, R. L., Neira, L. M., De Leon Garcia, G. L., Cuellar, K., & Rodriguez, J. (2019). Primary Care and Food Bank Collaboration to Address Food Insecurity: A Pilot Randomized Trial. *Nutrition and Metabolic Insights, 12*, 1178638819866434. https://doi.org/10.1177/1178638819866434	Medically tailored food packages	Randomized control trial	Length: 6 months Sample: Adults (58; 29 in intervention) Inclusion criteria: Adults with HbA1c level >9% with positive screen on food insecurity 2-question screener	Primary care practice in San Antonio, Texas in partnership with the food bank	Primary care providers gave patients access to biweekly allotments of fresh produce and other healthy food from a food bank's mobile truck at the clinic. In addition, patients received nutrition education by a registered dietician from the food bank and were screened by food bank staff for eligibility for other assistance programs. They also received up to 3 home visits by a community health worker.	Primary: Control of type-2 diabetes mellitus Secondary: Diet quality; BMI	Control of type-2 diabetes mellitus: There was an absolute change in HbA1c levels of 3.1% in intervention group vs 1.7% in control group. Diet quality: There was a significant improvement in diet quality in the intervention group compared to the control group. Diet quality was measured using the "Starting the Conversation - Diet" 7-item intake assessment. BMI: There were no statistically significant changes in BMI.
Forbes, J. M., Forbes, C. R., Lehman, E., & George, D. R. (2019). "Prevention Produce": Integrating Medical Student Mentorship into a Fruit and Vegetable Prescription Program for At-Risk Patients. *The Permanente Journal, 23*, 18-238. https://doi.org/10.7812/TPP/18-238	Referral to produce distribution	Pre-post study (without control)	Length: 6 weeks Sample: Families (9) Inclusion criteria: Families or individuals ages 5 to 75 who were existing patients at Penn State Health and at risk of chronic illness or metabolic disease; difficulty obtaining fruits and vegetables	Hospital and farmers' markets in Hershey, PA	Providers supplied patients with $40 vouchers for fruits and vegetables at a farmers' market for each of four weeks, offered month-long one-on-one weekly mentorship with medical students, and provided formal education and shopping sessions at the farmers' market.	Primary: Fruit and vegetable consumption Secondary: Changes in knowledge and behaviors	Fruit and vegetable consumption: Daily fruit consumption increased from 37.5% of participants pre-program to 62.5% at the end of the program. Weekly consumption of vegetables also increased. Changes in knowledge and behaviors: There were increases in exercise behavior and confidence in cooking a main dish from a recipe.
Friedman, D. B., Freedman, D. A., Choi, S. K., Anadu, E. C., Brandt, H. M., Carvalho, N., Hurley, T. G., Young, V. M., & Hébert, J. R. (2014). Provider communication and role modeling related to patients' perceptions and use of a federally qualified health center-based farmers' market. *Health Promotion Practice, 15*(2), 288–297. https://doi.org/10.1177/1524839913500050	Referral to produce distribution	Pre-post study (without control)	Length: 22 weeks Sample: Adults (44) Inclusion criteria: Adult patient of health center and diagnosed with type 2 diabetes	Farmers' market located at a Federally Qualified Health Center in South Carolina	Patients were given access to a farmers' market at the health center. Providers gave patients prescriptions and vouchers for the market, talked one-on-one about diet during appointments, and modeled healthy purchases and eating at the market for patients. Providers also gave patients a $5 voucher after attending each of four diabetes self-management education classes.	Primary: Impact of provider communication on use of the farmers' market	Impact of provider communication on use of farmers' market: Patients said the farmers' market gave them a chance to interact with their health care providers while shopping and said having the market located at the health center allowed for new communication with their providers about the importance of healthy eating.

CITATION	INTERVENTION CATEGORY	DESIGN TYPE	STUDY DETAILS	SETTING	INTERVENTION DESCRIPTION	TARGETED OUTCOMES	FINDINGS
Gany, F., Lee, T., Loeb, R., Ramirez, J., Moran, A., Crist, M., McNish, T., & Leng, J. C. (2015). Use of Hospital-Based Food Pantries Among Low-Income Urban Cancer Patients. *Journal of Community Health, 40*(6), 1193–1200. https://doi.org/10.1007/s10900-015-0048-7	Food pantry in health care setting	Nested cohort	Length: 4 months Sample: Adults (351) Inclusion criteria: Patient at one of five cancer clinics; food insecure	Hospital based food pantry in New York City.	Providers screened patients in five cancer clinics using the 18-item USDA food insecurity screener then referred them to the on-site food pantry. Patients could receive a food bag weekly. Food bags contained healthy, nutritious, non-perishable food items provided by Food Bank for New York City.	Primary: Patterns of uptake of food pantry intervention Secondary: Predictors of use of food pantry intervention	Uptake of food pantry intervention: Uptake ranged from no additional visits to nearly weekly visits, with a median of 2 and mean of 3.25 additional visits in four month period. Predictors of use of the food pantry intervention: Predictors of use included patients aged 50 years or older, those who were immigrants, and stage IV cancer patients. Patients with prostate cancer were more likely to use the pantry than patients with breast cancer.
Garg, A., Toy, S., Tripodis, Y., Silverstein, M., & Freeman, E. (2015). Addressing social determinants of health at well child care visits: a cluster RCT. *Pediatrics, 135*(2), e296–e304. https://doi.org/10.1542/peds.2014-2888	Referral to community-based food bank or food pantry	Randomized control trial	Length: One-time referral Sample: Mothers (336; 168 in intervention) Inclusion criteria: Families with infants <=6 months old who presented for well child care	8 urban community health centers in greater Boston, MA	Providers screened patients for unmet basic needs (child care, food security, housing, household heat, parents education, employment) at well-child care visits, then provided lists of community resources available for each need. The program was called WE CARE (Well Child Care, Evaluation, Community Resources, Advocacy, Referral, Education).	Primary: Enrollment in community-based resources	Enrollment in community-based resources: More mothers in the intervention than control group had enrolled in at least one new resource (39% v. 24%), including food assistance.
Greenthal, E., Jia, J., Poblacion, A., & James, T. (2019). Patient experiences and provider perspectives on a hospital-based food pantry: a mixed methods evaluation study. *Public Health Nutrition, 22*(17), 3261–3269. https://doi.org/10.1017/S1368980019002040	Food pantry in health care setting	Mixed-method evaluation	Length: Ongoing Sample: Adult patients (30); Medical providers (89) Inclusion criteria: Patients: at least one visit to the pantry and English proficiency; Providers: provider in hospital's Internal Medicine, Pediatrics, Women's Health, Family Medicine, or Immigrant and Refugee Health department	Hospital based food pantry in Northeastern US	Providers screened patients for food insecurity. If food insecure, patients were referred to the hospital system's food pantry where they could receive food up to twice per month and could visit the pantry's teaching kitchen for cooking classes.	Primary: Patient experience and satisfaction Secondary: Barriers to provider referral to pantry	Patient experience and satisfaction: Patients expressed high satisfaction with food quality, convenience, and perceived lack of stigma at the hospital-based pantry. The pantry helped them eat more fruits and vegetables, but they expressed concerns about the healthfulness of other foods distributed. Barriers to provider referral: Providers expressed barriers to consistently screening patients for food insecurity and referring them to the pantry, such as time constraints and insufficient training on food insecurity.
Hickey, E., Phan, M., Beck, A. F., Burkhardt, M. C., & Klein, M. D. (2020). A Mixed-Methods Evaluation of a Novel Food Pantry in a Pediatric Primary Care Center. *Clinical Pediatrics.* Advance online publication. https://doi.org/10.1177/0009922819900960	Food pantry in health care setting	Mixed-method evaluation using age-matched controls	Length: Ongoing Sample: Families (504) Inclusion criteria: Food insecure patients of the clinic	Pediatric primary care clinic in Cincinnati, Ohio	Families are screened for food insecurity using the Hunger Vital Sign. If food insecure, they receive 3-day supply of food from the Food As Medicine in Low-Income Youth (FAMILY) pantry.	Primary: Use of the FAMILY food pantry and completion of preventive care services	Completion of preventative services: There was no significant relationship between accessing the pantry and completion of up-to-date immunization status, lead screening, or developmental screening. Many families were connected to community resources.

CITATION	INTERVENTION CATEGORY	DESIGN TYPE	STUDY DETAILS	SETTING	INTERVENTION DESCRIPTION	TARGETED OUTCOMES	FINDINGS
Joshi, K., Smith, S., Bolen, S. D., Osborne, A., Benko, M., & Trapl, E. S. (2017). Implementing a Produce Prescription Program for Hypertensive Patients in Safety Net Clinics. *Health Promotion Practice, 20*(1), 94–104. https://doi.org/10.1177/1524839917754090	Referral to produce distribution	Process evaluation	Length: 3 months Sample: Adults (224) Inclusion criteria: Diagnosed with hypertension; food insecure	Safety net clinics and farmers' markets in Ohio	Providers screened patients with hypertension for food insecurity using a two-item questionnaire. If a patient screened positive for food insecurity, they were referred to the intervention which consisted of three visits including a blood pressure check, targeted nutrition counseling with goal setting, and the provision of four $10 vouchers to purchase produce at farmers' markets. Providers supplied patients with a location card for farmers' markets including hours, a Community Food Guide, and handouts from the American Heart Association.	Primary: Implementation challenges Secondary: Voucher utilization	Implementation challenges: Challenges identified in the process evaluation included limited physician staff time, use of different electronic medical record systems across clinic sites, and staff turnover. Voucher utilization: A total of $14,590 in vouchers were redeemed at 12 of the 20 available farmers' markets.
Lauck, L., & Gates, G. (2017). Effectiveness of the Fresh Rx Program in Food Bank Clients with Chronic Disease. *Journal of Nutrition Education and Behavior, 49*(7), S36-S37. doi:10.1016/j.jneb.2017.05.319	Referral to produce distribution	Pre-post study (without control)	Length: 9 months Sample: Adults (120) Inclusion criteria: Diagnosed with obesity, hypertension, and/or diabetes	Clinics in Oklahoma	Providers recruited patients at two local clinics to participate in a Fresh Rx Program that included access to healthy food through a free mobile market, food tasting, brief nutrition and lifestyle education, and medical care.	Primary: Food insecurity Secondary: Consumption of fruits and vegetables; clinical measures (body weight, blood pressure, diabetes control)	Food security: There was an increase in food security and an increase in access to fresh fruits and vegetables. Consumption of fruits and vegetables: No improvement was observed. Clinical measures: No improvement was observed.
Marcinkevage, J., Auvinen, A., & Nambuthiri, S. (2019). Washington State's Fruit and Vegetable Prescription Program: Improving Affordability of Healthy Foods for Low-Income Patients. *Preventing Chronic Disease, 16*, E91. https://doi.org/10.5888/pcd16.180617	Referral to produce distribution	Post-study (without control)	Length: 6 weeks Sample: Adults (144) Inclusion criteria: Enrolled in SNAP	Clinic and community-based settings and supermarkets in WA	Providers gave eligible patients a $10 voucher redeemable for fruits and vegetables at any of 169 participating supermarkets. The vouchers could be used to purchase fresh, canned, or frozen fruits or vegetables. Vouchers were valid for one month.	Primary: Redemption rate Secondary: Patient satisfaction	Redemption rate: There was an overall redemption rate of 54.4% (15,481 of 28,481 prescriptions written). Patient satisfaction: Patients reported being less likely to run out of food, an increased ability to afford balanced meals, and a perceived increase in fruit and vegetable intake. Patients also reported they were able to better manage their health conditions.
Marpadga, S., Fernandez, A., Leung, J., Tang, A., Seligman, H., & Murphy, E. J. (2019). Challenges and Successes with Food Resource Referrals for Food-Insecure Patients with Diabetes. *The Permanente Journal, 23*, 18-097. https://doi.org/10.7812/TPP/18-097	Referral to community-based food bank or food pantry	Qualitative: Semi-structured interviews	Length: Ongoing Sample: Adults (31) Inclusion criteria: Food insecure patients in diabetes clinic	Hospital diabetes clinic in San Francisco, CA	Providers screened patients in a diabetes clinic using the Hunger Vital Sign™. If a patient screened positive for food insecurity, providers supplied them with individually tailored information about community food resources including SNAP, food pantries, meal programs, and home-delivered and medically tailored meals. 143 patients screened food insecure, and 31 participated in the study's qualitative interviews.	Primary: Utilization of referral Secondary: Barriers to food resource use	Utilization of referral: Very few patients followed through on referrals, but the most positive connection was made to Project Open Hand, a medically tailored meal program. Clinic staff helped patients apply for Project Open Hand's services. Barriers to food resource use: The most reported barriers to connecting with food resources after the referral were inaccessiblity (such as location, hours, etc.), competing priorities, and not needing the referrals.

CITATION	INTERVENTION CATEGORY	DESIGN TYPE	STUDY DETAILS	SETTING	INTERVENTION DESCRIPTION	TARGETED OUTCOMES	FINDINGS
Morales, M., Epstein, M., Marable, D., Oo, S., & Berkowitz, S. (2016). Food Insecurity and Cardiovascular Health in Pregnant Women: Results From the Food for Families Program, Chelsea, Massachusetts, 2013-2015. *Preventing Chronic Disease, 13*, E152. doi: 10.5888/pcd13.160212	Referral to community-based food bank or food pantry	Cross-sectional (with control)	Length: Ongoing Sample: Pregnant women (145) Inclusion criteria: Pregnant women; age 18 or older; patient of obstetric clinic at Chelsea Healthcare Center	Community health center in Chelsea, MA	Providers screened patients for food insecurity. If a patient screened positive for food insecurity, providers connected them to Food for Families. Patients completed a standardized enrollment interview and were connected to services such as SNAP, WIC and food pantries.	Primary: Blood pressure and blood glucose	Blood pressure: Women enrolled in Food for Families had better SBP and DBP over the course of their pregnancy than those who were not referred. Blood glucose: There were no observed differences in blood glucose levels over the course of pregnancy for women enrolled in Food for Families and women who were not referred to the program.
Orsega-Smith, E., Slesinger, N., & Cotugna, N. (2019). Local Pediatricians Partner with Food Bank to Provide Produce Prescription Program. *Journal of Hunger & Environmental Nutrition*. Advance online publication. doi:10.1080/19320248.2019.1592051	Referral to produce distribution	Pre-post study (without control)	Length: 1 year Sample: Parents (41) Inclusion criteria: Parent of pediatric patient experiencing food insecurity; Medicaid as primary insurance, classified as overweight, or family with two or more children	2 Pediatrician offices in Delaware	Providers screened parents of pediatric patients for food insecurity. If a parent screened positive for food insecurity, providers gave a prescription to pick up fresh produce once per month from a mobile pantry truck at the doctors' offices. Food bank staff also provided nutrition education and cooking demonstrations on distribution days.	Primary: Fruit and vegetable consumption	Fruit and vegetable consumption: Adults reported a significant increase in fruit and vegetable consumption from baseline. Child fruit consumption significantly increased, but there were no significant changes in child vegetable consumption.
Palakshappa, D., Vasan, A., Khan, S., Seifu, L., Feudtner, C., & Fiks, A. G. (2017). Clinicians' Perceptions of Screening for Food Insecurity in Suburban Pediatric Practice. *Pediatrics, 140*(1), e20170319. https://doi.org/10.1542/peds.2017-0319	SNAP application assistance	Cross-sectional (without control)	Length: Ongoing Sample: Families (122); Clinicians (18) Inclusion criteria: Children presenting for 2-, 15-, or 36-month well-child visit; Clinician at one of six participating sites	6 pediatric primary care clinics in Philadelphia	Providers screened patients for food insecurity. If a patient screened positive for food insecurity, they were eligible for a referral to a community partner (Benefits Data Trust) for assistance applying for SNAP. SNAP applications were completed over the phone.	Primary: Enrollment in SNAP Secondary: Food insecurity; clinician acceptability	Enrollment in SNAP: 1 family was enrolled in SNAP, and 9 families spoke to the community partner. Food insecurity: The study did not assess post-intervention, but the prevalence at the baseline was low (2.8%). Clinician acceptability: The primary barriers to screening patients for food insecurity were personal discomfort; concern about families reacting negatively; concern about being unable to provide adequate resources.

CITATION	INTERVENTION CATEGORY	DESIGN TYPE	STUDY DETAILS	SETTING	INTERVENTION DESCRIPTION	TARGETED OUTCOMES	FINDINGS
Palar, K., Napoles, T., Hufstedler, L. L., Seligman, H., Hecht, F. M., Madsen, K., Ryle, M., Pitchford, S., Frongillo, E. A., & Weiser, S. D. (2017). Comprehensive and Medically Appropriate Food Support Is Associated with Improved HIV and Diabetes Health. *Journal of Urban Health: Bulletin of the New York Academy of Medicine, 94*(1), 87–99. https://doi.org/10.1007/s11524-016-0129-7	Diabetes self-management support at food pantry	Pre-post study (without control)	Length: 6 months Sample: Adults (72) Inclusion criteria: Diagnosis of HIV or type-2 diabetes; current client of Project Open Hand; English or Spanish speaking; age 18 or older; income < 300% federal poverty level	Non-profit organization in San Francisco, CA	A local nonprofit that provided food assistance supplied meals and snacks fulfilling 100% of daily caloric requirements, tailored to meet nutritional guidelines for a healthy diet. Clients picked up food twice per week.	Primary: Food insecurity Secondary: Diet quality; BMI; HbA1c for those with diabetes	Food insecurity: There was a significant decrease in severity of food insecurity: very low food security decreased from 59.6% to 11.5%; high food security increased from 9.62% to 53.9%. Diet quality: There was an increase in the frequency of fruit and vegetable consumption, and a decrease in the frequency of fatty food consumption. BMI: BMI decreased in the group with diabetes from 36.1 to 34.8. HbA1c: There was a slight decrease (not statistically significant) in the mean from 9.23% to 8.75%.
Ridberg, R. A., Bell, J. F., Merritt, K. E., Harris, D. M., Young H.M., & Tancredi, D. J. (2019). Effect of Fruit and Vegetable Prescription Program (FVRx) on Children's Fruit and Vegetable Consumption. *Preventing Chronic Disease, 16*(E73), 1-13. http://dx.doi.org/10.5888/pcd16.180555	Referral to produce distribution	Pre-post study (without control)	Length: 4 to 6 months Sample: Children (883) Inclusion criteria: Ages 2 to 18; diagnosis of overweight or obese; parental consent; patient willingness; family intent to make at least 3 program visits	12 clinical sites in 6 states and DC	This intervention was part of Wholesome Wave's Pediatric Fruit and Vegetable Prescription Program. Medical providers issued eligible patients fruit and vegetable prescriptions to be used at eligible farmers' markets. The prescription value depended on household size ($0.50-$1.00/household member per day), and they were distributed at up to six clinic visits. The intervention also included in-clinic nutrition education and obesity counseling with focus on fruit and vegetable consumption.	Primary: Consumption of fruits and vegetables	Consumption of fruits and vegetables: There was a significant dose-response increase in children's consumption of fruits and vegetables per each additional clinic visit.
Ridberg, R. A., Bell, J. F., Merritt, K. E., Harris, D. M., Young, H. M., & Tancredi, D. J. (2019). A Pediatric Fruit and Vegetable Prescription Program Increases Food Security in Low-Income Households. *Journal of Nutrition Education and Behavior, 51*(2), 224–230. e1. https://doi.org/10.1016/j.jneb.2018.08.003	Referral to produce distribution	Pre-post study (without control)	Length: 4 to 6 months Sample: Children (578) Inclusion criteria: Ages 2 to 18; diagnosis of overweight or obese; parental consent; patient willingness; family intent to make at least 3 program visits	9 clinical sites in 5 states and DC	This intervention was part of Wholesome Wave's Pediatric Fruit and Vegetable Prescription Program. Medical providers issued eligible patients fruit and vegetable prescriptions to be used at eligible farmers' markets. The prescription value depended on household size ($0.50-$1.00/household member per day) and were distributed at up to six clinic visits. The intervention also included in-clinic nutrition education and obesity counseling with focus on fruit and vegetable consumption.	Primary: Food insecurity, adapted from the USDA 18-item module	Food insecurity: Low food security decreased from 33% at baseline to 22% at last visit, and those with very low food security decreased from 9% to 1%. High or marginal food security increased from 58% to 76%.

CITATION	INTERVENTION CATEGORY	DESIGN TYPE	STUDY DETAILS	SETTING	INTERVENTION DESCRIPTION	TARGETED OUTCOMES	FINDINGS
Schlosser, A. V., Joshi, K., Smith, S., Thornton, A., Bolen, S. D., & Trapl, E. S. (2019). "The coupons and stuff just made it possible": economic constraints and patient experiences of a produce prescription program. *Translational Behavioral Medicine, 9*(5), 875–883. https://doi.org/10.1093/tbm/ibz086	Referral to produce distribution	Qualitative: Semi-structured interviews	Length: 3 months Sample: Adults (224; 23 interviewed) Inclusion criteria: Diagnosed with hypertension; food insecure	Safety net clinics and farmers' markets in Ohio	Providers screened patients with hypertension for food insecurity using a two-item questionnaire. If a patient screened positive for food insecurity, they were referred to the intervention which consisted of three visits including a blood pressure check, targeted nutrition counseling with goal setting, and the provision of four $10 vouchers to purchase produce at farmers' markets. Providers supplied patients with a location card for farmers' markets including hours, a Community Food Guide, and handouts from the American Heart Association.	Primary: Challenges to participant experience	Challenges to participant experience: Barriers to participant engagment included lack of access to transportation to farmers' markets, limited and unstable income, and a focus on personal behaviors rather than the structural influence on personal behaviors.
Seligman, H. K., Lyles, C., Marshall, M. B., Prendergast, K., Smith, M. C., Headings, A., Bradshaw, G., Rosenmoss, S., & Waxman, E. (2015). A Pilot Food Bank Intervention Featuring Diabetes-Appropriate Food Improved Glycemic Control Among Clients In Three States. *Health Affairs (Project Hope), 34*(11), 1956–1963. https://doi.org/10.1377/hlthaff.2015.0641	Diabetes self-management support at food pantry	Pre-post study (without control)	Length: 6 months Sample: Adults (687) Inclusion criteria: HbA1C >= 6.5% at screening or prior diabetes diagnosis; pantry client or food insecure; age 18 or older; spoke English or Spanish	Food pantries and clinics affilitated with food banks in CA, OH and TX	There were two ways to be enrolled in the intervention: (1) Medical providers screened patients with diabetes for food insecurity and referred eligible patients to the program, or (2) food pantry staff screened clients for diabetes or elevated HbA1C. Food pantries distributed diabetes-appropriate food once or twice monthly depending on household size and referred clients to primary care when needed. Clients were also provided diabetes self-management support and education.	Primary: HbA1C Secondary: Diabetes self-management behaviors; fruit and vegetable intake	HbA1C: There was significant improvement in the mean HbA1C from 8.11% at baseline to 7.96% at follow up. Poor glycemic control declined from 28% to 25%. Fruit and vegetable intake: There was significant improvement in number of servings of fruits and vegetables consumed per day.
Seligman, H. K., Smith, M., Rosenmoss, S., Marshall, M. B., & Waxman, E. (2018). Comprehensive Diabetes Self-Management Support From Food Banks: A Randomized Controlled Trial. *American Journal of Public Health, 108*(9), 1227–1234. https://doi.org/10.2105/AJPH.2018.304528	Diabetes self-management support at food pantry	Randomized control trial	Length: 6 months Sample: Adults (568; 285 in intervention) Inclusion criteria: HbA1C >= 7.5% at screening; existing or new pantry client; age 18 or older; spoke English or Spanish; had a phone or mailing address; intended to remain in the area for 12 months	27 food pantries affiliated with food banks in CA, MI and TX	The intervention took place in food pantries in partnership with food banks and included referral to primary care, formal diabetes self-management classes, 1-on-1 check-ins with educators, and twice-monthly food packages containing diabetes-appropriate food. The diabetes self-management education classes included two 2-hour structured sessions and an optional monthly 1-hour drop in sessions.	Primary: HbA1C Secondary: Food insecurity; fruit and vegetable intake	HbA1C: There were no statistically significant improvements in HbA1c between the intervention and control groups. HbA1C was signficiantly lower at follow-up among intervention participants who fully engaged in the program compared with those who did not fully engage. Food insecurity: There was statistically significant improvement in the intervention group compared to the control group. Fruit and vegetable intake: There was statistically significant improvement in the intervention group compared to the control group.

CITATION	INTERVENTION CATEGORY	DESIGN TYPE	STUDY DETAILS	SETTING	INTERVENTION DESCRIPTION	TARGETED OUTCOMES	FINDINGS
Smith, S., Malinak, D., Chang, J., Perez, M., Perez, S., Settlecowski, E., Rodriggs, T., Hsu, M., Abrew, A., & Aedo, S. (2016). Implementation of a food insecurity screening and referral program in student-run free clinics in San Diego, California. *Preventive Medicine Reports, 5*, 134–139. https://doi.org/10.1016/j.pmedr.2016.12.007	SNAP application assistance	Cross-sectional (without control)	Length: Ongoing Sample: Adults (430) Inclusion criteria: Over age 18; patient of the UCSD student-run free clinic	3 student-run free clinics in San Diego, CA	Clinic staff screened patients for food insecurity and provided all patients, regardless of food security status, information on local food pantries based on their home address. If a patient screened positive for food insecurity, they were assessed for SNAP eligibility. Clinics partnered with a local food bank and other organizations to conduct same-day SNAP enrollment onsite monthly and the traditional two-step enrollment process onsite regularly. Clinic staff also supplied patients with diabetes with food packages.	Primary: Food insecurity Secondary: Utilization of referral resources	Food insecurity: The study did not assess food insecurity post-intervention. The prevalence at the baseline was 74%. Utilization of referral resources: 201 patients with diabetes received monthly food boxes. 66 patients receivied food from an off-site food pantry. 64 patients enrolled in SNAP.
Wang, E., Gilbert, A., & Wessels, A. (2019). The Food Pharmacy Network: An Alternative Method for Addressing Food Insecurity and an Assessment of Its Effectiveness (OR02-08-19). *Current Developments in Nutrition, 3*(Suppl 1). doi:10.1093/cdn/nzz051.OR02-08-19.	Food pantry in health care setting	Randomized parallel-group	Length: 12 months Sample: Adults (1028; 513 in intervention) Inclusion criteria: Patient of one of 15 member clinics	15 health clinics with on-site food pantries across the US	The 15 participating clinics were members of the Food Pharmacy Network. The intervention group was able to visit a client-choice pantry, attended monthly meetings with a nutritionist or dietician to receive motivational interviewing, and received targeted referrals to community services.	Primary: Food insecurity Secondary: Self-sufficiency; fruit and vegetable consumption	Food insecurity: The intervention group was less likely to experience very low food insecurity post-intervention. Self-sufficiency: The intervention group increased scores on self-sufficiency scale post-intervention. Fruit and vegetable consumption: The intervention group saw an increase of 1.5 servings of fruits and vegetables per day compared to the control group.
Wetherill, M. S., Chancellor McIntosh, H., Beachy, C., & Shadid, O. (2018). Design and Implementation of a Clinic-Based Food Pharmacy for Food Insecure, Uninsured Patients to Support Chronic Disease Self-Management. *Journal of Nutrition Education and Behavior, 50*(9), 947–949. https://doi.org/10.1016/j.jneb.2018.05.014	Medically tailored food packages	Pre-post study (without control)	Length: 6 months Sample: Adults (80) Inclusion criteria: Patient at affiliated clinic who self-enrolled or received a referral from health care or social work provider	2 health clinics in OK, in partnership with local food bank	At enrollment, participants received a medically-appropriate food package of fresh produce and shelf-stable food items, an educational booklet, and 5 recipe cards. Patients could receive food packages monthly for up to six months.	Primary: Dietary intake Secondary: Food insecurity; blood pressure	Dietary intake: Participants experienced significant improvement in dietary fiber intake and a nonsignificant increase in daily fruit and vegetable intake. Food insecurity: Mean food security did not change from baseline. Blood pressure: There was significant improvement in diastolic blood pressure for participants who accessed food assistance at least four times and who had high blood pressure at enrollment.