

Assessing Access to Healthy Food Among Brooklyn Park Children and Families with Children



Prepared by

Stephanie Boylan

Student in PUBH 7696: Maternal and Child Health Field Experience
University of Minnesota | School of Public Health
Faculty Advisor: Jamie Stang

Prepared on Behalf of

City of Brooklyn Park

Spring 2017



Resilient Communities Project

UNIVERSITY OF MINNESOTA
Driven to DiscoverSM

The project on which this report is based was completed in collaboration with the City of Brooklyn Park as part of the 2016–2017 Resilient Communities Project (RCP) partnership. RCP is a program at the University of Minnesota’s Center for Urban and Regional Affairs (CURA) that connects University faculty and students with Minnesota communities to address strategic projects that advance local resilience and sustainability.

The contents of this report represent the views of the authors, and do not reflect those of RCP, CURA, the Regents of the University of Minnesota, or the City of Brooklyn Park.



This work is licensed under a Creative Commons Attribution-NonCommercial 3.0 Unported License. To view a copy of this license, visit www.creativecommons.org/licenses/by-nc/3.0/ or send a letter to Creative Commons, 444 Castro Street,

Suite 900, Mountain View, California, 94041, USA. Any reproduction, distribution, or derivative use of this work under this license must be accompanied by the following attribution: “Produced by the Resilient Communities Project (www.rcp.umn.edu) at the University of Minnesota. Reproduced under a Creative Commons Attribution-NonCommercial 3.0 Unported License.”

This publication may be available in alternate formats upon request.

Resilient Communities Project

University of Minnesota
330 HHHSPA
301—19th Avenue South
Minneapolis, Minnesota 55455
Phone: (612) 625-7501
E-mail: rcp@umn.edu
Web site: <http://www.rcp.umn.edu>



The University of Minnesota is committed to the policy that all persons shall have equal access to its programs, facilities, and employment without regard to race, color, creed, religion, national origin, sex, age, marital status, disability, public assistance status, veteran status, or sexual orientation.

Table of Contents

Background.....	5
Data Report.....	5
Literature Review Abstract.....	12
Proposed Program Overview.....	13
Logic Model.....	14
Evaluation Plan.....	15
Data Collection Instrument.....	21
Appendix: Literature Review.....	23
References.....	58

Background

Along with being designated a Racially Concentrated Area of Poverty (RCAP), two census tracts along the Zane Avenue Corridor are also identified as food deserts by the USDA, making it critical that the City identify ways to increase access and consumption of healthy food for the long-term health of the community.

Data Report

The Zane Avenue Corridor is located in the southern part of Brooklyn Park and includes parts of seven different census tracts. The map (right) shows the City of Brooklyn Park with Zane Avenue Corridor highlighted in pink and the seven census tracts outlined in blue.

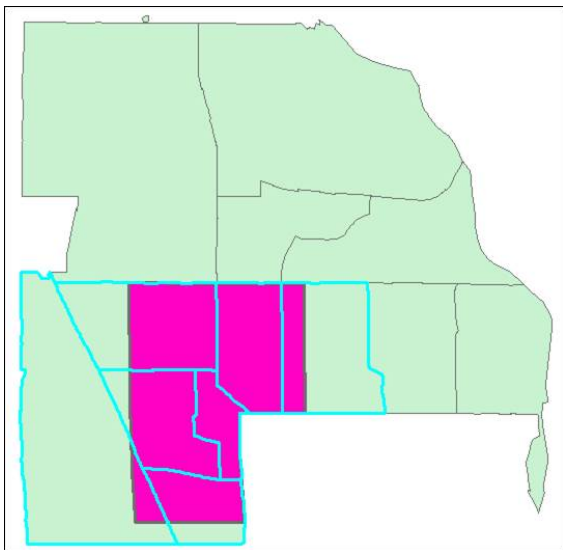


Table 1 shows the age breakdown in Zane Avenue Corridor. The total population of this area is 28,458. The largest age group is 25-45 year olds totaling 31.75% of the population. The second highest is ages 0-17. This group is 29.94% of the population or 8,521 individuals. This report

will focus on youth in the 0-17 age group. Parents and families tend to fall in the 25-45 year old age range, which will also be a focus for this project.

Table 1. Age breakdown in Zane Avenue Corridor

Age	Population	Proportion
0-17	8521	29.94%
18-24	3091	10.86%
25-45	9035	31.75%
46-64	5391	18.94%
65+	2420	8.50%
Total	28458	100.00%

Data From: 2016 Esri Demographics

Table 2 depicts family household income in Zane Avenue Corridor. Income plays a large role in whether a family has the ability to access healthy food. The USDA defines food insecurity as limited access to adequate food by a lack of money and other resources. Household incomes are widely distributed, but about 40.50% of households in Zane Avenue Corridor have an income less than \$35,000.

Table 3 shows race and gender distribution of 0-14 year olds in Zane Avenue Corridor. The race with the largest proportion is Black/African American (40.15%). The White, Asian, and Hispanic populations have comparable proportions, around 14%. The proportion of male and female 0-14 year olds are near equal with 50.94% male and 49.06% female.

Table 2. Family household income in Zane Avenue Corridor

Household Income	# of households	Proportion
less than \$15,000	1,475	14.57%
\$15,000 - \$24,999	1,198	11.83%
\$25,000 - \$34,999	1,427	14.09%
\$35,000 - \$49,999	1,654	16.33%
\$50,000 - \$74,999	1,981	19.56%
\$75,000 - \$99,999	1,139	11.25%
\$100,000 - \$149,999	974	9.62%
\$150,000 - \$199,999	173	1.71%
\$200,000 or greater	105	1.04%
Total	10,126	100.00%

Data From: 2016 Esri Demographics

Table 3. Race and gender distribution of 0-14 year olds in Zane Avenue Corridor

Race	Population			Percent		Proportion by race
	Male	Female	Total	Male	Female	
White	595	637	1,232	48.30%	51.70%	14.40%
Black/African American	1,706	1,729	3,435	49.67%	50.33%	40.15%
American Indian/Alaska Native	23	20	43	53.49%	46.51%	0.50%
Asian	662	591	1,253	52.83%	47.17%	14.65%
Hispanic	643	608	1,251	51.40%	48.60%	14.62%
Pacific Islander	1	2	3	33.33%	66.67%	0.04%
Other	394	305	699	56.37%	43.63%	8.17%
Multiple	334	305	639	52.27%	47.73%	7.47%
Total	4,358	4,197	8,555	50.94%	49.06%	100.00%

Data From: 2016 Esri Demographic

The United States is facing an insecurity-obesity paradox, where many individuals suffer from both conditions at the same time. Table 4 shows data from a report by Hennepin County that depicted that in children two to five years old who live in Minnesota, the prevalence of being

overweight or obese has been going down, but in Brooklyn Park the prevalence is on the rise especially in racially diverse, low access, and impoverished areas. There was a 15.92% increase in two to five year olds who were overweight and obese and a 11.21% increase in individuals two to five years old who were obese in Brooklyn Park.

Table 4. Percent change in obesity rates of children age 2 to 5 years old in City of Brooklyn Park v. State of Minnesota from 2012 to 2015

	Minnesota			Brooklyn Park		
	2012	2015	% change	2012	2015	% change
Overweight and Obese ($\geq 85^{\text{th}}$ percentile)	28.70%	27.90%	-2.79%	24.50%	28.40%	15.92%
Obese ($\geq 95^{\text{th}}$ percentile)	12.70%	12.20%	-4.10%	10.70%	11.90%	11.21%

Data From: Hennepin County WIC

Table 5 and 6 show data from the 2015 USDA Food Access Research Atlas. Table 5 describes the number of individuals age 0-17 in the seven urban tracts that are a part of Zane Avenue Corridor who live more than ½, 1, 10, or 20 mile(s) from the nearest supermarket, supercenter, or large grocery store. Table 6 shows the number of housing units receiving Supplemental Nutrition Assistance Program (SNAP) benefits at the same distances. There are 7,869 individuals age 0-17 who live within ½ mile and 2,922 who live within 1 mile. No individual lives more than 10 miles from the nearest supermarket, supercenter, or large grocery store. There are 269 households receiving SNAP benefits within ½ mile and 92 receiving them within 1 mile.

Table 5. Number of individuals age 0-17 in the following urban tracts living more than ½, 1, 10, or 20 mile(s) from the nearest supermarket, supercenter, or large grocery store in 2015

Census Tract	1/2 Mile		1 Mile		10 Miles		20 Miles	
	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage
27053026807	1158.51	22.12%	723.14	13.81%	0	0	0	0
27053026809	1782.00	35.36%	1021.19	20.27%	0	0	0	0
27053026810	976.44	16.01%	40.22	0.66%	0	0	0	0
27053026811	1730.00	30.61%	1048.87	18.56%	0	0	0	0
27053026816	1291.49	20.63%	82.58	1.32%	0	0	0	0
27053026818	411.92	9.02%	0.92	0.02%	0	0	0	0
27053026819	517.76	11.51%	4.60	0.10%	0	0	0	0
Grand Total	7868.11	145.27%	2921.52	54.73%	0	0	0	0

Data From: USDA Food Access Research Atlas

Table 6. Number of housing units receiving SNAP benefits at ½, 1, 10, and 20 miles in the following urban tracts living more than ½, 1, 10, or 20 mile(s) from the nearest supermarket, supercenter, or large grocery store in 2015

Census Tract	1/2 Mile		1 Mile		10 Miles		20 Miles	
	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage
27053026807	421.70	20.24%	249.26	11.97%	0	0	0	0
27053026809	389.23	23.07%	213.12	12.63%	0	0	0	0
27053026810	243.94	10.99%	15.58	0.70%	0	0	0	0
27053026811	254.39	14.41%	151.33	8.57%	0	0	0	0
27053026816	155.94	7.21%	11.14	0.52%	0	0	0	0
27053026818	85.15	5.33%	0.15	0.01%	0	0	0	0
27053026819	326.60	16.68%	3.58	0.18%	0	0	0	0
Grand Total	1876.96	97.93%	644.16	34.58%	0	0	0	0

Data From: USDA Food Access Research Atlas

Of the seven urban tracts that are a part of Zane Avenue Corridor, Table 7 shows that five of these are low-income and the poverty rate ranges from 13.1% to as high as 36.6%.

Table 7. Low-income tracts, tract poverty rate, and tract median family income in 2015

Census Tract	Low Income	Poverty Rate	Median Family Income
27053026807	Yes	13.1	\$ 60,000.00
27053026809	Yes	25.2	\$ 31,698.00
27053026810	Yes	24	\$ 48,076.00
27053026811	No	13.8	\$ 72,500.00
27053026816	No	13.1	\$ 78,000.00
27053026818	Yes	18.1	\$ 56,089.00
27053026819	Yes	36.6	\$ 35,435.00

Data From: USDA Food Access Research Atlas

Table 8 shows a list of all schools that Brooklyn Park youth attend. It also shows the number of students enrolled at the school (Enr), number who have free lunch (Free), number who have reduced lunch (Red), and the percentage of students who have free and reduced lunch (Free & Red Lunch). Those highlighted in red portray the schools with greater than or equal to 50% of students who receive free and reduced price lunch. Of these 36 schools, over half (19) have greater than 50% of students receiving free and reduced price lunch.

Table 8. Number and percent of students receiving free and reduced price lunch in the schools in which Brooklyn Park students attend.

County	District Name	School Name	Enr	Free	Red	Free & Red Lunch
Hennepin	OSSEO PUBLIC SCHOOL DISTRICT	BASSWOOD ELEMENTARY	1003	102	23	12.46
Hennepin	OSSEO PUBLIC SCHOOL DISTRICT	CEDAR ISLAND ELEMENTARY	447	99	31	29.08
Anoka	ANOKA-HENNEPIN PUBLIC SCHOOL DIST.	CHAMPLIN/BROOKLYN PK ACD MATH ENSC	881	220	81	34.16
Hennepin	OSSEO PUBLIC SCHOOL DISTRICT	CREST VIEW ELEMENTARY	261	201	29	88.12
Anoka	ANOKA-HENNEPIN PUBLIC SCHOOL DIST.	DAYTON ELEMENTARY	469	110	33	30.49
Hennepin	BROOKLYN CENTER SCHOOL DISTRICT	EARLE BROWN ELEMENTARY	1014	665	149	80.27
Hennepin	OSSEO PUBLIC SCHOOL DISTRICT	EDINBROOK ELEMENTARY	682	343	95	64.22
Hennepin	OSSEO PUBLIC SCHOOL DISTRICT	ELM CREEK ELEMENTARY	507	140	42	35.89
Anoka	ANOKA-HENNEPIN PUBLIC SCHOOL DIST.	EVERGREEN PARK ELEMENTARY	443	287	72	81.03
Hennepin	OSSEO PUBLIC SCHOOL DISTRICT	FAIR OAKS ELEMENTARY	406	309	59	90.64
Hennepin	OSSEO PUBLIC SCHOOL DISTRICT	FERNBROOK ELEMENTARY	803	111	37	18.43
Hennepin	ROBBINSDALE PUBLIC SCHOOL DISTRICT	FOREST ELEMENTARY	565	289	53	60.53
Hennepin	OSSEO PUBLIC SCHOOL DISTRICT	GARDEN CITY ELEMENTARY	305	215	41	83.93
Hennepin	ROBBINSDALE PUBLIC SCHOOL DISTRICT	LAKEVIEW ELEMENTARY	444	275	32	69.14
Hennepin	ROBBINSDALE PUBLIC SCHOOL DISTRICT	MEADOW LAKE ELEMENTARY	606	422	62	79.86
Anoka	ANOKA-HENNEPIN PUBLIC SCHOOL DIST.	MONROE ELEMENTARY	664	247	87	50.30
Hennepin	ROBBINSDALE PUBLIC SCHOOL DISTRICT	NORTHPORT ELEMENTARY	596	435	68	84.39
Hennepin	OSSEO PUBLIC SCHOOL DISTRICT	OAK VIEW ELEMENTARY	472	192	36	48.30
Anoka	ANOKA-HENNEPIN PUBLIC SCHOOL DIST.	OXBOW CREEK ELEMENTARY	1211	174	112	23.61
Hennepin	OSSEO PUBLIC SCHOOL DISTRICT	PALMER LAKE ELEMENTARY	463	287	77	78.61
Hennepin	OSSEO PUBLIC SCHOOL DISTRICT	PARK BROOK ELEMENTARY	267	186	35	82.77
Hennepin	OSSEO PUBLIC SCHOOL DISTRICT	RICE LAKE ELEMENTARY	657	183	48	35.15
Hennepin	OSSEO PUBLIC SCHOOL DISTRICT	RUSH CREEK ELEMENTARY	878	67	22	10.13
Hennepin	OSSEO PUBLIC SCHOOL DISTRICT	WOODLAND ELEMENTARY	709	163	55	30.74
Hennepin	OSSEO PUBLIC SCHOOL DISTRICT	ZANEWOOD COMMUNITY SCHOOL	377	287	40	86.73
Hennepin	OSSEO PUBLIC SCHOOL DISTRICT	Brooklyn Middle STEAM School	915	471	122	64.80
Anoka	ANOKA-HENNEPIN PUBLIC SCHOOL DIST.	JACKSON MIDDLE	2118	542	209	35.45
Hennepin	OSSEO PUBLIC SCHOOL DISTRICT	Maple Grove Middle School	1690	303	98	23.72
Hennepin	OSSEO PUBLIC SCHOOL DISTRICT	North View Middle School IB World	699	484	109	84.83
Hennepin	OSSEO PUBLIC SCHOOL DISTRICT	Osseo Middle School	996	255	99	35.54
Hennepin	ROBBINSDALE PUBLIC SCHOOL DISTRICT	ROBBINSDALE MIDDLE	1238	747	135	71.24
Hennepin	BROOKLYN CENTER SCHOOL DISTRICT	BROOKLYN CENTER SECONDARY	918	608	147	82.24
Anoka	ANOKA-HENNEPIN PUBLIC SCHOOL DIST.	CHAMPLIN PARK HIGH SCHOOL	2801	692	275	34.52
Hennepin	OSSEO PUBLIC SCHOOL DISTRICT	MAPLE GROVE SENIOR HIGH	2295	234	80	13.68
Hennepin	OSSEO PUBLIC SCHOOL DISTRICT	OSSEO SENIOR HIGH	2022	795	212	49.80
Hennepin	OSSEO PUBLIC SCHOOL DISTRICT	PARK CENTER IB WORLD SCHOOL	2042	1095	258	66.25

Data From: Minnesota Department of Education

Literature Review Abstract

This literature review seeks to examine the success of community programs in increasing access to healthy food in suburban areas through school policy, school gardens, grocery store marketing, transportation, and youth engagement techniques. I searched the PubMed database with the Mesh terms “food,” “access,” and “Minnesota.” This brought up 183 results. After filtering for “free full text,” 74 results showed. From these, papers included were those relevant to children and families. Four were chosen. I also searched PubMed with the Mesh terms “food,” “access,” and “intervention.” This brought up 765 results. After filtering for “free full text,” 325 results showed. This was narrowed down to 216 by filtering dates to the past five years. From these, papers again included those relevant to children and families. Articles that focused on low-income, minority communities were preferential. Eleven were chosen. In all articles reviewed, researchers suggested, in some form, a focus on changing policies, systems, and environments to prevent obesity by promoting healthful eating and active living. Though interventions varied greatly between policy, environmental, and system changes, themes emerged from this review. Three common themes were (1) advertising and marketing, (2) youth engagement, and (3) community and academic partnerships. The success of an implementation to increase food access depends largely on the location of the issue, social determinants of health, and demographics in that area. Each community should assess current interventions to determine how they can change and model the intervention to fit their community. The complete review of literature is summarized more extensively in an appendix to this report.

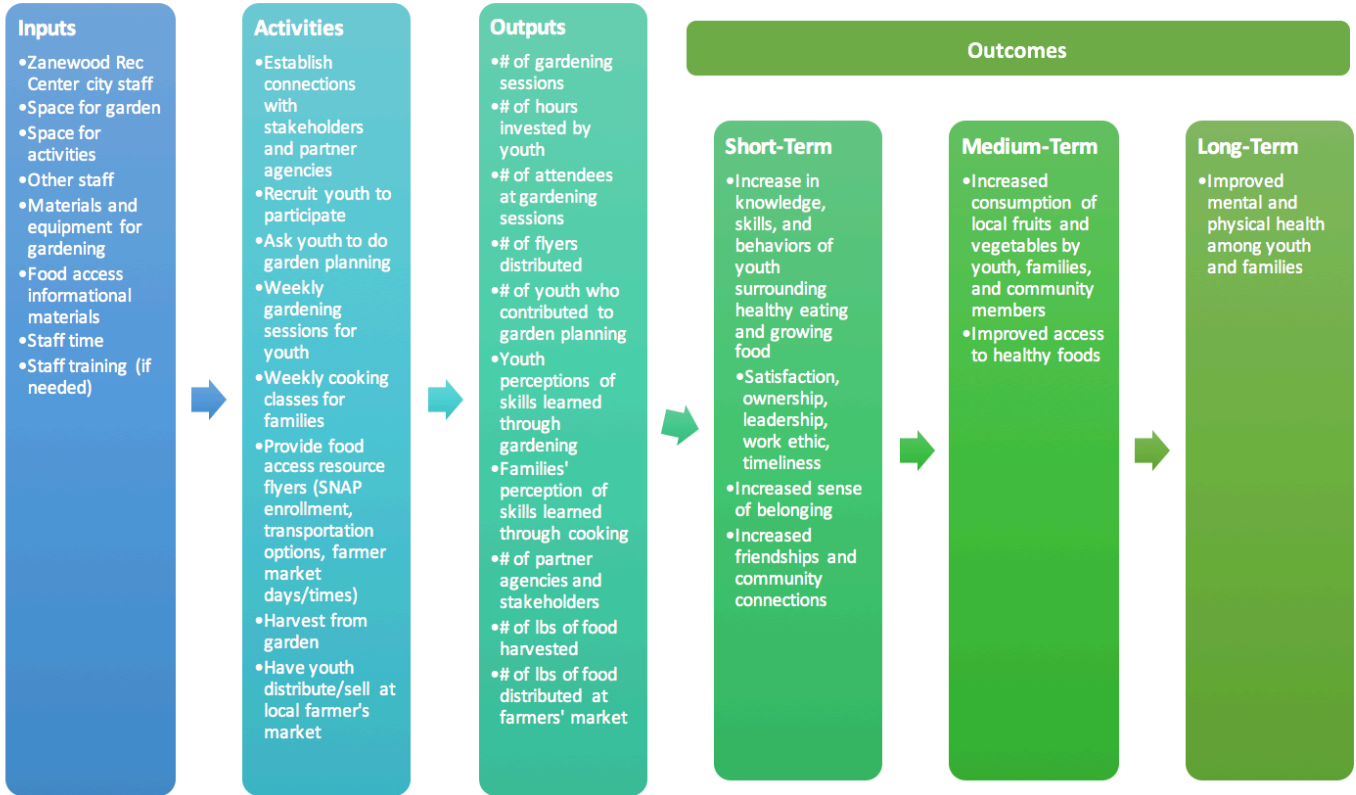
Proposed Program Overview

The program intervention will be a community garden program. The City of Brooklyn Park will implement a community garden youth and family program through Zanewood Recreational Center. Below, a logic model and proposed evaluation plan describe the key components of the program. Potential stakeholders are the youth, City of Brooklyn Park, parents and families of youth, businesses surrounding Zanewood Rec Center, schools, Brooklyn Alliance for Youth, and Hennepin County. The staff at Zanewood Rec Center will play a large role in the activities of the program. The city will establish connections with stakeholders and partner agencies.

Zanewood Rec Center will recruit youth to participate in the community garden program. The youth will help design and plan the garden space. Throughout the year of this intervention there will be weekly gardening sessions for youth, weekly cooking classes for families, and food access resources available. When the vegetables are ripe, youth will harvest and sell them at the local farmer's market. The proceeds will be split between the city and the youth. The goal of this program is to increase access to healthy food in Zane Avenue Corridor for youth and families. This program will help achieve this goal by increasing knowledge, skills, and behaviors of youth surrounding healthy eating and growing food, increasing a sense of community, as well as increasing satisfaction, ownership, work ethic, and timeliness of youth in the community. In order to evaluate the program, formative, process, and outcome evaluation will be done.

Logic Model

Zanewood Rec Center Community Garden Program



Program Goal: Increase access to healthy food in Zane Avenue Corridor for youth and families

Evaluation Plan

Formative Evaluation

Formative evaluation is the first evaluation process conducted prior to implementing any study. It is a crucial process that involves pre- and pilot-testing materials as they are being developed in order to review and make final versions. These questions will help determine the future revisions to the program and materials to ensure the highest participation.

Questions to be addressed:

- How will you advertise/market?
- What are you advertising/marketing?
- What activities do the youth want?
- What's the most popular time of day for garden activities?
- What activities were already offered? If applicable, why have people not participated?
- Are weekly gardening sessions enough?
- What do families already know about SNAP, transportation, and farmers' markets in the community?
 - What else would they like information about?
- What do families want to know about cooking?

Data sources to be used:

- Focus group with youth from the community
 - Test food access resource flyers
 - Test a draft calendar of events
 - Address formative questions

- Focus group with parents from the community
 - Test food access resource flyers
 - Test a draft calendar of events
 - Address formative questions

Process Evaluation

Process evaluation refers to describing how well a program or intervention was or is being implemented. Process evaluation is done to provide information about: whether a program or intervention is being carried out as planned; whether the program methods are working well; and whether the intended content is being conveyed accurately. Some components of a process evaluation are fidelity, dose delivered, dose received, and reach. Fidelity describes whether the intervention is implemented as intended. It includes content and planned dose. Dose delivered refers to how much of the planned program dose is actually made available to participants. Dose received refers to how much of the planned dose the person actually experiences or is exposed to. Reach describes whether the program reached the intended audience. Did the target audience have a chance to participate in the program? Did audience members have an equal chance to participate, or did the program reach only certain members of the target population?

Questions to be addressed:

- Garden:
 - Have youth been recruited to participate?
 - Are gardening sessions being done as planned (weekly)?
 - Are youth attending activities?
 - Are youth satisfied with gardening sessions?
 - Have connections been made with partner agencies and stakeholders?
 - Are youth involved in the planning of the garden?
 - Are youth harvesting the produce?
 - Is food being distributed at a local farmers' market?
- Cooking & Resource sessions:
 - Are staff trained?
 - Is there fidelity to cooking class protocol?
 - Are cooking classes being done as planned (weekly)?
 - Are resource sessions being delivered as planned?

Data sources to be used:

- Logbook of attendance at all sessions
- Record/receipts of food distributed at farmers' market
- Survey
 - Self-reported hours
 - Satisfaction
 - Involvement
- Observations of staff conducting classes/sessions

Outcome Evaluation

Outcome evaluation identifies the results or effects of a program. It assesses the usefulness of a program in producing change. It is conducted to know how well the objectives of a program are met. Outcome evaluation is important to gain knowledge about program activities,

demonstrate your program's success or progress, communicate your program's impact to others, initiate future projects and possibly future funding.

Questions to be addressed:

Short Term:

- Did the knowledge of healthy food options increase?
- Did the awareness of community garden, cooking classes, and food access information flyers increase?
- Did families' confidence in their ability to cook healthy food increase?
- Did social support for engagement in activities increase?
- Did motivation for healthy eating increase?
- Did youth feel their work ethic (timeliness, leadership, etc.) increased?
- Did families feel their sense of community increased?
- Did families feel their sense of belonging increased?
- Did youth feel their friendships increased?

Medium Term:

- Did consumption of fruits and vegetables increase?
- Did access to healthy foods increase?

Long Term

- Did mental health improve?
- Did physical health improve?

Study design:

- Pre/Post
 - Strengths: fairness to stakeholders/residents
 - Weaknesses: less robust than randomized control, self-reported
 - Threats to validity:
 - History: we can't control what happens in the community
 - Experimental mortality: lose residents to follow up (relocation, illness)

Data sources to be used:

- Surveys
 - Perception of mental health
 - Perception of physical health
 - Knowledge, confidence, motivation, etc.
 - Cooking skills
 - Social engagement, participation, access to food

Protocols, Stakeholders, and Timeline

Potential stakeholders:

- Youth
- City of Brooklyn Park
- Parents/Families of Youth
- Surrounding businesses
- Other organizations: schools, Brooklyn Alliance for Youth, Hennepin County

Protocols:

- Protocol for training staff
- Protocol for giving food to farmers' market

Timeline:

	2017		2018									
	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT
Project development	█	█	█	█								
Focus groups					█							
Conduct baseline survey					█							
Conduct community garden intervention						█	█	█	█	█	█	
Conduct cooking intervention						█	█	█	█	█	█	
Conduct resource intervention						█	█	█	█	█	█	
Conduct mid-point survey									█			
Conduct follow-up survey												█
Analysis/write-up												█

Data Collection Instrument

A survey will be used to assess many components of the youth garden program. Surveys are easy to distribute, relatively inexpensive and can reach a broad range of community members.

Some weaknesses of surveys are that we cannot assume all community members have competent literacy levels or speak the same language, we cannot assume community members will respond, and there is no room for interpretation.

Potential follow-up survey questions for youth:

- How did you hear about the Zanewood Rec Center gardening program?
- How many gardening sessions have you attended?
 - Did you go every week it is offered?
- How satisfied are you with this program? (scale)
- Did you help plan the garden?
- Did you help harvest the produce?
- Did your knowledge of healthy food options increase?
- Did you feel motivated to eat healthier after the program?
- Do you feel your work ethic (timeliness, leadership, etc.) increased?
- Do you feel your friendships increased because of the program?
- Do you consume more fruits and vegetables because of the program?
- Do you have better access to healthy foods because of the program?
- Did your mental health improve because of the program?
 - If yes, how so?
- Did your physical health improve because of the program?
 - If yes, how so?
- What can be improved about this program?

Potential follow-up survey questions for families:

- How did you hear about the Zanewood Rec Center cooking program?
- How did you receive or find the resources and flyers?
- Did you attend cooking sessions?
 - If so, how many?
 - Did you go every week it was offered?
- How satisfied are you with this program? (scale)
- What can be improved about the cooking classes?
- Did you find the resources and flyers helpful?
- How satisfied are you with the resources and flyers? (scale)
- What can be improved or added to the resources and flyers?
- Did your confidence in your ability to cook healthy food increase?
- Do you feel your sense of community increased because of the program?
- Do you feel your sense of belonging increased because of the program?
- Do you feel motivated to eat healthier after the program?
- Do you consume more fruits and vegetables because of the program?
- Do you have better access to healthy foods because of the program?
- Did your mental health improve because of the program?
 - If yes, how so?
- Did your physical health improve because of the program?
 - If yes, how so?

Appendix: Literature Review

Introduction

Regarding population health, there are many social determinants of health to consider. The Center for Disease Control and Prevention (CDC) defines social determinants of health as conditions in the places where people live, learn, work, and play that affect a wide range of health risks and outcomes.¹ Examples of social determinants of health include environment, health behaviors, transportation, housing, education, employment, language and cultural barriers, and food insecurity. Food insecurity can have detrimental effects on the health of an individual. The United States Department of Agriculture (USDA) defines food insecurity as limited access to adequate food by a lack of money and other resources.² Income is a large factor, but as this review will specify, access to resources such as transportation and education also play a large role in whether a person experiences food insecurity. Food insecurity is an issue, not just in one area, but across all regions of the United States. The 2015 Household Food Security Report from the USDA concluded that 15.8 million households were food insecure.² The report also showed that children were food insecure at times during the year in 3.0 million U.S. households with children.² This is an important issue, because a poor dietary intake at a young age can result in poor individual health in the future including obesity, poorer performance at school, and eventually higher medical costs.³

Background and Significance

Food insecurity occurs throughout the U.S., but is often found in pockets of impoverished areas known as food deserts. A food desert is described as a part of the country void of fresh fruit, vegetables, and other healthy whole foods.⁴ There are 72,865 food deserts as defined by the USDA in 2015.⁴ Not only is this an issue of lack of access to healthy food, but also an issue of abundant “quick food.” This abundance increases access to processed, sugar, and fat laden foods that are contributing to the nation’s obesity epidemic. The U.S. is facing an insecurity-obesity paradox, where many individuals suffer from both conditions at the same time.⁵

There have been many successful programs implemented to resolve healthy food access issues around the country, but, by observing the number of current food deserts and the obesity epidemic, it is clear there is still more to be done. The needs of each community differ greatly. People select what they eat and drink in the context of their social, economic, cultural, and physical environment.⁶ The availability, price, marketing, and social meaning of food all have an impact on food choices.⁶

This literature review seeks to examine the success of community programs in increasing access to healthy food in urban/suburban areas through school policy, school gardens, grocery store marketing, transportation, and youth engagement techniques.

Methods

I searched the PubMed database with the Mesh terms “food,” “access,” and “Minnesota.” This brought up 183 results. After filtering for “free full text,” 74 results showed. From these, articles included were those relevant to children and families. Four were chosen. I also

searched PubMed with the Mesh terms “food,” “access,” and “intervention.” This brought up 765 results. After filtering for “free full text,” 325 results showed. This was narrowed down to 216 by filtering dates to the past five years. From these, articles included those relevant to children and families. Articles that focused on low-income, minority communities were preferential. Eleven were chosen.

Results

Recent evidence has linked neighborhood food environments to health and nutrition status. A study done by Blitstein, et. al in 2012 explored whether characteristics such as quality, selection, and convenience were associated with dietary intake of fruits and vegetables.⁷ Their intervention was called the 5-4-3-2-1- Go! Campaign and focused on six low-income, primarily minority neighborhoods in Chicago.⁷ It delivered messages about nutrition and physical activity using local media and grassroots efforts. Local media included neighborhood newspapers, radio advertisements, and health fairs.⁷ The study sample was large (495 respondents) and targeted households that included young children. Logistic regression analysis is used when the dependent variable is binary. In this case, it was used for the dichotomized fruit and vegetable index vs. the perceived satisfaction index. The results showed that respondents who agreed that they had convenient access to quality and selection were 2.13 times as likely to eat three or more servings of fruits and vegetables, while those who strongly agreed were 4.42 times as likely to eat three or more servings of fruits and vegetables daily.⁷ This depicts the important relationship between convenient access to healthy options and the consumption of healthy food. Additionally, this study found that those shopping at a local co-op or a farmer’s market

rather than supermarket were 2.77 times more likely to report eating three or more fruits and vegetables daily.⁷ Also, frequent shopping trips were more likely to report higher fruit and vegetable consumption.⁷ This is, again, likely related to the first result that showed those who have convenient access ate more fruits and vegetables than those who do not. The authors of this study suggest that nutrition promotion campaigns be put into place to alter the built environment as simply increasing availability might not yield beneficial change.⁷ This study data was cross-sectional and observational. A limitation to this study is that cross-sectional cannot make causal links. It is equally probable that those who want to eat more fruits and vegetables seek out stores with higher quality and selection such as farmer's markets and co-ops.

Similar to the previous nutrition promotion campaign, Foster et. al evaluated the effects of in-store marketing strategies to promote the purchase of specific healthier items in five product categories: milk, ready-to-eat cereal, frozen meals, in-aisle beverages, and checkout cooler beverages.⁸ This was a cluster-randomized controlled trial. Eight urban supermarkets in low-income, high-minority neighborhoods were randomly assigned to an intervention or control group.⁸ The intervention stores received a 6-month in-store marketing intervention that promoted sales of healthier products through placement, signage, and product availability strategies.⁸ The researchers also conducted focus groups to receive feedback from primary shoppers with at least one child younger than 18 years old.⁸ They asked questions regarding purchase decision making, brand loyalty, food and beverage preferences, nutrition knowledge, and acceptance or reluctance to change good, and beverage purchases.⁸ The results of the intervention showed significantly greater sales of skim and 1% milk, water and two of three types of frozen meals compared with the control groups during the same time period.⁸ No

differences were found between stores in sales of cereal, whole or 2% milk, beverages, or diet beverages.⁸ The focus groups showed the top motivators of shopping habits to be price, taste, and children's preferences.⁸ The top motivators of shopping habits are areas where public health can intervene. Interventions that include taste tests, marketing to children, and price changes are included in this review. A strength of this study was that it was a randomized control trial. They were able to compare their intervention with a control group. Also, they used quantitative and qualitative data, although their report focused on the qualitative, not reporting much on the results of the focus group. Price reductions were not tested in this trial, but that is also a factor to consider that affects food choice. Focus groups included youth voices from the community.

Gebauer et. al aimed to describe the presence of convenience stores within walking distance of urban junior high and high schools. Seeing as students may frequently shop at these stores before or after school and/or during their lunch hour, it is important to understand what is available. They determined walking distance as 800 meters or ½ miles. They studied convenience stores within walking distance of all 36 public junior high and high schools in St. Paul and Minneapolis.⁹ Twenty-five schools served populations where >70% of students were eligible for free and reduced price lunch.⁹ Their analysis examined sample means and ranges. An average of 2.2 convenience stores were within walking distance around each school.⁹ Fresh vegetables were in 49% of the stores and fresh fruits in 51% of the stores.⁹ Overall, 94% of the advertisements were for less healthful products and 36% were for more healthful products.⁹ The authors suggest this as a starting point in developing youth-focused nutrition interventions.⁹ They suggested additional research be done on advertising as many food,

alcohol, and drug companies provide incentives for stores to feature their products.⁹ A strength of this study was that it observed not only location of stores, but also the stock of the stores. Transportation and the ability of youth to walk to a store determines where they will get their food, if not at their school.

A study done by Ghosh-Dastidar et. al also examined the relationship among distance to store, this time looking at obesity rates. This study was unique in that the authors also examined food prices. Interviews with 1,372 households were completed in two low-income, majority African American neighborhoods with a supermarket.¹⁰ Audits of 16 stores where participants reported doing their major food shopping were conducted.¹⁰ Descriptive statistics were computed to explore associations among obesity, sociodemographic characteristics, distance to store, and store food prices.¹⁰ Significant differences were tested using t-tests and chi-square tests. Multivariate logistic regression models were appropriate for this study looking at the multiple variables stated above. Main findings from the study showed that both distance to store and prices were positively associated with obesity.¹⁰ Low-and high-priced stores significantly differed in their display and marketing of junk foods relative to healthy foods.¹⁰ Shopping at a store with one standard deviation higher prices was associated with 36% lower odds of being obese.¹⁰ Fruits and vegetables dominated the view from the main entrance in 14% of low-price and 71% of high-price stores.¹⁰ This shows that placing supermarkets in food deserts to improve access may not be as important as simultaneously offering better prices for healthy foods relative to junk foods, actively marketing healthy foods, and enabling consumers to resist the influence of junk food marketing. A strength of this study is that it included both

objective stores audits and survey results. A limitation is that although it looked at food price, there was a lack of data on purchases.

Healthy HotSpot is an initiative that also involves corner stores. Cook County Health Department recruited community institutions who then recruited corner stores to participate in the initiative. The stores were asked to add new, healthful foods to become eligible to receive new equipment, marketing materials, and enhanced community outreach.¹¹ Twenty-one corner stores participated in expansion of adding six new foods including one fresh fruit, one fresh vegetable, and four foods chosen from additional categories.¹¹ Marketing materials were posters, shelf tags, stickers, and end-of-aisle flags.¹¹ There were also taste tests in each store.¹¹ This study by Jaskiewicz et. al used process evaluation and quantitative analysis of data from communication records. The study's main finding was that community institutions (i.e. local governments, nonprofit organizations, and faith-based institutions) can play a key role in identifying and engaging corner stores that are willing and able to implement a retail environment initiative.¹¹ Similar to Blitstein, et. al, and many of the articles reviewed, the researchers suggested a focus on changing policies, systems, and environments to prevent obesity by promoting healthful eating and active living. This study had many limitations as there was a delay in implementation and a community institution capacity. In regards to fidelity of implementation, dose delivered, dose received, and recruitment, all planned aspects of the program were delivered.

A study done by Laska et. al focused on healthy food options stocked in retailers who are authorized under the Supplemental Nutrition Assistance Program (SNAP). They used cross-sectional data from a large policy evaluation to conduct secondary analyses.¹² Store audits

were also collected in this study as was done in Ghosh-Dastidar et. al. Ninety-one randomly selected, licensed food stores in Minneapolis and St. Paul were audited.¹² More than half of these stores carried one or more varieties of fat-free or low-fat milk, fresh or canned fruit, and whole-grain-rich cereal.¹² Only 1/3 stocked one or more varieties of fresh vegetables and only ¼ stocked whole-grain-rich products.¹² Few stores stocked at least two varieties of each product.¹² The authors suggested that the USDA change policies to improve minimum stocking requirements for SNAP-authorized retailers.¹² This study was limited in that supermarkets and retailers participating in the Supplemental Nutrition Program for Women, Infants, and Children (WIC) were not included in the study. Some foods were also omitted from the study. Food and beverage pricing and stakeholder perspectives on opportunities for SNAP policy change were not included.

Wigg et. al researched grocery shopping behavior and food stamp usage of low-income women with children in order to identify factors influencing their food choices on a limited budget. A total of 14 focus groups took place.¹³ The researchers also did a quantitative grocery shopping activity that required participants to prioritize food purchases from a 177-item list on a budget of \$50 in a one-week period.¹³ Ninety-two women participated who had at least one child between the ages of nine and 13 years old.¹³ One-third of the sample came from homeless shelters and 51% were African-American.¹³ Findings suggest that their food choices and grocery shopping behavior were shaped by, not only individual and family preferences, but also their economic and environmental situation.¹³ Transportation and store accessibility were major determinants of shopping frequency, and they used various strategies to make their food dollars stretch.¹³ Participants expressed that they liked fruits and vegetables, but were limited

by high costs.¹³ They felt canned versions were poor substitutes, but this option came free from food shelves and pantries.¹³ Participants said they would like to shop at local farmer's markets but did not have cash and food stamps were not accepted.¹³ The conclusion from this study was that efforts to improve food budgeting skills, increase nutrition knowledge, and develop meal preparation strategies involving more fruits and vegetables could be valuable in helping low-income families nutritionally make the best use of their food dollars.

Differing from the above studies, which focused on marketing in convenience stores, a study by Caspi et. al examined how school nutrition policies and practices are patterned by school-level characteristics. Data was used from the 2008-2012 Minnesota School Health Profiles survey to assess school nutrition policies and practices, and National Center for Educational Statistics data were used for school characteristics. Policies and practices included availability of low-nutrient, energy dense items, strategies to engage students in healthy eating and restrictions on advertisements around the school.¹⁴ School location was most strongly related to school nutrition policies.¹⁴ City schools were less likely than rural schools to have vending machines/school stores, and less likely to sell sport drinks.¹⁴ City schools were also more likely to prohibit advertisements for low-nutrient, energy dense products in school buildings.¹⁴ Schools located in cities generally provide a healthier food environment for their students compared with schools in rural areas and towns.¹⁴ Despite these initial advantages, some policies and practices in city schools are eroding over time, whereas rural school policies have largely remained unchanged. Advertisements of low-nutrient, energy dense foods appear to be increasing. Researchers suggest monitoring trends in policies/practices (e.g. limiting salty snacks, offering taste testing, and banning unhealthy food advertisements in school

publications) across school settings to see the influence on diet, weight, and academic outcomes in future research.¹⁴ Even though this study focused on school policies, it is interesting that there was a common theme between this and the previous studies reviewed. Advertisements and marketing appeared in both cases. This is an important area to be concerned of due to the shift towards increased advertising and media. A strength of this study is that there was a large sample of schools and the data was from a four-year period. A limitation was that policies and practices at the school level were self-reported by school principals or designees. This could lead to bias if they were unaware of all policies and practices. Also, schools who did not want to participate in survey may have been different than those who did participate. Additionally, only select nutrition-related policies that were measured over time are reported.

Many studies have assessed the impact of gardening on food security, access, safety, and family relationships. A community-based participatory research project, Harvest Fiesta Project, used popular education techniques to support and educate Hispanic farmworker families in planting and maintaining organic gardens.¹⁵ Measures included a pre- post-gardening survey, key informant interviews, and observations made at community-based gardening meetings to assess food security, safety and family relationships.¹⁵ Thirty-eight families enrolled (163 household members).¹⁵ Analysis of text responses and key informant interviews revealed that physical and mental health benefits were reported as well as economic and family health benefits from the gardening study, primarily because the families worked in the gardens together.¹⁵ A community gardening program can reduce food insecurity, improve dietary intake and strengthen family relationships. Pre- and post- questionnaires involved the

use of descriptive statistics and Wilcoxon Signed-Ranks Test. This was an appropriate test, because the questionnaires are repeated measurements. Frequency of adult vegetable intake of “Several times a day” increased from 18.2 to 84.8% and frequency of children’s vegetable intake of “several times a day” increased from 24 to 64%.¹⁵ Before the gardening season, worrying in the past month that food would run out before money was available to buy more dropped from 31.2% to 3.1%.¹⁵ When asked if the garden helped the health of the family, 94.9% of participants reported that it did.¹⁵ Over 2/3 (69.2%) reported that children under the age of 18 helped in the garden.¹⁵ Similar to the study done by Jaskiewicz et. al, this journal article focused on community institution partnerships. The researchers stated that academic partners are committed to conducting research that will improve health and that community partners are committed to help families build skills for loving relationships and healthy lifestyles.¹⁵ By coming together, these partners can achieve both goals.

A study by Cyzman et. al partnered with the community to implement community gardens. The Activate West Michigan coalition planted its first garden in 2005 and supported nice gardens on seven different sites.⁶ Over time approximately 2,000 middle and elementary students maintained the gardens and cultivated 500 pounds of produce.⁶ The students came from low-income households, received free or reduced-price lunches, and attended schools in inner city Grand Rapids, MI.⁶ The community and schoolyard gardens encouraged eating more fruits and vegetables by increasing exposure to fresh produce and teaching gardening skills. Students received healthy recipes to help their families cook together and use the fresh produce. Promotional information was sent to parents and families and posted in prominent locations at the school. The researchers stated that public health efforts will need to be

comprehensive, focusing on increasing awareness and knowledge, changing and sustaining healthy behaviors, improving the food environment, and addressing other social determinants of health.⁶

Freedman et. al explored some of these public health efforts by examining of the process and feasibility factors associated with the development of a multi-component environmental intervention designed to increase access to fresh fruits and vegetables in four low-income, minority, urban communities with few healthy food retail outlets.¹⁶ Their intervention was called the Veggie Project. It included 3 components: (a) onsite farmers' markets, (b) a Super Shopper voucher program, and (c) a Youth Leader Board. Receipts from sales transactions at the farmers' markets were analyzed, close-ended surveys with participants, and journal entries by youth were completed. Thirty-four farmers' markets occurred resulting in 1,101 sales transactions.¹⁶ Financial vouchers were used to purchase 63% of the produce.¹⁶ Youth Super Shoppers came to the market at least once and made significantly more purchase transactions than adults.¹⁶ Overall, the Veggie Project increased access to healthy foods, particularly among the youth. These findings illuminate the importance of youth development elements within the health promotion intervention and highlights the significance of economic incentives. This study was a case study based on a convenience sample. Limitations were that it did not have a comparison group and purchase does not equal consumption.

A similar farmer's market study was done by Parmer et. al, but in a school setting. The study was conducted with six second-grade classes. The six classes were divided into three treatment groups. Two classes received both nutrition education and gardening, two classes

received only nutrition education, and two classes served as the control group.¹⁷ Self-report questionnaires, interview-style taste and rate items, and lunchroom observations were conducted.¹⁷ Analysis of variance was done to examine results. This test is appropriate because there are three groups being analyzed. This study found the same results as Freedman et. al where the intervention increased access to healthy foods, particularly among the youth. This study was limited to second grade and not randomized, but did have a comparison group.

Focusing on underserved communities facing significant challenges to eating healthy, Goddu et. al implemented a “prescription” intervention to help patients living with diabetes. With the input of Walgreens, a farmer’s market, and health centers, the Food Rx was designed to combine a prescription, a coupon, nutrition information, and a map.¹⁸ The result was a visually appealing, low-literacy resource, available at six health centers, given to patients by their providers during clinic visits, and redeemable at participating Walgreens stores and the farmer’s market.¹⁸ Researchers used Nutrition Environment Measures Survey in Stores (NEMS-S) and found the Walgreens stores had less variety of healthy options available than local grocers.¹⁸ Despite this, the prices of these healthy options were comparable and sometimes better than at local grocers.¹⁸ Quality was about the same in each.¹⁸ A limitation of this implementation was that a “prescription” does not offer long term financial support for underserved patients. A strength was that providers were trained to fill out prescriptions and stores/farmer’s market were trained on how to accept the prescriptions. Much effort was put in to make this project community-based.

Hu et. al explored knowledge regarding the crucial next step of building feasible, community-supported solutions such as urban food security projects, farmer’s markets, and

urban agriculture.¹⁹ This qualitative study used in-depth interviews, focus groups, and participant observations to identify strategies to promote locally grown produce from an urban food security project, Produce From the Park (PFP), an urban farm.¹⁹ This focused on produce consumption in a low-income, urban food desert populated primarily by African Americans. Following the trend, advertising was said to aggravate a growing dependence on fast or processed food. One informant said parents were misled by commercials and so-called health messages in packaging of sugary cereals.¹⁹ This study's findings were also in line with the articles that focused on convenience stores; marketing and store stock affect what an individual will buy. Food choices were dictated by options at corner stores and carry outs, the most accessible food sources.¹⁹ Informants noted that corner stores either have no fresh produce or may just have one or two options.¹⁹ A lack of interest in trying healthy foods and changing current behaviors were seen as additional barriers related to issues of tradition and awareness.¹⁹ As Cyzman et. al stated, changing the food environment will take a long and sustained societal response. Community involvement and leadership are the keys to having a community change the way they live, think, and act.¹⁹

Laska et. al examined neighborhood food environments, adolescent nutrition, and weight status. The cross-sectional, observational study had a total of 349 adolescents. They completed 24-hour dietary recalls and had their weight and height measured.²⁰ They also reported demographic information and other diet-related behaviors. GIS were used to examine the availability and proximity of food outlets, particularly those captured within the 800, 1600 and/or 3000 meter network buffers around participants' homes and schools.²⁰ Adjusting for gender, age and socio-economic status, adolescents' sugar-sweetened beverage intake was

associated with residential proximity to restaurants (including fast food), convenience stores, grocery stores and other retail facilities within the 800 and/or 1600 m residential buffers.²⁰ Body mass index (BMI) Z-score and percentage body fat were positively associated with the presence of a convenience store within a 1600 m buffer.²⁰ Other factors, such as energy, fruit and vegetable intake, as well as convenience store and fast food purchasing, were not significantly associated with features of the residential neighborhood food environment in adjusted models.²⁰ In addition, school neighborhood environments yielded few associations with adolescent outcomes.²⁰ Limitations of this study included that it was a small, non-representative youth sample and there were disagreements between data sources that were used in finding the results. Additionally, the diets were recalled over a 24-hour period, so there may be recall bias. Nevertheless, these findings align with the other articles reviewed in that fast food and convenience stores tend to be stocked with unhealthy food options. Therefore, the likelihood that persons living within walking distance of these food outlets having a large BMI would be high.

Discussion

In all articles reviewed, researchers suggested, in some form, a focus on changing policies, systems, and environments to prevent obesity by promoting healthful eating and active living. Though interventions varied greatly between policy, environmental, and system changes, themes emerged from this review. Three common themes were (1) advertising and marketing, (2) youth engagement, and (3) community and academic partnerships. Advertising and marketing showed to be a large influencing factor in what individuals purchased at convenience

stores, grocery stores, and even farmer's markets. Stores most likely receive a monetary incentive for promoting unhealthy food options. Based on the literature, some recommendations for future research include advertising practices that can solve this issue. The shift toward increased advertising should be examined in future research and linked to changes in school budgets and student health outcomes.^{9, 14} Youth engagement was important in each of the journal articles whether youth were involved in the implementation or involved in the evaluation of the program. The population in attention should give input into the creation of a project to ensure it is what is wanted and needed, and that it will be used in the more effective way possible. Involving community and academic partnerships can help facilitate that engagement with the community. An ideal project to resolve food insecurity in youth would include appropriate advertising and marketing, youth engagement, and community and academic partnerships. Other recommendations for future studies from the literature included: assessing food and beverage pricing and stakeholder perspectives on opportunities for SNAP policy change,¹² diverse settings research to assess racial/ethnic school composition and policies,¹⁴ and research to examine relationship between purchasing healthy foods and eating healthy foods.¹⁶

Conclusion

In conclusion, lack of healthy food access can have detrimental effects on the health of children and adolescents, which can affect their lifestyles and health in adulthood. Store communication tools, location and stock of "quickie marts," and nutrition policies all play a large role as risk factors in healthy food access. Changing the current food environment will

need to be comprehensive, focusing on increasing awareness and knowledge, changing and sustaining healthy behaviors, improving the food environment, and addressing other social determinants of health.⁶

Literature Review Matrix

Table 1. Literature Review Matrix

Author / Date	Research Question(s)/ Objective	Methodology	Analysis & Results	Conclusions	Implications for Future research	Implications For practice	Strengths/ Limitations/Relevance
Blitstein 2012	Are characteristics such as quality, selection, and convenience associated with dietary intake of fruits and vegetables (FV) independent of perceived costs in an inner-city, low income population?	Community sample drawn from six low-income, primarily minority neighborhoods in Chicago, IL. The 5-4-3-2-1 Go! Campaign delivered a set of science-based messages about nutrition and physical activity through use of small-scale, local media and grassroots efforts such as neighborhood newspapers, radio advertisement and health fairs. Messages promoted the benefits of a healthy diet rich in fruits and vegetables and the use of community resources	Secondary analysis. Logistic regression analysis. Respondents who agreed that they had convenient access to quality and selection were 2.13 times as likely to eat 3 or more servings while those who strongly agreed were 4.42 times as likely to eat 3 or more servings of FV daily. Those shopping at a local co-op or a farmer's market rather than supermarket were 2.77 times more likely to report eating 3 or more FV daily. Frequent shopping	Among a generally minority and low-income population, quality, selection and convenience are important determinants of fruit and vegetable consumption.	Look past simple structural obstacles and consider the relational contexts of persons and environments.	Nutrition promotion campaigns that aim to alter the built environment by increasing access to fruits and vegetables should recognize that simply increasing availability might not yield beneficial change when characteristics of the shopping context are	Data are cross-sectional and observational. Equally probable those who want to eat more FV seek out stores with higher quality and selection. Limited by items available in survey – did not

		that support an active lifestyle. 495 respondents participated in data collection. 3- to 7-year-olds were the target population.	trips were more likely to report higher FV consumption.			ignored. Policy, system and environmental change to alter the built environment by decreasing costs and barriers associated with healthy choices.	assess all variables. Study targeted households to include young children. The community sample was drawn from low-income, primarily minority neighborhoods.
Foster 2014	Evaluate the effects of in-store marketing strategies to promote the purchase of specific healthier items in 5 product categories: milk, ready-to-	Cluster-randomized controlled trial. Eight urban supermarkets in low-income, high-minority neighborhoods. Random assignment. Intervention stores received a 6 month, in-store marketing intervention that	Intervention stores showed significantly greater sales of skim and 1% milk; water, and 2 of 3 types of frozen meals compared with control during same time. No differences were found between stores in sales of	Straightforward placement strategies can enhance the sales of healthier items in several food and beverage categories.	--	--	Randomized control trial. Objective and direct measures. Small sample size. Only changed marketing

	eat cereal, frozen meals, in-aisle beverages, and checkout cooler beverages.	promoted sales of healthier products through placement, signage, and product availability strategies. Focus groups were conducted with primary shoppers and at least one child younger than 18. Questions addressed purchase decision making, brand loyalty, food and beverage preferences, nutrition knowledge, and acceptance or reluctance to change good and beverage purchases.	cereal, whole or 2% milk, beverages, or diet beverages.				in stores. Price reductions not tested. Focus groups included youth. The community sample was drawn from low-income, primarily minority neighborhoods.
Gebaue r 2011	Aims: describe the presence of convenience stores within walking distance (800 m) of urban junior high and high schools; describe availability of	Convenience stores within 800 m of all 36 public junior high and high schools in St. Paul and Minneapolis. Schools represent a diverse array of students; 25 schools served populations in which >70% of students were eligible	Analyses examined basic descriptive characteristics, including sample means and ranges. An average of 2.2 convenience stores within 800 m buffers surrounding each urban school. Fresh vegetables were in	Understanding the foods available in convenience stores near schools may be useful in developing youth-focused nutrition interventions.	Advertising practices deserve additional research, as many food, alcohol and tobacco companies may provide incentives for	Storeowners could convert cooler space to stock healthy snacks (e.g. low-fat yogurt, fresh fruit, and ready-to-eat vegetables).	In St. Paul and Minneapolis. Schools represent a diverse array of students; 25 schools served

	healthier foods, snacks, and beverages in these convenience stores, including snacks in single-serve packages; describe food/beverage advertising and other store advertising and the availability of “impulse buys” at checkout counters.	for free/reduced price lunch.	49% of the stores and fresh fruits in 51% of the stores. Overall, 94% of the advertisements were for less healthful products (e.g. soda, beer, chips, and prepared food), and 36% were for more healthful products (e.g. milk, juice, and produce).		stores to feature their products.		populations in which >70% of students were eligible for free/reduced price lunch.
Ghosh-Dastidar 2014	To examine the relationship among distance to store, food prices, and obesity.	The Pittsburgh Hill/Homewood Research on Eating, Shopping, and Health study conducted interviews with 1,372 households in two low-income, majority African American neighborhoods with a supermarket. Audits of 16 stores where	Distance to store and prices were positively associated with obesity. Low- and high-priced stores significantly differed in their display and marketing of junk foods relative to healthy foods. Shopping at a store	Placing supermarkets in food deserts to improve access may not be as important as simultaneously offering better prices for healthy	--	--	Objective store audits and survey results. Most food desert residents have low SES, so findings may not

		participants reported doing their major food shopping were conducted.	with one standard deviation higher prices was associated with 36% lower odds of being obese. FV dominated the view from the main entrance in 14% of low-price and 71% of high-price stores.	foods relative to junk foods, actively marketing healthy foods, and enabling consumers to resist the influence of junk food marketing.			be generalizable. Lack of data on purchases . Association may be that residents with low socio-economic status (SES) had higher rates of obesity and tend to shop at low-price stores.
Jaskiewicz 2013	Evaluate corner store initiative, Healthy HotSpot, as a strategy to improve access to healthful foods in low-income and	Cook County Health Department recruited community institutions who recruited corner stores to participate in the initiative. Corner stores were asked to add new, healthful foods to become	Process evaluation – quantitative analysis of data from communication records. 8 community institutions that enrolled at least 1 corner store received	Community institutions (e.g. local governments, nonprofit orgs, faith-based institutions) can play a key	--	A focus on changing policies, systems, and environments to prevent obesity by promoting healthful	Implementation delays, and community institution capacity. Suburban

	minority communities.	eligible to receive new equipment, marketing materials, and enhanced community outreach. 9 community institutions participated. 21 corner stores participated in expansion of adding 6 new foods including 1 fresh fruit, 1 fresh vegetables, and 4 foods chosen from additional categories. Developed marketing materials – posters, shelf tags, stickers, and end-of-aisle flags. Taste test in each store.	an average of 3-4 calls, 11.8 in-person meetings, and 72.6 emails from Healthy HotSpot. They held an average of 4.6 promotional events.	role in identifying and engaging corner stores across jurisdictions that are willing and able to implement a retail environment initiative to improve access to healthful foods in their communities.		eating and active living.	county. 41% African American.
Laska 2014	Quantify healthy foods stocked in small-size to mid-size retailers who are authorized under SNAP, but not under the Special Supplemental Nutrition	Formative, cross-sectional data from a large policy evaluation to conduct secondary analyses. Store audits were conducted in 2014 in 91 randomly selected, licensed food stores in Minneapolis and St. Paul. Supermarkets and retailers participating	Analysis conducted on STATA. The 91 stores were corner stores, food-gas marts, dollar stores, and pharmacies. More than half carried one or more varieties of fat-free or low-fat milk, fresh or canned fruit, and whole-grain-rich	Many stores did not stock a variety of healthy foods.	Food and beverage pricing and stakeholder perspectives on opportunities for SNAP policy change.	The U.S. Department of Agriculture should change policies to improve minimum stocking requirements for SNAP-authorized	Limited study sample and some foods omitted. Food and beverage pricing and stakeholder

	Program for Women, Infants, and Children (WIC)	in WIC, which are required to stock healthy foods, were excluded as were other stores not reasonably expected to stock staple foods.	cereal. Only 1/3 stocked one or more varieties of fresh vegetables and only ¼ stocked whole-grain-rich products. Few stores stocked at least 2 varieties of each product.			retailers. Reducing health disparities through system-level policy and environmental change. Perspectives of local, state, and national stakeholders should be considered when establishing these requirements, and store-level technical assistance would be needed.	perspectives on opportunities for SNAP policy change were not included.
Wigg 2008	Purpose was to examine the grocery shopping behavior and food stamp usage of low-	Focus groups examined food choice in the context of personal, behavioral and environmental factors. 14 focus groups. A quantitative grocery	Mean age was 37 and 76% were overweight or obese. Findings suggest that their food choices and grocery shopping behavior	Efforts to improve food budgeting skills, increase nutrition knowledge, and develop	--	Efforts to improve food budgeting skills, increase nutrition knowledge, and develop	92 low-income women, with at least one child aged 9-13 years

	<p>income women with children to identify factors influencing their food choices on a limited budget.</p>	<p>shopping activity required participants to prioritize food purchases from a 177-item list on a budget of \$50 a one-week period. 92 low-income women, with at least one child aged 9-13 years in their household, residing in the Twin Cities. 1/3 of sample came from homeless shelters. 51% were African-American.</p>	<p>were shaped by not only individual and family preferences, but also their economic and environmental situation. Transportation and store accessibility were major determinants of shopping frequency, and they used various strategies to make their food dollars stretch. Meat was the most important food group. Participants expressed that they liked FV, but were limited by high costs and felt canned versions were poor substitutes, but they were free from food shelves/pantries. Said they would like to shop at local farmer's markets but did not have cash</p>	<p>meal preparation strategies involving less meat and more FV, could be valuable in helping low-income families nutritionally make the best use of their food dollars.</p>		<p>meal preparation strategies involving less meat and more FV, could be valuable in helping low-income families nutritionally make the best use of their food dollars. Granting specific FC allotments and promoting the option to use food stamps at local farmers' markets due to high costs in retail grocery stores. Nutrition education</p>	<p>in their household, residing in the Twin Cities. 51% were African-American. Limitations/strengths of study not stated.</p>
--	---	---	---	---	--	---	---

			and food stamps not accepted			directed towards children as they play an integral role in food-related activities and habits established early carry on.	
Caspi 2014	Purpose to examine how school nutrition policies and practices are patterned by school-level characteristics (e.g. location, racial/ethnic composition, and free/reduced priced lunch eligibility).	Used data from the 2008-2012 MN School Health Profiles survey to assess school nutrition policies and practices, and National Center for Educational Statistics data were used for school characteristics. Policies and practices included availability of low-nutrient, energy dense items, strategies to engage students in healthy eating and restrictions on advertisements around the school.	School location was most strongly related to school nutrition policies. City schools were less likely than rural schools to have vending machines/school stores, and less likely to sell sport drinks. City schools were also more likely to prohibit advertisements for low-nutrient, energy dense products in school buildings.	Schools located in cities generally provide a healthier food environment for their students compared with schools in rural areas and towns. Despite these initial advantages, some policies and practices in city schools are eroding	Monitoring trends in policies/practices (e.g. limiting salty snacks, offering taste testing, and banning unhealthy food advertisements in school publications) across school settings to see the influence on diet, weight, and academic outcomes. The shift	--	Large sample of schools. Policies and practices at the school level were self-reported by school principals or designees. Schools who did not want to participat

				over time, whereas rural school policies have largely remained unchanged. Advertisements of low-nutrient, energy dense foods appear to be increasing.	toward increased advertising should be examined in future research and linked to changes in school budgets and student health outcomes. Diverse settings research is needed to assess racial/ethnic school composition and policies.		e in survey may have been different than those who did participate. Only select nutrition-related policies that were measured over time are reported.
Carney 2011	What is the impact of gardening on assess food security, safety and family relationships?	Community-based participatory research project (Harvest Fiesta Project) used popular education techniques to support and educate Hispanic farmworker families in planting and maintaining organic	Frequency of adult vegetable intake of "Several time a day" increased from 18.2 to 84.8% and frequency of children's vegetable intake of "several time a day"	Analysis of text responses and key informant interviews revealed that physical and mental health benefits were	--	Academic partners are committed to conducting research that will improve health. Community partners are	The average number of children was 2.3. 81.5% of home with children

		gardens. Measures included a pre- post-gardening survey, key informant interviews and observations made at community-based gardening meetings to assess food security, safety and family relationships. 38 families enrolled - 163 household members.	increased from 24 to 64%. Before the gardening season, worrying in the past month that food would run out before money was available to buy more dropped from 31.2% to 3.1%. When asked if the garden helped the health of the family, 94.9% of participants reported that it did. 92.3% also encouraged other families to start a garden too. Over 2/3 (69.2%) reported that children under the age of 18 helped in the garden.	reported as well as economic and family health benefits from the gardening study, primarily because the families worked in the gardens together. A community gardening program can reduce food insecurity, improve dietary intake and strengthen family relationships.		committed to help families build skills for loving relationships and healthy lifestyles. By coming together, these partners can achieve both goals.	under 18 were 2 parent homes. Study design was observational and pre-post rather than a randomized design.
Cyzman 2009	Partner with community to implement community gardens.	The Activate West Michigan coalition planted its first garden in 2005 and supported 9 gardens on 7 different sites. Over time approximately	The community and schoolyard gardens encouraged eating more FV by increasing exposure to fresh produce and teaching gardening	Changing the current food environment will take a long and sustained societal	--	Community involvement and leadership are the necessary keys to having a community	The students came from low-income households, received

		2,000 middle and elementary students maintained the gardens and cultivated 500 pounds of produce. The students came from low-income households, received free or reduced-price lunches, and attended schools in inner city Grand Rapids.	skills. Garden celebrations showcased students' efforts and provided an opportunity for families to experience the benefits of eating together. Students received healthy recipes to help their families cook together and use the fresh produce. Promotional information sent to parents and families and posted in prominent locations at the school.	response. Public health efforts will need to be comprehensive, focusing on increasing awareness and knowledge, changing and sustaining healthy behaviors, improving the food environment, and addressing other social determinants of health.		change the way they live, think, and act.	free or reduced-price lunches.
Freedman 2011	Examination of the process and feasibility factors associated with the development of a multi-component	The intervention, the Veggie Project, included 3 components: (a) onsite farmers' markets, (b) a Super Shopper voucher program, and (c) a Youth Leader Board. Receipts from sales	Receipts from sales transactions at the farmers' markets were analyzed. Quantitative analysis of stakeholder's thoughts on the market. In total, adults spent	The Veggie Project increased access to healthy foods, particularly among the youth. These findings	More research is warranted to examine the relationship between market use and dietary behaviors as well as other	Economic incentives are useful for youth. 12% of overall purchase transactions were made by youth who	Case study. Based on convenience sample. No comparison group. Purchase

	environmental intervention designed to increase access to fresh fruits and vegetables in four low-income, minority, urban communities with few healthy food retail outlets.	transactions at the farmers' markets were analyzed, close-ended surveys with participants, and journal entries by youth were completed. 34 farmers' markets occurred resulting in 1,101 sales transactions. Financial vouchers were used to purchase 63% of the produce. Youth Super Shoppers came to the market at least once and made significantly more purchase transactions than adults.	\$1,259.62 and youth spent \$171.75 of their own money at the farmer's markets. 71% of adults and 77% of youth were repeat customers. Stakeholders indicated that the Veggie Project was innovative and necessary because access to healthy foods was quite limited in the study context. Youth involvement often translated into parent involvement.	illuminate the importance of youth development elements within the health promotion intervention.	factors (i.e. besides physical and economic) influencing food access among adults. Examine relationship between purchasing healthy foods and eating healthy foods. Evaluations are needed to assess influence of environmental interventions on dietary behaviors.	were't Super Shoppers, so youth were motivated to use their own money to buy FV. If you build a farmer's market, people will come.	does not equal consumption. Could not track Super Shopper customers.
Parmer 2009	To examine the effects of a school garden on children's FV knowledge, preference, and consumption	The study was conducted with 6 second-grade classes in an elementary school in the southeastern United States. The 6 classes were divided into 3 treatment groups. Two classes	Self-report questionnaires, interview-style taste and rate items, lunchroom observations. Analysis of variance. Participants in the NE+G and NE	School gardens as a component of nutrition education can increase fruit and vegetable knowledge and cause	More generalizable population.	Findings suggest that school administrators, classroom teachers, and nutrition educators should	Limited to second grade. Not RCT. Focus on school-aged kids.

		received both nutrition education and gardening, 2 classes received only nutrition education, and 2 classes served as the control group. 115 students participated.	treatment groups exhibited significantly greater improvements in nutrition knowledge and taste ratings than did participants in the CG. Moreover, the NE+G group was more likely to choose and consume vegetables in a lunchroom setting at post-assessment than either the NE or CG groups.	behavior change among children. Although nutrition education alone does seem to improve fruit and vegetable knowledge and preference in children, adding the gardening component appears to strengthen the likelihood that children will increase vegetable intake.		implement school gardens as a way to positively influence dietary habits at an early age.	
Goddu 2015	“Prescription” intervention to help patients living with diabetes in underserved	With the input of Walgreens, the Farmers Market, and health centers, the Food Rx was designed to combine a	Used Nutrition Environment Measures Survey in Stores (NEMS-S). The Walgreens stores had less	Food Rx is a community-university partnership to promote healthy eating			Trained providers. Doesn’t offer long term financial

	communities facing significant challenges to eating healthy.	prescription, a coupon, nutrition information and a map. The result was a visually appealing, low-literacy resource, available at six health centers, given to patients by their providers during clinic visits, and redeemable at participating Walgreens stores and Farmers Market.	variety of healthy options available than local grocers. Despite this, the prices of these healthy options were comparable and sometimes better than at local grocers. Quality is about the same. Next step is to identify purchasing trends.	and combat disparities on the South Side of Chicago, a predominantly African American neighborhood with high rates of diabetes.			support for underserved patients. Highlights existing resources.
Hu 2013	Explore knowledge regarding the crucial next step of building feasible, community-supported solutions such as urban food security projects, farmers' markets, and urban agriculture. Research	This qualitative study used in-depth interviews, focus groups, and participant observations to identify strategies to promote locally grown produce from an urban food security project, Produce From the Park (PFP), an urban farm. Focused on produce consumption in a low-income, urban "food desert" populated primarily by African Americans.	Advertising was said to exacerbate a growing reliance on fast or processed food. One informant said parents were misled by commercials and so-called health messages in packaging of sugary cereals. A lack of interest in trying healthy foods and changing current behaviors were seen as additional barriers	Strategies such as creating mentoring opportunities, food demonstrations, and modifying traditional foods appear in previous work. The importance of understanding community perceptions of	Future studies should seek to understand how vulnerable subgroups negotiate access to locally grown produce. Involving CRs as data collectors and analysts could help access these groups and address	Distributing samples, hosting cooking demonstrations, and issuing "5-minute recipe) cards with nutrition information were mentioned as strategies for demonstration fast and feasible.	Focused on African Americans . Less input from people facing the greatest barriers to access due to recruitment strategy. Multiple methods and

	<p>Question 1: How does the cultural and structural food environment influence community members' access to and demand for healthy foods? Research Question 2: What strategies can boost community members' interest in PFP as a supplier of healthy produce?</p>		<p>related to issues of tradition and awareness. Food choices were also dictated by options at corner stores and carry outs, the most accessible food sources. Informants noted that corner stores either have no fresh produce or may just have one or two options.</p>	<p>UFS projects.</p>	<p>their concerns.</p>	<p>Informants emphasized targeting youth to improve their health, generate a long-term customer base, and create a "distribution force" for promoting healthy food at home. Health promotion efforts must use diverse strategies. Farming in low-income urban settings creates an opportunity to explore sustainable and healthy food systems that are</p>	<p>populations were included to triangulate findings.</p>
--	---	--	--	----------------------	------------------------	--	---

						equitable and respectful of local culture.	
Laska 2009	To examine neighborhood food environments, adolescent nutrition and weight status.	Cross-sectional, observational study. A total of 349 adolescents were recruited to the study. Participants completed 24h dietary recalls and had their weight and height measured. They also reported demographic information and other diet-related behaviors. GIS were used to examine the availability and proximity of food outlets, particularly those captured within the 800, 1600 and/or 3000m network buffers around participants' homes and schools.	Adjusting for gender, age and socio-economic status, adolescents' sugar-sweetened beverage intake was associated with residential proximity to restaurants (including fast food), convenience stores, grocery stores and other retail facilities within the 800 and/or 1600 m residential buffers. BMI Z-score and percentage body fat were positively associated with the presence of a convenience store within a 1600m buffer. Other factors, such as energy, fruit and vegetable intake, as well as convenience	Many factors are likely to have an important role in influencing adolescent dietary intake and weight status. Interventions aimed at increasing neighborhood access to healthy foods, as well as other approaches, are needed.	Selection of an appropriate buffer size.	Intervention strategies to promote healthy dietary patterns among adolescents are needed, some of which should include macro-level policy approaches.	Strength – using state-of-the-art dietary intake assessment and measured highest and weights. Limitations – conducted in one region. Small, non-representative youth sample. Disagreements between data sources.

			store and fast food purchasing, were not significantly associated with features of the residential neighborhood food environment in adjusted models. In addition, school neighborhood environments yielded few associations with adolescent outcomes.				
--	--	--	---	--	--	--	--

References

- ¹ Center for Disease Control and Prevention. Social Determinants of Health: Know What . Health. U.S. Department of Health and Human Services. 10 March 2017. Retrieved 17 April 2017 from <https://www.cdc.gov/socialdeterminants/>
- ² United States Department of Agriculture. Household Food Security in the United States 2015. Sept 2016. Retrieved 17 April 2017 from <https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us.aspx>
- ³ United States Department of Agriculture. Access to Affordable and Nutritious Food: Measuring and Understanding Food Deserts and Their Consequences. 2009; 51-59.
- ⁴ United States Department of Agriculture. 2017. Received from: <https://www.ers.usda.gov>
- ⁵ Hennepin County. WIC: Women, Infants, and Children. Received from: <http://www.hennepin.us/residents/health-medical/wic-women-infants-children>.
- ⁶ Cyzman D, Wierenga J, and Sielawa J. Pioneering healthier communities, West Michigan community response to the food environment. *Health Promotion Practice*. 2009; 10(2): 155S.
- ⁷ Blitstein JL, Snider J, and Evans WD. Perceptions of the food shopping environment are associated with greater consumption of fruits and vegetables. *Public Health Nutrition*. 2012;15(6): 1124-1129. doi:10.1017/S1368980012000523
- ⁸ Foster GD, Karpyn A, Wojtanowski AC, et. al. Placement and promotion strategies to increase sales of healthier products in supermarkets in low-income, ethnically diverse neighborhoods: a randomized controlled trial. *Am J Clin Nutr*. 2014;99: 1359-68.
- ⁹ Gebauer H and Laska MN. Convenience stores surrounding urban schools: an assessment of healthy food availability, advertising, and product placement. *Journal of Urban Health*. 2011; 88(4): 616-622.
- ¹⁰ Ghosh-Dastidar B, Cohen D, Hunter G, et. al. Distance to store, food prices, and obesity in urban food deserts. *Am J Prev Med*. 2014;47(5): 587-595.
- ¹¹ Jaskiewicz L, Dombrowski RD, Durmmond HM, et. al. Partnering with community institutions to increase access to healthful foods across municipalities. *Prev Chronic Dis*. 2013;10:13 Doi: <http://dx.doi.org/10.5888/pcd10.130011>

- ¹² Laska MN, Caspi CE, Pelletier JE, et. al. Lack of healthy food in small-size retailers participating in the Supplemental Nutrition Assistance Program, Minneapolis-St. Paul, Minnesota, 2014. *Prev Chronic Dis.* 2015; 12:150171.
- ¹³Wigg K and Smith C. The art of grocery shopping on a food stamp budget: factors influencing the food choices of low-income women as they try to make ends meet. *Public Health Nutrition.* 2008;12(10): 1726-1734.
- ¹⁴Caspi CE, Davey C, Nelson TF, et. al. Disparities persist in nutrition policies and practices in Minnesota secondary schools. *J Acad Nutri Diet.* 2015;115:419-425.
- ¹⁵Carney PA, Hamada JL, Rdesinski R, et. al. Impact of a community gardening project on vegetable intake, food security and family relationships: a community-based participatory research study. *J Community Health.* 2012; 37:874-881. doi: 10.1007/s10900-011-9522-z
- ¹⁶Freedman DA, Bell BA, and Collins LV. The Veggie Project: a case study of a multi-component farmers' market intervention. *J Primary Prevent.* 2011; 32:213-224. doi: 10.1007/s10935-011-0245-9
- ¹⁷Parmer SM, Slaisbury-Glennon J, Shannon D, and Struempfer B. School gardens: an experiential learning approach for a nutrition education program to increase fruit and vegetable knowledge, preference, and consumption among second-grade students. *J Nutr Educ Behav.* 2009; 41:212-217.
- ¹⁸Goddu AP, Roberson TS, Raffel KE, Chin MH, and Peek ME. Food RX: A Community-University partnership to prescribe healthy eating on the south side of Chicago. *J Prev Interv Community.* 2015; 43(2): 148-162. Doi:10.1080/10852352.2014.973251
- ¹⁹Hu A, Acosta A, McDaniel A, and Gittelsohn J. Community perspectives on barriers and strategies for promoting locally grown produce from an urban agriculture farm. *Health Promotion Practice.* 2013; 14(1): 69-74. doi: 10.1177/1524839911405849
- ²⁰Laska MN, Hearst MO, Forsyth A, et. al. Neighborhood food environments: are they associated with adolescent dietary intake, food purchases and weight status? *Public Health Nutrition.* 2010: 13(11): 1757-1763.