



Food as Medicine: An Evaluation of a Fresh Food Incentive Program

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Introduction

- “Let food be thy medicine and medicine be thy food”
–Hippocrates
- Diet rich in fruits and vegetables prevents chronic metabolic conditions (Bryce et al., 2017)
- Socio-economic status and geographic limitations influences food insecurity (FI)
- Food incentive programs attempt to bridge the gaps in access
- Additional research is needed to evaluate effectiveness and sustainability of food incentive programs



Background & Significance

What is food insecurity (FI)

- Lack of consistent access to acquire adequate food due to insufficient funds or resources
- Social determinants of health and racial disparities intensify FI

FI Prevalence

- African Americans (22%)
- Hispanics (17%)
- Caucasian (7%) (Food security, 2022)
- Local (Detroit): 69% (“Detroit food metrics”, 2021)
- State (MI): 11.8% (“Food insecurity in Michigan”, 2023)
- Federal: 10.2% (USDA, 2021)

Health Care Expenditures in Michigan as a result of FI

- \$1,801,282,000 per year (Food security, 2022)
- Michigan ranks above the 75th percentile

Detroit Mercy's Implementation of Fresh Incentives

- Fitzgerald community (zip code 48221) block club leaders expressed interest
- Ford Community Corp Partnership grant funded the project
- DNP students from the NUR 7200 Epidemiology and Population Health course Summer 2022 semester developed the model
- NUR 4350 Community Health Practicum nursing students implemented the project
- **Unique Features of Detroit Mercy's implementation:**
 - 1:1 in-home education sessions
 - Weekly monitoring of biometrics
 - Prepared meals
 - Physical activity, Emotional Eating, Coping with Triggers education modules
 - Goal-setting
 - Recipes
 - Community resource directory



Detroit Mercy's Implementation of Fresh Incentives

cont. . .

- **Implementation of two food incentive programs:**
 - **Farmacy Foods:** nutritionist guided freshly prepared meals
 - No education modules or outcome measures
 - **Fresh Prescriptions:** fruit and vegetable prescription program
 - Has education modules and measures outcomes
- **Participants & Recruitment Strategies:**
 - $n= 22$
 - Inclusion criteria: senior or disabled Fitzgerald community resident with at least one chronic metabolic condition
 - 11 participants located across 4 city blocks; recruited by Fitzgerald block club leaders
 - 11 participants located in the Theresa Maxis facility; signed up after receiving information session





Detroit Mercy's Implementation of Fresh Incentives cont. . .

Cycle 1: 8/30/22-10/18/22 (Residential)

- Farmacy Foods: 5 freshly prepared meals a week for 6 weeks
- Detroit Mercy Education Modules

Cycle 2: 10/19/22-12/7/22 (Residential)

- Same participants from Cycle 1
- Fresh prescriptions: fruit and vegetable boxes for 6 weeks
- Fresh Prescriptions Education Modules

Cycle 3: 1/10/23-2/21/23 (Theresa Maxis)

- Fresh prescriptions: fruit and vegetable boxes for 6 weeks
- Detroit Mercy Education Modules
- Fresh Prescriptions Education Modules

Detroit Mercy Education Modules:

- Physical Activity
- Emotional Eating
- Coping with Triggers

Fresh Prescriptions Education Modules:

- Food Storage
- My Plate & Portion Sizes
- Nutrition Labels
- Sugar & Salt
- Fats & Oils

Clinical Question

- PICO: For elderly and/or disabled, chronically ill residents in the Fitzgerald community, does the participation in a freshly prepared meal and/or produce incentive program with an in-home nutrition and physical activity education module increase the consumption of fresh fruits and vegetables, improve cardiometabolic health, and promote changes in dietary and physical activity behaviors.





Literature Review

Decreased food insecurity and increased consumption of fresh produce

Improvement in cardiometabolic health & management of diseases

Improvement in quality of life

Factors that contribute to program satisfaction
(i.e. food quality, funding, versatility, friendly staff, & nutrition education)

Factors that inhibit healthy eating behaviors
(i.e. cost, household size, disability, transportation, time constraints, & cultural norms)



Organizational Assessment: Detroit Mercy

Strengths

- Detroit Mercy mission, vision, & Mercy Jesuit values
- DNP chair, reader, and organizational chair
- Strong stakeholder support
- Financial support
- Service-learning requirements
- Marketing

Weaknesses

- Model development
- Recruitment
- Time constraints
- First launch of program; lack of experience

Opportunities

- Fundraising
- Connect participants to community resources
- Improve patient-provider communication and relationship
- Potential to improve health outcomes
- Strengthen community partnerships

Threats

- Participant retention
- Environmental/Public health challenges
- Inability to recruit participants or faculty to implement the project



Purpose

- Perform an evaluation of a freshly prepared meal and/or produce incentive program and identify impacts on:
 - Consumption of fruits and vegetables
 - Cardiometabolic health
 - Dietary and physical activity habits
- Determine whether a prepared meal component produces additional effects
- Identify strengths & weaknesses
- Future sustainability



Theoretical & Conceptual Frameworks

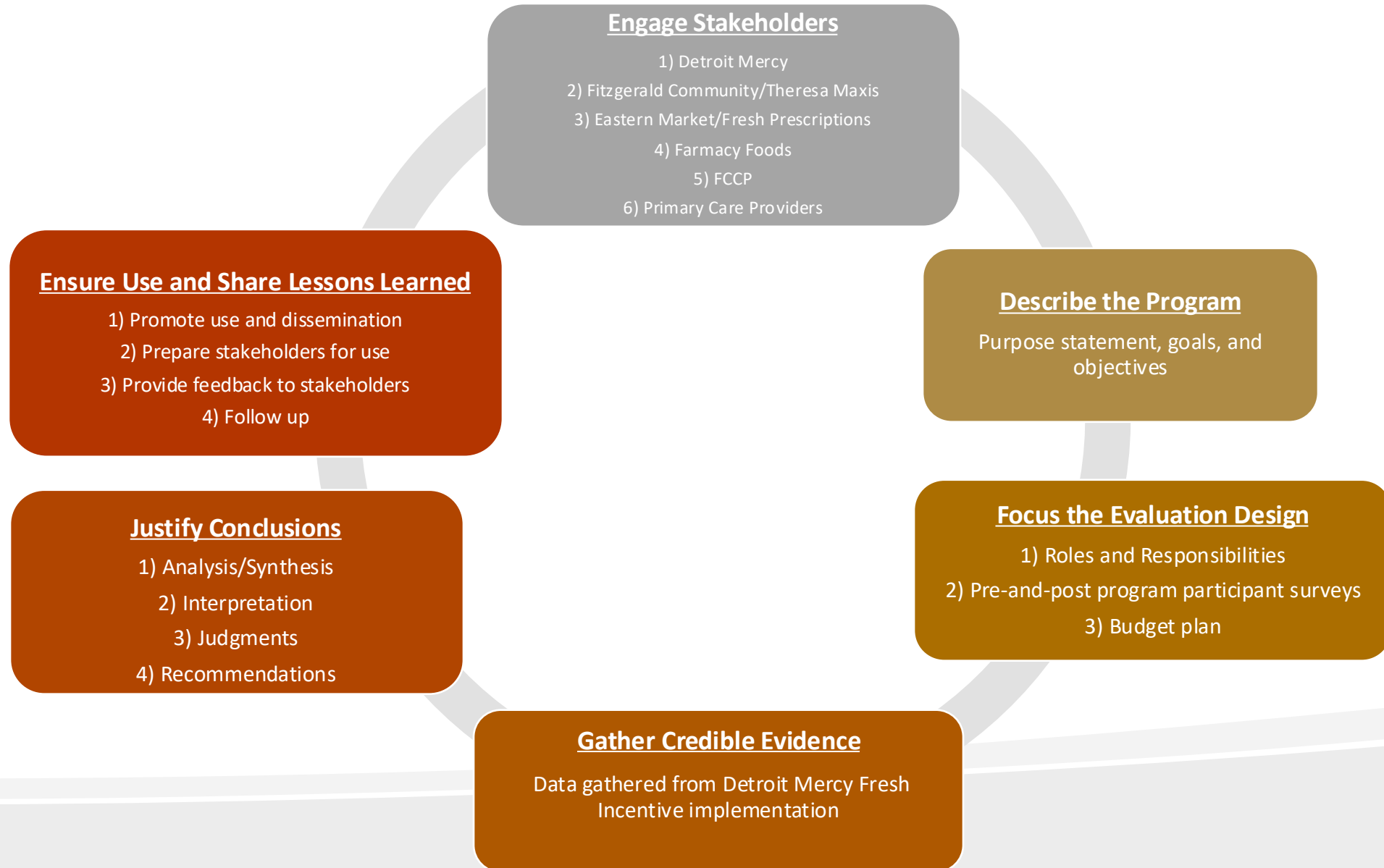
Social Ecological Model

- Social-ecological models are useful in “describing the interactive characteristics of individuals and environments that underlie health outcomes . . . to guide public health practice” (Golden & Earp, 2012, p.364).

CDC Framework for Program Evaluation

- CDC Framework for Program Evaluation: helps public health professionals understand and further integrate evaluation concepts and promote evaluation literacy and competency (Milstein & Wetterhall, 2000).

CDC Framework for Program Evaluation



Project Methodology



- **Design:** Program evaluation using a mixed-methods research design
 - Guided by the CDC Framework for Program Evaluation
 - Collaboration with community partners
 - To better understand food sovereignty efforts
- **Ethical Considerations:** Detroit Mercy’s Institutional Review Board approval for exempt status
- **Statistical methods:**
 - Survey tools
 - (i.e. select all that apply, multiple choice, fill in the blank, 5-point Likert, and short answer questions)
 - Areas of measurement: Demographics, Hunger Vital Sign, Dietary, Exercise Habits, Knowledge/Perceptions
 - Intellectus Statistics:
 - Non-parametric Wilcoxon signed rank test for quantitative data
 - Descriptive statistics
 - Microsoft Excel:
 - Content analysis for qualitative data
 - Creation of graphs



Data Analysis



Demographics

- **Gender:** 16 female; 6 male
- **Ethnicity:** 86% African-American
- **Age:** 32 to 92 years old
- **Annual Income:**
 - 31%= \$10,000- \$14,999
- **Education:**
 - High School Diploma: 59%
 - Some High School: 13%
 - Higher Education: 27%
- **Food insecurity:** 90% denied
- **Receiving supplemental food assistance (SNAP, EBT, WIC):** 50%

Hunger Vital Sign

Variable	n	%
Within 12 months, I/we worried whether food would run out before we go money to buy more		
Yes	2	9.09
No	22	90.91
Within 12 months, I/we worried the food I/we bought didn't last and we didn't have money to get more		
Yes	3	86.36
No	19	13.64

Note. Due to rounding errors, percentages may not equal 100%.



Objective 1: Determine if the consumption of well-balanced meals and fruits and vegetables have any impact on biometric data (i.e. weight, waist circumference, and blood pressure).

- No statistically significant improvement in biometrics:
 - Cycle 1: freshly prepared meals alone
 - Cycle 2: produce boxes; statistical significance seen only in **diastolic blood pressure** ($p = .040$)
 - Cycle 3: produce boxes

****Participants did not share similar goals for weight loss or blood pressure reduction****

Objective 1 cont. . .

Weight Loss

	Significance	Summary Statistics
Total weight loss (n= 10)	p= 0.005	Pre: M= 202.10 lbs Post: M= 198.07 lbs Range of pounds lost: -0.3 lbs to -7.7 lbs Average pounds lost: -4.03 lbs
Intentional weight loss with success (n= 6)	p= 0.028	Pre: M= 207.35 lbs Post: M= 203.87 Range of pounds lost: -0.3 lbs to -5.6 lbs Average pounds lost: -3.48 lbs
Unintended weight loss (n= 4)	p= 0.068	Pre: M= 194.22 lbs Post: M= 189.38 lbs Range of pounds lost: -1.1 lbs to -7.7 lbs Average pounds lost: -4.85 lbs
Unsuccessful with weight loss despite having goal (n= 4)	p= 0.068	Pre: M= 262.40 lbs Post: M= 264.05 lbs Range of pounds gained: +0.1lbs to +4.3 lbs Average weight gain: +1.65 lbs

Summary:

- 10/22 (45%) participants lost weight; M= -4.03lbs
- Statistical significance observed in this subgroup
- 6/10 participants that loss weight set goals intended for weight loss
- 4/10 participants did not set goals for weight loss but experience weight loss
- 4/22 participants set weight loss goals but were unsuccessful

Objective 2: Determine if the program had an impact on the consumption of fresh fruits and vegetables.

Variable	Cycle 1 & 2	Cycle 3
Number of times fruit consumed in one week	$p= 0.397$ pre: $M= 5.00$ post: $M= 6.73$	$p= 0.005$ pre: $M= 2.27$ post: $M= 7.55$
Number of times vegetables consumed in one week	$p= 0.674$ pre: $M= 7.18$ post: $M= 6.09$	$p= 0.032$ pre: $M= 3.09$ post: $M= 9.73$
Number of times salty or greasy foods/snack consumed in one week	$p= 0.931$ pre: $M= 3.73$ post: $M= 4.55$	$p= 0.473$ pre: $M= 2.55$ post: $M= 1.73$
Number of times sweetened or diet beverages consumed in one week	$p= 0.553$ pre: $M= 4.92$ post: $M= 5.27$	$p= 0.204$ pre: $M= 1.82$ post: $M= 4.55$

Summary:

- No statistically significant changes in dietary changes in Cycle 1 and 2 participants
- Statistically significant improvement in fruit ($p= 0.005$) and vegetable ($p= 0.032$) consumption seen in cycle 3 participants
- No significant changes in unhealthy foods/beverages in either groups



Objective 2 cont. . .

- *Theme 1: Program introduced participants to new fruits, vegetables, and recipes*
 - Produce boxes introduced participants to squash, spinach, zucchini, asparagus, cauliflower, cabbage, mango, and kiwi
 - Freshly prepared meals introduced participants to new flavors and recipes (i.e. curry and beef dishes were favorites)
 - 18/22 participants reported they will continue to increase their fruit and vegetable intake and maintain a well-balanced meal in the future



Objective 3: Determine if the nutrition and physical education modules have any impact on cardiometabolic health, changes in dietary behavior, and improvement in self-management of comorbidities.

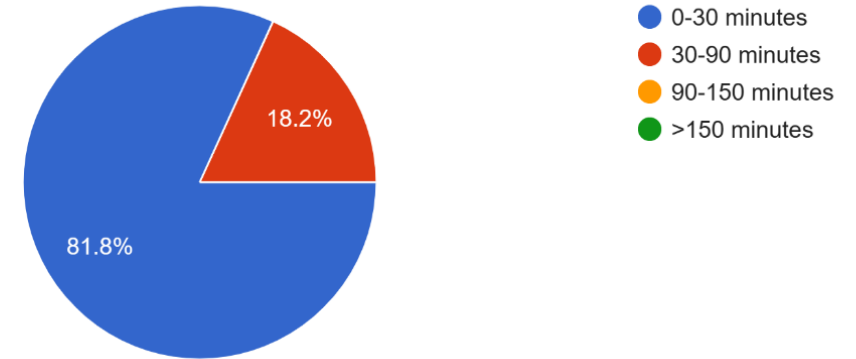
- Statistically significant improvements seen in the following Likert questions:
 - “I believe that diet and exercise contributes to a healthy lifestyle”: $p= 0.005$
 - “I believe that eating a well-balanced meal and staying physically active reduces high blood sugar, blood pressure, and cholesterol”: $p= 0.012$
 - “I know how to store fruits and vegetables so they last longer”: $p= 0.04$

Objective 3 cont. . .

- Physical activity significantly increased: $p < 0.001$
- 81.8% reported the use of resistance bands
- 3 participants stated the bands were helpful in increasing arm strength and range of motion
 - “it increased my strength and I can now raise my arm above my head to do my hair!”

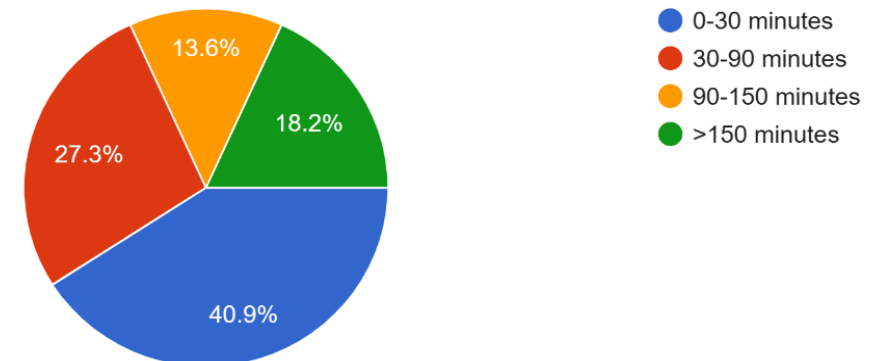
Pre-Survey

How many minutes do you perform moderate to strenuous exercises each week?
22 responses



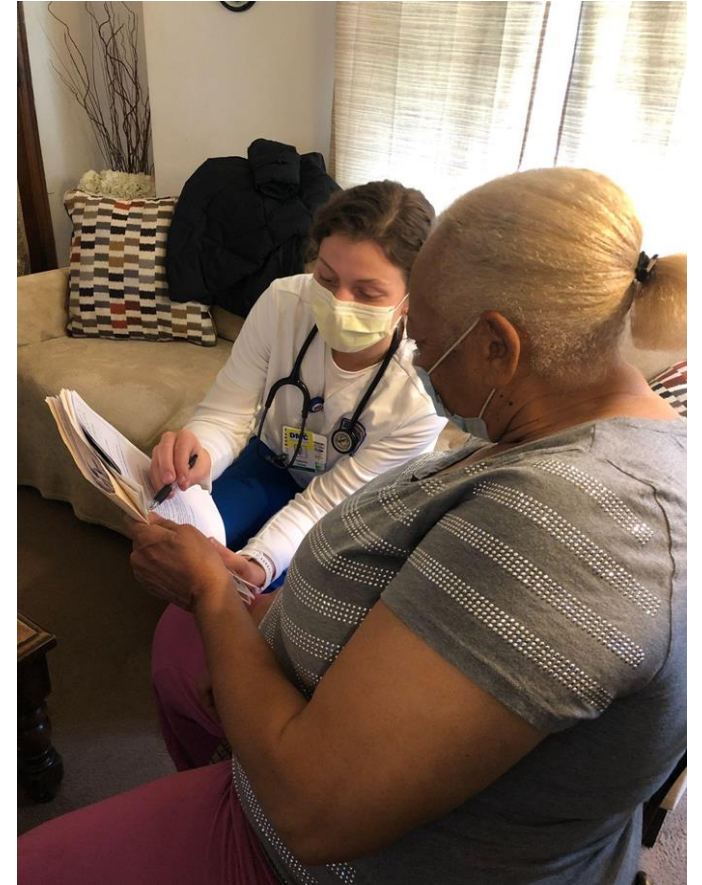
Post-Survey

How many minutes do you perform moderate to strenuous exercises each week?
22 responses



Objective 3 cont. . .

- *Theme 2: Education modules and in-person visits increased self-awareness and promoted accountability of one's health*
 - Modules, in-person home visits, weekly monitoring of biometrics made participants more self-aware and accountable of their health




Objective 4: Compare whether participants found freshly prepared meals more beneficial to their health/dietary behaviors than receiving fresh produce boxes.

Theme 3: Quality, quantity, and versatility were important to participants

- 36.3% ($n=4$) preferred meals
 - Convenient and exploration of new flavors
- 18.18% ($n=2$) preferred the produce boxes
 - Freedom to prepare meals of their liking
- 27.27% ($n=3$) enjoyed both
- Participants wanted autonomy with food choices





Objective 5: Identify if participant goals were accomplished. If not, why? Were there any new goals identified after participating in the program?

- *Theme 4: Different learning modalities and in-person visits were helpful in achieving goals*
 - About 81% ($n=18$) participants reported they achieved their personal goals
 - Newly identified goals were to eat more fruits and vegetables, choose healthier snacks, control portion sizes, exercise more
 - Various teaching modalities, particularly in-person 1:1 visits with nursing students were most helpful



Objective 6: Identity barriers to healthy eating

- Barriers to healthy eating include:
 - Poor food quality
 - Limited food choices
 - Transportation
 - High costs
- Positive outcomes:
 - Program resulted in significant improvement with accessing fruits and vegetables ($p < 0.001$)
 - Program increased the utilization of local farmers market (pre: $n=5$, 22.73%; post: $n=9$, 40.91%)



Program Evaluation

Summary & Recommendations



Benefits

- Setting goals and demonstrating readiness increases likelihood of success (i.e. seen in weight reduction)
- Program introduces new fruits, vegetables, recipes
- Program helps participants identify new goals to continue after program end
- Physical activity education increased weekly minutes of exercise performed, strength, and range of motion
- 1:1 in-home visits with weekly biometric monitoring increased engagement, motivation, and accountability
- In-home visits foster closer interactions and provides an opportunity to alleviate social determinants of health
- Nutrition education made participants more self-aware of their health
- Freshly prepared meals was helpful in providing convenience in meal preparation and encouraged participant to explore new flavors
- Produce boxes promoted culinary creativity and supported local farmers



Constraints

- 6-week duration was regarded as too short by some participants
- Scheduling in-person visits was challenging
- Unable to collect biometric lab values (i.e. HbA1c, glucose, LDL, and total cholesterol)
- Variations in quality and quantity of produce received
- Lack of autonomy over food choices
- Difficulties completing surveys/navigating websites



Recommendations

- Recruit participants that are food insecure using the “Hunger Vital Sign” screening tool
- Recruit participants that are ready and motivated to make lifestyle changes using the “Readiness to Change Questionnaire”
- Help participants identify personal S.M.A.R.T goals and stay on track
- Increase the frequency of biometric monitoring and provide participants with tracking sheets
- Implement the use of fingerstick point-of-care glucometers, HbA1c, and total cholesterol meters



Recommendations cont. . .

- Include physical activity education modules that is tailored to meet the specific needs of the population (i.e. resistance bands, home exercise plans for the elderly/disabled, how to stay active in the winter, etc.)
- Use the Rapid Assessment of Physical Activity (RAPA) tool to evaluate exercise habits
- Provide personalized 1:1 in-home education sessions using various learning modalities (i.e. audio/visual, video recordings, video/telephone conferencing, handouts, etc.)
- Establish standardized criteria for food quality and quantity (i.e. pricing, 70:30 rule for vegetables and fruit) to prevent variations across vendors; perform quality checks at farm sites
- Accommodate individual meal or produce preferences
- Incorporate recipe cards or booklets with deliveries so that they match with what they are receiving



Recommendations cont. . .

- Edit Fresh Prescription survey tools to evaluate retained knowledge gained from other education modules (not just food storage and My Plate)
- Edit Fresh Prescriptions survey tools to simplify questions and avoid redundancy (i.e. problems found with questions assessing intake of fruits, vegetables, greasy foods, sweetened beverages, and home occupancy)
- Provide participants with comprehensive list of community resources and map of local farmers markets
- Award participants with completion certificates and provide a summary of their performance (i.e. biometric, dietary intake, and physical activity changes)

Sustainability Plan

McAuley School of Nursing partners with others to provide healthy food to homes

+ NAVIGATE THIS SECTION

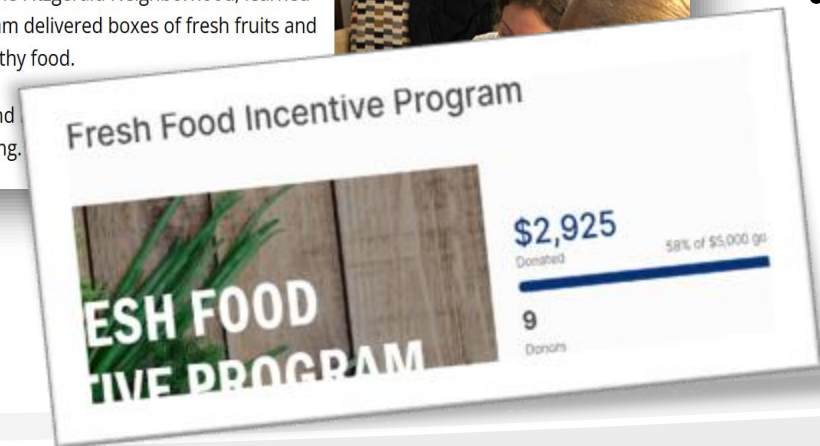
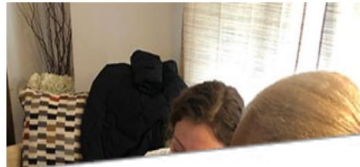
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Detroit Mercy empowers students and faculty to integrate their intellectual, spiritual and social development. Nowhere is this more clearly on display than in the McAuley School of Nursing's Fresh Incentive Program.

This program began when Jonetta Banks, community representative for the Fitzgerald Neighborhood, learned about a program at Eastern Market called Fresh Prescriptions. The program delivered boxes of fresh fruits and vegetables to individuals in neighborhoods who don't have access to healthy food.

She brought the idea to [Fr. Tim Hipkind, S.J.](#), and shortly after, Fr. Hipkind Clinical Associate Professor [Elaine Webber](#) on board; she got the ball rolling.



- This study was featured in the Detroit Mercy news article
- Continued collaboration with community partners is strong
- Detroit Mercy crowdfunding and marketing strategies raised \$2,925.00 to continue supporting this project
- Dr. Karen Mihelich & Dr. Elaine Webber were awarded \$21,000.00 from the Faculty Research Award (FRA) to continue program initiatives

Implications for Practice

- Food incentive programs have tremendous benefits
 - Promote health outcomes
 - Encourage dietary changes
 - Improve physical activity
 - Decrease issues with food access
 - Improve community partnerships
 - Promote the understanding of food sovereignty, social determinants of health, and Healthy People 2030 goals
 - Employ Jesuit Mercy Values



Eastern Market





Volunteering at CWO Farms





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- DNP Organizational Leader/Mentor: Patrice Brown
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- Fr. Timothy Hipskind and Bianca Candella: FCCP Coordinators
- NUR 7200 Epidemiology and Population Health Summer 2022 students
- NUR 4350 Community Health Practicum Nursing students:
 - Joel Vanhook: Student leader for FCCP grant
 - Implementors of Cycle 1: Alaina Beshi, Grace Day, Giovanna DiMaria, Caleb Hamilton, Vanessa Sadek, & Amanda Zuccaro
 - Implementors of Cycle 2: Katherine Conrad, Cariese Cooks, Mikayla Cupp, Courtney Goodyke, Michael Martin, Meghan Moore, & Amanda Williams
 - Implementors of Cycle 3: Nasreen Kobeissi, Shelby Kolakovich, Shum Kurdi, Jennifer Libert, Albina Mamedova, Emma Pehote, & Manal Shaito

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