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A Collaborative Approach to Incentivizing Healthy Food Choices among Uncontrolled Diabetic Patients at a Local Federally Qualified Health Center to Improve Health Outcomes

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Abstract

Background: The rate of uncontrolled diabetes among patients at a local Federally Qualified Health Center (FQHC) is higher than the nation standard, a phenomenon believed to be caused by the effects of social determinants of health (SDOH). SDOH, specifically food insecurity, play a significant role in health outcomes of diabetic patients. Increasing access to healthy foods, thereby reducing food insecurity, has the potential to improve glycemic control and reduce diet related chronic disease.

Objectives: The project aims to determine if partnership with a membership based incentivized grocery store has the potential to positively impact health outcomes among vulnerable patients with uncontrolled type 2 diabetes.

Methods: This quality improvement project targeted patients above age 18 residing in Kent County, Michigan, that met all of the following: a) a diagnosis of type 2 diabetes, b) glycosylated hemoglobin (A1C) at or above 9%, c) household income at or below 200% of the federal poverty level. Collaborative efforts with a membership based incentivized grocery store were established and qualifying patients were connected with the resource. Data was collected via chart audit, phone interviews, and review of purchasing habits.

Results: During the patient recruitment period between 8/2019-12/2019, 48 patients expressed interested in the Food Club. Of those 48, 23 referrals were successfully completed, and six individuals completed the membership process. Primary outcomes were A1C, depression scores, and barriers encountered by patients during the referral and membership processes.

Implications: Practice implications included increasing SDOH screening workflow to gain insight on the barriers patient face. These preliminary results will be strengthened by continued work under grant funding received by the FQHC.

Keywords: Food insecurity, glycemic control, incentivized food, social determinants of health, diet related chronic disease, uncontrolled diabetes, healthy food choices

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A Collaborative Approach to Incentivize Healthy Food Choices among Uncontrolled Diabetic Patients at a Local Federally Qualified Health Center to Improve Health Outcomes.

Introduction

According to the 2017 National Diabetes Statistics Report, an estimated 9.4% of the U.S population suffers from diabetes, with type 2 diabetes accounting for approximately 90-95% of cases (CDC, 2017). Type 2 diabetes is the seventh leading cause of death in the United States, with a total direct and indirect cost of $245 billion dollars, yet despite the multiple resources and medications available for patients, many health care organizations are failing to meet the nation standards. Type 2 diabetes has a disproportionately large impact on vulnerable populations; an occurrence that is believed by many to be a consequence of the large number of social disparities, specifically food related, experienced by the population (Gucciardi, Yahabi, Norris, DelMonte, & Farnum, 2014).

Social determinants of health, defined by the World Health Organization (2019) as conditions in which people are "born, grow, live, work, and age" are considered a factor of health inequalities, making the renewed focus by healthcare professionals timely and imperative. Food insecurity, a SDOH affecting primarily vulnerable populations, is a key factor affecting the management of diabetes and glycemic control (Silverman et al. 2015; Shalowitz et al. 2017; Lyles et al. 2013; Heerman et al. 2016; Seligman, Jacobs, Lopez, Tschann, & Fernandez, 2012; Young, Yum, Kang, Shubrook, & Dugan, 2018). Food insecurity, as defined by the USDA (2019), is the "disruption of food intake or eating patterns because of lack of money or other resources" (p.1). Individuals with food insecurity are often concerned that their food would run out before they were able to buy more, and/or they were unable to purchase healthy options due to financial limitations. Households composed of racial minorities at or below the federal poverty

level are at a greater risk for food insecurity (Lyles et al., 2013). These populations often seek health care services from Federally Qualified Health Centers (FQHCs).

A healthy diet composed of adequate fruits and vegetables has been shown to reduce the probability of diet related chronic disease, specifically diabetes (Silverman et al. 2015, Young et al. 2018). Due to multiple factors including transportation, lack of chain supermarkets, and financial limitations, low income communities often suffer from food insecurity (Young et al. 2018). Gucciardi et al. (2014) found that household food insecurity is more prevalent among households with a person living with diabetes and/or reside within impoverished areas. For many healthcare organizations, especially those serving predominately vulnerable populations, this SDOH must be addressed to successfully manage diabetes and other diet related chronic diseases.

In addition to food insecurity, evidence suggests a relationship between SDOH and/or depression symptoms and glycemic control (Hughes, Yange, Ramanathan, & Bejamins, 2016; Young et al. 2018; Silverman et al. 2015; Rivich et al. 2019; Shalowitz et al. 2017). Approximately one of every four people with type 2 diabetes is diagnosed with depression, with the presence of depressive symptoms proven to increase the risk of poor glycemic control (Semenkovich, Brown, Svrakic, & Lustman, 2015). A study by Rivich et al. (2019) determined that a positive PHQ-2 was a statistically significant predictor of having an uncontrolled A1C and is thought to be related to emotional distress experienced by the patient. Food insecurity is also shown to impact the prevalence of depressive symptoms, further supporting the need to address this SDOH among vulnerable patients with Type 2 diabetes.

Assessment of the Organizational

To successfully impact the care for uncontrolled diabetic patients with food insecurity, it is advantageous to understand the circumstances within the organization. The organizational assessment is the initial step completed by the Doctor of Nursing Practice (DNP) student to determine current values of the proposed project setting (Moran, Burson, & Conrad, 2017). This assessment aids the DNP student in understanding the current state of the organization, the status of multiple organizational variables, and organizational readiness for change. The organizational assessment was completed at an urban Federally Qualified Health Center (FQHC) within a Midwestern community, hereinafter referred to as the organization. The organization is affiliated with a midsize independent healthcare system with over 20 locations throughout the state, over 76,000 patients, and services encompassing primary care, women's health, pediatrics, dental, vision, behavioral health, correctional health, and employee assistance. The system is the largest FQHC in the state (XXX, 2019).

The specific location of focus currently employees four physicians and two nurse practitioners, with ancillary staff including a certified diabetes educator, certified dietitian, phlebotomist, community health worker, medical assistants, registered nurses, a radiology technician, and an AmeriCorps volunteer. Additionally, the organization recently merged with an integrated care clinic that employs one MD, one psychiatric nurse practitioner, two health coaches, and two medical assistants.

Framework for Assessment

The Burke-Litwin Model of Organizational Performance and Change was chosen as the foundation of this organizational assessment due to cohesiveness and ease of usability (see Appendix A). Also referred to as a Model of Organizational Performance and Change, the

Burke and Litwin model, authored in 1992, suggests a relationship between internal and external factors and the subsequent effects those factors have on performance. The authors defined four elements within an organization: External environment, Transformation Factors, Transactional Factors, and Performance (Individual and Organizational).

Twelve variables make up transformational and transaction factors. The structure of the model illustrates how influences flow through an organization and the interrelated nature of the organizational variables. Factors higher in the model are believed to have a stronger influence on the processes of change than those below. The multidirectional arrows illustrated represent a multi-systems approach; meaning a change in one factors will affect others. The External Environment represents "input" to the organization, thus the start of the model. The "output", defined by Burke and Litwin (1992) as Individual and Organizational Performance, represents to end of the model. The feedback loop for these two elements is multidirectional, thus the external environment affects performance, and vice versa.

Current State of the Organization using Burke Litwin Framework

The organization is a FQHC, with 98% of the patient population at or below 200% of the federal poverty level. Over 80% of the of patients have Medicare, Medicaid, or no insurance; therefore, changes in regulatory guidelines and insurance can impact the organization. As of June 2019, of the 593 diabetic patients at the site, 174 of these individuals who reside in Kent County had an A1C greater than 9% (see Appendix B). Of the twelve organizational locations, the specific clinic of focus has the largest number of patients with uncontrolled diabetes. Additionally, a number of qualifying patients at the clinic were recently screened for SDOH, specifically questions related to food insecurity (see Appendix C). Unfortunately, this number only totaled 31 patients. The organization is currently focusing on understanding SDOH,

creating a standardized screening process, and the impact these variables have on the maintenance and progression of chronic disease.

An organizational goal within the clinic is to become a referral partner for a local non-profit, incentive-based community grocery store. The grocery store, a nonprofit operating since January 2015, is a membership-based grocery store in which members pay a monthly fee and are allocated "points" to be used towards the purchase of groceries (see Appendix D). In order to become a member, potential applicants must be provided a referral form, which is currently only offered at one location. The "points based" program incentivizes healthy food options by charging members fewer "points" than unhealthy choices. Because of the payment structure of the membership based incentivized grocery store, 42% of food that is purchased is a fruit or vegetable (Food Club, 2018).

Within the organization, 29% of diabetic patients have an A1C greater than 9%. Leadership is committed to improving patient specific health outcomes. Personal interviews with stakeholders suggest that the complex patient population, in combination with various SDOH are the reason behind this alarming statistic. The organization is prepared for change, with strong support identified in both leadership (transformation) and managerial (translational) factors. Unfortunately, only 17.8% of qualifying patients were screened for SDOH, indicating a significant gap in data pertinent to the phenomenon of interest. This is thought be the result of the recent introduction of SDOH screening and subsequent unstandardized process.

Ethics and Protection of Human Subjects

The Institutional Review Board at Grand Valley State University (GVSU) determined that this project is not research, and thus meets the criteria for Quality Improvement (see

Appendix E). The DNP project site did not have an institutional review board, therefore GVSU was the sole IRB determination submitted.

Stakeholders

The management of diet related chronic diseases, healthy food choices, and health outcomes are all influenced by multiple factors, therefore, both the patients and family are active participants. The proposed partnership with the food club requires active participation by all members of the healthcare team, patients, and employees of the food club. To successfully influence the phenomenon of interest, the organizations involved, the patient, and family must understand the role healthy food choices have on the progression of chronic disease.

Key stakeholders are those individuals that are interested in the project and could affect or be affected by the project outcome (Moran et al., 2017). Specifically related to the phenomenon of interest, key stakeholders include all six providers at the clinic, the certified diabetes educator, community health worker, current patients, new patients, family/peers of patients, ancillary staff, and the team at the incentive-based community grocery store. Prior to starting this project letters of support were obtained from both the organization and Food Club (see Appendix F and G).

SWOT

Strengths, weaknesses, opportunities, and threats (SWOT) were examined at the organization (see Appendix H). This SWOT analysis was used to identify opportunities for SDOH improvement and guide project implementation decision making.

Strengths. The organization is focused on reducing A1C and creating a partnership with the food club. Additionally, interdisciplinary staff including social work, community health worker, nursing, and certified dietician are all on site to meet patient needs. The organization

also has a certified diabetes educator on site to aid in patient education. There is a clearly defined vision, mission, and strategic plan with identified data measurement goals. Additionally, work climate and culture within the organization is flexible and open to change. The Food Club is motivated to explore a relationship with the organization and gain understanding of how their model can improve health outcomes.

Weaknesses. A weakness of the organization are the demanding tasks for staff and limited time. This results in a lack of staff knowledge related to local community resources, a job that is many times deferred to the community health worker. Additionally, only 17.8% of uncontrolled diabetes patients are currently screened for food specific SDOH.

Opportunities. The external environment represents a wealth of opportunities for the organization. This includes collaboration with external community health services and resources to assist patients with housing, food, transportation, and/or employment assistance. Specifically, the active involvement by the grocery store director in the planning process offers an elite partnership opportunity. Grants and incentives are also available for funding support.

Threats. Budget and funding constraints represent an external threat for the relationship between the organization and the Food Club. Additionally, the patient population targeted have higher than average appointment no-show and non-compliance rates. 98% of patients within the organization are at or below 200% of the federal poverty line. This creates a significant challenge for program buy-in and health promotion.

Clinical Practice Question

A local Federally Qualified Health Center (FQHC) has noted that their diabetic outcomes do not meet the national benchmarking standards. Current social determinant of health (SDOH) screening has low completion rates among the vulnerable patient population seen, leading to a

large percentage of patients with unknown health related social needs. It is theorized that the completion of these screening tools, with subsequent connection to community resources, can potentially improve health outcomes including depression. Will an active membership to an incentivized grocery store lead to positive health outcomes and reduced food insecurity among patients with uncontrolled diabetes?

Review of the Literature

A review of literature was completed to assess information related to the effect food specific SDOH and depression have on the progression of diabetes, and the potential role food incentive programs have on mitigating discrepancies. The literature review will support the DNP project focus of increasing access to healthy food options, reducing food insecurity, and incentivizing healthy food choices. The goal of the literature review was to address the following questions:

1. *Does food insecurity contribute to worsening glycemic index among patients with Type 2 Diabetes Mellitus?*
2. *Does the presence of depressive symptoms negatively affect glycemic index among patients with Type 2 Diabetes Mellitus?*
3. *Does Community Health Worker involvement and food incentive programs reduce food insecurity among vulnerable populations?*

Method

A rapid systematic review was chosen as the foundation of the current literature review due to the ability to provide timely information for decision making within an organization. According to Moher, Liberati, Tetzlaff, and Altman (2009), a systematic review is a "review of a clearly formulated question that uses systematic and explicit methods to identify, select, and

critically appraise relevant research, and to collect and analyze data from the studies that are included in the review" (p.1). A rapid review streamlines the traditional systematic review of literature, taking less than five weeks to complete (Ganann, R, Ciliska, D & Thomas, H., 2010).

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guideline, found in Appendix I, is the framework used for this review (Moher, Liberati, Tetzlaff, Altman, & PRISMA Group, 2009). An electronic search was conducted in June-July of 2019 within CINAHL Complete, PubMed, and Cochran Library. Search terms include: food incentive program, health promotion, motivation, food assistance, food insecurity, heath disparities, food safety, social determinants of health, diabetes mellitus type 2, glycemic control, and depression.

Inclusion and Exclusion Criteria

Article type. Meta-analysis, systematic reviews, randomized controlled trials, cohort studies, case reports, and observational studies with comparison groups were included in the review. Additional inclusion criteria are articles published between the years of 2012-2019 and peer- reviewed academic journals.

Language and geography. Only reviews in the English language were included. Countries with similar health care systems were included. Countries included in the review include the United States and Germany (1). The sole systematic review included in this literature was authored and completed in Germany.

Population. For this review, included were study samples composed of adult patients 18 years of age or greater who have a diagnosis of Type 2 Diabetes. Studies were excluded if they included a pediatric population or only focused on one race/ethnicity.

Intervention. Single interventions were included in this review. Studies that did not explain the type of intervention used were excluded from the review. Additionally, studies that implemented multifactorial interventions were excluded.

Comparison. Studies involving the use of food motivation, food insecurity, and food incentive programs and/or social determinants of health as it relates to the progression of diabetes or depression were included in the review. Studies involving gestational diabetes and steroid induced diabetes were excluded from the review.

Outcome. Outcomes included were A1C, BMI, blood pressure, depression scores, diabetes self-care, diabetes distress, food security/insecurity, diabetes knowledge, and glycemic control.

Summary of Results

The search yielded a total of 262 articles following removal of duplicate items. Following PRISMA guidelines, articles were reviewed for inclusion and exclusion criteria. A review of titles and abstracts led to the exclusion of 213 articles. A review of content then excluded an additional 39 articles. The ten articles chosen following the PRISMA guidelines all had similar inclusion/exclusion criteria and study objectives (see Appendix I). The sole systematic review and meta-analysis included a review of food insecurity and the odds of Type 2 diabetes. Also included were RCTs, a case report, cohort study, cross sectional surveys, and secondary cross-sectional analysis of data collected from randomized control trials.

Measures

Current practice within the organization to screen patient SDOH is completed via the Accountable Health Communities (AHC) Health-Related Social Needs Standards Screening Tool (see Appendix K). Developed by the Centers for Medicare and Medicaid Services

following in depth review of existing screening tools, the AHC is a 10-item instrument that identifies patient needs related to housing instability, food insecurity, transportation difficulties, utility assistance needs, and interpersonal safety (Billioux, Verlander, Anthony, & Alley, 2017). The AHC screening tool adopted the two food insecurity questions from the 'Hunger Vital Sign', a published food insecurity screening tool that has been shown to be both specific, sensitive, and valid when assessing low income families (Billioux et al., 2017).

A variety of outcome measures were used throughout the ten studies reviewed. Common baseline data includes: age, race/ethnicity, education level, comorbid medical conditions, food insecurity, depression symptoms, diabetes distress, diabetes self-care, and glycemic control. The United States Department of Agriculture's Six Item Short Form Food Security Survey, used by fours reviews, was the primary measurement tool used in reviews to assess food insecurity (Silverman et al. 2015; Shalowitz et al. 2017; Lyles et al. 2013; Seligman et al. 2012). Additional tools used to measure food insecurity include the USDA Food Security Questionnaire (Young et al. 2018) and the US Household Food Security Survey Module (Heerman et al. 2016).

Diabetes education and community interventions centered on positively impacting diabetes management. These activities can be measured by assessing diabetes knowledge, diabetes self-care, and diabetes distress. Tailoring interventions to address these factors will influence outcomes. Diabetes numeracy refers to an individual's capability to mathematically manage their diabetes. Young et al. (2018) measured diabetes numeracy via the Diabetes Numeracy Test (DNT-5) and diabetes knowledge via the Spoken Knowledge in Low Literacy Diabetes Scale (SKILLD). Diabetes Self Care measurement tools include the Summary of Diabetes Self Care Activities (SDSCA) diet score (Silverman et al. 2015; Heerman et al. 2016), the Starting the Conversation tool (Silverman et al. 2015), and the Personal Diabetes

Questionnaire (PDQ-11) (Heerman et al. 2016). Diabetes distress was measured via the Diabetes Distress Scale (Seligman et al. 2012). Additionally, measures including self-reported fruit and vegetable consumption were often in the form of surveys (Lyles et al. 2013). Glycemic control was measured using A1C levels obtained via finger stick blood samples or electronic medical charts (Silverman et al. 2015; Young et al. 2018; Hughes et al. 2016; Rivich et al. 2019; Shalowitz et al. 2017; Seligman et al. 2012).

Three studies included a measurement of depressive symptoms in addition to food insecurity when assessing for factors influencing glycemic index. All studies used the Patient Health Questionnaire (PHQ-2 or PHQ-9) to assess depressive symptoms.

Evidence to be used for Project

The purpose of the literature review was to assess existing literature related to identified phenomenon of interest: the relationship between food insecurity, glycemic control, vulnerable populations, and Type 2 diabetes with interventions related to the application of incentivized grocery store. SDOH significantly affects diabetes management, specifically among vulnerable populations. Of the studies that measured the prevalence of food insecurity, it was determined that the majority of participants had been affected by this SDOH. Food insecurity within the household increased the probability of elevated A1C levels (Young et al. 2018; Gucciardi et al. 2014; Silverman et al. 2015; Shalowitz et al. 2017). According to Abdurahman, Chaka, Nedjat, Dorost, & Maidzadeh (2019), the relationship between food insecurity and glycemic control is multifactorial, led by the increasing risk of obesity and overconsumption of sugary/fatty foods.

Additional predictors of poor diabetes management included the presence of depression. The risk of major depression doubles in patients with a diagnosis of Type 2 diabetes, with depressive symptoms proven to adversely impact the management of diabetes and diabetes

complications increasing the risk of worsening depression (Semenkovich et al. 2015). A study by Rivich et al. (2019) found a positive PHQ-2 is a significant predictor of poor glycemic control.

Poor self-care behaviors, including diabetes distress and medication adherence, are associated with poor glycemic control. These factors can be mitigated by a multidisciplinary team that works together with patients in various settings to increase disease knowledge (Heerman et al., 2016). Community Health Worker interventions have the potential to positively influence not only behavioral and psychosocial outcomes, but also impact health specific measurements, specifically A1C (Hughes et al., 2016). Including Community Health Workers in this team has to potential to reduce A1C, improve diabetes knowledge, improve diabetes self-care, improve medication adherence, improve social support perceptions, and reduce depressive symptoms.

Young et al. (2018), Rivich et al. (2019), Lyles et al. (2013), Seligman et al. (2012) and Shalowitz et al. (2017) focused on data collection from FQHC patients. This patient population is significantly impacted by SDOH. Additionally, a study by Ferdinand et al. (2017) used "Veggie Dollar" program points and qualitative data to quantify the consumption of fruits and vegetables among vulnerable populations. This article is the sole piece of literature that reviews the application of an incentivized health food program. The study concluded that monetary incentives were associated with increased fruit and vegetable purchases at local fresh food markets among low income minorities. The effects above can be reasonably duplicated based on a review of evidence, indicating that a collaborative relationship between the organizational site and Food Club could potentially lead to improved health outcomes.

Household food insecurity is a substantial threat to vulnerable populations, affecting not only the development of depressive symptoms, but the management of glycemic control. This

threat can be reduced by educating patient about diabetes management and increasing the availability of fruits and vegetables. Reducing food insecurity among Type 2 diabetic patients within vulnerable populations, through interdisciplinary interventions, has the potential to positively impact glycemic control. The specific impact of incentivized food programs is an area that needs to be further explored in the literature.

Phenomenon Conceptual Model

To assess the quality of care for uncontrolled diabetic patients, the DNP project will use the Donabedian Model (see Appendix L). The Donabedian model defines three components that are used to evaluate the quality of care: structure, process, and outcome. The structure of an organization directly influences organizational processes, which subsequently is directly related to outcomes (Donabedian, 1988).

Structure

According to Donabedian (1988), "Structure denotes the attributes to the settings in which care occurs" (p. 1745). These characteristics include both material and human resources, in addition to organizational structure. The site of the DNP project is located within a central, easily assessable location in an urban community. In addition to healthcare providers and aids, the site employees a certified diabetes educator and community health worker. These human resources build a strong foundation for the care of the identified vulnerable population. The project site has financial limitations affecting the material foundation. The project site is an FQHC, with many financial allocations garnered by government grants. Interventions should be presented with financial limitations in mind.

Process

Patient care processes are directly related to the organizational structure (Donabedian, 1988). The screening of SDOH is a task designated to clinical staff, with follow up designated to either the community health worker or office staff at checkout. This non-standardized process often leads to a large percentage of patients either not completing the screening process or lacking follow through. Process refers to what is actually being done when delivering care (Donabedian, 1988). Additionally, there are currently no collaborative partnerships with food club programs.

Outcome

The structure and processes of an organization ultimately impacts outcomes (Donabedian, 1988). FQHC's are driven by quality indicators, meaning that health measures directly affect reimbursement. As previously identified, the number of patients with uncontrolled diabetes is elevated within the organization. Additionally, food insecurity directly impacts not only the control of A1C, but also depression. Both the patient and organization have the potential to benefit from a collaborative relationship between the organization and the Food Club.

Project Plan

Purpose of Project and Objectives

This project used collaborative processes to connect identified patients to a membership-based incentivized grocery store with the goal to increase access to healthy foods. The outcome of this project was to determine if collaboration with a membership based incentivized grocery store would result in positive health outcomes among patients with uncontrolled type 2 diabetes. The organization and the Food Club are exploring a collaborative partnership in which the health

clinic has the capability to refer potential Food Club members. At the start of the DNP project the Food Club had 75 membership openings that were designated for the organization's patients. Objectives of this DNP project included:

1. Identifying patients at the organization that have uncontrolled type 2 diabetes (A1C>9%)
2. Determining organizational workflow strategies to efficiently identify interested patients and subsequently connect them to the proposed partner location.
3. Assessing food insecurity via the Accountable Health Communities (AHC) Health-Related Social Needs Standards Screening Tool.
4. Implementing a membership-based food incentive program to patients with A1C>9% to improve food insecurity.
5. Determining if a collaborative relationship with a membership-based grocery store will result in reduced A1C among patients with uncontrolled Type 2 Diabetes.
6. Determining if a collaborative relationship with a membership-based grocery store will result in improved food insecurity among patients with uncontrolled type 2 diabetes.
7. Determining if a collaborative relationship with a membership-based grocery store will result in improved depression among patients with uncontrolled type 2 diabetes.

Design for the Evidence-based Initiative

The PDSA (Plan-Do-Study-Act) Cycle was used to guide the introduction of an incentivized grocery store within the aforementioned patient population (see Appendix M). Introduced in the 1920s, the PDSA model provides guidance for developing, testing, and implementing change within an organization. The model forms the foundation for organizational development and leadership features. The framework focuses on identifying and transitioning through four stages: plan, do, study, act (Act Academy). Details regarding the model and its

stages are described in subsequent sections.

Setting and Sample

The project took place at the organization and the Food Club. Organizational participants included all members of the healthcare delivery team, with special investment by the certified diabetes educator and community health worker. The population of interest included in this quality improvement initiative are: adult patients age 18+, residing in Kent County, with a household income at or below 200% of the federal poverty level, with an A1C>9% (indicated uncontrolled diabetes) and food insecurity as determined by the Accountable Health Communities (AHC) Health-Related Social Needs Standards Screening Tool.

Model Guiding Implementation: PDSA Cycle

Plan

The DNP project plan involved forming a collaborative relationship with a membership-based incentivized grocery store that effectively incentivizes the purchase of healthy food options, targeting patients with uncontrolled diabetes and food insecurity. Each step of the project plan is outlined below in "implementation strategy and elements".

Do

The implementation of the project started with the DNP student reviewing patients with an A1C>9% (indicating uncontrolled diabetes) and determining if they had completed the organization's SDOH screening tool. If the tool has not been completed, the first step was to appropriately screen the individual. If the patient was identified as having food insecurity, they would be offered membership to the Food Club. Following an appointment with the certified diabetes educator to review the goals of the grocery store and healthy diet options, the patients would be given a referral form to start their active membership at the Food Club.

Study

Data collected included gender, age in years, race household size, food insecurity status pre and post intervention, depression score (PHQ2/PHQ9) pre and post intervention, hemoglobin A1C pre and post intervention, grocery store engagement (monthly), and purchasing habits (quantity of food purchased in each food category, (see Appendix N). Data was collected over a four-month implementation period and appropriately evaluated. Descriptive statistics were used to analyze patient demographics, engagement, and food purchasing perception.

Act

Following the collection and evaluation of data, the organization was provided with an appropriate summary of results. Based on data the usefulness of the collaborative relationship with a membership based incentivized grocery store would be better understood and financial support will be better appreciated. Outcome measurements were evaluated by organizational leadership to determine future organizational process changes to improve patient care.

Implementation Steps and Strategies

1. The DNP student, with the assistance of organizational employees, reviewed the charts of patients at the site with uncontrolled type 2 diabetes (A1C>9%). This report was provided to the DNP student via internal email from the site manager. The DNP student determined if: 1. The patient had completed the aforementioned AHC social needs screening tool and had food insecurity or 2. If the patient has not completed the aforementioned AHC screening tool.
2. The DNP student, with the assistance of organizational employees, contacted patients with A1C>9% and determined if they had interest in joining the Food Club. Patients

were provided with a brief overview of the program. (see Appendix O- Initial Patient Communication Phone Call Script).

3. The DNP student, with the assistance of organizational employees scheduled interested patients for "Non-Clinical" group appointments with the Certified Diabetes Educator (CDE).
4. At "Non-Clinical" appointments, the DNP student and CDE educated patients on the Food Club. The DNP student continuously communicated with the Certified Diabetes Educator and placed official Food Club referrals into patient's chart.
5. Patients participating in the membership-based incentivized grocery store were provided assistance with shopping and transportation as needed by the organizational employees and the DNP student.
6. Participating patients continued with routine scheduled follow-up appointments with healthcare providers, including routine collection of A1C via point of care finger stick, depression screening, and healthcare screenings (i.e.: labs/imaging) per already utilized standard guidelines.
7. The DNP student served as organizational liaison for the Food Club. The DNP student communicated with the Food Club to obtain member specific data related to engagement and patient purchasing habits.
8. The DNP student collected and de-identified quantitative data and stored this in an excel spreadsheet via patient chart audit. Following the implementation period, the DNP student collaborated with the statistician GA to appropriately analyze data.

9. The DNP student collected and de-identified qualitative data via phone interviews. Following the implementation period, the DNP student worked with the organization and Food Club to reduce barriers of engagement (see Appendix P).

Measures

The DNP student obtained identifiable and private information about the living subjects involved including name, MRN, phone number, demographics, household size, SDOH information, A1C, depression scores, grocery store spending habits, and grocery store visits. This data was communicated solely through internal systems. These outcome measures are outlined in Appendix Q.

AHC Health Related Social Needs Standards Screening Tool. Developed by the Centers for Medicare and Medicaid Services following in-depth review of existing screening tools, the AHC is a 10-item instrument that identifies patient needs related to housing instability, food insecurity, transportation difficulties, utility assistance needs, and interpersonal safety (Billioux, Verlander, Anthony, & Alley, 2017).

Hemoglobin A1C. A blood test that provides information about a patient's average levels of blood glucose, also called blood sugar, over the past 3 months (National Institute of Diabetes and Digestive and Kidney Disease (NIDDK), 2018). The DNP student conducted chart audits to identify A1C.

Depression score. As measured by the PHQ-2 and PHQ-9, patient questionnaires routinely administered at every patient appointment. The DNP student conducted chart audits to identify depression score.

Food Club purchasing habits. Quantity of food purchased in eight food categories (see Appendix N). The DNP student collaborated with the Food Club executive team to access Food Club database and collect data related to member purchasing habits.

Food Club engagement. As measured by the number of patient visits to the Food Club per month. The DNP student collaborated with Food Club executive team to collect data related to member engagement.

Data Management and Analysis

Secured data was accessed solely through the internal network. The DNP student assigned each patient an ID number to appropriately de-identify them. Following this the patient was known only by that ID number. There was only one copy of the master key for the ID numbers and patients, and it was stored in the DNP student's office at the organization. Following de-identification, data was collected and stored on an excel spreadsheet (See Appendix R-Data Dictionary)

The DNP student collaborated with the statistician graduate assistant to appropriately analyze data. Descriptive analysis was used to analyze patient demographics, grocery store engagement, and grocery store purchasing habits. Statistical analysis was used to analyze A1C, food insecurity, and depression. The DNP student conducted phone interviews to collect qualitative data (see Appendix P).

Resources & Budget

The DNP project implementation was driven by an understanding of financial outlook and staff effort. Organizational stakeholders, including providers and leadership, were dedicated to the attainment of project goals. Key characteristics of project success included staff buy-in and leadership support of the implementation plan. In addition, a valuable resource was the

statistician graduate student who was crucial for the analyzation of data. The DNP student also received grant funding totaling $1,500. A budget for the project can be found in Appendix S. The outlined budget included estimated personnel cost related to donated time for the DNP student, organizational employees, and statistician GA. Due to the COVID-19 pandemic, the DNP students access to the organization was eliminated. Discussions with stakeholders reflected the $1500 grant funding be applied towards the purchase of 75 Rapid "10 Ride" public bus passes following the completion of transportation incentive workflow processes. It is unclear if these funds can be transferred the organization following the termination of student placement restrictions.

Timeline

To fully address the objectives of the DNP project and ensure that the clinical question and purpose statements were addressed, the DNP student progressed through the following timeline (Appendix T):

- **Phase One:** The DNP identified a mentor, project focus, and organizational specific information related to the DNP project. This included assistance with grant writings, reviewing grant narratives, and attending various organizational meetings.
- **Phase Two:** The DNP student completed work on the organizational project with no funding. IRB approval was sought and completed, and organizational changes were made to better support project objectives.
- **Phase Three:** The DNP student communicated with organizational leadership to improve project sustainability. This included meeting with key stakeholders, modifying workflow processes and ownership to meet organizational needs, and collecting and analyzing data.

Results

In this section the process improvement results are discussed along with the outcomes of implementation. First, the DNP student received a report of all patients with uncontrolled diabetes from organizational stakeholders. 130 patients were identified that met the following inclusion criteria: adult patients age 18+ residing in Kent County, with a household income at or below 200% of the federal poverty level, an A1C>9% (indicated uncontrolled diabetes) and food insecurity as determined by the Accountable Health Communities (AHC) Health-Related Social Needs Standards Screening Tool. All qualifying patients were contacted via telephone to determine interest in the Food Club. A total of 48 (36.9%) patients expressed interest in the opportunity. Of the 48, 23 (47.9%) of those interested patients completed referrals between 8/2019 – 12/2019. Of the 23 patients that completed the referral process, a total of 6 (26.1%) visited the Food Club and completed the membership process.

Workflow Process. With assistance from organizational stakeholders, the DNP student collaborated to create a succinct and effective workflow process in order to successfully identify patients that met inclusion criteria, accurately track patients through the recruitment phase, and successfully complete the membership process at the Food Club. This is in line with the implementation steps and strategies outlined above. Project stakeholders continuously provided feedback to ensure a successful outcome. The workflow process is identified below:

1. **Patient Recruitment Process**
    - The organizational site manager provided the DNP student with a report identifying all patients with uncontrolled diabetes (A1C>9%). The DNP student, with assistance from the community health worker (CHW), reviewed the charts of patients at the site with uncontrolled diabetes. The DNP student and CHW then

determined if the patients had completed the AHC Social Needs Screening Tool and subsequent responses to food insecurity, or if the patient had not completed the screening tool.

- The DNP student, with assistance from the CHW, contacted patients with A1C>9% and determined if they were interested in the membership based incentivized grocery store, first starting with patients with reported food insecurity.
- The DNP student, with assistance from the CHW, educated interested patients on the Food Club and placed a 'Food Club' referral in the chart of interested patients. The DNP student also determined the patient's primary mode of transportation. The patient was informed that they would be called at a later time to schedule a time to complete the referral process, mandatory education, and receive transportation assistance if needed.
- After identification of "Non-Clinical: food club education/referral' appointment timeslots with the certified diabetes education (CDE), the DNP student called patients to schedule referral appointments.

2. Group Education Session and Referral Process

- Throughout the patient recruitment period of 8/2019-12/2019, the CDE held a number of 'Non-Clinical: food club education/referral' appointments in a group structure to review 'My-Plate' nutrition information and complete the referral paperwork. During these meetings the CDE provided patients with pre-assembled re-usable shopping bags (previously constructed by the DNP student).

- Patients enrolled with the Food Club met with the CDE quarterly or as needed. The CDE developed an individualized nutritional plan based on health history, health goals, and personal preferences.

3. Data Collection

- The DNP student collected and de-identified data to store in an excel spreadsheet within the organizations shared drive. The DNP student also created a master key (de-identifying the patient and assigning them an ID number). This was stored on a USB within the DNP student's office.
- The Food Club provided the DNP student with monthly reports identifying current members, food club engagement, and purchasing habits.
- The DNP student created a data dictionary and conducted chart audits to appropriately identify previously determined measures. These measures included food insecurity score, A1C level, depression score.
- Participating patients continued with routine regularly scheduled appointments with healthcare providers, including routine collection of A1C via point of care finger stick, depression screening, and health care screenings per already utilized standard guidelines.
- Following the implementation period, the DNP student collaborated with the organizational site manager and statistician GA to appropriately analyze data.

4. Organization-Food Club Patient Support

- The DNP student, with the assistance of the CHW, assembled re-usable shopping bags consisting of an organizational magnet, MyPlate nutritional information, Food Club educational brochure, and contact information for the CHW. Patients

participating in the Food Club program were provided assistance with shopping/transportation as needed by the DNP student and CHW.

- The DNP student in collaboration with organizational employees monitored patient progress, reviewed patient purchasing habits.
- The DNP student worked with patients to identify barriers impacting consistent visits to the Food Club.

Sample Characteristics. The characteristics of the sample are shown in Appendix U. Mean age of patients that completed the membership process was 47 (SD 7.63), with an average household size of five. One male and five females completed the membership process with equal numbers of Caucasians (n=2), African American (n=2), and Hispanic (n=2). Mean age of patients that completed the referral process but not the membership process was 59 (SD 8.7), with an average household size of 2. Eight males and nine females completed the membership process with unequal numbers of Caucasians (n=3), African American (n=9), and Hispanics (n=5).

AHC Health Related Social Needs Standards screening tool. Of the referral group, a total of 11 were appropriately screened for SDOH. Two questions on the tool are specific to food insecurity:

1. Within the past 12 months, he/she worried that their food would run out before they got money to buy more (often true, sometimes true, never true).
2. Within the past 12 months, the food he/she bought just didn't last and he/she didn't have money to buy more (often true, sometimes true, never true).

Of the patients that completed membership to the Food Club, 50% of patients (n=3) screened positive for questions one and two (see Appendix V-positive food insecurity screening).

Hemoglobin A1C. A1C was evaluated pre-Food Club and 3 months post-Food Club. The mean A1C of patients that completed the referral process but did not complete Food Club membership was 10.8%. The average A1C of patients that completed the membership process to the Food Club was 10.1% with an average A1C measured three months post intervention of 8.25%. (see Appendix W).

Depression score. The average depression score, as measured by the PHQ-9, was evaluated among patients that did and did not complete the food club membership process. Mean depression score among patients that completed the referral process but did not complete a membership at the Food Club was 10.7. The mean depression score among patients that completed both the referral process and membership processes was 4.6 (see Appendix X). Due to the COVID-19 pandemic, the DNP student was unable to complete the chart audit process for post intervention depression scores.

Food Club engagement. Six Food Club memberships were completed between the months of August-January. These patients were ID numbers 00008, 00009, 00010, 00016, 00017, 00019. Two patients, #00009 and #00017, consistently went from start of membership to conclusion of the data collection period, a length of time totaling four months. Patient #00009 visited the Food Club five times during month one, five times during month two, four times during month three, and four times during month four. Patient #00017 visited the Food Club two times each month for four consecutive months. Patient #00010 obtained membership for month one (two visits) and month three (2 visits). Patient #00008 completed the membership for two months, visiting two times during month one, and one time during month two. Lastly, two patients only completed the membership process for one month. Patient #00016 visited the Food Club two

times during his membership period and patient #00019 visited the Food Club just one time during their membership period.

Food Club purchasing habits. The DNP student tracked Food Club member purchasing habits in accordance with the previously identified food category guide, with a specific focus on fruits and/or vegetables. Of the purchases, 37.6% of food purchased was either a fruit or vegetable in the first month. In month two, 33.3% of food purchased was a fruit or vegetable, with subsequent months at 36.9% (month three) and 57.3% (month four) (see Appendix Y).

Qualitative Data Analysis. Of the 48 patients that expressed interest in the Food Club, 25 individuals did not complete the membership process. Due to the elevated number of patients, the DNP student reached out to interested individuals via telephone to determining reasoning behind lack of membership completion. Patients were asked the following questions to gain insight that may improve future endeavors:

1. Why haven't you completed the membership process at the food club
2. What is your primary mode of transportation?
3. Do you feel transportation issues are impacting your participation in the food club?
4. What is the biggest struggle you have in managing your diabetes
5. What is the biggest struggle you have in eating healthy foods

Of the patients called, 23 did not answer and messages were left on the answering machine. One patient answered and stated that they moved out of state. 11 patients provided feedback to the DNP students related to the questions above. The majority of individuals used a personal vehicle (n=5), public transportation (n=2), or a family membership (n=2) as a primary mode of transportation. Five patients reported that transportation issues are not impacting their participation at the Food Club, while four patients stated that lack of transportation is impacting

the decision to complete membership. When questioned about reasoning for not completing membership the majority of patients continued to express interest but have not had a chance to visit the location (n=5). Additionally, patients expressed confusion with the sign-up process (n=2), forgot about the Food Club (n=1), were out of town and hadn't visited yet (n=1), and were no longer interested in the opportunity (n=1).

Patients were furthermore questioned about difficulties managing their diabetes and eating healthy foods. When questioned about the biggest struggle with managing diabetes, patients stated that diet (n=2), managing blood sugar (n=2), busy work schedule (n=1), and monetary limitations (n=1) were the biggest barriers. When quested about eating healthy foods patients stated that diet (n=3), money (n=2), and busy schedules (n=1) were the largest difficulties.

Discussion

The goal of the project was to collaborate with key stakeholders to identify patients at the organization that have uncontrolled diabetes and determine an efficient workflow to connect interested patients with the local Food Club partner. Following this connection, the DNP student aimed to determine if membership to the incentive-based Food Club could reduce food insecurity and improved health outcomes among vulnerable patients. At the conclusion of the project, the DNP student successfully identified patients with uncontrolled diabetes and determined an efficient organizational workflow to connect patients with the Food Club.

The outcomes expected were improved food insecurity, improved depression scores, and reduced A1C following membership to the Food Club. Due to limited Food Club membership enrollment, the DNP student was not able to determine if membership is a statistically significant indictor of improving food insecurity or health outcomes among the target population. Patient interest does offer a promising indicator of future enrollment rates. Quantitative and Qualitative

results provide future guidance to organizational leadership related to program feasibility, cost, and design, allowing the DNP project to be considered a pilot study for future quality improvement initiatives planed by the organization.

Despite low enrollment, the DNP student was able to work with organizational stakeholders to identify qualifying patients and create an efficient workflow process. Additionally, the DNP student was able to provide evidence to present to leadership related to inconsistencies of current SDOH screening practices. Prior to project initiation, a number of qualifying patients at the clinic were recently screened for SDOH, specifically questions related to food insecurity. Unfortunately, this number only totaled 31 patients (5.6%). Due to the small percentage of patients screened for food insecurity, the DNP student removed the presence of food insecurity as a qualifying factor for recruitment. All patients with uncontrolled diabetes no matter their assessment on food insecurity were offered membership to the food club. By doing this, the DNP student was able to increase the target population. 11 patients in the referral group had completed SDOH screening, equal to 47% of the sample.

Several barriers to identify qualifying patients and connecting patients with the Food Club include lack of SDOH screening and lack of staff education prior to program initiation. Barriers the DNP student encountered related to workflow processes included concern related to patient's paying an additional copay for an office visit related to Food Club information/referral completion, the feasibility of meeting with all interested patients within the allotted time frame, and the front desk staff unaware of Food Club appointments and turning patients away. The DNP student also faced language barriers during the recruitment stage, as a limited number of staff members were bilingual. Moreover, during the patient referral period the organizational community health worker resigned, leading to an inability to screen Spanish speaking patients.

The DNP student updated organizational stakeholders via bi-weekly emails and meetings. This update emails included current processes, barriers experienced, and feedback. Organizational stakeholders appreciated the communication and provided feedback to improve processes.

Limitations

This project is in the early stages of completion, because of this there was a small implementation period and a small sample size. Due to time restrictions, the patient recruitment period was limited, leading to a reduced number of patients that completed the referral and ultimately completed membership to the food club. Additional limitations include organizational funding, patient psychosocial influences, and Spanish language barriers. Due to organizational limitations on funding, assistance by organizational employees during the implementation phase was limited.

In addition, the resignation of the community health worker and subsequent inability to appropriately screen Spanish speaking patients significantly affected patient recruitment. To mitigate this, the DNP student identified qualifying patients on the certified diabetes educators schedule that could be recruited during their appointment time. The CDE, who is bilingual, agreed to educate patients during follow up appointments to complete the referral process. The DNP student also purchased and placed a whiteboard/corkboard in the CDE's office in eyesight of patients, thereby increasing patient visibility of Food Club marketing and advertising materials.

The largest limitation of the project was the DNP student's inability to access organizational resources during the final weeks of the data analyzing period. Due to the COVID-19 pandemic, access to patient data and organizational resources was eliminated resulting in the

inability to complete chart audits related to depression scores and collect qualitative data on patients that were previously unable to be contacted.

Stakeholder Support

The DNP project was made possible by strong support from organizational stakeholders and leaders. The organization identified the care of uncontrolled diabetics as a key practice change, therefor the DNP student had the support of a variety of resources. The DNP student was present for all stakeholder meetings during the early stages of the project. Organizational stakeholders continuously provided feedback of project development. Additionally, the organization aided the DNP student in patient tracking capabilities via electronic health record changes and communication strategies.

Leadership at the Food Club were also actively involved in the DNP project. The DNP student visited the location bi-weekly to provide updates and feedback to executive leadership. The DNP student also took organizational stakeholders to the location to educate staff on the layout of the food club and the patient experience shopping there. Food Club leadership remained actively involved and flexible during the project lifetime.

Project Sustainability Plan

The DNP project has a robust sustainability plan to further patient recruitment and data collection. Following the patient recruitment period and initial data collection, the DNP student was notified by organizational stakeholders that the organization was chosen to be the recipient of a $50,000 grant that was written to support the previously identified practice problem. This grant provided funding to the organization for a length of two years. Following this announcement, the DNP student was an active participant in organizational meetings to determine next steps and implementation strategies. The DNP student collaborated with

organizational leadership and staff concerning workflow processes, barriers experienced, and initial project findings.

During the lifetime of the grant, the organization will continue to connect patients with uncontrolled diabetes, as well as included patients with uncontrolled hypertension, to the Food Club. The organization is also working to improve SDOH screening among their patients. The DNP student additionally identified another university DNP student to take charge of the project in the future months. This succeeding student was provided a tour of the organization, introduced to stakeholders, educated on the DNP project and future grant study, and connected with an organizational mentor.

Implications for Practice and Further Study in the Field

This DNP project had numerous practice implications. Most notably, identification of social determinants of health better improves the care coordination among patients. Additionally, connection with the Food Club has the potential to improve food insecurity and the amount of healthy foods patients have access to. The DNP project served as a "pilot" study of the now current grant, allowing the organization insight into key workflow strategies, barriers, and possible outcomes. Due to the limitations in research related to incentivizing health food choices among vulnerable populations, the subsequent grant research has the potential to significant impact what is known about the management of diet related chronic disease among vulnerable populations.

Conclusion

Type 2 diabetes is the seventh leading cause of death in the United States, with a total direct and indirect cost of $245 billion dollars. This diet related chronic disease has a disproportionately large impact on vulnerable populations, an occurrence that is believed by

many to be a consequence of the large number of social disparities, specifically food related, experienced by the population. An organizational assessment proved that this statistic is accurate, with over 29% of diabetic patients at the organization having an A1C greater than 9%. An evidence-based literature review on the topic acknowledged the proposed solution to be valid. By properly screening for food insecurity and connecting patients to resources that increase access to healthy fruits and vegetables it is possible to positively impact health outcomes.

Although significant barriers were faced, the DNP project successfully connected the organization as a referral partner for a local non-profit, incentive-based community grocery store. During the recruitment period the DNP student successfully identified 48 patients with interest in the Food Club, with 23 total patients completing the referral process. Unfortunately, of those 23, only six patients successfully completed the membership process at the Food Club. Due to the small sample size, the reliability of data collected is limited due to the increased likelihood of variability and bias. Budget and funding constraints remain an external threat for the relationship between the organization and the Food Club, an issue that is lessened by grant funding. Grant funds also mitigate organizational weaknesses related to staffing limitations.

Due to the robust sustainability plan and grant funding, the organization and the subsequent DNP student can continue this project, with next steps including appropriately screening patients for food insecurity, targeting patients that remain interested in the Food Club, and increasing the sample size of patients that have completed membership to improve statistical data analyzation.

Dissemination of Results

The results of this project were disseminated via various methods, allowing for individuals from various organizations with interest in reducing healthcare disparities to gain insight from the DNP student's research and project results. Project workflow processes, objectives, and results were presented to organizational employees during monthly staff meetings. Unofficial results of the project were presented to organizational stakeholders in March of 2020. Additionally, the DNP presented a final defense to organizational stakeholders and a poster presentation to members of the Grand Valley State University community. A final paper will also be submitted to ScholarWorks.

Reflection on DNP Essentials

As required by the American Association of Colleges of Nursing (AACN), the foundation of a DNP education is based on and understanding and enactment of eight DNP essentials. The attainment of these essentials has proven to adequately prepare the DNP student to operate at the highest level of proficiency with their professional practices. The eight DNP essentials include: scientific underpinnings of practice, organizational and systems leadership for quality improvement and systems thinking, clinical scholarship and analytical methods for evidence-based practice, information systems/technology, health care policy for advocacy, interprofessional collaboration, clinical prevention and population health, and advanced nursing practice. A summary of the attainment of these DNP essentials during the DNP project are outlined below.

DNP Essential I: Scientific Underpinning for Practice

The scientific foundation of practice includes the ability to integrate nursing science with knowledge related to ethics, analytical, psychosocial, and organizational science domains

(AACN, 2006). Fulfilling this essential entails developing new practice processes, evaluating outcomes, and enhancing the delivery of healthcare. The DNP student met this essential through the project by completing a literature review to gain a background on current evidence to support proposed interventions and implementing evidence-based practices to improve the delivery of healthcare.

DNP Essential II: Organizational and Systems Leadership for Quality Improvement

According the AACN (2006), this DNP essential involves using advanced communication skills, developing and evaluating care delivery processes, monitoring budgets, and analyzing cost effectiveness. The DNP student met this essential by meeting with organizational leadership and quality improvement teams to develop efficient workflow processes and update stakeholders on project progress at outlined through the timeline reviewed above.

DNP Essential III: Clinical Scholarship and Analytical Methods for Evidence Based Practice

The transformation of research into evidence-based practice is a key ability of a DNP prepared student (AACN, 2006). This DNP student met this essential by using systematic methods to search for and evaluate literature and provide the best evidence-based intervention to improve health outcomes among uncontrolled diabetic patients at the organization of focus. Additionally, the DNP student used information technology and research methods to appropriately determine the target population, qualifying patients, and identify process gaps.

DNP Essential IV: Information Systems/Technology and Patient Care Technology for the Improvement and Transformation of Health Care

A defining skill of the DNP prepared student is the ability to use information technology to improve the delivery and transformation of healthcare. The development of this skill produces

an individual that has the capability to use information systems/technology resources to implement process and quality improvements and deliver evidence-based care (AACN, 2006). Throughout project development and implementation, the DNP students has used the electronic health record, communicated with data and informatics leadership within the practice site, implemented changes within the electronic health record, and created a new order management task and referral portal solely for Food Club members to improve data tracking capabilities.

DNP Essential V: Health Care Policy for Advocacy in Health Care

A thorough understanding of healthcare policy and the role of advocacy within the nursing practice is crucial for the doctorate prepared nursing student. The DNP prepared student should have the capability to impact healthcare policy that addresses the inequalities of the current health system (AACN, 2006). The DNP student met this essential by gaining an understanding of organizational policies and developing workflow processes around outlined organizational practices. The DNP student advocated for the vulnerable population within the organization throughout the project. Additionally, the DNP student attended the 2019 MICNP Advocacy Day and was invited to the 2020 AACN Policy Summit in Washington DC. Unfortunately, due to the COVID-19 pandemic, the Policy Summit was canceled. The DNP student did however review webinars provided by the AACN related to policy regulation and advocacy.

DNP Essential VI: Inter-Professional Collaboration for Improving Patient and Population Health Outcomes

The multifactorial, complex healthcare system demands collaboration between disciplines in order to provide efficient and well-rounded patient care. The skill of interprofessional collaboration allows the DNP student to provide patient centered care (AACN, 2006). The DNP student met this essential through continuous communication with the certified diabetes

education, RN care manager, and project stakeholders. The DNP student also provided feedback information to providers.

DNP Essential VII: Clinical Prevention and Population Health for Improving the Nation's Health

The promotion of health, transition of mindset from treatment based to prevention based, and the understanding of population health encompass the goal of DNP Essential VII (AACN, 2006). The unequal prevalence of diet related chronic disease among vulnerable populations is a significant issue in healthcare and represents one of its largest disparities. This essential was the most utilized by the DNP student. The DNP student met this essential by spending a significant amount of time at the FQHC and working closely with the population to improve health outcomes related to diet related chronic disease.

DNP Essential VIII: Advanced Nursing Practice

At the foundation of a doctoral prepared nurse is an understanding of the essential skill and knowledge needed to successfully practice advanced practice nursing (AACN, 2006). Within the project site the DNP student shadowed multiple physicians and nurse practitioners. The development and dissemination of workflow processes for the DNP project placed the DNP student in the position of leader.

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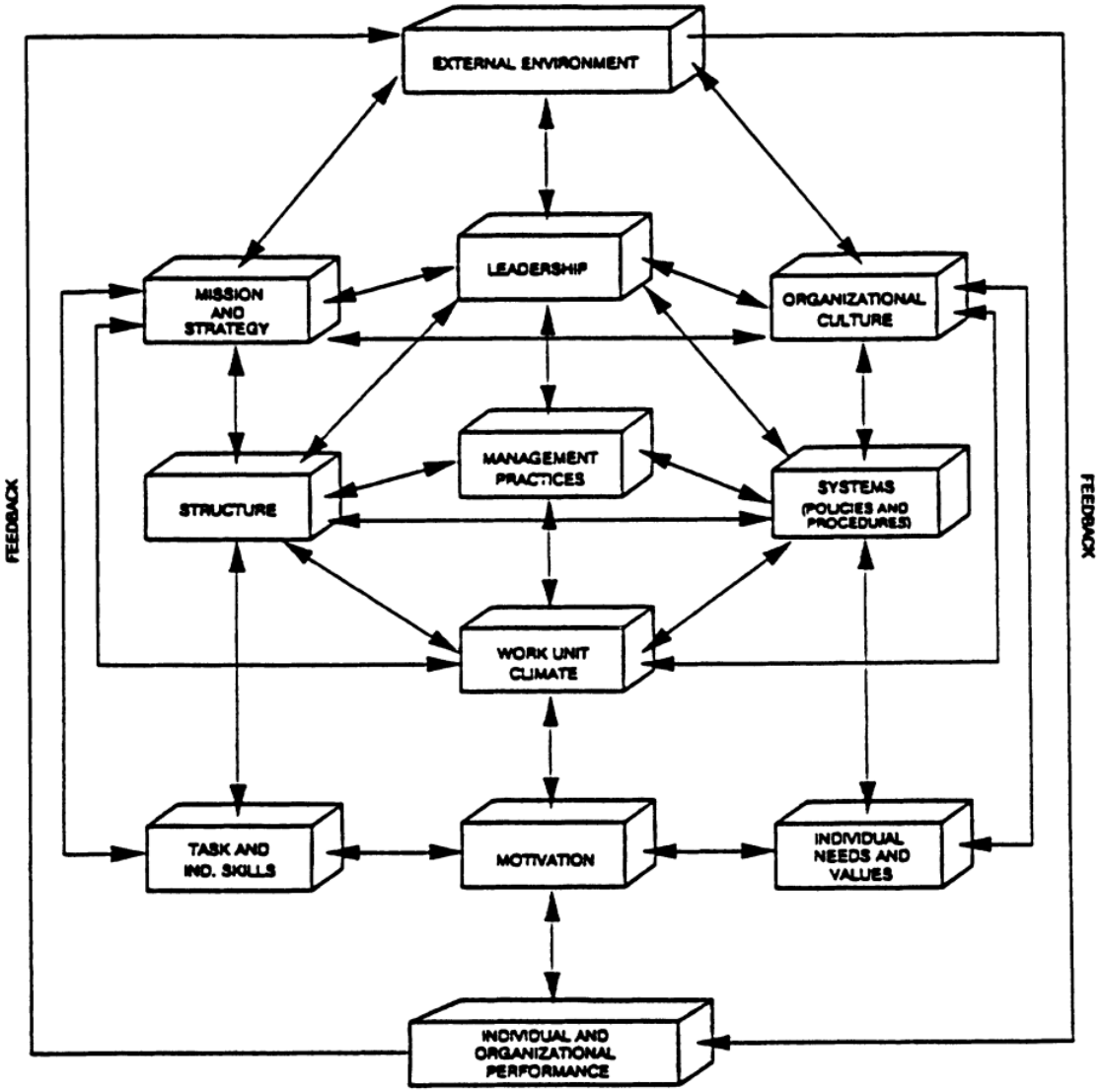
Appendices

Appendix A

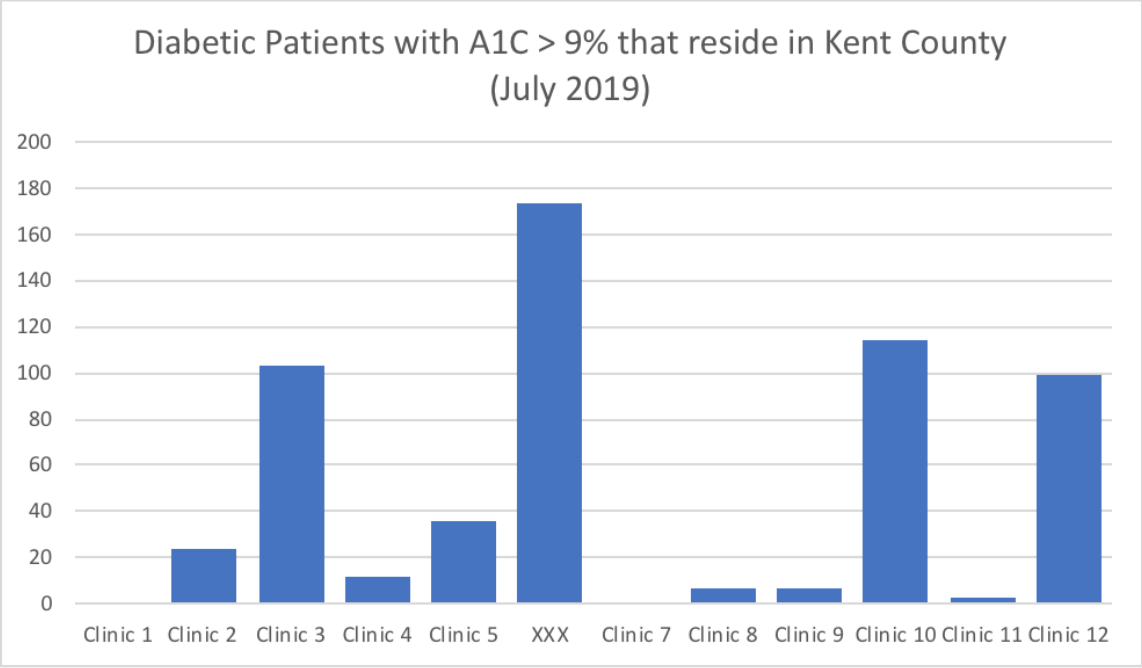
Burke Litwin Causal Model



Adapted from "A Causal Model of Organizational Performance and Change," by W.W. Burke and G.H. Litwin, 1992, *Journal of Management, 18,* 528. Copyright 1992 by Southern Management Association.

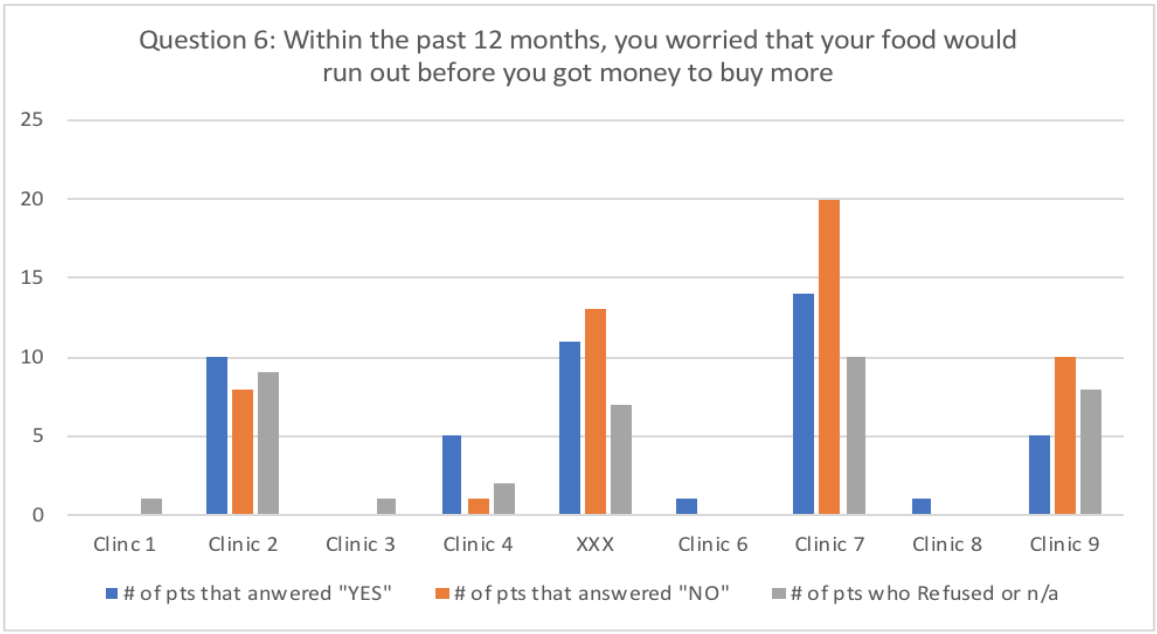
Appendix B

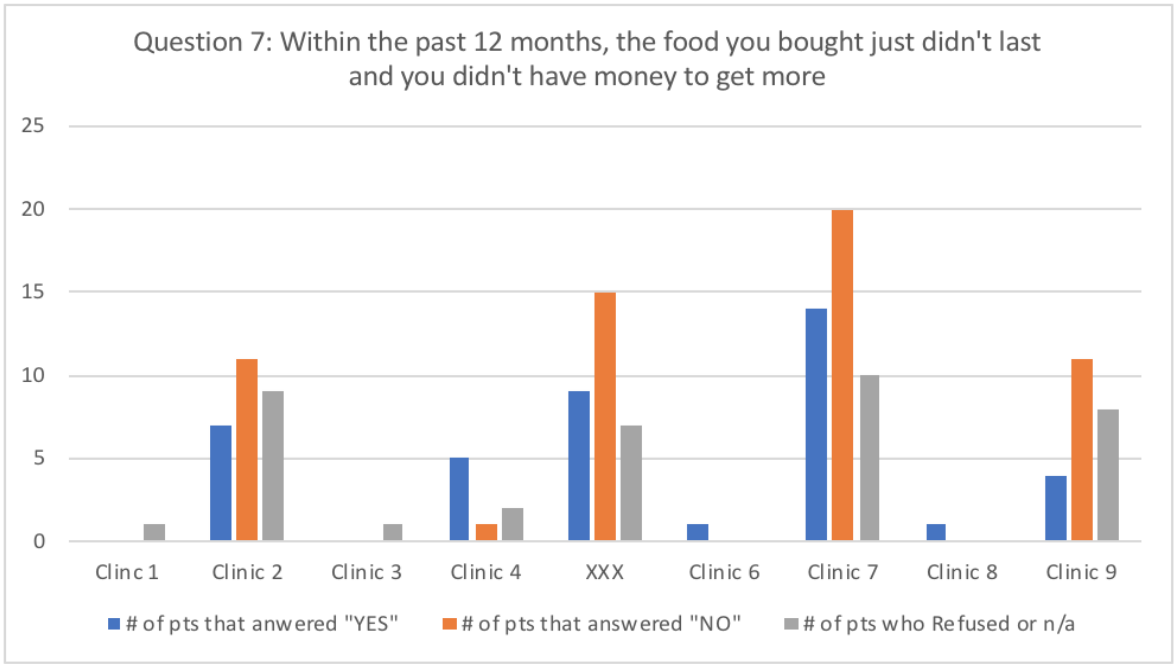
Uncontrolled Diabetes Patient Population



Appendix C

Screening for SDOH among Uncontrolled Diabetics





Appendix D

Food Club Presentation

COMPARED TO

$13 AT A TRADITIONAL GROCERY STORE

$13 AT THE FOOD CLUB (60 POINTS)

12 POINTS

12 POINTS

Appendix E

GVSU IRB Approval Letter

GRAND VALLEY STATE UNIVERSITY
www.gvsu.edu

DATE:	August 28, 2019
TO:	Karen Burritt
FROM:	Office of Research Compliance & Integrity
PROJECT TITLE:	Incentivizing Healthy Food Choices among Uncontrolled Type 2 Diabetic Patients with Food Insecurity to improve Depressive Symptoms and Glycemic Control.
REFERENCE #:	20-047-H
SUBMISSION TYPE:	IRB Research Determination Submission
ACTION:	Not Research
EFFECTIVE DATE:	August 28, 2019
REVIEW TYPE:	Administrative Review

Thank you for your submission of materials for your planned scholarly activity. It has been determined that this project does not meet the definition of research* according to current federal regulations. The project, therefore, does not require further review and approval by the IRB. Scholarly activities that are not covered under the Code of Federal Regulations should not be described or referred to as "*research*" in materials to participants, sponsors or in dissemination of findings. While performing this project, you are expected to adhere to the institution's code of conduct and any discipline-specific code of ethics.

A summary of the reviewed project and determination is as follows:

The purpose of the project is to use quality improvement methodology to determine if collaboration with the Community Food Club, a membership based incentivized grocery store, will result in positive health outcomes among patients with uncontrolled Type 2 Diabetes and food insecurity. The results of this project will be used to improve patient care and patient outcomes at one local community health clinic. While this is a systematic investigation, it is not designed to create new generalizable knowledge. Therefore, it does not meet the federal definition of research and IRB oversight is not required.

This determination letter is limited to IRB review. It is your responsibility to ensure all necessary institutional permissions are obtained prior to beginning this project. This includes, but is not limited to, ensuring all contracts have been executed, any necessary Data Sharing Agreements and Material Transfer Agreements have been signed, and any other outstanding items are completed.

An archived record of this determination form can be found in IRBManager from the Dashboard by clicking the "_ xForms" link under the "My Documents & Forms" menu.

If you have any questions, please contact the Office of Research Compliance and Integrity at (616) 331-3197 or rci@gvsu.edu. Please include your study title and study number in all correspondence with our office.

Office of Research Compliance and Integrity | 1 Campus Drive | 049 James H Zumberge Hall | Allendale, MI 49401
Ph 616.331.3197 | rci@gvsu.edu | www.gvsu.edu/rci

Appendix F

Letter of Support from Site Mentor

To Whom It May Concern:

In my capacity as the Chief Medical Officer at [redacted] I fully support Briauna Taylor's project entitled Incentivizing Healthy Food Choices among Uncontrolled Type 2 Diabetic Patients to Improve Food Insecurity, Depressive Symptoms, and Glycemic Control.

The proposed work is addressing social determinants of health, particularly food insecurity in our population of patients who have uncontrolled diabetes, food insecurity and are at 250% of the federal poverty line or below. These patients face significant barriers to improve their health. This project helps reduce barriers for these patients and aligns with the mission of [redacted] which highlights the importance of comprehensive quality care for all, regardless of their ability to pay. Studying patient engagement with the program as well as clinical outcome indicators such as glycemic control, BMI, blood pressure and lipid levels is highly relevant to our organization and may lead to more enhanced models of health care service in the future.

[redacted] guarantees the availability of the necessary supports in order to ensure a successful implementation and completion for the proposed project.

Sincerely,
[redacted], MD, FACP
[redacted]
Chief Medical Officer

Appendix G

Letter of Support from Food Club Executive

To Whom It May Concern:

In my capacity as the Executive Director at the [redacted] Food Club, I fully support Briauna Taylor's project entitled Incentivizing Healthy Food Choices among Uncontrolled Type 2 Diabetic Patients to Improve Food Insecurity, Depressive Symptoms, and Glycemic Control.

The proposed work is addressing social determinants of health, particularly food insecurity in [redacted]'s population of patients who have uncontrolled diabetes, food insecurity and are at 200% of the federal poverty line or below. These patients face significant barriers to improve their health. This project helps reduce barriers for these patients and aligns with the mission of the Food Club which highlights the importance access to healthy foods in an approach rooted in dignity and consumer choice. Studying patient engagement with the program as well as clinical outcome indicators such as glycemic control, BMI, blood pressure and lipid levels is highly relevant to our organization and may lead to more enhanced models of food security as it pertains to health in the future.

The [redacted] Food Club guarantees the availability of the necessary supports in order to ensure a successful implementation and completion for the proposed project.

Sincerely,

[redacted]

Executive Director

[redacted] Food Club

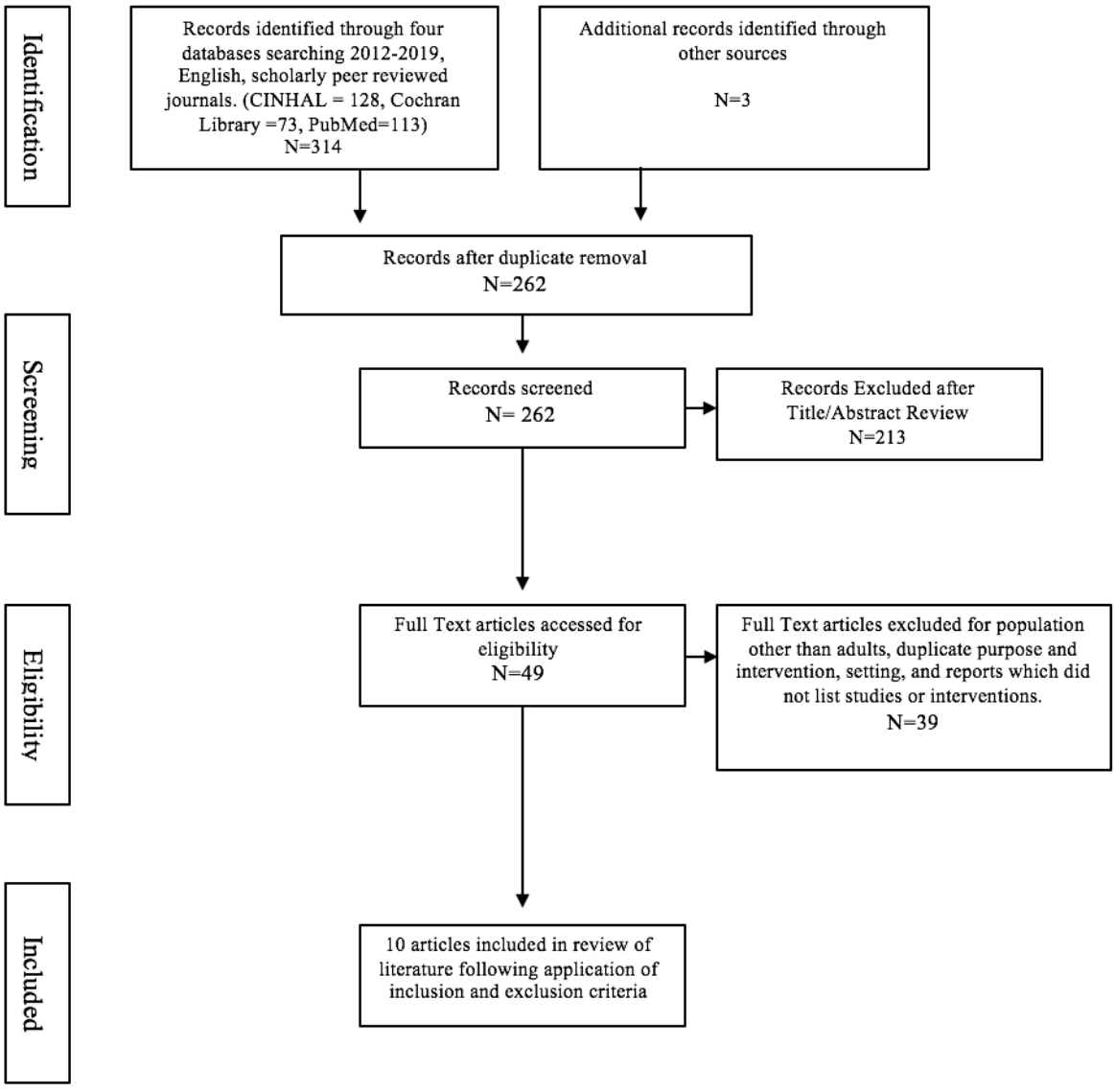
Appendix H

Strengths, Weaknesses, Opportunities, Threats (SWOT) Analysis

SWOT Analysis	
Strengths	**Weaknesses**
• Organizational focus on reducing A1C and creating a partnership with the local food club. • Certified diabetes educator on site to aid in patient education • Clearly defined vision, mission, and strategic plan with identified data measurement goals. • Work climate and culture that is flexible and open to change.	• Demanding tasks for staff and limited time. • 17.8% of uncontrolled diabetes patients currently screened for food specific SDOH.
Opportunities	**Threats**
• Active involvement by food club director in the planning process. • Grants and incentives available for funding support. • Collaborations with external community health services and resources to assist patients with housing, food, transportation, and/or employment assistance.	• Elevated no-show and patient non-compliance rates. • Budget and funding constraints. • 98% of patient population at or below 200% of the federal poverty level.

Appendix I

PRISMA Flow Diagram of Systematic Search



Adapted from "Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement," by D. Moher, A. Liberati, J. Tetzlaff, D. Altman, and PRISMA Group, *BMI, 339* (7716), 332-336. Copyright 2009

Appendix J

Table of Evidence

Author (Year) Purpose	Design (N)	Inclusion Criteria	Intervention vs Comparison	Results	Conclusion
Ferdinand, R., Torres, R., Scott, J., Saeed, I., & Scribner, R. *(2017)*	Cross sectional Observational survey analysis N=176	Five fresh food markets within New Orleans. Participants must be enrolled in the "Veggie Dollars" (VDP) program.	Comparison: membership to a voucher-based program that incentivized purchases of fruit and vegetables.	Point of sales data indicated VDP sales nearly doubled over the intervention period. Majority of participants (63%) reported produce purchases increased. 89% of participants reported increasing consumption of fruits and vegetables.	Monetary incentives were associated with increased fruit and vegetable purchases at local fresh food markets among low income minorities.
Rivich, J., Kosirog, E., Billups, S., Petrie, J., Saseen, J. (2019). Objective of study was to identify characteristi	Retrospective cohort study. N=6,85	Diagnosis of diabetes within the ages of 18-89 at an FQHC.	A1C >9% or untested vs. patients with A1C<9%.	48% of patients who met inclusion criteria had an uncontrolled A1C. Results indicated that poor	Poor appointment adherence and depressive symptoms are associated with higher A1C levels among

Author (Year) Purpose	Design (N)	Inclusion Criteria	Intervention vs Comparison	Results	Conclusion
cs associated with A1C>9% or untested A1C compared with patients with A1C<9% at an FQHC.				appointment adherence and and/or a positive PHQ-2 screening increased the risk for uncontrolled A1C among patients.	patients at an FQHC
Shalowitz et al. (2017) To determine whether food security is related to glucose control, beyond ongoing medication management, among Type 2 diabetes patients at a FQHC.	Longitudinal observational study N=339	Adult patients of an FQHC with a diagnosis of Diabetes and completed food insecurity questionnaire	Intervention: community benefit program. Baseline assessment of food security, demographics and diabetes, observation throughout a 24month study period with A1C measured throughout. Comparison of food secure patients vs. food insecure patients.	Patients with lower food security when compared to other patients were more likely to be on insulin and have higher A1c levels at baseline.	Among Type 2 Diabetic patients, low food security impairs glucose control.
Abdurahman, A., Chaka, E., Nediat, S., Dorosty, A., & Maidzadeh,	Systematic Review and meta-analysis of 18 articles.	Included studies assessed the association of household food	Relationship between food insecurity and diabetes type 2	Household food insecurity is significantly associated with the	Household food insecurity increases the odds of Diabetes

Author (Year) Purpose	Design (N)	Inclusion Criteria	Intervention vs Comparison	Results	Conclusion
R. (2019) Objective is to clarify the association between household food insecurity and type 2 diabetes mellitus		insecurity with the risk of diabetes type 2 in adults. Exclusion criteria included non-human studies, reviews/case reports/letters, study population less than 18 years of age.		odds of diabetes type 2.	type 2 among adults.
Young, C., Yun, K., Kang, E., Shubrook, J., & Dugan, J. (2018). Purpose of study is to explore the correlations between A1C and social and personal factors such as diabetes knowledge and food insecurity among patients at a FQHC.	Cross sectional survey study N=96	Diagnosis of type 2 diabetes, English speaking, 18 years of older patients at the identified FQHC	USDA food security questionnaire, demographic questionnaire, DNT15, SKILLED scale administration and A1C obtained and analyzed.	Results from the food insecurity questionnaire had the highest correlation with A1C	Patients with food insecurity, low diabetes knowledge, and low diabetes numeracy are the most vulnerable patients with diabetes. These factors should be assessed by the healthcare organization and interventions implemente

Author (Year) Purpose	Design (N)	Inclusion Criteria	Intervention vs Comparison	Results	Conclusion
					d as indicated
Hughes, M., Yange, E., Ramanathan, D., & Bejamins, M. (2016) Assess the impact of a community health worker-based intervention in reducing A1C levels among adults with type 2 diabetes.	Case Report N=459	Adults aged 18+ with a diagnosis of diabetes. Exclusion criteria included Diabetes Type 1, diagnosis of a mental illness, and less than age 18.	Intervention: Community health worker-based intervention focused on educating patients on managing diabetes, diet, exercise, and goal setting.	A1C decreased by 0.5%, participants were less likely to be depressed, to forget to take their diabetes medications, and more likely to score higher on diabetes knowledge assessments	The community health worker program was effective in reducing A1C in identified patients. Additional positive outcomes were seen in depressive symptoms and diabetes knowledge and self-maintenance.
Silverman, J., Krieger, J., Kiefer, M., Hebert, P., Robinson, J., & Nelson, K. (2015). Evaluate the relationships between food insecurity and	Secondary analysis of baseline data from a Peer Support for Achieving Independence in Diabetes, a RCT trial that took place from 11/2011-	30-70-year-old adults with A1C greater than or equal to 8% and a household income less than 250% of the federal poverty level.	Intervention: Community health worker led home-based diabetes self-management	Prevalence of food insecurity was 47.4%, statistical analysis reviewed pts with food insecurity were more likely to be depressed, report	Food insecurity is associated with depression, diabetes distress, low medication adherence, and worse glycemic control.

Author (Year) Purpose	Design (N)	Inclusion Criteria	Intervention vs Comparison	Results	Conclusion
depression, diabetes distress and medication adherence, and to determine whether these factors influence glycemic control.	10/2013			diabetes distress, and have low medical adherence	
Seligman, H., Jacobs, E., Lopex, A., Tschann, J., & Fernandez, A. (2012). Objective is to determine if food insecurity is independent ly associated with poor glycemic control, or if healthy diet, diabetes self-efficacy, or emotional distress affect this relationship.	Cross sectional survey analysis and chart review N=711	Diagnosis of type 2 Diabetes, English or Spanish speaking adult patients age 18 or older that self-identified as white, African American, or Mexican American.	No intervention, the relationship between food insecurity and glycemic control was reviewed.	The mean A1C for individuals with food insecurity was 0.47% higher than those without. Food insecure individuals were significantly more likely than food secure individuals to have poor glycemic control (A1C >8.5%)	Household food insecurity increases the likely hold of individuals being overweight or obese, increases the prevalence of diabetes, and is correlated with higher A1C levels.

Author (Year) Purpose	Design (N)	Inclusion Criteria	Intervention vs Comparison	Results	Conclusion
Lyles et al. (2013). Objective of the study is to determine if food insecurity makes diabetes self-care more difficult	Secondary observational analysis of a randomized clinical trial that took place 2009. N=665	Adult patients of the identified FQHC that had an A1C level >6.5%, spoke English, and had no significant auditory, visual, or cognitive impairments.	Intervention: health literacy and diabetes communication initiative. Intervention assessed the effectiveness of administering diabetes self-management support tools and educational guides to patients.	33% of the sample population reported baseline food insecurity. Food insecurity was a statistically significant indicatory to glycemic control.	Participants of the study who reported food insecurity at baseline had improvements overtime following the intervention.
Heerman et al. (2016) Objective was to examine the association between food insecurity, diabetes self-care, and glycemic control.	Cross sectional analysis of baseline data from an RCT N=401	Diagnosis of diabetes type 2, aged 18-85, English or Spanish speaking, with a most recent A1C greater than or equal to 7.5%.	RCT intervention: training for providers in enhanced low-literacy/numeracy communication techniques for diabetes management, or a standard diabetes educational intervention.	73% of patients reported food insecurity. Food insecurity was significantly associated with self-care behaviors, worse glycemic control.	Food insecurity is a significant predictor of self-care behaviors and worsening glycemic control.

Appendix K

AHC Health Related Social Needs Proxy Screening Tool

Screening Location:
Cherry Health - _____

Accountable Health Communities (AHC)
Health-Related Social Needs
Proxy Screening Tool

Cherry Health participates in a screening and referral program that can help connect individuals and families to available services in Kent County that may improve their health. By answering these questions, we can provide connections to local services. Many of these services are low cost or free of charge, depending on availability. All information gathered will be kept confidential. Please answer the questions as they relate to his/ her situation. There are no right or wrong answers.

Client Demographics

Screening Date: _____
County of Residence: _____
Medicaid, Medicare, or HICN ID Number (Please Circle One): _____
First and Last Name: _____
Date of Birth: _____
Address: _____ **Apt #:** _____
City, State, ZIP: _____
Primary phone number: _____ **Home Mobile Work (Please Circle One)**
Email: _____
If you are the parent or caregiver for this individual, please provide your name: _____
Preferred language: _____

☐ Client Declined Screening

Information

1. Complete the following statement. I am answering this survey about…

☐ Myself ☐ My child ☐ Another adult for whom I provide care
☐ Other *(please describe your relationship to this person)* _____

For the rest of the survey, please think about the person you selected in Question 1 when answering the questions.

2. How many times has he/she received care in an emergency room (ER) over the last 12 months? *If he/she is in the ER now, please count his/her current visit. Please do not count urgent care visits.*

☐ 0 times ☐ 1 time ☐ 2 or more times

3. Does he/she live in any of the following locations?

Go to page 3 End

☐ An assisted living facility (this is a long-term care option that provides personal care support services such as meals, bathing, dressing, or medications)
☐ A nursing home (this is a long-term care option that provides 24 hours a day medical care that would not be possible in other housing)
☐ A rehabilitation center or skilled nursing facility (these are centers that help a person heal after illness or injury by providing treatments like physical, occupational, or speech therapy)
☐ An in-patient recovery program for a drug or alcohol problem
☐ A psychiatric facility (this is a health care facility providing treatment to those with behavioral or emotional illnesses)
☐ A correctional facility (such as a jail, prison, detention center, or penitentiary)
☐ None of the above (continue to page 2)

Before you continue, please make sure you have selected responses to the above questions and completed this section.

(over)

Please think about the person you selected in Question 1 when answering the questions. Please select the option that best describes him or her.

Living Situation

4. What is his/her living situation today?

☐ He/she has a steady place to live

☐ He/she has a place to live today, but **he/she is worried** about losing it in the future

☐ He/she does not have a steady place to live (he/she is temporarily staying with others, in a hotel, in a shelter, living outside on the street, on a beach, in a car, abandoned building, bus or train station, or in a park)

5. Think about the place he/she lives. Does this place have problems with any of the following? CHOOSE ALL THAT APPLY

☐ Pests such as bugs, ants, or mice
☐ Mold
☐ Lead paint or pipes
☐ Lack of heat
☐ Oven or stove not working
☐ Smoke detectors missing or not working
☐ Water leaks
☐ None of the above

Food

Some people have made the following statements about their food situation. Please answer whether the statements were OFTEN, SOMETIMES, or NEVER true for him/her and their household in the last 12 months.

6. Within the past 12 months, he/she worried that their food would run out before they got money to buy more.

☐ Often true ☐ Sometimes true ☐ Never true

7. Within the past 12 months, the food he/she bought just didn't last and he/she didn't have money to get more.

☐ Often true ☐ Sometimes true ☐ Never true

Transportation

8. In the past 12 months, has lack of transportation kept him/her from medical appointments, meetings, work or from getting things needed for daily living?

☐ Yes ☐ No

Utilities

9. In the past 12 months has the electric, gas, oil, or water company threatened to shut off services in his/her home?

☐ Yes ☐ No ☐ Already shut off

Safety

Because violence and abuse happens to a lot of people and affects their health we are asking the following questions.

10. How often does anyone, including family and friends, physically hurt him/her?

☐ Never ☐ Rarely ☐ Sometimes ☐ Fairly often ☐ Frequently

11. How often does anyone, including family and friends, insult or talk down to him/her?

☐ Never ☐ Rarely ☐ Sometimes ☐ Fairly often ☐ Frequently

12. How often does anyone, including family and friends, threaten him/her with harm?

☐ Never ☐ Rarely ☐ Sometimes ☐ Fairly often ☐ Frequently

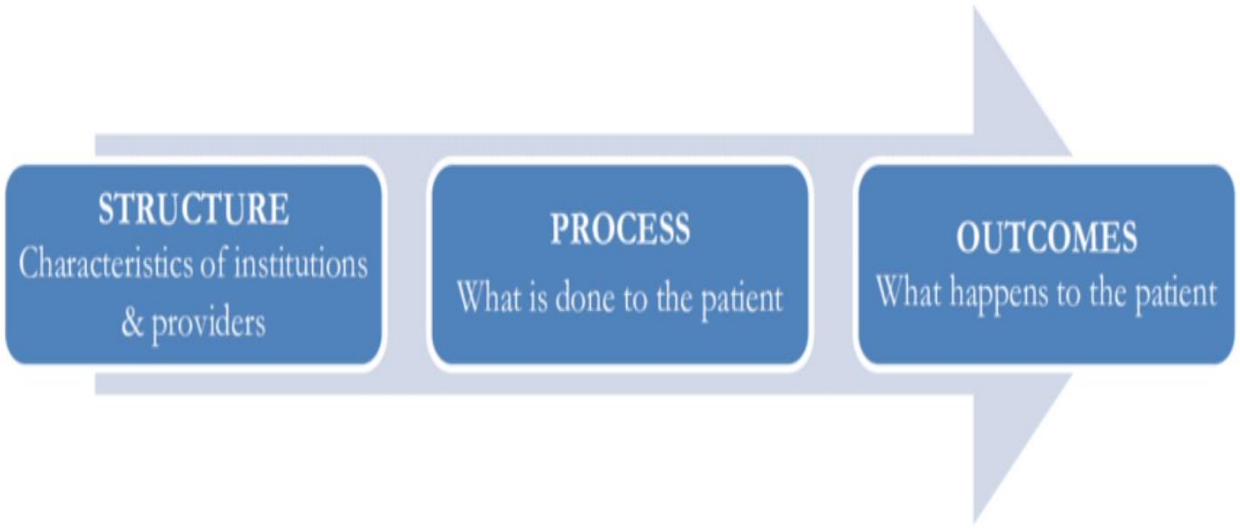
13. How often does anyone, including family and friends, scream or curse at him/her?

☐ Never ☐ Rarely ☐ Sometimes ☐ Fairly often ☐ Frequently

(over)

Appendix L

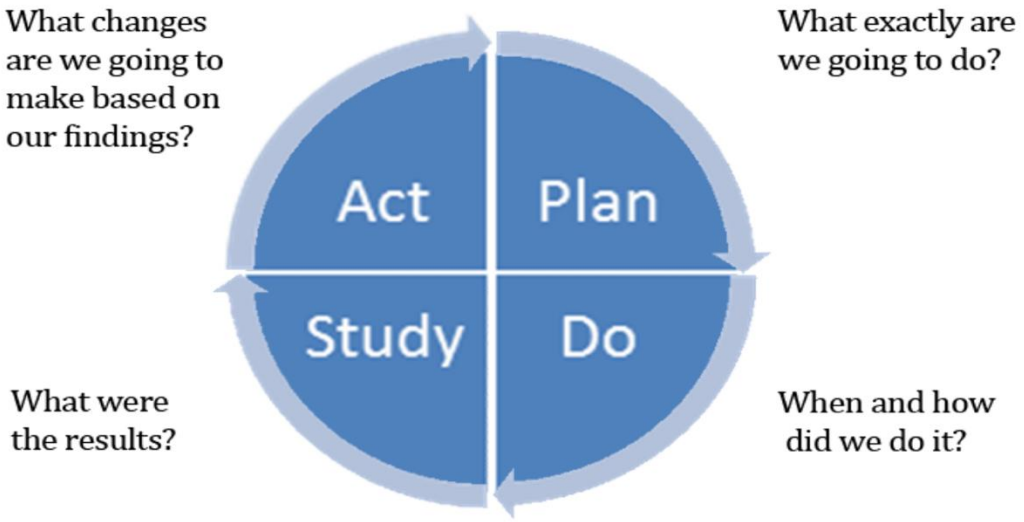
The Donabedian Model



The Donabedian Model. Adapted from "The Quality of Care, How Can it be Assessed" by A Donabedian, 1988, *Journal of the American Medical Association*

Appendix M

PDSA Cycle



Adapted from "PDSA Cycle Template" by CMS. Copyright 2017

Appendix N

Food Club Category Guide

CATEGORY GUIDE

Category	Points	Limit	Category	Points	Limit	Category	Points	Limit
Baby Food	1	6	Cheese	4	2	Lunchmeat	4	6
Baked Good	2	6	Coffee	4	6	Milk	6	2
Baking	2	6	Condiment	2	6	Pasta	2	6
Beans	1	6	Eggs	3	1	Peanut Butter	4	2
Beverages	2	6	Fresh Fruit	1	6	Prepared Meals	3	6
Bread	2	6	Fresh Vegetables	1	6	Rice	1	6
C/F Fruit	1	6	Frozen Deserts	4	6	Snacks	4	6
C/F Vegs	1	6	Frozen Meals	3	6	Soup	2	6
Canned Meat	4	6	Frozen Meat	6	2	Yogurt	2	6
Cereal	2	6	Juice	2	6			

Dairy
Cheese
Milk
Yogurt

Grain
Baking
Bread
Cereal
Pasta
Rice

Ready Made
Prepared Meals
Frozen Meals
Soup
Baby Food

Protein
Beans
Eggs
Canned Meat
Frozen Meat
Lunchmeat

Drinks
Beverages
Coffee
Juice

Fruits and Vegetables
C/F Fruit
C/F Vegs
Fresh Fruit
Fresh Vegetables

Sweets
Frozen Deserts
Snacks
Baked Goods

Miscellaneous
Condiments
Peanut Butter

Appendix O

Initial Patient Communication Phone Call Script

Caller: “Hi my name is …. and I am a …. calling from your providers office at the organization”

Caller: “You have been identified by you provider as a patient with uncontrolled diabetes, meaning your A1C is greater than 9%. The organization is now collaborating with a local non-profit in order to increase your access to health foods with the goal of improving your health. Are you interested in learning more?”

- If NO: “Thank you for your time, if you have any questions please feel free to notify the office”. End call

If patient requests additional information about food club:

- Caller: “The food club is a membership-based grocery store that operates on a points system. The monthly costs range from $11-13, and you are given a certain number of points to spend on food. The club is set up like a normal grocery store, only difference is you purchase food with your points, healthy foods are fewer points than unhealthier choices. Right now, the organization is able to provide you a referral to be able to take directly to the Food Club”
- Caller: “Would you like come into the office and learn more and complete a referral? This process should only take 15minuts”
    - If YES: “Next steps include having you come into the office to complete a referral form and to further discuss the food club, are you able to review dates at this time?
        - If Yes: provide patient with a time for group referral completion
        - If No: provide patient with telephone number and extension to CHW to make appointment time.

If patient does not answer call, leave message on answering machine:

Caller: “Hi my name is ... and I am a …. calling from the organization. Please call me back at: 616-XXX-XXX ex.XXXX”

Appendix P

Patient Follow Up Interview Questions

Referral complete, no membership started

1. I see that you have completed the referral process for the Food Club, have you had a chance to go to the location. If not, why?
2. What is your primary mode of transportation?
3. Do you feel transportation issues are impacting your participation in the Food Club?
4. What is the biggest struggle you have with eating healthy foods and maintaining a healthy diet?
5. What is the biggest struggle you have in managing your diabetes?

Referral complete, membership started

1. I see that you completed the membership process at the Food Club, what are your thoughts on the store?
2. What is your primary mode of transportation?
3. Do you feel transportation issues are impacting your participation in the Food Club?
4. Food insecurity post intervention questions:
    a. Following membership to the Food Club, are you worried that your food would run out before you got money to buy more?
    b. Following membership to the Food Club, do you feel the food you bought just didn't last and you didn't have money to get more?
5. What is the biggest struggle you have in eating healthy foods and maintaining a healthy diet?
6. What is the biggest struggle you have in managing your diabetes?

Appendix Q

Outcome Measures

	Concept measured	How measured (tool, survey)	When measured	Who measures
Patient Outcomes	Hemoglobin A1C	Percentage (%), obtained via Point of Care finger stick	Every 3 Months	Organization
	Food Insecurity	Accountable Health Communities (AHC) Health-Related Social Needs Standards Screening Tool.	Pre-intervention, post intervention	Student, Organization
	Depression	Patient Health Questionnaire (PHQ2 or PHQ9)	Weekly chart audit	Organization
	Food Club Purchasing Habits	Quantity of food purchase in eight food categories.	Monthly	Student
	Food Club Engagement	# of visits to food club per month	Monthly	Student

Appendix R

Data Dictionary

Data Discription	SAS Discriptor	Data Code
patient id	id	id number
Food Club Membership Completion	CFC_Memb	1=yes 2=no
Gender	Gender	1=female 2=male
Age in Years	Age	Age
Household Size	Household_size	total # of family members
Race	Race	1=Caucasion 2=African American 3=Hispanic 4=Other
Food insecurity 1 Pre	Food_ insec1_pre	2=often true, 1= sometimes true, 0=never true, .= n/a or refused
Food insecurity 2 Pre	Food_insec2_pre	2=often true, 1= sometimes true, 0=never true, .= n/a or refused
Food Insecurity 1 Post	Food_ insec1_post	2=often true, 1= sometimes true, 0=never true, .= n/a or refused
Food insecurity 2 Post	Food_insec2_post	2=often true, 1= sometimes true, 0=never true, .= n/a or refused
Depression Score (PHQ) Pre intervention	Dep_pre	PHQ scores range from 0-
Depression Score (PHQ) post intervention	Dep_post	PHQ scores range from 0-
HemoglobinA1C Pre intervention	A1C_pre	Percentage 5%-15%
Homoglobin A1C Post intervention	A1C_prost	Percentage 5%-15%
Food Club Enagement Month 1	CFC_Vis1	Total # of visits each month
Food Club Enagement Month 2	CFC_Vis2	Total # of visits each month
Food Club Engagement Month 3	CFC_Vis3	Total # of visits each month
Food Club Enagement Month 4	CFC_Vis4	Total # of visits each month
Total Quantity of food purchased in Month X	Total_X	numerical value
Total Quantity of grain purchased in Month X	Dairy_X	numerical value
Total Quantity of grain purchased in Month X	Grain_X	numerical value
Total Quantity of Ready Made meals purchased in Month X	ReadyMade_X	numerical value
Total Quantity of protein purchased in Month X	Protein_X	numerical value
Total Quantity of drinks purchased in Month X	Drinks_X	numerical value
Total Quantity of fruits and vegetables purchased in Month X	FruitVeg_X	numerical value
Total Quantity of sweets purchased in Month X	Sweets_X	numerical value
Total Quantity of miscellaneous items purchased in Month X	Misc_X	numerical value

Appendix S

Budget

A Collaborative Approach to Incentivizing Healthy Food Choices among Uncontrolled Diabetic Patients at a Local Federally Qualified Health Center to Improve Health Outcomes	
Revenue	
Presidential Grant	**1500**
Total Revenue	1500
Expenses	
DNP Student (time donated)	-
Community Health Worker (time donated)	450
Statistician (time donated)	200
Professionally printed flyers and educational material (75)	200
Rapid 10 ride pass (75)	**1,012.5**
Total Expenses	1,862.5

Appendix T

Timeline

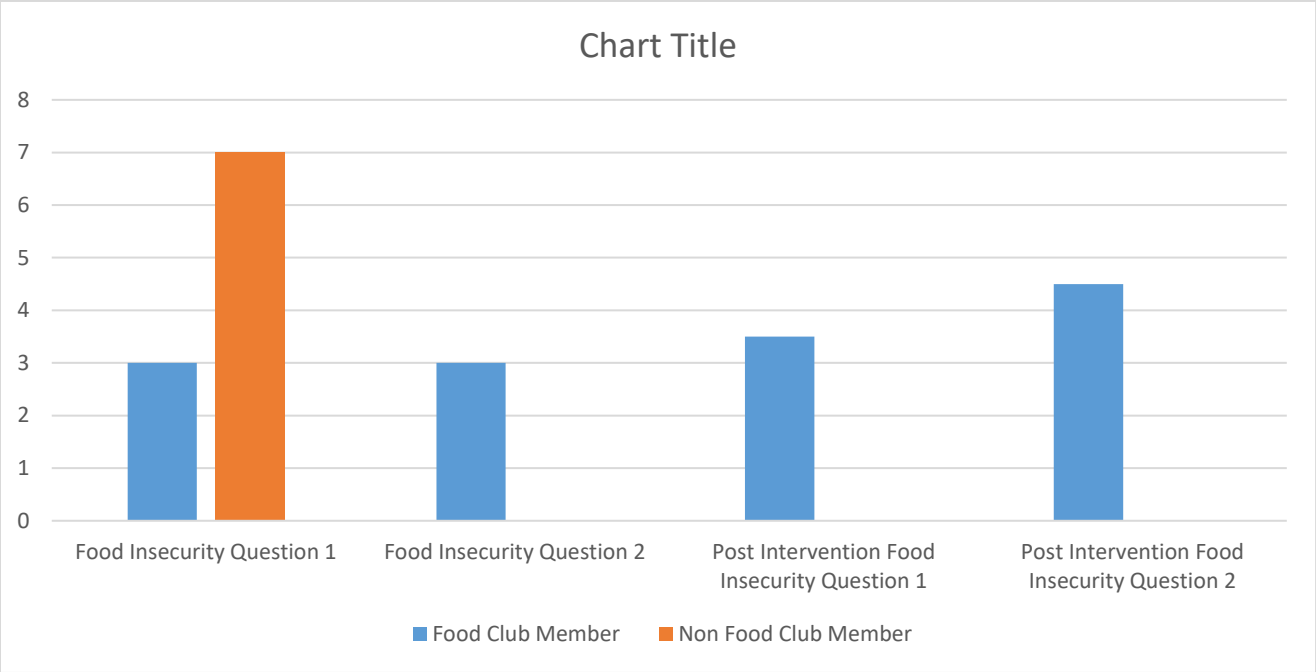
Appendix U

Sample Population Demographics

	FOOD CLUB MEMBER N=6	**FOOD CLUB NON-MEMBER N=17**
AGE	47.3 (SD 7.63)	58.7 (SD 8.79)
GENDER	Male: 16.7% (1) Female: 88.3% (5)	Male: 47.1% (8) Female: 52.9% (9)
RACE/ETHNICITY	Caucasian: 33.3% (2) African American: 33.3% (2) Hispanic: 33.3% (2)	Caucasian: 17.7% (3) African American: 52.9% (9) Hispanic: 29.4% (5)
HOUSEHOLD SIZE	4.5 (SD 3.0)	2.1 (SD 1.2)

Appendix V

Positive Food Insecurity Screening



Appendix W

Hemoglobin A1C among Sample

	Food Club Member n=6	Food Club Non-Member n=17
A1C Pre	10.12 (SD 1.7)	10.79 (SD 1.69)
A1C Post	8.25 (SD 1.3)	N/A

Appendix X

Depression Score among Sample

	Food Club Member n=6	Food Club Non-Member n=6
Depression Score	4.6 (SD 7)	10.7 (SD 9)
Post-Intervention Depression Score	N/A	N/A

Depression scores as measured by the PHQ-9, data limited due to restrictions on chart audits

Appendix Y

Food Club Purchasing Habits

	Month 1 N=6	Month 2 N=3	Month 3 N=3	Month 4 N=2
% Fruit or Vegetable	37.6%	33.%	36.9%	57.3%

Number reflective of the percentage of food purchased that is either a fruit or vegetable