PROMOTING PREDIABETES SCREENING WITHIN THE PRIMARY CARE SETTING: AN EVIDENCE-BASED APPROACH UTILIZING THE DIABETES PREVENTION TOOLKIT

by

Stephanie A. Kwabi

A Project Brief submitted to the Faculty of the University of Delaware in partial fulfillment of the requirements for the degree of Doctor of Nursing Practice

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ABSTRACT

The rising prevalence of type 2 diabetes in the United States is a growing public health concern. Estimates by the CDC predict that by 2025 one in five Americans will have diabetes. Currently, the CDC estimates that one in three American adults have prediabetes, in which 70% of them will eventually develop type 2 diabetes within five years. A review of the literature promotes the efficacy of standardized, evidence-based screening measures and interventions to offset the rising prevalence of prediabetes and the subsequent development of type 2 diabetes. However, despite the efficacy of preventative interventions, the literature notes that most clinicians are not implementing the available evidence-based recommendations and interventions.

The significant underutilization of these resources has resulted in the continual increase in the prevalence of type 2 diabetes. The CDC, in partnership with the AMA, created the Diabetes Prevention Toolkit to serve as a fundamental resource to support providers in preventing type 2 diabetes. The toolkit provides standardization of screening measures and proper testing protocols. It also provides educational resources and intervention strategies, including referrals to CDC-recognized Diabetes Prevention Programs. To bridge the gap between evidence-based literature and clinical practice, the DNP Practice Change Project was developed with guidance from Nola Pender’s Theory of Health Promotion. The project's purpose focused on promoting the efficacy of screening for prediabetes and encouraging the utilization of the Diabetes Prevention

Toolkit within the primary care setting. The project was successfully implemented in Fall of 2022 at a Federally Qualified Primary Care Health Center. A retrospective chart review was conducted to collect information on the baseline screening practices at the health center to compare to the data collected during the project implementation. The data analysis and major findings confirmed that the utilization of the toolkit significantly increased the rate of prediabetes screening, as evidenced by the increase in the daily average of patients screened, the increase in the percentage of patients ordered an HbA1C test and the increase in the percentage of clinicians providing patients education and referral to a diabetes prevention program.

Chapter 1

INTRODUCTION

The rising prevalence of type 2 diabetes within the United States is an alarming public health crisis. Every year 1.5 million Americans are diagnosed with this chronic disease costing billions in healthcare expenditures (Centers for Disease Control [CDC], 2020b; CDC, 2019). The growing epidemic has prompted the CDC in partnership with the American Medical Association (AMA) to implement strategic processes and tools to support clinicians in combating this crisis; the creation of screening tools and the Diabetes Prevention Program serves as fundamental processes in this fight (Tseng et al., 2017). Screening for prediabetes is an essential measure in preventing type 2 diabetes as 70% of individuals with prediabetes eventually develop type 2 diabetes (Tseng et al., 2017). Fortunately, the prediabetic stage is reversible; during this stage, improved screening measures promotes early detection and implementation of preventive interventions. Despite evidence supporting the success of preventive interventions, reports reveal that clinicians do not provide the proper evidence-based recommendations and interventions for at-risk patients (Tseng et al., 2017). Additionally, evidence suggests an estimated 90% of prediabetic patients were unaware of their condition, implying that many high-risk patients were simply not being screened (Tseng et al., 2017). Implementing standardized, evidence-based screening measures is key to identifying prediabetic patients and subsequently promoting preventive interventions to help suppress the growing type 2 diabetes epidemic.

1.1 Background

Prediabetes is a condition in which an individual's blood glucose levels are slightly elevated but not abnormal enough to establish an official diagnosis of type 2 diabetes (CDC, 2020a). The specific clinical parameters of prediabetes as defined by the American Diabetes Association (ADA) defines includes a fasting plasma glucose of 100-125 mg/dL; 2-hour plasma glucose of 140-199 mg/dL after engaging in the 75g oral glucose tolerance test; or a hemoglobin A1C (HbA1C) of 5.7% - 6.4 % (Kullgren et al., 2017).

For most patients, the prediabetic stage is typically asymptomatic, often silently converting patients to the more severe disease state of type 2 diabetes (Khan et al., 2019). By definition, prediabetes is not an actual disease; however, this condition's insidious nature consequently fosters the development of type 2 diabetes, resulting in further health complications and dangerous patient outcomes if not identified and addressed early (Khan et al., 2019). The development of prediabetes and type 2 diabetes can occur at any age; however, the risk increases with advancing age. Additional factors that can contribute to an individual's risk are the following: overweight/obesity, 45 years or older, family history (e.g., parents or siblings), decrease physical activity, history of gestational diabetes, and minority ethnic groups (e.g., Black/African Americans, Hispanics, and Native Americans) (CDC, 2019).

1.2 Significance

Though evidence suggests that most type 2 diabetes cases are preventable, the diabetes epidemic continues to tear through the United States and many nations worldwide. According to the CDC (2019), 1 in 10 Americans (equivalent to 30 million people) have type 2 diabetes, and only 1 in 4 are aware of their diagnosis. Additional statistics from the CDC (2020a) reveal that over 88 million American adults have prediabetes, equating to about 1 in 3 people, of which only about 10% are aware of their condition. The prevalence is even more staggering in older adults ages 65 and up, with estimates revealing over half of this population having prediabetes (CDC, 2020a). The morbidity and mortality rates associated with this disease are even more alarming; reports reveal that diabetes is the 7th leading cause of death within the United States (CDC, 2019). In 2017 alone, the total annual cost of care for people with diabetes within the US was 327 billion dollars, an astounding 33% increase in five years; these values translate to an expenditure of one in four healthcare dollars spent on diabetes management (CDC, 2019). The burden of cost associated with diabetes is very evident, within the United States, people with diabetes spend two to three times more on health care costs as compared to individuals without the disease. This averages to an annual medical expense of $16,750 (CDC, 2019; Khan et al., 2019). On a global scale, the estimated prevalence of diabetes is about 8.8%, ranking 5th in mortality, resulting in about 1.6 million deaths annually (Khan et al., 2019). Consequently, diabetes promotes a 15% increase in premature death and an overall 10 to 20 year decrease in life expectancy (Khan et al., 2019).

The chronic and debilitating nature of the disease can lead to long term damage and dysfunction. Many patients with unmanaged diabetes develop health complications such as organ failure, especially the kidneys, heart, eyes, nerves, and blood vessels resulting in sequelae such as kidney failure, blindness, stroke, hypertension, and amputation of limbs (Khan et al., 2019). Without proper initiatives to decrease the prevalence of this disease, estimates reveal that by 2025 one in five

Americans will have diabetes; on an international scale, by 2035, there will be 592 million total diabetes cases worldwide (CDC, 2019; Khan et al., 2019).

A fundamental strategy to prevent type 2 diabetes is to screen high-risk patients for prediabetes and provide necessary interventions. Without proper screening and intervention, many individuals with prediabetes will eventually develop type 2 diabetes within five years (CDC, 2019). The prediabetic stage provides an opportune period for public health officials and clinicians to grapple and seize this vulnerable yet reversible state to disrupt the development of type 2 diabetes. As expressed by Kullgren et al. (2017), a crucial opportunity to initiate a conversation with patients about prediabetes is during primary care appointments. During these precious sessions with patients, providers can grasp the opportunity to screen at-risk individuals and initiate conversations focused on promoting patients' interest in engaging in evidence-based strategies to prevent the progression of type 2 diabetes.

1.3 PICOT Question

In the realm of evidence-based practice (EBP), the clinical query is instrumental in guiding the literature search for evidence to support clinical decision-making within a healthcare setting (Dang & Dearholt, 2018). Beyond just identifying the clinical problem, it is essential to have a well-developed question to guide the process of assembling evidence for appraisal, synthesis, and translation into practice (Dang & Dearholt, 2018). The PICOT format encompasses all the attributes needed to develop a strong, appropriate, and answerable practice question. The PICOT format serves as an instrumental tool in directing the search for relevant information and helps reduce the time and resources spent on the literature search (Dang & Dearholt, 2018). The development of the following PICOT question will help guide the project implementation:

In adult patients, 18 years and older who are at risk for prediabetes (P), does the utilization of the Diabetes Prevention Toolkit in the primary care setting (I) as compared to current practice (C) increase the rate of prediabetes screening (O) within three months (T)?

1.4 Theoretical Framework

The selected theory for guidance is Nola Pender’s Health Promotion Model (HPM), a middle-range theory. The Health Promotion Model was initially published in 1987 and revised in 1996 due to evolving theoretical perceptions and empirical outcomes (Khoshnood et al. 2018). Two other theories inspired the theory: Albert Bandura's Social Learning Theory and Fishbein Expectancy Value Theory (Khoshnood et al. 2018). The Social Learning Theory influences HPM through its emphasis on the cognitive qualities that lead persons to modify their behavior. Healthcare provider actions play a vital role in modifying behavior-specific cognitions and providing major motivational significance for patients engaging in interventions (Khoshnood et al. 2018). The Fishbein Theory supports the HPM by emphasizing that individuals will invest and dedicate resources in anticipation of positive/favorable outcomes. That is to say; patients are more inclined to work toward goals they see as advantageous and attainable (Khoshnood et al. 2018). Pender's model defines health as a positive dynamic state rather than merely the absence of disease or illness. Health promotion is a behavior that is inspired by a desire to advance one's well-being and optimize human health potential (Butts & Rich, 2018, p.448). Essentially the person's definition of health for themselves is more imperative in promoting health behaviors than any general text-book definition of health (Butts & Rich, 2018).

There are three major concepts for the HPM: individual characteristics and experiences, behavior-specific cognitions and affect, and behavioral outcomes (Alkhalaileh et al., 2011 & Khodaveisi et al., 2017). It is imperative to highlight that the theory emphasizes that every person has unique personalities and characteristics that affect how they interact with interpersonal and physical environments (Alkhalaileh et al., 2011 & Khodaveisi et al., 2017). In terms of behavior-specific cognitions and affect, the theory acknowledges that there are behavior-specific variables such as perceived benefits of health, perceived barriers to action, perceived self-efficacy, and activity-related affect (Butts & Rich, 2018). These variables have a critical motivational implication on individuals; additionally, nursing actions can alter these variables (Butts & Rich, 2018). Lastly, the desired outcomes would be health-promoting behaviors, which are the ultimate goals of the HPM. Pender's model utilizes 14 theoretical propositions to guide health promotion and disease prevention (Butts & Rich, 2018). Although the HPM's primary focus is on the person, the healthcare provider plays a vital role in promoting health consciousness in patients. This role encompasses fostering awareness related to health-promoting behaviors, promoting self-efficacy, sponsoring the beneficial outcomes of change, adjusting the environment to support behavior change, and managing the barriers to change (Butts & Rich, 2018).

The Health Promotion Model will serve as a reliable guideline and framework for addressing prediabetes screening and promoting interventions. Of the 14 theoretical propositions presented by the HPM the seven that will provide the best service for the proposed practice inquiry question are: Perceived Benefits (2), Perceived Barriers (3), Perceived Self-Efficacy (4), Behavioral Related Affect (6), Interpersonal Influences (9), Situational Influences (10) and Competing Demands (12). Utilizing these seven propositions will assist health care professionals in their design and approach to care for their patients. As mentioned earlier, the key to combating the health effects of diabetes is through preventive measures such as screening. Therefore, the use of the HPM will help focus the project on primary and secondary care/prevention. As highlighted by the CDC (2020a), primary prevention focuses on intervening before adverse health effects occur. Actions such as vaccinations, promoting health, altering risky behaviors (poor diet, physical inactivity, drug use), and banning substances known to have adverse health outcomes contribute to health promotion (CDC, 2020a). Secondary prevention, which is the primary tool for this project, focuses on screening measures to identify diseases in the earliest stages before the manifestations of signs and symptoms (e.g., blood pressure screenings, HBA1C/blood-sugar checks, Mammograms) (CDC, 2020a).

Implementing evidence-based screening measures and interventions within the primary care setting is essential in combating prediabetes and the subsequent development of type 2 diabetes. Screening within the primary care setting provides an opportune moment for providers to engage patients in conversation about adopting health-promoting behaviors through lifestyle modifications (Kullgren et al., 2017).

The Health Promotion model intends to support and encourage patients to embrace healthy lifestyle habits and thus reflects the purpose of this project. Additionally, guidance from Pender’s theory supports providers with utilizing available tools and resources to educate patients and recommend referrals to evidence-based CDC-certified Diabetes Prevention Programs (Kullgren et al., 2017). Additional support by Kullgren et al. (2017) expresses that diabetes prevention relies heavily on patient engagement. Patients must believe that their risk for type 2 diabetes is real and modifiable, have a strong motivation to prevent type 2 diabetes, understand strategies and approaches to help decrease their risk as well as motivation to engage in identified strategies and have the self-efficacy and support system to endure interventions and sustain health behaviors (Khodaveisi et al., 2017 & Kullgren et al., 2017)

Chapter 2

REVIEW OF LITERATURE

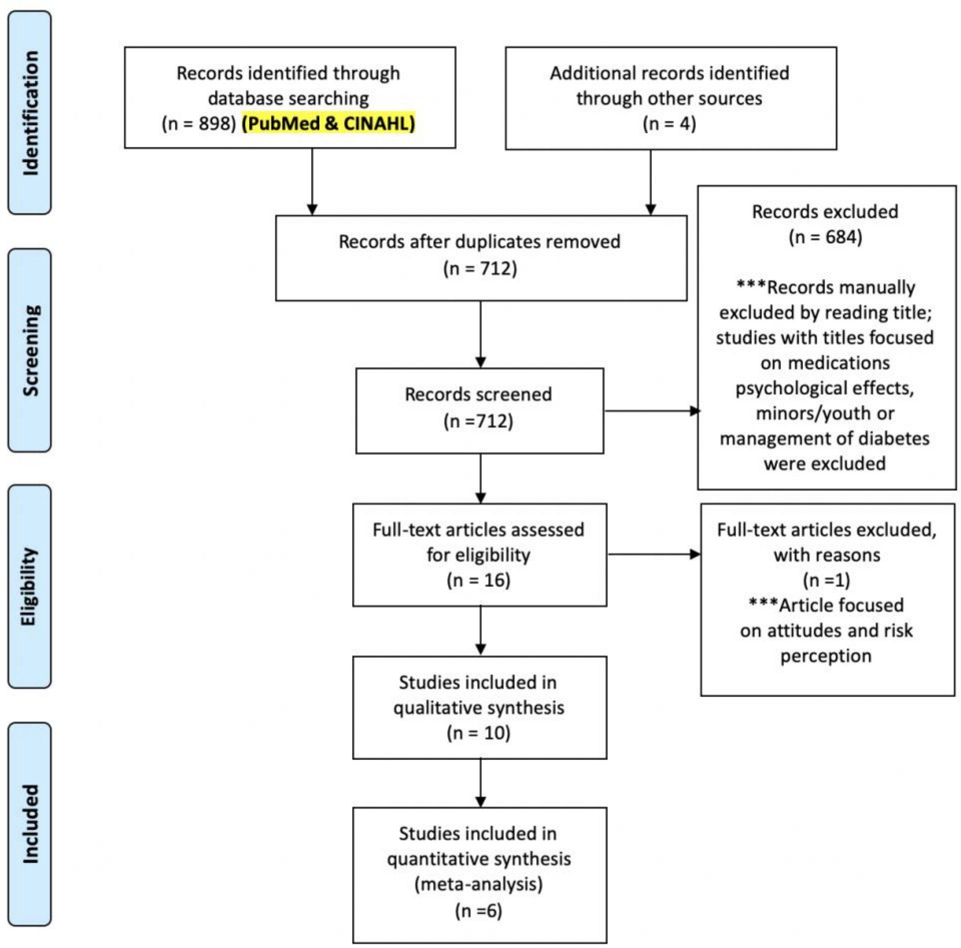
The development of the PICOT question and guidance provided by Pender's theoretical framework cultivated a thorough literature search that generated convincing evidence to support the pursuit of the clinical query within the primary practice setting. The following paragraphs provide details pertaining to the literature search process and results, the review/synthesis of evidence gathered, and recommendations and purpose of the evidence-based project initiative.

2.1 Search

The literature search was conducted on electronic databases including PubMed and CINAHL utilizing the following keywords, mesh-phrases, and Boolean operators: "Prediabetic State" OR "prediabetes" AND "PREVENTION; "Prediabetic State" OR "prediabetes" AND "DIAGNOSIS"; "Diabetes prevention program." The following limitations were applied to help filter the results: "5-year limit from January 2015 to November 2020"; "scholarly (peer-reviewed) journals"; "systematic reviews"; and "remove duplicates." After applying the limits mentioned above, each search result produced records ranging from 23 to 226 articles. The 2009 Prisma Flow Diagram was utilized to help guide the process of determining the final inclusion articles—refer to Figure 1.1 for a complete review. The total number of records from all searches was 712. Following the Prisma Diagram, 684 articles were eliminated based on the following exclusion criteria: studies with titles/abstracts focused on medications, psychological effects, minors/youth, management of diabetes, and attitudes and risk perception. After conducting a thorough screening of the titles and abstracts, a final total of 16 articles were included for literature review and synthesis.

Figure 2.1

Prisma Diagram of Literature Search



2.2 Review and Synthesis

The Johns Hopkins Evidence-Based Practice Model was utilized to analyze, appraise, and synthesize the final 16 articles—refer to Appendix A for a complete review of the literature table. Of the 16 final articles, ten were categorized as qualitative studies, and the remaining 6 were quantitative studies. The articles covered relevant information ranging from clinician's perspective and knowledge of the prediabetes and prevention measures, the prevalence of referrals to diabetes prevention programs within the primary care setting, the efficacy and effectiveness of screening for prediabetes, and the effectiveness of lifestyle intervention programs such as CDC certified Diabetes Prevention Programs.

Provider knowledge, attitude, and perception of prediabetes screening was a central focus and theme in the literature search. A study conducted by Nhim et al. (2018) explored the patterns in PCPs' (Primary Care Provider) self-reported rates of screening, testing, and referring patients with prediabetes to a CDC- recognized lifestyle change program (LCP). As highlighted in the study by Nhim et al. (2018), despite significant evidence supporting the benefits of lifestyle change programs and increasing insurance/employer coverage, providers' referral rates to these programs are considerably low. Nhim et al. (2018) discovered that only about 27% of providers screened patients for prediabetes utilizing the CDC Prediabetes Screening Test or the ADA Type 2 Diabetes Risk Test. Additionally, less than a quarter (23%) of providers referred patients to CDC recognized lifestyle change programs (Nhim et al., 2018). Throughout the USA, over 1500 organizations provide high-quality, DPP (Diabetes Prevention Program) like lifestyle change programs; however, total participation has reached only about 0.4% of the 65 million eligible Americans with prediabetes (Ackermann et al. 2020). This evidence is further supported by a cross-sectional qualitative study conducted by Venkataramani et al. (2019), which reviewed data from the 2016 National Health Interview Survey; the survey collected self-reported information about diabetes primary prevention, including information on diabetes diagnosis, screening, risk factors, referral, and interest/participation in diabetes prevention programs. Among the total of 28,354 participants, 2,341 were considered eligible for diabetes prevention programs; of these eligible individuals, only 4.2% reported being referred to a diabetes prevention program by a healthcare provider (Venkataramani et al.,2019). Subsequently, 2.4% of eligible individuals participated in a program. With such low rates of referral and participation, Venkataramani et al. (2019) propose improving efforts to enhance screening, recruitment, and retention of high-risk patients in lifestyle diabetes prevention programs. Overall, this suggests a need to improve access and referral efforts in the clinical setting. Interestingly enough, the US Preventive Services Task Force, as well as the Community Preventive Services Task Force, have issued recommendations for clinicians, specifying screening and testing guidelines; among these recommendations are propositions to refer all patients with laboratory results within the prediabetes range to evidence-based diabetes prevention programs (Nhim et al., 2018). In an effort to improve access and referral efforts, as of April 2018, Medicare has begun covering the National Diabetes Prevention Program for beneficiaries (Venkataramani et al.,2019).

As mentioned earlier, prediabetes screening measures and referral rates are heavily influenced by the provider's knowledge and perception; therefore, it is imperative to encourage and support positive perceptions among clinicians (Nhim et al., 2018). To promote screening and referrals, the CDC, in partnership with the AMA launched the Prevent Diabetes STAT (Screen, Test, Act, Today) Toolkit in 2015 (Nhim et al., 2018). This toolkit, also referred to as Diabetes Prevention Toolkit, aims to increase screening and awareness of the CDC National Diabetes Prevention

Program. The collaborative initiative focuses on three key steps: screening patients for prediabetes using available risk tests; testing high-risk patients using either a hemoglobin A1c, 2-hour glucose tolerance, or fasting plasma glucose test; referring patients with prediabetes to CDC-recognized LCP classes (Nhim et al., 2018).

The toolkit contains materials to help engage and support providers with integrating the screening, testing, and referral processes into their practices and workflow. The efficacy of the toolkit was emphasized in the fact that providers who were aware of the STAT toolkit and CDC-recognized LCP programs were two to three times more likely to screen patients for prediabetes; percentage-wise, this calculates to about 56.5% compared to 26.7% (Nhim et al., 2018).

Despite the knowledge that community lifestyle change programs effectively prevent or delay the onset of type 2 diabetes, there remain challenges in implementing resources to maximize their impact (Holliday et al., 2019). As part of the Centers for Medicare and Medicaid Innovation demonstration project, the AMA in partnership with the YMCA of the USA developed quality improvement strategies to increase the routine screening, testing, and referral of Medicare patients with prediabetes to a CDC-recognized diabetes prevention program at local YMCAs (Holliday et al., 2019). The AMA enlisted 26 primary care practices to apply point-of-care and retrospective methods (or a combination of both) in the quality improvement initiative. A quasi-experimental mixed-methods study implemented by Holliday et al. (2019) designed a pretest-posttest evaluation to determine the efficacy of this initiative. The objective was to evaluate if the adoption of specific tools and resources combined with systems changes led to increased systematic screening, testing, and referrals within primary care practices; the findings of the study serve as a framework that can be adapted to support AMA and Medicare diabetes prevention services (Holliday et al., 2019). Providers and members of the care team were trained to utilize the Diabetes Prevention Toolkit, which included a retrospective algorithm and point-of-care methods to identify patients with prediabetes (Holliday et al., 2019). This study's resulting analysis revealed that increased awareness and simple modifications to clinical workflows led to increased screening and referrals to the YMCA's diabetes prevention program (Holliday et al., 2019). A more detailed evaluation revealed that practices that used only a retrospective method had a lower percentage of enrollment (11%) as compared to practices that used only the point-of-care method (56%) and those that used a combination of the two (51%) (Holliday et al., 2019). Interestingly, despite the point-of-care method having the highest enrollment rate (56%), that method had the lowest number of referrals; clinical practices that used retrospective methods had the highest numbers of referrals (Holliday et al., 2019). Additional important key factors highlighted in this study were the importance of a strong provider-to-patient relationship; smaller independent clinical practices that foster stronger provider-to-patient relationships had the highest percentage of patients enrolled in a diabetes prevention program (Holliday et al., 2019). The study suggests another key theme in the literature search that significantly endorses the notion that provider recommendation and discussion can increase patient motivation to adapt to healthy lifestyle modifications (Holliday et al., 2019).

To further confirm the necessity to improve prediabetes screening and referrals to lifestyle intervention programs, a quasi-experimental study conducted by Keck et al. (2020) evaluated the outcome of provider referral rates after implementation of 3 interventions: clinician education, a champion, and patient identification. To help increase knowledge and awareness of the diabetes prevention program (DPP), clinicians received education about prediabetes and the DPP (Keck et al., 2020). A quality improvement initiative conducted in Colorado discovered that primary care practices with change champions were better able to implement diabetes improvement initiatives (Keck et al., 2020). This discovery prompted the decision to elect a prediabetes care champion (active clinician) to help raise awareness, share knowledge, and create enthusiasm about the DPP through direct conversations with colleagues (Keck et al., 2020). Lastly, clinicians received daily electronic health record reports on patients with appointments scheduled for the following day; these patient's charts indicated a high risk for prediabetes based on prior HbA1C scores or diabetes screening criteria set forth by the United States Preventive Services Task Force (Keck et al., 2020). The results of the study revealed that clinicians in the intervention group had 3.82 greater odds (95% CI=0.51, 28.80) of referring a patient with prediabetes to the DPP than clinicians in the control group (Keck et al., 2020). The clinicians in the control group referred 6.9% of prediabetic patients to the DPP as compared to 1.5% of the control group. In reference to clinician perceptions, the study revealed all the clinicians agreed that the electronic DPP referral system made it more likely that they would refer a patient; additionally, clinicians agreed that a prediabetes champion positively influenced their prediabetes care/management (Keck et al., 2020).

The overall analysis and synthesis of several articles in the literature review also emphasized a key theme regarding the efficacy of lifestyle change programs (also known as lifestyle intervention/modification programs or, more specifically, the DPP.

A randomized controlled study by Kramer et al. (2018) investigated the effectiveness of a Diabetes Prevention Program-Group Lifestyle Balance in achieving the goal of a 7% weight loss in addition to increasing moderate/intense physical activity to 150 minutes per week within six months (Kramer et al., 2018). The results of the study were highly successful in reducing weight, increasing physical activity levels, and improving other risk factors such as total cholesterol, triglycerides, and HbA1C for type 2 diabetes (Kramer et al., 2018). At six months, the average weight loss was 11.2lbs (-5.4%, $P<.001$). A large community-based randomized comparative effectiveness trial was designed by Ackermann et al. (2015); this 2-year study generated considerable support for the efficacy of the YMCA Diabetes Prevention Program. According to the study, overall, a 5% or greater weight loss was achieved by 29 (13.4%) of standard care participants as compared to 69 (32.4%) of the YMCA-DPP participants (Ackermann et al., 2015). At 12 months, the adjusted offs of 5% or greater weight loss was 3.1 times higher for participants in the YMCA-DPP as compared to the standard care participants (95% CI = 1.9, 5.0 kg; $P< .001$) (Ackermann et al., 2015).

A literature review by Ackerman et al. (2020) emphasized that research on DPP-like programs has validated that weight-loss effectiveness is greatest for lifestyle interventions that emphasize both healthy nutritional behaviors and physical activity. It is also relevant to incorporate and promote increase self-efficacy through behavioral approaches such as goal-setting, self-monitoring, self-regulation, and problem-solving (Ackerman et al., 2020). Additionally, recommendations gathered through systematic reviews recommend creating DPP programs that involve at least 8 to 26 hours of intervention contact time delivered through 12 to 26 sessions in a 12 to 18 months span (Ackerman et al., 2020). A systematic review conducted by Kerrison et al. (2017) reviewed nine randomized control trials to assess the feasibility of utilizing lifestyle intervention programs to manage prediabetes and prevent type 2 diabetes. The review concluded that there is sufficient evidence to support the effectiveness of lifestyle interventions to treat prediabetes (Kerrison et al.,2017). Further conclusive statements from the review mention that the incidence of diabetes is significantly decreased in the intervention groups compared to control groups receiving standard care (Kerrison et al.,2017).

Furthermore, not only did glycemic control improve in the short term, but several participants reverted to normoglycemia. (Kerrison et al.,2017). In the long run, glycemic control diminished; however, overall glycemic control was maintained and superiorly better managed than baseline results and control groups (Kerrison et al.,2017).

Though the overall consensus of the literature review endorses evidence that supports initiatives and interventions to promote screening for prediabetes and subsequent referrals to lifestyle intervention programs, there is strong evidence that indicates gaps in the literature pertaining to proper management, policies/protocols, and interventions. A systematic review with a meta-analysis conducted by Barry et al. (2017) questioned the efficacy of screening and treating policies in preventing type 2 diabetes. According to Barry et al. (2017), the diagnostic accuracy of tests used to detect prediabetes in screening programs is low with regards to the lack of sensitivity and specificity of the HbA1C test, which is the most commonly used test for diagnosing. In addition, the study states that the fasting glucose test is also not a comprehensive diagnostic tool due to is its high specificity but low sensitivity, which promotes a high number of false-negative results (Barry et al.,2017). Barry et al. (2017) also highlighted the lack of overlap with a diagnostic test, stating these tests identify different prediabetic population groups; according to the study, the prevalence of diagnosed prediabetes would essentially double if ADA criteria are used versus the World Health Organization (WHO). This same sentiment was echoed in another systematic review with a meta-analysis conducted by Glechner et al. (2018). The study also stated that in comparison to the current WHO criteria, the ADA criteria results in a two-to-three-fold increase in the number of individuals diagnosed with prediabetes. To further add to the gap in knowledge and regulation, there is currently no general agreement on laboratory thresholds for prediabetes (Glechner et al., 2018). Despite these gaps in knowledge, Glechner et al. (2018) concluded strong evidence from the study's meta-analysis of 10 randomized control trials to support the efficacy of prediabetes screening and lifestyle intervention programs. The review concluded that individuals with prediabetes who participated in lifestyle intervention programs had a 54% lower risk of progressing to type 2 diabetes as compared to individuals receiving standard treatment without lifestyle intervention (after one year: 4% vs. 10%; RR 0.46 [95% CI 0.32, 0.66]) (Glechner et al., 2018). A 3-year follow-up still upheld the efficacy, reporting a 36% lower risk of developing type 2 diabetes (after three years: 14% vs. 23%, RR 0.64 [95% CI 0.53, 0.77]) (Glechner et al., 2018).

2.3 Project Recommendation

The literature search and appraisal consensus generated convincing evidence to support the pursuit of the evidence-based project initiative. Though the literature reviewed also revealed different areas of diabetes prevention/prediabetes-management that have gaps in the strength of their evidence, the overall synthesis of literature profoundly supports existing evidence and initiatives. This opportunity to promote improvement initiatives aligns perfectly with the EBP project's objective of increasing screening for prediabetes within the primary care setting and subsequently encouraging referrals to CDC recognized diabetes prevention programs for patients identified as at risk. The evidence synthesized from the literature review supports the objective of the evidence-based project. Evidence recommends that providers utilize standard screening measures to assess at-risk patients and ensure proper testing utilizing verified diagnosing measures defined by the ADA (Holliday et al., 2019). The conclusive synthesis of the literature search has set forth the stage to implement and evaluate the EBP project.

2.3.1 Project Purpose and Aims

Purpose

The purpose of this evidence-based project is to promote the efficacy of screening for prediabetes and encourage the utilization of the Diabetes Prevention Toolkit within the primary care setting

Aims

1. To determine if the implementation of the Diabetes Prevention Toolkit within the primary care setting as compared to current practice will generate an increase in screening for prediabetes as measured by clinicians ordering HbA1Cs based on Prediabetes Risk Test score during the 8-week active project implementation time frame.

2. To identify barriers to utilizing the Diabetes Prevention Toolkit within the primary care setting as measured by surveying stakeholders using a simple rankings and ratings survey upon the 12-week project conclusion.
3. To determine if the implementation of the Diabetes Prevention Toolkit increases providers' effort to educate and refer patients to a CDC-recognized Diabetes Prevention Program during the 8-week active project implementation time frame.

Chapter 3

METHODOLOGY

The continuous development of this evidence-based project requires an exploration of the methodologies and strategies needed for implementation. As previously mentioned, utilizing the Diabetes Prevention Toolkit offers providers practical resources and standardized protocols to guide decisions in caring for at-risk patients. However, an essential component of initiating the full potential of the Toolkit is rooted in developing a solid screening process within the primary care setting. A well-developed screening process can set the stage for increased and continual follow-up care within the primary care offices/clinics. This chapter provides a review of the clinical setting, subjects/participants involved, strategic methodology on the implementation process; timeline of implementation; ethical considerations; data collection, analysis and evaluation, project budget, and project close-out and dissemination plan.

3.1 Setting

The practice setting for the project implementation is called Beacon Health Center, a satellite facility of West Cecil Health Center located 253 Lewis Lane, Havre De Grace, Maryland 21078. Beacon Health Center is recognized as a Federally Qualified Health Center (FQHC); as a federally qualified health center, the facility offers low-cost healthcare services to medically underserved populations of all ages from infancy to older adulthood (WCHC, 2018). Beacon Health Center operates Monday-Friday; Mondays, Tuesdays and Wednesdays 7:30am-4:30pm. Thursdays 7:30am-7:00pm and Fridays 7:30pm-2:00pm. At Beacon Health Center (West Cecil

Health Center), the mission statement reads “The mission of West Cecil Health Center is to increase access to comprehensive healthcare services and improving the health status of ALL members of the community (West Cecil Health Center [WCHC], 2018).” This mission is powered by the vision to “become the provider and employer of choice for healthcare services in Conowingo and the surrounding area (WCHC, 2018). In their effort to uphold their mission and vision, the center upholds the following core values as guidance: “teamwork, honesty, transparency, reliability, productivity, and commitment to a staff reflecting the diversity of the community. Basing our delivery of services on the values of compassion, confidentiality, continuous quality improvement and responsible use of available resources (WCHC, 2018).” The mission and vision statement of Beacon Health Center enhances and aligns with the aims of this evidence-based project which is to prevent type 2 diabetes and eliminate the associated morbidity and mortality by screening at-risk patients and empowering them with education and resources to improve their quality of life. Beacon Health serves patients of all ages and provides services including primary care services, behavioral health services, gynecological services and dental (WCHC, 2018). To support the facilitation of this evidence-based project, Sharon Holloway family nurse practitioner practicing at Beacon Health Center will serve as the appointed project site mentor.

3.2 Participants

The population of interest are adult patients 18 years and older meeting the following inclusion criteria: the patient is presenting for non-acute care such as a physical or wellness check; the patient does not already have a diagnosis of diabetes and the patient is not currently pregnant. All patients who present to the office every day for 8 weeks who meet the inclusion criteria will be eligible to participate in the practice change initiative. For this evidence-based project, participants will be selected utilizing convenience sampling. In other words, all subjects who present to the center during the 8 weeks of active project implementation will be allowed to partake in the project. There is no discrimination of subjects based on gender, race/ethnicity, religion, or sexual orientation. Exclusion criteria of participants include patients younger than 18 years, patients already diagnosed with diabetes and patients who are pregnant.

3.2.1 Stakeholder Analysis

The ever-evolving world of healthcare with subsequent change initiatives and research innovations has made it essential to promote collaborative efforts between researchers/facilitators and stakeholders (Franco-Trigo et al., 2020). The process of knowledge transfer and implementation of innovations and change initiatives are complex and require stakeholder analysis to help develop and set the foundations for appropriate planning processes and strategic actions (Franco-Trigo et al., 2020). A stakeholder analysis is therefore defined as a methodology developed to recognize and understand the stakeholders around a health innovation planning process; this is centered on information collected about them (e.g., attributes, relationships) and prioritizing their need for involvement in such planning processes. A well-designed evidence-based project initiative puts into consideration the stakeholders that will be directly and indirectly affected by the implementation of the project. Bearing in mind the importance of a thorough stakeholder analysis the following stakeholders were identified as essential components to the development of the project's purpose and outcomes:

- Patients: The patient is also a key stakeholder. They will be the ones mostly directly affected by the project implementation. Patients will be informed of about the screening initiative and be given an opportunity to volunteer. They will be informed that non-participation will not affect the quality of care they receive. Their participation in the screening process in addition to their adherence to completing a HbA1C test will have a significant impact on achieving the purpose and aims of this project.
- Facility clerk/front desk receptionist: Facility clerk/front desk receptionist: The clerk will play a pivotal role in this project. They will be the first point of contact with initiating patients to the project. They will maintain a prepackaged packet containing the prediabetes risk test as well the prediabetes information sheet at the main desk. They will have information about the inclusion criteria and will present packets to patients meeting the listed criteria. They will inform the patient that this is a practice change initiative screening for prediabetes and that participation is voluntary. They will also communicate this information to the medical assistant assisting the patient during their appointment.
- Medical Assistants and Certified Nursing Assistants: Medical Assistants and Certified Nursing Assistants: the office has 4 medical assistances; one is assigned to the NP and the other is assigned to the PA. The two remaining assistants help with administrative task and

serve as “floaters” and assisted where needed. The medical assistant is another key stakeholder. They will ensure that eligible participating patients have correctly completed and scored their prediabetes risk test. They will be responsible for making a copy of the risk test and providing a copy to the provider before the provider initiates the patient visit. They will ensure that the retained copy with the following identifiable information (patient’s first initial, last name and date of birth) is securely put away in a designated folder in a locked cabinet.

- Registered Nurse/Nurse Case Manager: The nurse case manager will be a supportive key stakeholder. She will work mostly with the DNP student and providers to ensure that patients who are found to be prediabetic have the proper information and resources needed. The providers may refer the nurse case manager to patients who are interested in finding out more information out a local CDC verified Diabetes Prevention Program.
- Providers/Clinicians (Doctors, NPs and PAs): The providers directly involved in this project include one nurse practitioner, and one physician assistant. There is also one medical director who oversees the nurse practitioner and physician assistant that is not indirectly involved with the project implementation. The providers are key stakeholders since their participation have a high impact on the project outcomes. The providers will work directly with the student project facilitator to coordinate the implementation of the toolkit. The providers will

consistently communicate with the student project facilitator to provide ongoing feedback on the progress of project.

- Office Manager: The office manager is another key stakeholder. She serves as a liaison between the student project facilitator and the staff members/subjects at the health center. The office manager supports the student in making decisions that align with the mission and vision statement of the health center. Additionally, the office manager provides the student with guidance on project implementation strategies that support clinical workflow and are cost effective to the facility and patients. She will also help establish the implementation routine that helps optimize achieving project aims without disturbing the clinical workflow/process.
- Project Faculty Mentor: The project faculty mentor is a strong guide that consults and supports the student project facilitator with problem-solving, strategic planning, and project implementation. The faculty mentor will oversee every step of the project implementation and promote the use of evidence-based practice/research throughout the implementation process.

It is critical to have the support of all stakeholders involved to implement this evidence-based project. All stakeholders play a pivotal role in facilitating this change initiative therefore it is essential to maintain weekly communication with stakeholders as well as weekly physical check-ins at the project site. During these weekly interactions progress audits and feedback will be exchanged between the project facilitator and stakeholders to ensure appropriate data collection as well as maintain project protocols to foster timely projection to meeting the project outcomes. The following information below will provide a detail description of the implementation plan as well as the unique and instrumental role of each stakeholder.

3.3 Project Timeline and Implementation Plan

1. The development of this project started with creating the PICOT question and review of literature in the Summer of 2019. The progression of the project has been continuously evolving as the methodology and strategies are forming. The project timeline is a total of 12 weeks from 09/05/2022-11/28/2022
    - The first 2 weeks 09/05/22-09/16/22: Conduct retrospective chart reviews to gather data on current screening practice for prediabetes
    - The third week 09/19/22-09/23/22: Provide education and orientation of project to clinic staff and conduct mock trials
    - The eight week period of active project implementation (9/26/22-11/18/22)
    - The final week: 11/21/22-11/25/22 (Gather and synthesize data for interpretation and conduct DNP Project Experience Survey with providers/stakeholders)
2. A Work Break Down (WBS) chart (see Appendix B) created to guide the project facilitator with setting deadlines and completing task related to the project development and implementation. . Data will be collected prior to the project implementation and will include electronic chart reviews of patients seen in the month of August 2022. Information on contributors to diabetes and related health issues will be collected (i.e., age, insurance status, BMI, history

of hypertension). A Pre-data collection form (Appendix C) will be utilized to collect this information; the form will not have any patient identifiers.

- Project lead (DNP student) will review patient charts following the same criteria that will be used during the active project implementation (criteria: 18 years and older, patients who presented for non-acute care such as physicals and wellness checks, patients who do not already have a diagnosis of diabetes and patients who are not pregnant)

3. The project lead will review provider summary notes on the visit and look at lab/test ordered, and key ICD/CPT (codes for diseases, symptoms, abnormal findings, medical services, and procedures) used during the visits that would indicate if there was any screening for prediabetes/diabetes
4. Pre project data collection (Appendix C) will not include any identifiable patient information.
5. During the 8-week project period, patients arriving to the primary care office (Beacon Health Center) who meet the inclusion criteria, will be provided with the "Prediabetes Risk Test" (Appendix D), an insert coversheet (Appendix E) and an information sheet "Prediabetes: Are You at Risk?" (Appendix F) by the office clerk/receptionist during check in.

    - Prediabetes Risk Test is a 7-question survey created by the Centers for Disease Control and Prevention (CDC) and the American Diabetes Association (ADA). The paper and pencil survey should take less than 2 minutes to complete.
        - The prediabetes risk test will have an insert coversheet attached to it with the following information: "You are participating in a practice

change initiative to screen for prediabetes. Participation is voluntary and will not affect the quality of care you receive at Beacon Health Center. A copy of your completed Prediabetes Risk Test will be retained with the following information: initial of your first name, full last name, and date of birth. This copy will be retained in a locked cabinet located in the office manager's office and only accessible with permission from the office manager. The copy will be utilized by the facilitator of the practice change initiative to collect the following demographic data: the patient's age, gender, race/ethnicity, and BMI category (i.e., underweight, overweight, or obese), history of hypertension and insurance status. Be assured that the collected data will remain confidential, and the information will not be identifiable or traceable to you the individual. At the conclusion of the practice change initiative, all forms will be shredded and discarded at Beacon Health Center."

6. Patients who agree to participate will be asked to complete the form as they wait to be checked in for their appointment.
7. The last question on the survey calculates a score based on their response; a score of 5 or higher indicates the patient is at increased risk for having prediabetes
8. The form will be put in the paper chart for the provider to see before entering the room to meet with the patient for their scheduled visit.

9. The provider will discuss with the patient their risk and decide with the patient if it is appropriate to do further screening by ordering a HbA1C test, a blood test to screen for diabetes.
10. All patients screened will be provided an educational packet (Appendices G, H, and I) with information sheets created by the CDC and American Medical Association (AMA).
11. The packet contains information on prediabetes, risk factors to prediabetes and information on Diabetes Prevention Programs (lifestyle prevention programs) to help make informed decisions about healthier lifestyle decisions
12. The participating patients who complete the Prediabetes Risk test will be provided a copy of their risk test.
13. A copy will be retained with the following identifying information: the patient's first initial, last name, date of birth. The retained copy will be securely kept in a folder labeled "DNP Project" that will be stored in a locked desk located in the office manager's office at Beacon Health Center.
14. The project lead will visit the project site once weekly during the project timeframe and retrieve the completed prediabetes risk test from the designated locked desk drawer in the office manager's office.
15. The project lead will utilize the identifiable patient information written on the Prediabetes Risk Test to conduct a chart review in the electronic health record (eClinical Works). Data will be collected from each chart using a data collection sheet (Appendix J) (i.e., age, insurance status, BMI, history of hypertension) as these can be contributors to diabetes. This data form will not have any patient identifiers on it.

16. The final week of the project will involve conducting the DNP Project Experience Survey with providers/stakeholders) (Appendix K)
    - The survey is a project lead developed paper and pencil survey.
    - The survey has 10 questions which should take less than 5 minutes to complete, and they will be asked to complete it in one week
    - The survey will be voluntary and anonymous and collected by the DNP student in a drop bin located in the office

3.4 SWOT Analysis

The implementation of a practice change initiative warrants an analysis to assess both internal and external factors and attributes that could both negatively and positively impact the change initiative (Terhaar et al., 2021). A well-known tool used to conduct this assessment is a strengths, weakness, opportunities, and threats (SWOT) analysis (Terhaar et al., 2021). The assessment of strengths and weakness provides the internal analysis while the assessment of opportunities and threats provides the external analysis (Terhaar et al., 2021). To help evaluate the readiness of Beacon Health Center for the practice change initiative a SWOT analysis was conducted and below are detailed summaries of the analysis.

Strengths

The strengths of a SWOT analysis focus on identifying key functions of the organization that have significant attributes and assets that contribute to positive outcomes (Terhaar et al., 2021). An analysis of the organization’s strength was discussed and identified with the assistance of the facility’s office manager. Beacon Health Center (satellite facility of West Cecil Health Center) is recognized as a

Federally Qualified Health Center (FQHC); as a health center the facility offers low-cost services to medically underserved populations (West Cecil Health Center [WCHC], 2018). The term medically underserved populations is designated by the U.S Secretary of Health and Human Services as the population group of an urban or rural area with a shortage of personal health services (Legal Information Institute, n.d.). For this reason, federal grants are provided to Beacon Health Center to help service these medically underserved populations; these grants are often applied to the service fees billed to patients (WCHC, 2018). As a federally recognized health center, it is required that no patient presenting for healthcare services at Beacon Health be denied services due to the individual's inability to pay (Health Resources & Services Administration [HRSA], 2018). To uphold this requirement Beacon Health offers a sliding fee discount to eligible patients based on household size and income; this ultimately helps to decrease healthcare cost for patients served at Beacon Health Center. (WCHC, 2018). The relatively compact size of the clinic and small staffing numbers strengthened employee cohesion and collaborative efforts to establish a positive work environment. The facility has two full-time providers: one nurse practitioner and one physician assistant. A physician also serves as the medical director for the company and supervises their work. Adjunct staff members also include the office manager, three medical assistants (one assigned to each provider and one that serves as a floating assistant providing additional help where needed. In addition, the clinic also has a nurse case manager, a social worker a front desk receptionist and an administrative assistant. This relatively small staff size made it ideal it to provide educational resources and facilitate teaching about the practice change initiative to the employees. Another great attribute of the facility is its ability to perform point of caring testing specifically HbA1C test within the office. This greatly improves the likelihood of patients complying with completing HbA1C test if warranted by the Prediabetes Risk Test. There was also a high presence of leadership support and enthusiasm from the office manager which contributed to a positive environment for project implementation,

Weaknesses

Weaknesses in a SWOT analysis refers to factors and attributes that the organization deems as deficient or needing further improvement (Terhaar et al., 2021). Regarding this practice change initiative, the facility's relatively small size decreases the availability of healthcare providers that service the facility. This makes the project vulnerable to major disruptions in the event of employee turn-over or other adverse factors such as a healthcare provider being terminated from their position. The turnover rate and staffing shortage at this facility is relatively high; this often leads to employee dissatisfaction and burnout which subsequently leads to low work morale and disinterest in participating in any new initiatives. Additionally, because the facility is relatively small, it's limited in the number of patients it can service; this hinders the opportunity to screen a large scale of patients. Another weakness identified is the lack of standardization between different provider's practice strategy in screening for prediabetes/diabetes. Each provider has their own rules and protocols they follow regarding screening practices; many of these are not evidence-based practices. This could potentially cause some resistance to change when introducing the practice change initiative and educating providers about the toolkit.

Opportunities

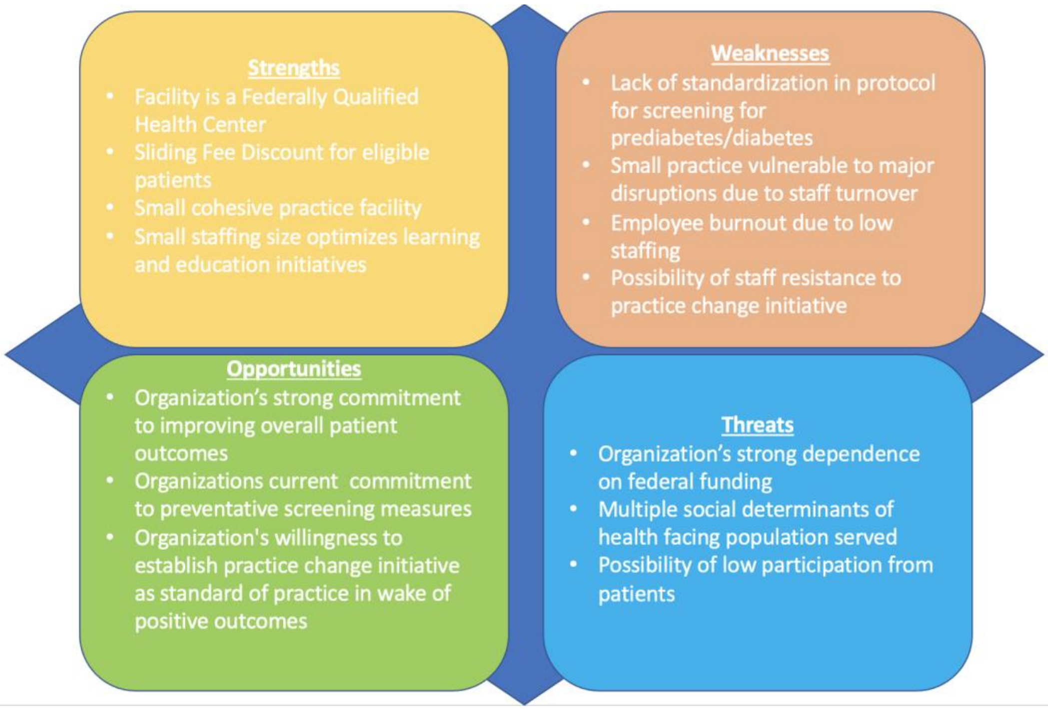
Opportunities in a SWOT analysis are recognized as external factors that optimizes an organization's opportunities for success (Terhaar et al., 2021). A strong opportunity identified to promote the implementation of this project was the evident health care crisis regarding the burden of diabetes nationwide. Beacon Health Center has a strong commitment to improving the overall health of the population it serves; this commitment to improving health outcomes incentivizes and encourages the employees to participate in this practice change initiative. The organization also emphasizes and participates in quality improvement measures which includes preventive screening measures which is the main purpose of this practice change initiative. The leadership of the practice were also interested in potentially sustaining the practice change if the project produced favorable outcomes that improved overall patient health. Additionally, if favorable outcomes are observed there is a potential for branching this initiative to West Cecil Health Center's Conowingo facility which is a bigger facility that serves a larger patient population.

Threats

Threats are external factors that can contribute to an organization's potential failure or inability to thrive (Terhaar et al., 2021). Since Beacon Health Center is federally funded, any threats from the federal government concerning reduction in funding greatly hinders the ability of the organization to function and provide low-cost service to its targeted population. In that regards any threats to the federal government or economic decline due to various factors such as epidemics/pandemics, wars and civil unrest can lead to dramatic notions and policy changes that can severely impact the ability of the practice to function. According to the office manager Beacon Health

Centers serves economically disadvantage clients facing various aspects regarding social determinants of health. Some of the factors identified by the office manager include low health literacy including language barriers affecting the patients and the low socioeconomic status of many of the patients. These factors pose a risk to patients participating in the practice change initiative.

Figure 3.1 SWOT Analysis



3.5 Ethical Consideration

Enrolling volunteers in human subjects' research requires a detailed and meaningful informed consent process that follows the cardinal principles of ethics (Artal & Rubenfeld, 2017):

- Autonomy- self-determination of adults who have decision-making capacity (Artal & Rubenfeld, 2017)
- Beneficence- providing benefits and balancing risk to benefits (Artal & Rubenfeld, 2017)
- Nonmaleficence- do no harm (Artal & Rubenfeld, 2017)
- Justice- equitably distribute benefits, risks, costs, and resources (Artal & Rubenfeld, 2017)

Although this project does involve human subjects an informed consent is not warranted. The medical practice (Beacon Health Center) where this project is taking place is looking to adopt the Prediabetes Risk Test as a screening tool to promote early identification of patients at risk for prediabetes. The project lead (DNP-Student) is looking to compare the patients seen prior to the initiation of the screening tool and after the implementation of the tool to see if the implementation and utilization of the screening tool prompted an increase in identifying patients at risk for prediabetes/diabetes in the practice. As this is something the medical practice is looking to implement as a potential new standard of care, there is no need for an informed consent. Nonetheless in effort to protect all participants and maintain transparency, this project went through a rigorous verification process conducted by the Institutional Review Board (IRB). The IRB is an integral part of any educational, research, or service-based institution that conducts research; the key responsibilities focus on protecting the rights and welfare of research subjects and maintaining ethical constructs (Pearson, 2020). Since this project will have human subjects, it is mandatory to seek approval from the IRB of the University of Delaware before project implementation. An IRB application form along with supporting documents was drafted by the project facilitator and reviewed by the faculty mentor and advisors before submission to the IRB. The IRB of the University of Delaware will provide final approval before project implementation. In effort to also maintain transparency with participants; participating patients will be informed of the risk associated with participation in the screening process. The risks involved in this study are the same as the risk participants would ordinarily encounter in their day-to-day life. This project is focused on screening and providing education on prediabetes; there will be no treatment provided. The possible foreseeable risks are described below:

- Mild anxiety from the screening process and resultant score
- Potential financial burden related to cost of further screening (i.e., if the provider and patient deem it appropriate to provide further screening with a HbA1C test).
- Potential exposure of Protected Health Information (PHI).

As mentioned earlier, full disclosure on the project purpose and aim will be provided to the participants. It will also be emphasized to the patients that participation in the project is completely voluntary and will not affect the quality of care they receive. Additionally, it will also be disclosed to patients that further screening with a HbA1C test may incur possible financial cost to the patient (at no more than $45 dollars) if the patient is uninsured or if their insurance does not cover such services. As mentioned earlier patients will also be provided will be provided with an insert an insert coversheet (Appendix G) along with the "Prediabetes Risk Test" (Appendix B during check in. The insert will disclose to the patients to that their demographical information (patient's age, gender, race/ethnicity, BMI category, hypertensive history and insurance status will be anonymously collected for data analysis and statistical significance.

3.6 Outcomes

The evaluation of the project outcomes will correlate with the three aims listed for this project. After successful completion of the 8-week active project implementation period, data anayalysis and synthesis will begin with a focus on the following outcomes as related to the aims. The focus outcome of the first aim is to measure the amount of HbA1C test scores that are ordered for patients scoring a 5 or higher on the prediabetes risk test. Subsequentially percentage values of HbA1C test ordered as well as completed will also be obtained as part of the descriptive statistics that will be collected. Other descriptive analysis outcomes that will be evaluated are correlations, trends, and percentages between the following patient variables: insurance status, age, ethnic/racial background, and gender. The highlight of the second aim is to identify barriers to utilizing the Diabetes Prevention Toolkit; this outcome will be measured by surveying stakeholders utilizing the DNP Project Experience Survey. The survey has 10 questions generated to evaluate positive and negative perceptions stakeholders may have about different aspects of the project including the feasibility of sustaining the practice change initiative after conclusion of the project and their perception of the benefits of the change initiative for the intended patient population. The third aim emphasizes the educational aspect of the toolkit and specifically inquiries about provider's efforts to provide patients with education and referral to a CDC-verified Diabetes Prevention Program. This outcome will be measured by a thorough chart review specifically focused on reviewing the provider's clinical summary note for confirmation of documented evidence of patients being provided with the educational materials from the toolkit and a referral (informal/unwritten) to a Diabetes Prevention Program.

3.7 Data Collection and Analysis

Throughout the implementation period, data collection will continuously be performed utilizing the Data Collection Sheet (Appendix J). The data analysis and synthesis will focus primarily on answering the 3 aims described above. Statistical data on the percentages of patients who were ordered a HbA1C based on the prediabetes risk test score will be recorded to satisfy aim #1 which is the primary outcome being measured for this project. To also help with interpreting data for the project significance and implications for advance practice, descriptive statistics on the following demographics: the patient's age, gender, race/ethnicity, and BMI category (i.e., underweight, overweight, or obese), history or hypertension and insurance status will be collected for comparison. Analysis will include reviewing statistical percentages, correlations, and trends for significance. An example of descriptive statistical data comparison includes determining the percentage of males screened who were at risk vs. the percentage of females screened who were at risk; the percentage of age groups screened 18-25, 26-35, 36-45, 46-64, 65 -older and the percentage at risk in each age group and percentage of racial/ethnic groups screened and the percentage at risk in the different racial/ethnic groups. Data analysis will be displayed utilizing summary tables, bar graphs, and line graphs.

3.8 Project Evaluation

The project will continuously be evaluated throughout the 12 weeks of implementation. The data collection and analysis process are key factors in the overall evaluation of the project. The project facilitator will ensure that a thorough progress evaluation and audit is done with the faculty mentor and site mentor to ensure that the aims/goals of the project are aligned and maintained on a weekly basis. Throughout the progression of the implementation process, the project facilitator will be open to constructive feedback from all stakeholders and make any necessary revisions that both faculty mentor and site mentor recommend. One of the essential components of the evaluation portion is maintaining weekly contact with project site and stakeholders. Maintaining diligence with weekly data collection is also a vital to the success of the project evaluation.

3.9 Project Budget

The student project facilitator solely addressed monetary investment and project expenses. The project does not have any outside sponsorship or grants. The following is the budget breakdown of expenses:

- Clear Document Folders to create educational packet for participants: 48 count/pack = $16.99 (x2 = $33.98)—anticipating screening 80-100 participants
- BIC Ball-point Pens: 36 count/pack= $4.99— pens for participants to use when filling out the questionnaire
- HP Ink Cartridge Color: 1 count = $24.89— ink for printing out the information sheets provided by the Toolkit for the packets
- HP Ink Cartridge Black: 1 count = $18.89— ink for printing out the information sheets provided by the Toolkit for the packets
- Gas for travel to facility: Average weekly cost $60.00 (x12 weeks= $720.00)
- Total anticipated cost: ~$803.00

3.10 Project Close-Out

The project will conclude at the ending of the fall (November) 2022 semester. The student project facilitator will have a close-out meeting with the site mentor and other stakeholders to review the data analysis and concluding feedback, including the benefits for patients and stakeholders, the possibility of adopting the initiative as a standard practice at the center, as well as any constructive feedback for future planning and implementation process.

3.11 Dissemination

The final project dissemination will occur in the spring of 2023 after complete data synthesis, analysis, and approval of all matters by the faculty mentor. A final DNP project document will be submitted to the University of Delaware School of Nursing Faculty. Upon approval, dissemination will consist of a comprehensive PowerPoint presentation highlighting all the important aspects of the project development, including the original PICOT question, literature review, planning and methodology process, and finally, implementation and data analysis/synthesis.

Chapter 4

RESULTS

4.1 Introduction

The active project implementation occurred over eight weeks. This chapter will analyze and interpret the raw data gathered during the implementation period. It is important to note that the screening process did not occur every day of the week that the facility was operating due to staffing issues at the site; this is further addressed under the limitations section. The screening was completed by staff members mostly on Tuesdays and Thursdays and occasionally on Wednesdays. The DNP project lead was present at the project site/facility during all the days the screening process was implemented. The evaluation of the project outcomes will correlate with the three aims listed for this project:

- The first aim is to measure the amount/percentage of HbA1C tests that are ordered for patients scoring a 5 or higher on the prediabetes risk test.
- The second aim is to identify barriers to utilizing the Diabetes Prevention Toolkit, measured by reviewing the DNP Project Experience Survey results.
- The third aim focuses on providers' efforts to offer high-risk patients education and referral to a CDC-verified Diabetes Prevention Program, measured by the provider's documentation of providing patients with the educational handout and community resources.

The following section will highlight important statistical values and descriptive statistics on the data collected.

4.2 Statistics

During the 8 weeks of active project implementation, a total of 62 patients met the inclusion criteria for screening. Of those 62 eligible patients, 39 (62.9%) identified as female patients, and 23 (37.1%) identified as male patients. Of the 62 eligible patients, 31(50%) identified as Non-Hispanic White/Caucasian, 15 (24.2%) identified as Hispanic/Latino, 9 (14.5%) patients identified as Non-Hispanic Black/African American, 4 (6.5%) identified as Asian, 2 (3.2%) identified as Native Hawaiian or Other Pacific Islander, and 1 (1.6%) identified as Non-Hispanic American Indian and Alaska Native. Of the 62 eligible patients, 54 (87.1%) were insured, and 8 (12.9%) were uninsured. Of the 62 eligible patients, 19 (30.6%) scored a 5 or above on the Prediabetes Risk Test, categorizing them as high-risk patients. Table 4.1 below summarizes the descriptive data focused on the 19 high-risk patients that scored a 5 or above on the Prediabetes Risk Test.

Table 4.1 Descriptive data on patients who scored a 5 or above on the Prediabetes Risk Test (PRT). These patients are identified and categorized as high-risk patients.

Patient #	Age (years)	Gender	Race/Ethn	Insured	PRT score	HbA1C Ordered/ Lab vs. POCT	Ed. Handout
1	37	Male	Non-Hispan. White	Yes	6	Yes/ Lab	Yes
2	50	Female	Non-Hispan. White	Yes	5	Yes/ Lab	Yes
3	57	Male	Non-Hispan. White	Yes	6	Yes/ Lab	Yes
4	57	Female	Non-Hispan. White	Yes	5	Yes/ Lab	Yes
5	43	Female	Non-Hispan. White	Yes	5	Yes/ Lab	Yes
6	64	Female	Non-Hispan. White	Yes	7	Yes/ Lab	Yes
7	71	Female	Non-Hispan. White	Yes	6	Yes/ Lab	Yes
8	65	Female	Black	Yes	7	Yes/ Lab	Yes
9	29	Male	Hispanic	No	5	No	Yes
10	60	Male	Non-Hispan. White	Yes	7	Yes/ Lab	Yes
11	32	Female	Black	Yes	6	Yes/ Lab	Yes
12	66	Female	Non-Hispan. White	Yes	6	Yes/ Lab	Yes
13	41	Female	Hispanic	No	5	No	Yes
14	35	Male	Non-Hispan. White	Yes	6	Yes/ Lab	Yes

15	62	Female	Non-Hispan. White	Yes	5	Yes/ Lab	Yes
16	53	Female	Hispanic	Yes	7	Yes/ Lab	Yes
17	59	Male	Non-Hispan. White	Yes	6	Yes/ Lab	Yes
18	53	Female	Non-Hispan. White	Yes	6	Yes/ Lab	Yes
19	36	Male	Non-Hispan. White	Yes	5	Yes/ Lab	Yes

The information presented in the table highlights the following statistical results:

- 19 out of 62 eligible patients scored a 5 or higher on the Prediabetes Risk Test- identifying them as high-risk patients. The calculated results yielded a statistical value of 30.6%- interpreted as the Prediabetes Risk Test identified 30.6% of all eligible patients screened as high risk for prediabetes.
- The ages of the 19 identified high-risk patients ranged from a low of 29 years to a high of 71 years. The mean age of the 19 identified high-risk patients was 51.1 years old.
- Of the 19 high-risk patients, 12 identified as females and 7 as males. The calculated results yielded a statistical value of 63.2% of high-risk patients identifying as females and 36.8% of high-risk patients identifying as males.
- Of the 19 high-risk patients, 14 identified as non-Hispanic whites, 2 identified as non-Hispanic Blacks, and 3 identified as Hispanics. The calculated results yielded a statistical value of 73.7% of high-risk

patients identifying as non-Hispanic whites, 10.5% identifying as non-Hispanic Blacks, and 15.8% identifying as Hispanics.

- Of the 19 identified high-risk patients, 17 were insured, and 2 were uninsured. The calculated results yielded a statistical value of 89.5% of insured patients and 10.5% of uninsured patients- interpreted as 89.5% of patients identified as high-risk having health insurance and 10.5% of high-risk patients not having health insurance.
- Of the 19 identified high-risk patients, eight scored a 6 on the Prediabetes Risk Test, seven scored a 5 on the Prediabetes Risk Test, and four scored a 7 on the Prediabetes Risk Test. The calculated results yielded the following statistical values: 42.1% of the identified high-risk patients scored a 6 on the Prediabetes Risk Test, 36.8% of the identified high-risk patients scored a 5 on the Prediabetes Risk Test, and 21.1% of the identified high-risk patients scored a 7 on the Prediabetes Risk Test. The mean Prediabetes Risk Test score of all 19 patients was 5.8, the mode Prediabetes Risk Test score of all 19 patients was 6 and the range Prediabetes Risk Test score of all 19 patients ranged from 5-7.
- 17 out of the 19 patients identified as high risk based on their Prediabetes Risk Test score were ordered an HbA1C test. The calculated results yielded a statistical value of 89.5%- interpreted as 89.5% of patients identified as high risk for prediabetes based on a

Prediabetes Risk Test score of 5 or above were ordered an HbA1C test by the attending provider.

- 17 out of the 17 HbA1C test ordered by the attending provider were ordered as laboratory testing to be completed at an outside lab service facility. This yielded a statistical value of 100%.
- 19 of the 19 identified high-risk patients were provided patient education handouts during their visit. This yielded a statistical value of 100%- interpreted as 100% compliance and effort from providers to provide all identified high-risk patients with educational handouts detailing information on prediabetes and local community resources on CDC-verified Diabetes Prevention Programs.

The first and third aims of the project are addressed as highlighted by the statistical values described above. The second aim of this project focuses on identifying barriers to utilizing the Diabetes Prevention Toolkit within the clinical setting; this was measured by reviewing the results of the DNP Project Experience Survey completed by all the stakeholders involved in the implementation process. This yielded a total of 10 surveys completed by the office manager, providers, the medical director, medical assistants, office clerks, and patient services representative. Table 4.2 below summarizes the stakeholder's responses to the questions.

Table 4.2 Stakeholder's Response to the DNP Project Survey Questions. Positive Responses are scores of 4s and 5s, Neutral Responses are scores of 3, Negative Responses are scores of 2s and 1s.

DNP Project Survey Questions	# Positive Responses	# Neutral Responses	#Negative Responses
1. What is your first reaction to the practice change initiative?	3	6	1
2. How would you rate the quality of the prediabetes risk test?	5	4	1
3. How easy or difficult was it to explain to your patients the purpose of the prediabetes risk test?	6	4	0
4. When you think about the Prevent Diabetes Tool Kit (Prediabetes Risk Test and the included educational resources) do you think of it as something you need or don't need for your practice?	4	4	2
5. How likely are you to implement this toolkit into your practice?	4	4	2
6. How organized is the toolkit?	6	3	1
7. How beneficial do you think this toolkit is to your patient's care?	5	4	1
8. How likely is it that you would recommend this toolkit to a colleague?	5	4	1
9. Did using this toolkit increase your efforts to educate and refer patients to a CDC-recognized Diabetes Prevention Program	7	2	1
10. What is your final reaction to the practice change initiative?	6	3	1
Totals:	51	38	11

Ten different stakeholders completed a total of 10 surveys. Each survey had ten questions for a total of 10 responses. When added, the total number of responses from all stakeholders is a total of 100 responses. Of the 100 total responses, 51 (51%)

of the responses were positive responses, 38 (38%) responses were neutral, and 11 (11%) of the responses were negative. The DNP survey responses highlighted the following barriers to the utilization of the Diabetes Prevention Tool Kit (Prediabetes Risk Test and the included educational resources):

- The providers/stakeholder's perceived importance of the need for the toolkit within the clinical practice as evidenced by the responses to question 4. Only 4 (40%) of responses were positive, indicating that less than 50% of stakeholders believe that the Diabetes Prevention Toolkit is needed/necessary within the clinical practice setting.
- The providers/stakeholder's likelihood to implement the toolkit as evidenced by the responses to question 5. Only 4 (40%) of responses were positive, indicating that less than 50% of stakeholders are likely to continue implementing this toolkit within the practice setting.
- The providers/stakeholder's perceived importance of the benefits of the toolkit to the patient's care as evidenced by the responses to question 7. 5 (50%) of the responses were positive, indicating that half of the providers/stakeholders did not acknowledge the benefits of the toolkit in improving patients' care.
- The providers/stakeholder's likelihood to recommend this toolkit to a colleague as evidenced by the responses to question 8. 5 (50%) of the responses were positive, indicating that half of the providers/stakeholders do not intend to recommend this toolkit to their colleagues.

4.3 Retrospective Chart Review

The first 2 weeks of the project implementation timeline was dedicated to completing a retrospective chart review. This chart review was completed to provide comparative data that assists in answering the PICOT question and, subsequently, the primary purpose of the project, which is to compare if the utilization of the Diabetes Prevention Toolkit as compared to current practice increases the rate of prediabetes screening within the primary care setting. The retrospective chart review was conducted during the month of August. Patients that met the inclusion criteria had their charts reviewed. The inclusion criteria for the patient population are as follow:18 years and older, patients who presented for non-acute care such as physicals and wellness checks, patients who do not already have a diagnosis of diabetes, and patients who are not pregnant. It is important to acknowledge that these are the same criteria used for patients during the active project implementation period.

Additionally, it should be noted that for the retrospective chart review, charts were reviewed for each day the clinic was operating during the month of August. This yielded a higher patient volume compared to the same period of time during the active project implementation, where screening was conducted on specific working days. A total of 44 patients meeting the eligibility criteria had their charts reviewed for the month of August. 30 (68.2%) out of 44 patients identified as female, and 14 (31.8%) out of 44 identified as males. Of these 44 patients, 22 (50%) were ordered HbA1C labs with the following associated ICD assessment code (Z13.1 Encounter for screening for diabetes mellitus). All 22 patients ordered a HbA1C were over the age of 40. Of the 22 patients who were ordered a HbA1C test 10 (45.5%) patients did not complete the laboratory test and 12 (54.5%) patients did complete the test. Of the 12 completed HbA1C laboratory test 5 had results between 5.7% -6.4% indicating prediabetes.

When comparing data from the retrospective chart review to the data gathered during the active project implementation period, there is a marked increase in the number of patients screened during the project implementation period. During the month of August, the clinic was opened and operating for 23 days. Forty-four eligible patients were identified as eligible for screening during that time period. When calculated, 44 patients screened over a period of 23 days yields a statistical average of 1.9 patients screened daily. Subsequently, during the 8-week active project implementation period, a total of 20 days were designated as screening days (two days in the month of September, ten days in the month of October, and eight days in the month of November). A total of 62 patients were identified as eligible for screening during the 8-week time period. When calculated, 62 patients screened over a period of 20 days yields a statistical average of 3.1 patients screened daily. Additionally, data analysis from the retrospective chart reviewed revealed that only 22 out of the 44 patients screened (50%) were ordered a HbA1C; whereas data analysis from the project implementation highlighted that 17 out of the 19 (89.5%) patients screened were ordered an HbA1C. A comparison of the two data displays a significant increase in the percentage of HbA1C ordered for patients during the project implementation. Based on these statistical values, it can be concluded that utilization of the Diabetes Prevention Toolkit did increase the rate of prediabetes screening within the primary care setting for this project. A deeper discussion on the data analysis will be explored in chapter 5.

4.3 Limitations in the Data Collection

A limitation noted with data collection included limitation on the days that the project could be actively implemented at the facility. As noted in the weakness section of the SWOT Analysis, the facility is a small practice, with only two primary care providers and three medical assistants. This equates to a relatively low patient volume at baseline at the site. When coupled with staffing shortages prompted by various reasons, including leave of absence, and standard employee turnovers, the daily patient volume presenting to the clinic is even lower, resulting in fewer patients available for screening. Additionally, limited time also contributed as a constraining factor in data collection. With only eight weeks to actively implement the project and the restriction of selected days for projection implementation as described above, data collection was not optimized. All this ultimately decreased the volume/quantity of patients that could have potentially been screened.

Chapter 5

INTERPRETATION OF THE DATA

5.1 Discussion

The purpose of the project was to assess if the utilization of the Diabetes Prevention Toolkit increased the rate of prediabetes screening within the primary care setting. The data analysis and major findings confirmed that the utilization of the toolkit significantly increased the rate of prediabetes screening within the primary care setting. The data analysis and synthesis focused primarily on answering the three aims of the project. First, statistical data on the percentages of patients who were ordered an HbA1C based on the prediabetes risk test score was recorded and reviewed to satisfy Aim 1. Next, the project's second aim was measured by reviewing the results of the DNP Project Experience Survey completed by all the stakeholders involved in the implementation process. Then lastly, statistical data on the percentages of identified high-risk patients who were provided patient education handouts during their visit was recorded to satisfy Aim 3. The following paragraphs will explore different points of discussion and the significance of each aim.

The project's first aim focused primarily on measuring an increase in the number of patients screened and the number of HbA1C tests that were subsequently ordered. The retrospective chart review revealed that baseline screening practices garnered an average of 1.9 patients screened daily. During the project implementation/intervention, data revealed that an average of 3.1 patients were screened daily, estimating a 61% increase compared to the baseline screening. Additionally, for the retrospective chart review, only 22 out of the 44 patients screened (50%) were ordered an HbA1C, whereas 17 out of the 19 (89.5%) high-risk patients screened during the project implementation were ordered an HbA1C. A comparison of the two findings displays a 55.9% increase in the percentage of HbA1C ordered for patients during the project implementation. An important point to note is that for the implementation data, 2 of the 19 high-risk patients were not ordered an HbA1C test because they did not have health insurance- as noted in their visitation summary note. Based on this finding it can be safely assumed that if the 2 patients were insured, 19 out of 19 of the identified high-risk patients would have been ordered an HbA1C test showing 100% compliance with the evidence-based recommendations set forth by the Diabetes Prevention Toolkit. The significant increase in the daily average of patients screened and the percentage of patients screened who were subsequently ordered an HbA1C during project implementation positively reflects the evidenced-based clinical significance and implication of utilizing the Diabetes Prevention Toolkit. Referring to the literature, providers/clinicians aware of the CDC/AMA-recognized toolkit were more likely to screen patients for prediabetes (Nhim et al., 2018).

The project's second aim was to determine barriers to utilizing the Diabetes Prevention Toolkit. Determining barriers were largely focused on measuring stakeholders' responses to the DNP Survey (Appendix K). The four questions on the survey that were primarily used to identify barriers to utilizing the Diabetes Prevention Toolkit were 4, 5, 7, and 8. For question 4, only 40% of stakeholders believe the Diabetes Prevention Toolkit is needed/necessary within the clinical practice setting. For question 5, only 40% of stakeholders are likely to continue implementing this toolkit within the practice setting; for question 7, only 50% of the stakeholders perceived the importance of the benefits of the toolkit to the patient's care. Lastly, for question 8, only 50% of the stakeholders will likely recommend this toolkit to a colleague. The significance of these responses attributing to barriers to utilization of the toolkit relays back to the literature asserting that providers who recognized the Diabetes Prevention Toolkit and had a positive attitude toward prediabetes as a clinical construct were more likely to follow the evidence-based guidelines for screening (Nhim et al. 2018). Negative perceptions of the toolkit and its usefulness within the clinical setting greatly hinder its utilization and indisputable benefits in promoting increasing screening and early intervention for prediabetes/diabetes.

The project's final aim assessed if implementing the Diabetes Prevention Toolkit increased providers' efforts to educate and refer patients to a CDC-recognized Diabetes Prevention Program. This aim was satisfied, as evidenced by documentation in the provider's patient visit summary, which noted in each patient's electronic chart that verbal education and an education packet were provided to each patient during their visit. In addition, the data analysis highlighted that 19 out of the 19 identified high risk-patients were provided education along with a patient education packet during their visit- this rendered 100% compliance with the evidence-based recommendations set forth by the Diabetes Prevention Toolkit. An additional point of discussion is drawn from the high percentage of positive responses to question 7 on the DNP survey. The question asked stakeholders if utilizing the Diabetes Prevention Toolkit increased their efforts to educate and refer patients to a CDC-recognized Diabetes Prevention Program; 70% of the responses were positive. This question also had the highest rate of positive responses on the survey, which correlates with the 100% compliance noted from the data analysis.

5.2 Project Limitations

As previously mentioned, the limitations of the project included a limitation on data collection secondary to restrictions on the days that the project could be actively implemented at the facility due to low staffing. Additionally, limited time also contributed as a constraining factor in data collection. With only eight weeks to actively implement the project and the restriction of selected days for projection implementation as described above, data collection was not optimized. Another factor that placed limitations on the project was the facility's small size; with only two primary care providers, this equates to a relatively low patient volume at baseline. When coupled with staffing shortages, the daily patient volume presenting to the clinic was even lower, resulting in fewer patients available for screening. A decreased patient volume created a reasonably low sample size, inhibiting the findings from being extrapolated for clinical significance.

As part of the project close-out, an open forum discussion was conducted with the facility staff after completing the DNP Project Experience Survey. All staff members recommended that for future practice/implementation, the Prediabetes Risk Test should be conducted using an electronic format, such as incorporating the test into a facility’s electronic health system. Specifically for the project site, all patient visits are conducted on a specialized template that reflects the type of patient appointment. For example, an annual physical template would be used for patients presenting for their annual physicals and wellness checks, and an acute visit template would be used for patients presenting for acute needs. Per their recommendations, building the Prediabetes Risk Test into a template makes utilization convenient and efficient, resulting in more compliance by staff. Staff members also noted that time constraints and scarce healthcare resources, specifically low staffing, was also a deterrence in implementing the utilization of the toolkit within their clinical practice.

5.3 Sustainability of the Project

The successful implementation of the project provides reassurance of its sustainability for future practice. However, the sustainability of the project heavily depends on the organizational setting and the stakeholder's perception of the importance and clinical significance of the practice change initiative. Factors necessary to sustain the project include leadership involvement and dedication in sustainability efforts, the availability of resources, including time and enough staff to efficiently implement the change initiative, as well as the perception, dedication, and determination of the staff to adopt the practice change initiative as a standard of practice. Lastly, the ability of the facility to incorporate the entire Diabetes Prevention Toolkit into its electronic health system greatly increases the rate of utilization and compliance. At the conclusion of the project, no decision was made by the leadership of the project site to implement the Diabetes Prevention Toolkit as a standard of practice.

5.4 Significance and Implications for Advanced Practice

Integrated healthcare aims to encourage collaborative efforts between clinicians and patients that foster health promotion and disease prevention, which are deeply rooted in early screening and preventative measures. The literature notes that a fundamental strategy to prevent type 2 diabetes is to screen high-risk patients for prediabetes and provide necessary interventions. The Diabetes Prevention Toolkit provides clinicians with evidenced-based methods and vetted tools that can easily be incorporated within the primary care setting. The utilization of this toolkit promotes earlier identification of prediabetes and subsequently provides a potential decrease in financial cost secondary to the significant financial burden of type 2 diabetes. The toolkit is unrestricted and available to clinicians and healthcare facilities to utilize without any cost. Prediabetes and diabetes screenings are both billable ICD-10 codes: (Z13.1- Encounter for screening for diabetes mellitus) and R73.03 (Prediabetes). The evidence-based literature, in correlation with the significance of the data analysis and major findings extracted from the DNP project, supports the efficacy of The Diabetes Prevention Toolkit and efforts to make it a standard of practice. Healthcare systems/organizations, insurance companies, healthcare leaders, and policymakers are encouraged to promote the toolkit's efficacy and establish laws and regulations that ease the incorporation of the toolkit within the primary care clinical setting.

5.5 Conclusion

In conclusion, the successful implementation of the DNP project supported the efficacy of utilizing the Diabetes Prevention Toolkit as promoted in the evidence-based literature. To summarize, the goal of the DNP project was to assess if the utilization of the Diabetes Prevention Toolkit increased the rate of prediabetes screening within the primary care setting. The data analysis and major findings confirmed that the utilization of the toolkit significantly increased the rate of prediabetes screening, as evidenced by the increase in the daily average of patients screened, the increase in the percentage of patients ordered an HbA1C and the increase in the percentage of clinicians providing patients education and referral to a diabetes prevention program. Implementation of the project was relatively stress-free, with minimal impact or burden on the facility's resources. Nonetheless, the project's conclusion did identify important barriers and limitations, including a low sample size inhibiting the findings from being extrapolated for clinical significance. Major recommendations for project improvement included incorporating the toolkit into a facility's electronic health system. All the positive outcomes highlighted in the data analysis and major findings of the project provide clinicians incentive to incorporate the Diabetes Prevention Toolkit as a standard of practice. Additionally, this encourages all clinicians to collaborate with the communities they serve to provide quality care based on evidence-based practice to increase health promotion and disease prevention.

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Appendix A

JOHNS HOPKINS EVIDENCE SUMMARY TOOL TABLE

Date:11/21/2020	EBP Question: In adult patients, 18 years and older who are at risk for prediabetes (P), does the utilization of the Diabetes Prevention Toolkit in the primary care setting (I) as compared to current practice (C) increase the rate of prediabetes screening (O) within three months (T)?						
Article Number	Author and Date	Evidence Type	Sample, Sample Size, Setting	Findings That Help Answer the EBP Question	Observable Measures	Limitations	Evidence Level, Quality
1.	Ackermann et al. 2015	Randomized Control trail	509 overweight or obese, low-income, nondiabetic adults in 9 urban primary care clinics in Indianapolis, Indiana	YDPP participants who completed 9 or more program visits achieved approximately a 5.3-kilogram (equivalent to 11.7 lbs.) lower body weight at 12 months than they would have if offered brief advice alone.	Weight loss	The study was of modest duration (12 months), preventing analyses of long-term weight maintenance or delayed clinical outcomes that might result only over longer periods	Evidence Level: 1 Quality Rating: B
2.	Ackermann et al. 2020	Literature Review	N/A	Research on DPP-like programs has demonstrated that weight loss efficacy is greatest for	N/A	Review of literature, the findings do not come from primary research	Evidence Level: 5 Quality Rating: A

				lifestyle interventions that focus on both healthy dietary behaviors and physical activity, while incorporating behavioral approaches like goal setting, self-monitoring, self-regulation, stimulus control, and problem solving			
3.	Alkhalaileh et al. 2011	Integrative Literature Review	11 Research Studies Meet inclusion criteria (9 Quantitative Studies; 1 Qualitative Study; 1Secondary analysis)	"Such review paper proves that HPM provides a framework within which to begin to understand the factors and variables that influence the initiation of healthy behaviors in different settings with various populations. This paper reveals that the effective use of research-	Health-promoting behaviors and self-esteem	Varying techniques and instruments used in data collection from the different studies (i.e. self-reported questionnaire, observation, lab tests, and measuring blood pressure)	Evidence Level: 5 Quality Rating: A

				based evidence in nursing practice and policy requires an integrated review such as that presented in this paper”			
4.	Barry et al., 2017	Systematic Review with Meta-Analysis	2874 titles were scanned and 148 papers (covering 138 studies) reviewed in full.	Meta-analysis showed that lifestyle interventions reduced the relative risk of developing diabetes by 31% (95% confidence interval 15% to 44%) if the intervention lasted six months to two years	Diagnostic accuracy of screening tests for prediabetes and the efficacy of interventions in	The main limitation of the review was the number of exclusions because of incomplete data available in published studies	Evidence Level: 1 Quality Rating: A
5.	Glechner et al., 2018	Systematic Review with Meta-Analysis	11,425 relevant abstracts; 419 full-text articles retrieved for detailed examination and a	Both the US DPP and the Finnish DPS showed significant benefits for lifestyle intervention participants aged 60 years or older, with	Efficacy and safety of lifestyle intervention, targeted at dietary and exercise behavioral changes type 2	Few studies analyzed if lifestyle intervention reduces long-term type 2 diabetes-related complications in	Evidence Level: 1 Quality Rating: B

			total of 58 analyzed	greater weight loss, exercise goal achievement, and reduction in risk to develop type 2 diabetes when compared to younger counterparts. Studies from the US and India concluded that lifestyle intervention is cost-effective for preventing type 2 diabetes over a period of three years	diabetes in people with pre-diabetes	people with prediabetes	
6.	Holliday et al., 2019	Mixed-Methods (Quantitative and Qualitative)	Recruited 30 clinical practices in 17 communities to participate in our study; 26 clinics agreed to participate (Practices referred a total of 5,640 patients)	This implementation evaluation revealed that increased awareness and simple modifications to clinical workflows led to increased screening and referrals to YMCA DPPs for preventing type 2 diabetes.	Rates of referral and enrollment of patients to YMCA-DPP	Convenience sample of clinical practices and YMCA DPP & did not determine the total number of patients served by each of the clinical practices	Evidence Level: 3 Quality Rating: A

7.	Keck et al., 2020	Cluster Randomized, Mixed-Methods (Quantitative and Qualitative)	2 primary care clinics	POC testing facilitates a face-to-face conversation and development of a treatment plan with the patient, resulted in increased DPP utilization. Different intervention components resonated with different clinicians, which supports using a multipronged implementation approach.	Referral of patients with prediabetes to the institutional Diabetes Prevention Program	Sample size and study duration in this pilot were limited by study funding, and sample size estimates were not calculated.	Evidence Level: 3 Quality Rating: A
8.	Kerrison et al, 2017	Systematic Review	9 studies met the inclusion criteria for the review	The review provides evidence for the effectiveness of lifestyle interventions to treat prediabetes. Overall, cumulative incidence of diabetes is drastically reduced in the	Assess glycemic control and incidence of T2DM diagnosis after exercise and dietary intervention.	Randomized controlled trails with large participant numbers need to be undertaken to assess the generalizability of lifestyle intervention	Evidence Level: 1 Quality Rating: A

				intervention groups compared to control groups (standard care). Furthermore, glycemic control was improved in the short term, with many participant’s reverting to normoglycemia. In the long term, glycemic control diminished, but glycemic control was still superiorly better managed than baseline results and control groups.		treatments	
9.	Khan et al. 2019	Literature Review	N/A	Provides detailed scientific information and statistics on the prevalence of diabetes/prediabetes on a global scale as well as detailed information	N/A	There is no information provided on a standardized approach, appraisal and critical review of studies mentioned	Evidence Level: 5 Quality Rating: A

				on the pathophysiology of the disease.		in the article.	
10.	Khodaveisi et al. (2017)	Quasi-experimental study	108 eligible women Fatemiyeh Hospital clinics in Hamadan, Iran	The results showed that the Pender's HPM-based training can positively affect and improve nutritional behaviors. Showed an increase in self-efficacy using the Pender's HPM, and reported that the knowledge about barriers and strategies increased the motivation and perceived social supports.	Perceived benefits; Perceived barriers, Behavior-related affect; Perceived self-efficacy; Situational influences; Interpersonal influences; Commitment to action; Nutritional behavior.	Researchers were unable to observe nutritional behaviors, and thus nutritional behaviors were examined using a self-report questionnaire; this might result in insufficiently accurate description of some variables.	Evidence Level: 2 Quality Rating: A
11.	Khoshnood et al. (2018)	Integrative Review	28 manuscripts	Nursing/provider actions play a vital role in modifying behavior-specific cognitions and providing	Internal Criticism of Theory vs External Criticism of Theory	There is no consistency between the studies reviewed	Evidence Level: 4 Quality Rating: B

				major motivational significance for patients engaging in interventions. HPM model has helped determined that nursing goals can focus on “strengthening resources, potentials, and capabilities” for individuals, families, and communities to help them obtain a better quality of life			
12.	Kramer et al. 2018	Randomized Control Trial	134 individuals enrolled in the study; implemented in 3 senior/community centers in Allegheny County, PA	An adapted DPP lifestyle intervention program delivered in 3 economically diverse senior/community centers was highly successful in reducing weight, increasing Physical activity levels, and improving other risk	Primary outcome assessed in this study was the change in weight from baseline to 6 months (absolute change and percent change)	Limitations to the study is the fact that although the 3 centers were economically diverse, the populations of these centers were not racially/ethnically diverse, limiting	Evidence Level: 1 Quality Rating: A

				factors for type 2 diabetes and CVD in older adults.		the generalizability of the result.	
13.	Kullgren et al. 2017	Randomized Control Trial	non-diabetic patients from the Ann Arbor VA Medical Center	Diabetes prevention relies heavily on patient engagement. Patients must believe that their risk for type 2 diabetes is real and modifiable, have a strong motivation to prevent type 2 diabetes, understand strategies and approaches to help decrease their risk as well as motivation to engage in identified strategies and have the self-efficacy and support system to endure interventions and sustain health behaviors	HbA1C Test Weight Change/BMI measurements Assessment Survey	The relatively small sample size may reduce the generality of the study.	Evidence Level: 1 Quality Rating: A

14.	Nhim et al., 2018	Qualitative	primary care providers (n¼1,256)	PCPs who had heard of the CDC-recognized LCP and STAT toolkit were more likely to screen patients for prediabetes, consistent with a study showing that physicians who had a positive attitude toward prediabetes as a clinical construct were more likely to follow national guidelines for screening.	Cross-sectional web-based survey were analyzed to measure self-reported prediabetes screening, testing, and referral behaviors	The CDC-recognized LCP and STAT toolkit were self-reported. Existing limitations in web-based survey platforms	Evidence Level: 3 Quality Rating: B
15.	Tseng et al. (2017)	Qualitative Study	140 PCPs from multispecialty practices affiliated with one academic system across the mid-Atlantic region	Screening for prediabetes is an essential measure in preventing type 2 diabetes due to the fact that 70% of individuals with prediabetes eventually develop type 2 diabetes. Reports	6% of providers correctly identified all 11 of the risk factors for prediabetes screening 39% of providers identified all of the traditional	Survey was conducted among providers from multi-specialty practices so findings may not be generalizable Possibility of recall	Evidence Level: 3 Quality Rating: A

				reveal that clinicians are not screening nor providing the proper evidence-based recommendations and interventions for at risk patients	or medical risk factors Only 17% of providers correctly identified the laboratory parameters for diagnosing prediabetes based on both fasting glucose and HbA1c	bias and social desirability bias		

16.	Venkataramani et al. 2019	Qualitative Study	The study population consisted of 2,341 adults	4.2% of individuals, reported being referred by a healthcare provider. More than one third (37.1%) of those reporting referrals to programming also reported program participation. Over-all, only 2.4% of eligible adults participated in diabetes prevention programming. Overall, this suggests a need to improve both program access and referral efforts, the latter being suboptimal in the clinical setting	Outcomes measured were program referral, participation, and interest	Limitations of this study include the use of self-reported measures to determine program eligibility and outcomes.	Evidence Level: 3 Quality Rating: B

Appendix B

WORK BREAKDOWN STRUCTURE (WBS) CHART

Project Title: Promoting Prediabetes Screening Within the Primary Care Setting:
An Evidence-Based Approach Utilizing the Diabetes Prevention Toolkit

Purpose: The purpose of this evidence-based project is to promote the efficacy of screening for prediabetes and encourage the utilization of the Diabetes Prevention Toolkit within the primary care setting

Aim 1:

To determine if the implementation of the Diabetes Prevention Toolkit within the primary care setting as compared to current practice will generate an increase in screening for prediabetes as measured by clinicians ordering HbA1Cs based on Prediabetes Risk Test score during the 8-week active project implementation time frame.

Activities	Activities	Activities	Activities
1) Develop DNP Project implementation plan by June 2022 • Establish and secure a project site and project site mentor • Identify key stakeholders of the project site (agency/facility) and conduct formal meetings to discuss implementation plan	1) Continued… • Communicate with agency office manager to establish the roles of key stakeholders in the project • Discuss each key stakeholder's role and decrease interruption to agency's regular clinical workflow	1) Continued… • Finalize implementation plan with agency office manager, project site mentor and faculty mentor • Conduct DNP Project Proposal Presentation • Complete IRB application and submit for review and approval	1) Continued… • Upon project approval by IRB DNP student will follow established project timeline of 12 weeks from 09/05/2022-11/28/2022 • DNP student will conduct retrospective chart reviews to gather data on current screening practice for prediabetes during the 1st week 09/05/22-09/09/22
1) Continued… • DNP student will utilize a "Pre-data" sheet created for retrospective chart review • DNP student will provide education and orientation of project to clinic staff and	1) Continued… • DNP student will review completed Prediabetes Risk Test survey and corresponding patient chart to determine if patients were screened and		

• DNP student will utilize tools and resources from the Diabetes Prevention Toolkit to educate staff/ key stakeholders • DNP student will conduct mock trials during the 2nd week 09/12/22-09/16/22 • 8-week period of active project implementation (9/19/22-11/11/22) • DNP student will utilize a data collection sheet created for active implementation chart review	ordered a HbA1C • Week 11/14/22-11/18/22 will mark completion of active project period and involve data synthesis for interpretation		

Aim 2: **To identify barriers to utilizing the Diabetes Prevention Toolkit within the primary care setting as measured by surveying stakeholders using a simple rankings and ratings survey upon the 12-week project conclusion.**

Activities	**Activities**	**Activities**	**Activities**
1) Utilize a post-implementation survey to assess providers' perceptions of DNP Project and toolkit • DNP student will utilize a 10 questionnaire self-created survey the final week (11/21/22-11/25/22 to conduct DNP stakeholder experience survey • High percentage of favorable answers will indicate a positive experience with utilizing			

Diabetes Prevention Toolkit and minimum identified barriers to implementation in the primary care setting			

Aim 3: **To determine if the implementation of the Diabetes Prevention Toolkit increases providers' effort to educate and refer patients to a CDC-recognized Diabetes Prevention Program during the 8-week active project implementation time frame.**

Activities	**Activities**	**Activities**	**Activities**
1) Conduct chart reviews utilizing self-created data collection sheet • Emphasize to providers during training and education during the second week to ensure to make note in their clinical-visit summary note of education and referral provided to patients • DNP student will identify the number of patients that were educated and referred to a CDC-recognized Diabetes Prevention Program (DPP) during 8 week active project implementation	1) Continued… • DNP student will collect data by conducting chart reviews and reading provider's clinical summary notes during data collection and synthesis stage during week 11/14/22-11/18/22		

Appendix C

DNP PROJECT PRE-DATA COLLECTION SHEET

1. **What ICD/CPT codes were used during patient visit?**
   - **ICD Codes:**
   - **CPT Codes:**
2. **What is the patient's age? ______________________**
3. **What is the patient's recorded gender and ethnicity? ___________________**
4. **What is the patient's BMI? _____________________**
5. **Does the patient have a history of hypertension? YES/NO**
6. **Does the patient have health insurance? If so, what? ___________________**
7. **Was the patient ordered a HbA1C test? YES/NO**
8. **If HbA1C ordered, did the patient complete the HbA1C test? YES/NO**
9. **If HbA1C tested, what was the HbA1C level? ___________________**
10. **Was the HbA1C point of care testing in the office or laboratory testing? POC/LAB**
11. **If HbA1C not tested, was it by provider's choice, patient's choice, or both? _**

Appendix D

PREDIABETES RISK TEST

Prediabetes Risk Test

NATIONAL DIABETES PREVENTION PROGRAM

Write your score in the boxes below

1. How old are you?

Younger than 40 years (0 points)
40–49 years (1 point)
50–59 years (2 points)
60 years or older (3 points)

2. Are you a man or a woman?

Man (1 point) Woman (0 points)

3. If you are a woman, have you ever been diagnosed with gestational diabetes?

Yes (1 point) No (0 points)

4. Do you have a mother, father, sister, or brother with diabetes?

Yes (1 point) No (0 points)

5. Have you ever been diagnosed with high blood pressure?

Yes (1 point) No (0 points)

6. Are you physically active?

Yes (0 points) No (1 point)

7. What is your weight category?

(See chart at right)

Total score:

Height	Weight (lbs.)		
4'10"	119-142	143-190	191+
4'11"	124-147	148-197	198+
5'0"	128-152	153-203	204+
5'1"	132-157	158-210	211+
5'2"	136-163	164-217	218+
5'3"	141-168	169-224	225+
5'4"	145-173	174-231	232+
5'5"	150-179	180-239	240+
5'6"	155-185	186-246	247+
5'7"	159-190	191-254	255+
5'8"	164-196	197-261	262+
5'9"	169-202	203-269	270+
5'10"	174-208	209-277	278+
5'11"	179-214	215-285	286+
6'0"	184-220	221-293	294+
6'1"	189-226	227-301	302+
6'2"	194-232	233-310	311+
6'3"	200-239	240-318	319+
6'4"	205-245	246-327	328+
	1 Point	2 Points	3 Points

You weigh less than the 1 Point column (0 points)

Adapted from Bang et al., Ann Intern Med 151:775-783, 2009. Original algorithm was validated without gestational diabetes as part of the model.

If you scored 5 or higher

You are at increased risk for having prediabetes and are at high risk for type 2 diabetes. However, only your doctor can tell for sure if you have type 2 diabetes or prediabetes, a condition in which blood sugar levels are higher than normal but not high enough yet to be diagnosed as type 2 diabetes. Talk to your doctor to see if additional testing is needed.

If you are African American, Hispanic/Latino American, American Indian/Alaska Native, Asian American, or Pacific Islander, you are at higher risk for prediabetes and type 2 diabetes. Also, if you are Asian American, you are at increased risk for type 2 diabetes at a lower weight (about 15 pounds lower than weights in the 1 Point column). Talk to your doctor to see if you should have your blood sugar tested.

You can reduce your risk for type 2 diabetes

Find out how you can reverse prediabetes and prevent or delay type 2 diabetes through a CDC-recognized lifestyle change program at https://www.cdc.gov/diabetes/prevention/lifestyle-program.

Risk Test provided by the American Diabetes Association and the Centers for Disease Control and Prevention.

American Diabetes Association. CDC

CS300699-A

Appendix E

PROJECT DISCLOSURE STATEMENT

ATTENTION! Please Read Below BEFORE Completing The Prediabetes Risk Test!

You are participating in a practice change initiative to screen for prediabetes. Participation is voluntary and will not affect the quality of care you receive at Beacon Health Center. A copy of your completed Prediabetes Risk Test will be retained with the following information: initial of your first name, full last name, and date of birth. This copy will be retained in a locked cabinet located in the office manager's office and only accessible with permission from the office manager. The copy will be utilized by the facilitator of the practice change initiative to collect the following demographic data: the patient's age, gender, race/ethnicity, and BMI category (i.e., underweight, overweight, or obese), history of hypertension and insurance status. Be assured that the collected data will remain confidential, and the information will not be identifiable or traceable to you the individual. At the conclusion of the practice change initiative, all forms will be shredded and discarded at Beacon Health Center.

Appendix F

PREDIABETES ARE YOU AT RISK

Are you at risk?

You could have prediabetes if you:

- Are 40 years of age or older
- Have a BMI that is categorized as overweight or obese
- Have a history of gestational diabetes
- Have a family history of type 2 diabetes
- Have certain medical conditions like high blood pressure
- Have a sedentary lifestyle

Why act now?

If you have prediabetes, you may be at higher risk for developing type 2 diabetes or other medical issues in the future.

Here's the good news ...

If you are diagnosed with prediabetes, there are treatment options to help prevent or delay type 2 diabetes.

Your treatment options may include the National Diabetes Prevention Program lifestyle change program, medication or medical nutrition therapy.

Get tested for prediabetes—talk with your doctor today.

AMA
AMERICAN MEDICAL ASSOCIATION

Appendix G

WHAT IS PREDIABETES

Why does prediabetes matter to me?

If you have prediabetes, you may have a greater risk of developing type 2 diabetes, as well as other medical conditions.

I feel fine, though.

Certain risk factors can increase your chances of having prediabetes.

How do I find out if I have prediabetes?

Prediabetes is diagnosed through a blood test. Your doctor can tell you more and order the best test for you.

Okay, now what?

The good news is that prediabetes is treatable and you *can* lower your risk of developing type 2 diabetes.

Your treatment options can include the evidence-based National Diabetes Prevention Program (National DPP) lifestyle change program, medication or medical nutrition therapy.

Get tested for prediabetes—talk with your doctor today.

Appendix H

SO YOU HAVE PREDIABETES NOW WHAT

AMA
AMERICAN MEDICAL ASSOCIATION

So you have prediabetes ... now what?

Start changing your daily habits

Simple changes to your daily habits can lower blood glucose in people with prediabetes. These changes can delay—and even prevent—the onset of type 2 diabetes and other problems.

Be more physically active each day
Aim for 150 minutes of activity per week—or about 30 minutes, five days a week

Make healthy food choices
Eat vegetables, fruits and whole grains, and remember to watch your portion sizes

Lose a little weight
Losing between 5 percent and 7 percent of your total weight can make a difference. Here are some examples of how much to lose:

If you weigh ...

150 lbs.	200 lbs.	250 lbs.
Try to lose 7–10 lbs.	Try to lose 10–14 lbs.	Try to lose 12–17 lbs.

What are your treatment options?

- National Diabetes Prevention Program (National DPP) lifestyle change program
- Medical nutrition therapy
- Medication

The National DPP lifestyle change program can help prevent or delay type 2 diabetes.

Appendix I

FREQUENTLY ASKED QUESTIONS SHEET

AMA AMERICAN MEDICAL ASSOCIATION | Prevent type 2 diabetes

Frequently asked questions

Below you will find some suggestions and guidance pertaining to frequently asked questions about prediabetes and the National Diabetes Prevention Program (National DPP) lifestyle change program. While these responses represent a great place to start your conversation, we also recommend addressing the following items with your clinical care team prior to beginning outreach to your eligible patients:

1. Determine if/how you will handle outreach to patients who may not know they have prediabetes.
2. Have answers specific to your organization's National DPP lifestyle change program. Or, if you are referring your patient to another organization's National DPP lifestyle change program, have its contact information ready and available.
3. Have a method to connect patients back to their physician or care team if they have questions.

Questions pertaining to prediabetes

What is prediabetes?

Prediabetes is a condition in which blood glucose (sugar) levels are higher than normal but not high enough to be diagnosed as diabetes. Many adults have prediabetes; however, the majority of those who have prediabetes don't know they have it.

Having prediabetes can put you at a higher risk for developing type 2 diabetes and other serious health problems.

What causes prediabetes?

The exact cause of prediabetes is unknown; although, there are known risk factors, such as having a family history of type 2 diabetes, having certain medical conditions, or having a BMI that is categorized as overweight or obese.

How is prediabetes diagnosed?

Prediabetes can be diagnosed through a blood test. Your physician can help determine what blood test is right for you and let you know what your results show.

What are the signs and symptoms of prediabetes? Is prediabetes dangerous?

Prediabetes often does not have any signs or symptoms and many people don't even know they have it. Prediabetes is not a life-threatening condition, but having it increases the risk of developing type 2 diabetes along with other medical conditions like high blood pressure, stroke and heart attack. Although not every patient with prediabetes will have these health problems or progress to type 2 diabetes, the risk can be reduced by participating in a National DPP lifestyle change program, which helps patients make long-term healthy lifestyle changes.

Questions pertaining to the National Diabetes Prevention Program lifestyle change program

Is this program just about losing weight and exercising?

While weight loss is a goal of this program, the program is not just about a specific diet or exercise program. The National DPP lifestyle change program was designed by the Centers for Disease Control and Prevention to help people make more informed choices and make lasting changes in their lives. You will not be told to do specific exercises or to join a gym, but you will learn to try new things, share your experiences with others and build new habits. You will also learn how to improve your overall health and, in doing so, reduce your risk of developing type 2 diabetes.

Appendix J

DNP PROJECT DATA COLLECTION SHEET

1. **What was the patients Prediabetes Risk Test Score?_____________________**
2. **What is the patient's age? _______________________**
3. **What is the patient's recorded gender and race/ethnicity? ________________**

   ______
4. **What is the patient's BMI? ______________________**
5. **Does the patient have a history of hypertension? YES/NO**
6. **Does the patient have health insurance? If so, what? ____________________**
7. **Was the patient ordered a HbA1C test? YES/NO**
8. **If HbA1C ordered, did the patient complete the HbA1C test? YES/NO**
9. **If HbA1C tested, what was the HbA1C level? ___________________**
10. **Was the HbA1C point of care testing in the office or laboratory testing? POC/LAB**
11. **If HbA1C not tested, was it by provider's choice, patient's choice, or both? _**

    ______
12. **Was patient provided the educational material on prediabetes and the Diabetes Prevention Program? YES/NO**
13. **What ICD/CPT codes were used during patient visit?**
14. **ICD Codes:**
15. **CPT Codes:**

Appendix K

DNP PROJECT EXPERIENCE SURVEY

As a stakeholder in this evidence base project, your feedback is extremely valuable in helping to determine the efficacy of this practice change initiative. Your responses are anonymous and will not be identified with you in any way. This survey has only 10 questions and should take you less than 5 minutes. Thank you for your support.

	5	4	3	2	1
1. What is your first reaction to the practice change initiative?	Very Positive	Somewhat Positive	Neutral	Somewhat Negative	Very Negative
2. How would you rate the quality of the prediabetes risk test?	Very High Quality	High Quality	Neutral	Low Quality	Very Low Quality
3. How easy or difficult was it to explain to your patients the purpose of the prediabetes risk test?	Very Easy	Somewhat Easy	Neither Easy Nor Difficult	Somewhat Difficult	Very Difficult
4. When you think about the Prevent Diabetes Tool Kit (Prediabetes Risk Test and the included educational resources) do you think of it as something you need or don't need for your practice?	Definitely Need	Probably Need	Neutral	Probably Don't Need	Definitely Don't Need
5. How likely are you to implement this	Extremely Likely	Very Likely	Somewhat Likely	Not So Likely	Not At All Likely

toolkit into your practice?					
6. How organized is the toolkit?	Extremely Organized	Very Organized	Somewhat Organized	Not So Organized	Not At All Organized
7. How beneficial do you think this toolkit is to your patient's care?	Extremely Beneficial	Very Beneficial,	Somewhat Beneficial,	Not So Beneficial	Not At All Beneficial
8. How likely is it that you would recommend this toolkit to a colleague?	10-9 Extremely Likely	8-7 Very Likely	6-5 Somewhat Likely	4-3 Not So Likely	2-0 Not At All Likely
9. Did using this toolkit increase your efforts to educate and refer patients to a CDC-recognized Diabetes Prevention Program?	Extremely Increased Efforts	Increased Efforts	Neutral	Somewhat Increased Efforts	Not At All Increased Efforts
10. What is your final reaction to the practice change initiative?	Very Positive	Somewhat Positive	Neutral	Somewhat Negative	Very Negative

Appendix L

IRB/HUMAN SUBJECTS APPROVAL

Institutional Review Board
210H Hullihen Hall
Newark, DE 19716
Phone: 302-831-2137
Fax: 302-831-2828

DATE:	August 29, 2022
TO:	Stephanie Kwabi, BSN
FROM:	University of Delaware IRB
STUDY TITLE:	[1936518-1] Promoting Prediabetes Screening Within the Primary Care Setting: An Evidence-Based Approach Utilizing the Diabetes Prevention Toolkit
SUBMISSION TYPE:	New Project
ACTION:	NOT HUMAN SUBJECTS RESEARCH DETERMINATION
DECISION DATE:	August 29, 2022

Thank you for your New Project submission to the University of Delaware Institutional Review Board (UD IRB). According to federal regulations, this project does not meet the definition of human subject research under the purview of the IRB.

The following definitions were used in making the NOT HUMAN SUBJECTS RESEARCH determination:

- **Research** means a systematic investigation, including research development, testing, and evaluation, designed to develop or contribute to generalizable knowledge.
- **Human subject** means a living individual about whom an investigator (whether professional or student) conducting research: (i) Obtains information or biospecimens through intervention or interaction with the individual, and uses, studies, or analyzes the information or biospecimens; or (ii) Obtains, uses, studies, analyzes, or generates identifiable private information or identifiable biospecimens.

No further action with the IRB Office is required at this time. Please consult with our office if any major changes to the reviewed project, relevant to the definitions above, were to be proposed.

A copy of this correspondence will be kept on file by our office. If you have any questions, please contact the UD IRB Office at (302) 831-2137 or via email at hsrb-research@udel.edu. Please include the study title and reference number in all correspondence with this office.

INSTITUTIONAL REVIEW BOARD
www.udel.edu