Implementing a Kidney Screening Process for Diabetic Patients in a Primary Care Office

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April 12, 2021

Abstract

Diabetes is the leading cause of kidney disease worldwide. Screening diabetic patients with microalbuminuria is an easy and inexpensive way to detect kidney disease in the early stages. A quality improvement project was designed to assist a primary care office in developing a standardized process and revising a protocol to increase diabetic kidney screening. The project's goal was to align with the Medicare and Medicaid 2019 benchmark of 95% in screening individuals with diabetes for chronic kidney disease. The project included revising a screening protocol, staff education followed by a questionnaire, and distributing visual kidney screening posters. The plan-do-study-act (PDSA) model guided project implementation. Diabetic kidney screening was tracked over a 12-week period. Out of 399 eligible patients due for a diabetic chronic kidney disease screening, 377 were screened (96%). This project addressed objectives related to Healthy People 2020 by increasing diabetic kidney screening, increasing the number of individuals aware of having kidney disease, and decreasing the overall burden of kidney disease. This project aligns with Triple Aim Initiatives to reduce cost, improve quality of health care and health in the diabetic population

Key words: Diabetic kidney disease, micro-albuminuria screening, primary care, screening diabetics for kidney disease

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Section I. Introduction

Background

Kidney disease among those with diabetes mellitus is cause for concern; 20% of the 400 million individuals with diabetes suffer from kidney disease, also known as diabetic nephropathy (McGrath & Edi, 2019). Diabetes is the leading cause of kidney disease in the United States, accounting for nearly 44% of newly diagnosed cases (National Kidney Foundation [NKF], 2016). Mortality rates are higher for diabetics with chronic kidney disease compared to those without it (Papadakis et al., 2020). In 2017, treating Medicare patients who had a diagnosis of chronic kidney disease cost over $84 billion in the United States, and treating people with end-stage kidney disease (ESKD) cost an additional $36 billion (Center for Disease Control [CDC], 2020). In 2017, the Medicare spending report revealed that costs were 54% higher for those with chronic kidney disease and diabetes versus those with diabetes alone (United States Renal Data System [USRDS], 2018a). If detected early during routine screenings, healthcare providers can prompt treatment and thwart the disease's advancement (NKF, 2018).

Organizational Needs Statement

The Center for Medicare and Medicaid Services (CMS) recommends a screening metric for primary care offices in the United States. The screening metric benchmark for diabetes includes testing for nephropathy. The CMS (2019, "Clinical Recommendation Statements" section) metric states, "at least once a year, assess urinary albumin (e.g., spot urinary albumin-to-creatinine ratio) and estimated glomerular filtration rate in patients with Type 1 diabetes for a duration of greater than or equal to 5 years and in all patients with Type 2 diabetes". The partner

organization for this Doctor of Nursing Practice (DNP) project, a primary care clinic located in southwestern North Carolina, currently does not meet this CMS metric.

Insurance providers offer reimbursements to healthcare providers based on their completion of specific metrics. Screening for diabetic nephropathy counts as a payer contract measure. The organization will receive credit for this metric and qualify for reimbursement if a urine-microalbumin or urine dipstick for protein is completed. Patient prescriptions for certain blood pressure medications such as Angiotensin-converting enzyme (ACE) inhibitor or Angiotensin II receptor blockers (ARB) qualify healthcare providers to meet payer contract measures as well. Although these prescriptions of medications allow for reimbursement, microalbumin urine screening is the only effective way to test diabetic patients for kidney disease.

The goal for the project site is to consistently achieve a 95% completion of the CMS metric every quarter in each of their primary care medical clinics. The project partner recognizes that some of their clinics within the system are meeting that goal, while others are not. This project will focus on one primary care clinic that is not meeting the quality metric. As of March 31, 2020, this clinic only had a 90% completion rate of screening ([redacted], personal communication, April 3, 2020). The project's goal is to increase screening of diabetic patients for kidney disease at this primary care clinic with the aim of reaching the CMS metric of a 95% completion rate.

Healthy People 2020 have leading health indicators that support the importance of this project. A few of these include reducing the proportion of the U.S. population with chronic kidney disease and increasing the proportion of persons with diabetes and chronic kidney disease who receive the recommended medical evaluation (Healthy People, 2020a). Reducing kidney

failure due to diabetes and reducing deaths among persons with chronic kidney disease are included in these indicators. This DNP project supports specific Healthy People 2020 goals that aim to reduce the burden of chronic kidney disease (CKD) in the United States.

This project aligns with the Triple Aim by improving the health of the diabetic population, improving cost for both the organization and patient, and improving the quality of health care. Screening diabetic patients for kidney disease can reduce the burden of compounding chronic illness on this already vulnerable population. The mortality rate of diabetic patients is linked to the presence and stage of kidney disease. Screening diabetic patients for kidney disease can slow the progression of the disease, thereby allowing patients to live a healthier, prolonged life (Koyal & Mottl, 2015).

Problem Statement

The DNP partner organization inconsistently screens diabetic patients for nephropathy. In not doing so, their patients miss out on treatments that could delay the onset of kidney disease. Not achieving this component of the CMS metric strains the organization financially. The organization not only suffers from significantly fewer reimbursements but bears the far greater cost of caring for diabetic patients who may progress to full-stage renal failure without even knowing they have the disease.

Purpose Statement

The purpose of this project is to increase diabetic nephropathy screenings to 95% at a primary medical clinic in southwestern North Carolina to align with the CMS benchmark. A standardized urine kidney screening process in diabetic patients will be developed collaboratively with all staff members to implement during routine office visits.

Section II. Evidence

Literature Review

Databases used for this project included PubMed, The Cumulative Index to Nursing and Allied Health Literature (CINAHL), and the University library resources. The initial search terms included screening for kidney disease and diabetes. The primary search yielded 47,934 results. The search was narrowed by using the following MeSH terms: diabetic kidney disease, urine-microalbumin, estimated glomerular filtration rate (eGFR), chronic kidney disease (CKD) screening tools, primary care, and early detection of CKD. From the search, 12,932 articles were identified. With the applied filters of full text, English language, and 2015 to the present, 4,466 results were found. Some articles focused on the early detection of kidney screening in vulnerable populations such as children. Other articles looked specifically at detecting CKD in at-risk diabetic groups such as African Americans and hypertensive patients. Although these topics are important, they were not specific to this proposed project, which will focus on all diabetic patients and were therefore excluded.

Specific guidelines related to CKD screening in people with diabetes were searched in PubMed and CINAHL. Statistical data on current rates of kidney disease, diabetic kidney disease, and screening rates of CKD were searched using Google. One guideline from the National Kidney Foundation had not changed since 2012. This guideline, although older than five years, was included in this paper.

The hierarchy of quantitative evidence pyramid was used to evaluate the level of evidence for each article. The revised Standards for Quality Improvement Reporting Excellence (SQUIRE) guidelines were used to assess articles. This method helped identify the level of evidence, methods used, study limitations, the aim, and application of findings to this proposed

project. After selecting the most relevant articles with a level of evidence of VI or greater from all these searches, 22 were used for this project. A literature matrix was used to organize the review and synthesis of the articles; this displayed the articles so that level of evidence, purpose, limitations, and authors could easily be reviewed and synthesized (See Appendix A).

Current State of Knowledge

Worldwide, diabetes is the leading cause of CKD and end-stage kidney disease (Alicic et al., 2017; Selby & Taal, 2020). An estimated 37 million Americans have CKD and are at risk for kidney failure and cardiovascular disease (NKF, 2020a). Bowe et al. (2018) found that between 2002 and 2016, the rates of CKD increased in all U.S states, with the most dramatic increase seen in the southern U.S. CKD is a clinical syndrome characterized by persistent albuminuria and a progressive decline of renal function and can be tested for by checking urinary albumin levels (Selby & Taal, 2020).

Screening for kidney disease is cost-effective and straightforward. The American Diabetes Association's (ADA) clinical screening recommendation is for a once-a-year diabetic urinary albumin and estimated eGFR screening for Type 1 diabetes with a duration of over five years and in all patients with Type 2 diabetes (T2D) (ADA, 2019). The National Kidney Foundation (NKF) also recommends and advocates for screening diabetics for CKD by urinary albumin and eGFR (NKF, 2012). The American Association of Clinical Endocrinologists and the American College of Endocrinology agrees with these recommendations and suggests similar guidelines. They recommend annual screening of urine albumin excretion rate and eGFR beginning five years after diagnosis in patients with Type 1 diabetes or at diagnosis in patients with Type 2 diabetes but suggests this starts after age 30 (Electronic Clinical Quality Improvement, 2018).

Healthy People 2020 (2020b) has identified screening for diabetes a priority. The goal is to reduce new CKD cases and associated complications, including disability, death, and economic costs in 2020. Healthy People 2020 reported that only 33.6% of Medicare beneficiaries with diabetes had annual urinary micro-albumin measured in 2007. The target is for a 10% increase in 2020 and for 37% of people to be screened. The United States Renal Data System reported similar results on the screening rates of CKD in 2016. They found after reviewing data-claims in diabetic Medicare patients that screening for urine albumin did not happen in half of these patients. Completion of urine screenings were only 41.8% on these diabetic patients (USRDS, 2018b.)

Research evidence demonstrates a correlation between diabetes and CKD and the inconsistency of CKD screening. Xu, Min et al. (2016) explored the causal association between T2D and CKD in Shanghai, China. Utilizing Mendelian Randomization (MR) analysis, Xu, Min et al. (2016) looked at 11,502 participants to explore genetic links. The results show a strong link between the genetic loci that cause insulin resistance, eGFR, and urinary albumin-to-creatinine ratio (UACR). This study concluded that there is a causal relationship between diabetes and CKD.

In a cross-sectional study done at Jimma University Medical Center, data on 9772 hypertensive and diabetic patients were collected and reviewed to look for predictors of CKD. Using multivariate logistic regression, independent predictors for chronic kidney disease include ACE nonusers, poor knowledge of CKD, fasting blood sugar over 150 mg/dl, and uncontrolled blood pressure of 140/90mmHG or above. The study found that 26% of the patients who had elevated blood sugar and low levels of awareness regarding kidney disease had CKD (Kumela et al., 2019). These results show another example of the link between hyperglycemia and CKD.

Another study, conducted in 2016, known as the See Kidney Disease (SeeKD), aimed to determine the prevalence of unrecognized CKD. This project was done in Canada and screened 6,329 participants from 2011 to 2014. Of the participants screened, 5,194 had at least one risk factor for CKD, including diabetes. After screening, 940 participants (18.8%) had unrecognized CKD (Galbraith et al., 2016). This study supports the findings that CKD is prevalent in high-risk groups and that without screening, it will go undetected.

The NKF (2020a) published a report that assessed the adequacy of screening individuals for CKD. Using LabCorp data facilities, 28,483,459 at-risk patient's charges were reviewed between November 2011 and September 2019. International Classification of Disease (ICD)- 9 and ICD-10 codes were used to determine the at-risk persons. At-risk persons had either an ICD-9 or ICD-10 code for diabetes, hypertension, or both. The study defined the adequacy of CKD screening when both eGFR and UACR had been ordered. Upon review of the data, only 22% of at-risk individuals had an adequate screening for CKD (NKF, 2020a). This study shows a significant need for additional CKD screening.

Krause et al. (2018) reviewed national claims for 28,348,363 persons. The standard Healthcare Effectiveness Data and Information Set (HEDIS) is used by health plans to measure and report on quality and performance. HEDIS was used to determine the rate of kidney screening. They found that screening for micro-albuminuria is overstated. This is due in part to when the National Committee of Quality Assurance (NCQA) expanded their criteria in 2007 for satisfying annual screening for diabetic patients to include a step 3. Step 3 includes the utilization of an ACE or ARBs. With the presence of a prescription for an ACE inhibitors or ARB, satisfaction of the quality-indicator is achieved. However, only 1% of the persons satisfying step

3 had evidence of a micro-albuminuria test. Although the quality indicator for screening kidney disease may appear satisfied, a spot urine albumin is missing.

The need to screen diabetic patients for kidney disease is undisputed. Health organizations have provided clear evidence-based guidelines that agree with one another in the method of screenings. Many institutions and studies have found gaps in the completion of CKD screenings, and improvements are needed.

Current Approaches

The measurement of eGFR & urinary albumin determines the presence and level of CKD (Cockwell & Fisher, 2020). The Center for Medicare and Medicaid Service (CMS) screening metric is to "assess once a year a urinary albumin and eGFR rate in patients with diabetes for a duration of greater than or equal to 5 years and in all patients with type 2 diabetes (CMS, 2019, "Clinical Recommendation Statements" section). This metric originates from the ADA kidney screening guidelines (ADA, 2019). The ADA's gold standard for detecting micro-albumin is a timed 24-hour collection of urine; however, this method of screening is time-consuming (NKF 2020b). The ADA (2019) and NKF (2020b) advise using a spot UACR as a CKD indicator due to its reliability and proficiency instead of a 24-hour collection of urine.

Although micro UACR is a widely accepted routine screening for nephropathy in diabetic patients, there are other suggested screenings found in the literature. Wasung et al. (2015) summarize research on new biomarkers available for early identification of kidney disease. They state that elevation of certain enzymes are present far before urine albumin is. For example, N-acetyl-β-D-glycosaminidase (NAG) is found to correlate with the direct elevation of serum ACE. Serum ACE is a direct indicator of early kidney damage & NAG is elevated before there is an elevation of urine albumin in diabetic groups. Although this marker is reliable, it is not cost-

effective or available to test for in primary care, and more research is needed (Wasung et al., 2015).

ElSharkawy et al. (2016), Salvador Madero (2015), and Rysz et al. (2017) explored in their literature reviews the use of old and new biomarkers to identify early CKD. Salvador Madero (2015) & Rysz et al. (2017) found that biomarkers are superior to spot UACR in earlier detection of CKD. However, Elsharkawy et al. (2016) found that the biomarker for kidney injury (KIM1) was not any more effective at screening for CKD than UACR. Although these biomarkers appear promising, Rysz et al. (2017) and Salvador Madero (2015) agree more research is needed to determine the biomarker's cost-effectiveness and pathogenesis in people with T2D. Due to the small amount of research done and no examples of NAG or biomarkers being ordered in primary care, these alternative screenings for CKD were not further investigated.

The proposed DNP project site abides to the CMS diabetic kidney screening metric but has not achieved full compliance with this diabetic screening metric. The clinic has the lab and equipment to run spot urines to test UACR on site. Completion of this in their diabetic population qualifies them for certain reimbursements. However, even with clear clinical guidelines and the literature supporting the relationship between diabetes and CKD, the screening is often overlooked. In collaboration with the project site partner, a decision was agreed on to develop an efficient, standardized process on UACR screening for all diabetic patients. This will include refining the existing protocol, educating the staff, educating the staff, and working with the quality metric team.

Evidence to Support the Intervention

Chen et al. (2019) conducted a systematic review of 998 articles that focused on the diagnosis, evaluation, and management of CKD in the primary care setting. It was concluded that since CKD patients are mostly asymptomatic, screening early in detecting the disease is vital. Most at-risk patients rely solely on a primary care physician to screen for, diagnose and start initial treatments for CKD. These patients typically do not see nephrologists until they have a confirmed diagnosis of CKD, and their treatments are past the point of primary care management. Screening for CKD must be a priority in primary care so that patients can get the care they need.

In the literature, screening diabetics for CKD with a spot UACR is just as effective as screening them with a 24-hour micro-albuminuria (Duru et al., 2018; Karar et al., 2015; McGrath & Edi, 2019). Micro-albuminuria is one of the first clinical indicators of kidney disease and is considered the primary marker for screening CKD (Chen et al., 2019; McGrath & Edi, 2019). A retrospective study performed between March 2013 and June 2014 by the Department of Pathology at King Khalid University Hospital reports similar findings (Hasanato, 2016). One hundred and twenty-two patients with T2D were given both a 24-hour urine test and a spot UACR test. The study concluded that the performance of UACR was comparable to the 24-hour urine albumin assay in excluding renal damage (Hasanato, 2016).

Another study conducted at Aga Khan University screened 1,280 T2D patients for micro-albuminuria (Ahmad, 2017). The researchers diagnosed 31.56% (404) of these T2D patients with early diabetic nephropathy by utilizing micro-albuminuria screening. They found that micro-albuminuria was the earliest sign of kidney disease and should be utilized as the first CKD screening tool.

Deem (2020) conducted a quality improvement initiative for increasing screening for diabetic CKD. She implemented three interventions that included an educational meeting, an electronic component in the EMR, and practice aids that contained information about protocol screening. In her project evaluation, she found that adherence to the ADA screening guideline had increased and that staff knowledge regarding CKD screening had improved. This supports the importance of utilizing education and protocols in quality improvement projects.

Although a streamlined process and protocol may be in place for ordering UACR, if the staff is unaware, it will not be used. A qualitative study done in Australia sought to identify the barriers and facilitators to CKD screening practices in primary care offices (Sinclair et al., 2017). An eight-item questionnaire guided by the Theory of Planned Behavior was administered to a convenience sample of 26 nurses. The results showed that although opinions were high on the importance of screening, there was also a strong consensus that there is not enough time or awareness of the need to screen for CKD. This belief was especially true when there were multiple medical concerns for the patient and not enough information about who needed CKD screenings. This supports the need to incorporate education into this project.

Evidence-Based Practice Framework

The operational framework that guided this quality improvement project was the Plan-Do-Study-Act (PDSA) cycle. In the 1920s, a prominent statistician, Walter A. Shewhart, created a model of change consisting of the stages Plan-Do-See (Butts & Rich, 2018). He found that more emphasis needed to be on the process of change and less on the product. W. Edwards Deming integrated Shewhart's original work in his book "The New Economics for Industry, Government, and Education" to create the PDSA cycle, previously known as the Plan-Do-Check-Act (Deming, W. Edwards 1900-1993 (William Edwards), 2000). Deming held steady to the belief that regarding process changes, "best effort and hard work not guarded by new knowledge, only dig deeper the pit we are in" (Deming, W. Edwards 1900-1993 (William Edwards), 2000) p. 18). The PDSA cycle was a new framework for change based on the idea of continuous movement and is often used in quality improvement to carry out ongoing processes. The purpose of PDSA is to effect change quickly, and due to this, it is often referred to as the rapid improvement process (Butts & Rich, 2018).

There are four distinct progressive steps in this framework model. In the planning phase, change aimed at improvement is identified. In this phase, information is gathered, objectives are defined, data collected, and a plan developed (Crowfoot & Prasad, 2017). Shah-Kan et al. (2019) used the PDSA cycle in a quality improvement project to increase bone density screening (BDS) in patients with irritable bowel disease (IBD). In their "plan" phase, they identified through a retrospective review that only 10.8% of patients with IBD in their practice were adequately undergoing bone mineral density (BMD) screening (Shah-Kan et al., 2019). They then defined their outcomes, developed their process of change, and created a plan for evaluating the change. In the "Do" phase of PDSA, the idea is carried out, observations documented, and data collected

(Crowfoot & Prasad, 2017). Shah-Kan et al. (2019) started implementing their project by educating the providers and placing flyers around the office. Throughout the "Do" phase, data was collected on the increasing numbers of patients getting screened for BMD. The third stage of the PDSA is "Study," in this phase, data is analyzed, results compared to predictions, and progress summarized (Crowfoot & Prasad, 2017). Sha-Kan et al. (2019) saw minimal improvement in their goal with solely educating the providers, so in the study phase, they looked at opportunities to develop their project by adding an EMR alert. The final stage is to "Act". In this phase, the changes that need to be made are identified for the next cycle of PDSA (Crowfoot & Prasad, 2017). Ultimately Sha-Kan et al. (2019) saw an improvement in BMD screening for IBD patients after implementing five cycles of PDSA.

Willison et al. (2016) conducted a quality improvement project utilizing the PDSA model. The model was used to identify, implement, and improve screening for UACR and to reduce waste from excess testing of more than one UACR a year. Using PDSA, Willison et al. (2016) were able to narrow their project to focus on a specific goal. The team went through seven different PDSA cycles. Although both project goals were unable to be met, Willison et al. (2016) were able to successfully improve patient awareness and increase the number of urines brought back to the lab and tested for UACR. They utilized and created an educational leaflet and then used the PDSA cycles to make changes to increase the process of their implementation. The plan was able to adjust from the original project plan and build on itself by continuing through the cycles.

The PDSA was utilized in this DNP project, starting with the "Plan" phase. In this phase, assessment of the utilization of the current kidney screening protocol for diabetic patients occurred. The protocol was changed as needed with input from providers, staff, and

administration. The formation of processes and reminders for completing kidney screenings during office visits for diabetic patients were developed. Education of the staff regarding the updated protocol, the importance of screening diabetics, and the procedure took place in the planning phase. In the "Do" phase, the initial implementation of the updated protocol began. During this phase, a reminder prompted the ordering of kidney screenings, and the rate of completion of kidney screenings was tracked. During the "Study" phase, an assessment of outcomes occurred. Gaps of the new process underwent revisions, strengths were made evident, and preparations for the next phase were developed.

Ethical Consideration & Protection of Human Subjects

The target audience for this project was medical assistances and providers who provide care to diabetic patients in the primary care clinic. They were educated on the project plan and implementation. Type 1 and Type 2 diabetic adults over 18 years of age benefited from the interventions.

The project's aim was to implement a standard of care that had no identified risk to the population involved. A staff member at the project site provided the patient data for the project and sent it to the project lead via a secure email. The information was transferred to excel on the project lead's personal computer, which remained password protected. No personal identifiable information was collected, and all information gathered was protected and stored in a double-locked location.

The medical center where the project was implemented had a formal internal review board (IRB) process for project approval. The project's site requires non-employee to partner with a system employee to co-lead projects within their organization. For this project, the project's site champion assisted in completing the formal IRB process.

The first step in the project's approval included completing the organization's Quality Improvement Project summary form. The form asks specific questions related to the project's aim, data collection strategy, evaluation process, and the evidence to support the project. The DNP project lead, in partnership with the project site champion, completed the form for submission. Prior to submission, the project lead completed human research modules training through the Collaborative IRB Training Initiative program. Additionally, data management, integrity, security module, and quality improvement modules were required by the organization of which only the project site champion completed.

Discussions occurred between the project lead and faculty about the university review process. The first step for the university review process was to complete questions related to the project's purpose and provide information about the project's content. The second stage was to complete and submit the Quality Improvement Program Evaluation Self Certification assessment for faculty approval. Once faculty approved, the assessment was submitted via a Qualtrics survey to the University review board, and the project was deemed quality improvement.

Section III. Project Design

Project Site and Population

This project site is a primary care clinic located in Charlotte, North Carolina. The clinic is affiliated with a not-for-profit, self-supporting healthcare system and serves adult patients from the surrounding urban areas. The clinic accepts most commercial insurance as well as Medicare and Medicaid.

A barrier encountered in this project process was obtaining formal approval from the project site. This was due to the site's lack of understanding regarding the health system's approval process around nonemployees conducting projects. With collaboration from the project's site champion and lead physician, the project plan was defined and approved by the health system. Another barrier was implementing during a pandemic. This limited group interactions and some aspects of the project education had to be converted to a virtual format.

Description of the Setting

The setting for this project took place exclusively at the site's primary care clinic. The conference room and the physician's offices were utilized for the site visits. Laminated sheets were displayed in patient exam rooms and staff areas. The site has its own laboratory where patients in this project had their urine tested for microalbumin. The site utilizes electronic medical records (EMR) and shares information directly through their computer systems. All the patient information collected for the project came from the EMR.

Description of the Population

The practice has four physicians, one physician assistant, one nurse practitioner, and eight medical assistances. Inclusion criteria for participation in the educational sessions were all staff holding a medical license and having direct contact with patients. The patient populations

that benefitted from this project were Type 1 and Type 2 diabetics over the age of 18. No personal identifiable information was collected on these patients.

Project Team

The project team members included the project lead, the nurse manager, the medical director or lead physician, the head of quality metrics, and the licensed staff. The project lead was responsible for the project's planning, implementation, tracking the project outcomes, and making necessary changes to meet the project's goals. The nurse manager was the site champion and served as a co-leader for the project. The project site champion assisted with the organization's institutional review board (IRB) process, educational sessions, and organizing implementation dates. The lead physician provided approval and support to engage staff in the project and reviewed the educational PowerPoint, and project tools. The leader of quality metrics and a member of her staff provided crucial information about the current protocol, offered clarifications, and were responsible for extracting and relaying data to the project lead. The licensed staff was an essential part of this project team. Since ordering micro-albumin for diabetic patients comes first from them, the staff provided feedback on needed project changes during the process review. The staff members were also involved in discussions regarding the processes that were working and what needed to be changed. They provided meaningful suggestions and helped guide the content that was reviewed during each site visit.

Project Goals and Outcome Measures

The purpose of this quality improvement project was to increase the screening of kidney disease in diabetic patients to achieve the project site's benchmark and improve the care of diabetic patients. The goals were for providers and staff to order micro-albuminuria screenings, patients to complete the screening, and the benchmark of 95% to be met. The outcome measures

tracked were the number of patients who were eligible for CKD screening, those who qualified and received CKD screening, and the total percentage of CKD screenings.

Description of the Methods and Measurement

The first step was planning and revising the diabetic kidney screening protocol and creating education for providers and staff. The primary content for the educational session included information on the project site's policy, the updated protocol, and procedures on nephrology screening. The current policy and procedure was lengthy and could be confusing. A diabetic nephropathy screening protocol was updated using key points from the current policy and procedure (See Appendix B). A PowerPoint was created for the virtual educational sessions. This included current guidelines, the updated protocol, the need for nephropathy screening, and the gaps in the current screening practice. The project site champion and the lead physician reviewed, provided feedback, and approved the content for the presentation.

To assess the staff completion of the virtual educational session, a post diabetic nephrology knowledge questionnaire was administered. Permission to use the questionnaire was obtained from Dr. Deem (See Appendix C). The six-item questionnaire is based on the ADA guidelines on micro-albuminuria screening (See Appendix D). The questionnaire was attached at the end of the educational voiced-over presentation, and the participants were directed to click on the link and complete the quiz.

Another method for implementation includes key visual reminders that were created and placed in the exam rooms. These laminated sheets alerted staff to order a micro-albuminuria on diabetic patients as needed (See Appendix E). These sheets included relevant ICD 10 codes that are commonly linked to micro-albuminuria screening.

The PDSA model was used as an additional implementation tool to evaluate the project's process and success. There was an initial PDSA cycle conducted at the start of the project and then every four weeks during implementation with a total of four cycles. The data collected was evaluated during each PDSA cycle to determine if the educational sessions, protocol, and visual reminders effectively increased the screening rates of kidney disease in diabetics. Informal staff interviews were conducted in small groups and individually. These interviews were used to obtain feedback regarding the protocol and to guide revisions.

Discussion of the Data Collection Process

Data was collected from the EMR with assistance from the site's quality metric manager and team member, who were in charge of data extraction. Data collected included: the number of diabetic patients who were eligible for CKD screening, the number of patients who received CKD screening, and the percentage of urine micro-albumin screenings completed. The data was collected using a tool created by the project lead (See Appendix F). The tool also includes a section to track if the 95% benchmark had been met during implementation. The data was entered into excel for analysis using descriptive statistics and displayed in a bar graph that trended against the benchmark of 95%.

The post questionnaire responses were entered on an excel spreadsheet for data analysis and compared to the total number of staff eligible to participate. Only the project lead had access to the questionnaire responses. A bar graph and table were used to present the data findings.

Implementation Plan

Implementation began the second week of August 2020. The project lead visited the site on August 10 and introduced the project to the staff. Following the initial site visit, a PowerPoint presentation was sent electronically to the staff.

Data was collected biweekly, reviewed, and changes were made utilizing PDSA. Times were scheduled with the site champion for the project lead to come to the project site and meet with staff members. During these site visits, questions were answered, data was reviewed with staff, and further education was provided. During week eight of implementation, laminated sheets were distributed and displayed in exam rooms and staff areas.

Timeline

The project was implemented over a three-month period beginning in August 2020. Following the PowerPoint presentation, data were evaluated biweekly with monthly PDSA cycle reviews. The last data collection period and completion date of this project was November 16, 2020. Dissemination of the findings occurred in Spring 2021 (See Appendix G).

Section IV. Results and Findings

Results

The project had several goals, including reaching the organization's benchmark for diabetic kidney screening, increasing awareness of the staff on the need to screen for nephropathy in diabetic patients, and creating an efficient means of ordering the screenings that would be easily adapted into the office workflow. During implementation, quantitative data collected included the following: number of patients eligible for micro-albuminuria screening, those who were screened for kidney disease, the total percent of those who were screened biweekly, the number of clinical staff invited to view the project education, and the number of those who viewed the educational session for the project (see Appendix H, Appendix I, and Appendix J for displayed findings).

Education of the staff was done via a virtual PowerPoint presentation with a post-evaluation quiz attached. Completion rates of the educational session by the staff were slightly over 85%. Of the 14 clinical staff invited to participate in the education, 12 viewed the materials (See Appendix H). The post-evaluation quiz was distributed to the clinical staff who participated in the education. Of the 12 participants who completed the quiz, 10 (83%) accurately answered all six questions.

There were a total of 399 eligible patients who were seen during the implementation period, and 377 (96%) of those were screened for kidney disease (See Appendix J). However, the project's goal was to achieve the diabetic nephropathy screening benchmark of 95% biweekly, not just in total over the 12 weeks. There was one bi-weekly period where the benchmark goal of 95% was not met. During weeks five and six, 70 patients were due for a microalbuminuria screen, but only 66 (94.3%) had the screening completed (See Appendix I).

There was a large influx of patients to the clinic in weeks five and six compared to weeks one through four. The increase in patients was due to several providers, who saw patients virtual during the beginning of implementation, returning to the clinic to see in-person visits. There were 70 patients seen in weeks five and six compared to the 43 patients seen in weeks one and two and 59 seen in weeks three and four. In weeks seven and eight, there were fewer patients (55) seen, and in the last four weeks, the patient numbers increased to 88 and 76, respectively.

Discussion of Major Findings

The PDSA cycle review was conducted to evaluate the project's process biweekly and make changes as needed. A total of four PDSA cycles were completed. During each PDSA cycle, the project lead visited the site and met with staff members. During the first PDSA review, it was evident that very few staff members had viewed the PowerPoint presentation and completed the quiz. At the following visit, donuts were provided to incentivize staff to complete the educations. After this visit, the participation increased from 10% to 84% (see Appendix H).

Prior to the project, the site had been below the 95% goal and consistently meeting the goal at around 90%. During implementation, the first and second biweekly screenings, nephropathy screenings were above the goal at 97.7 % and 96.6%, respectively (See Appendix I). However, during weeks five and six, kidney screenings decreased to 94.3%. There was an increase in the nephropathy screening over the last six weeks; the nephropathy goal was met by 96.4%, 96.5%, and 97.4%, respectively (See Appendix I).

With a decrease in the goal during weeks five and six, further review was conducted to identify the specific patients who had not had a microalbuminuria done. It was identified that these patients were under the care of one provider who was consistently missing the screening. After further investigation and conversations with the provider and staff, it was determined that

the microalbuminuria order was not being entered on every patient encounter. In addition, patients unknowingly were leaving the office after their visit without going to the lab, even with an active microalbuminuria order. After collaborating with the provider's Medical Assistant (MA), the provider decided that she would alert each patient to check back with her prior to leaving the office to see if they needed to have lab work done. Education took place with her, including the importance of ordering the microalbuminuria and showing her the EMR alert for diabetic kidney screening.

During the second PDSA cycle review, it was identified during the site visit and discussions with staff that the busier the clinical pods were, the more likely staff were to miss a screening or forget to direct a patient to the lab even if the screening was ordered. Another finding identified in discussions with the staff was that although the EMR has a built-in alert that flags patients due for a diabetic kidney screening, staff were often unaware of this alert, how to locate it or what it meant. A shortcut to check the status of a diabetic patient's kidney screening in the EMR was identified as an area that some staff needed help locating. Follow-up education was provided to the staff on using the EMR technology and identifying patients who were due for screening. Staff demonstrated competencies on a return demonstration in looking up and ordering needed diabetic kidney screenings on diabetic patients utilizing the EMR tool.

After the third PDSA cycle review, it was identified that the staff might benefit by having a visual tool to remind them to send patients to the clinic. A simple and easy tool in the form of a poster was created to help remind staff to order screenings (See Appendix E). Laminate posters were posted in each pod and in several exam rooms during week eight of implementation. These posters listed several vital facts related to the importance of screening and identified ICD 10 codes that can be used for billing the screenings. After the posters were distributed, staff

members provided feedback to the project lead on how the posters triggered them to order a screening.

Implementation of a standardized process in diabetic nephrology screening led to an improvement in screening diabetic patients for kidney diseases within the organization. By increasing staff awareness of the built-in EMR alert and the importance of ordering microalbuminuria screening and placing visual reminders, the project site achieved the benchmark goal over the project period.

Section V. Interpretation and Implications

Cost Benefit Analysis

This project was time-intensive but financially inexpensive. The financial costs of this project were limited to the laminated sheets and the incentives for staff with an estimated total cost of $45 (See Appendix K). However, there were significant time commitments in creating the visuals, PowerPoint, incorporating the quiz into electronic format, staff education, and one-on-one meetings with staff. Involving staff over the project's implementation and engaging them in education to ultimately change the way they practice and manage diabetic patients was time-intensive. Although the project site has a quality metrics department that assists staff in achieving certain goals, they work with multiple offices and have limited time to meet with staff. A project similar to this would involve additional time for the quality metric staff to manage.

This project had several benefits for the organization. First and foremost, increasing early kidney screenings for diabetics is an essential health maintenance measure to care for the project site's diabetic patient population. A standardized process in ordering diabetic kidney screenings increases screenings and can prevent new kidney disease cases thru early identification. Ordering early diabetic kidney screenings is inexpensive, and by detecting kidney disease in the early stages, healthcare costs can be reduced. As a result of the increased morbidity and mortality associated with diabetic nephropathy, those with kidney disease have a high annual healthcare cost ranging from $8000 to $43,000 (Zhou et al., 2017).

This project supported the organization in achieving one of its quality metrics through the creation of workflow efficiency in diabetic nephropathy screening that increased reimbursements. Insurance companies have created contracts with the organization based on benchmarks and a chosen set of quality metrics of which nephropathy monitoring is one. By the

organization meeting the Center of Medicare and Medicaid (CMS) benchmark of over 95%, they qualify for certain financial reimbursements through payer contract measures.

Due to the pandemic, many patients had virtual visits and were unable to have lab visits done. These patients were not included in the first few weeks of data collection; however, midway through the project's implementation, the number of patients that needed to be screened greatly increased due to the return of all visits in person. In weeks five and six, when the screening was at it is lowest, a larger number of patients were seen in the office and identified as eligible for screenings compared to previous weeks.

This project's overall findings demonstrated a positive increase in diabetic screening. Screening compliance consistently increased throughout this project, with only a slight deviation from the goal. This increase in screening helped the organization qualify for financial reimbursements and served to prevent long-term healthcare cost by early identification of kidney disease.

Resource Management

The organization has a quality metric leader and team that extracts data and can review detailed reports to identify which patients missed the screenings and link them to providers/staff and circumstances. This is a phenomenal resource provided by the project site. Another resource available is a built-in electronic medical record (EMR) alert to remind staff to order nephropathy screenings. There is a 24-hour information technology (IT) support staff that manages alerts and can be contacted if there are EMR questions or concerns. The project site has its own lab and lab technicians that provide assistance with order completions and serves as a major asset to the clinical team. All these resources provided support to the project’s improvement of nephropathy screenings compliance.

Many of the medical assistances did not have an awareness of who was responsible for tracking metrics and why these metrics were important. With education from the quality metric team, all clinical staff would have a clear understanding of how metrics are obtained, who reviews them, and the importance of achieving the metrics for the project site and patients receiving the screening.

One resource that would benefit the project site would be providing an incentive to the non-provider staff members for ordering the micro-albumin screenings. For example, the providers receive a direct financial kickback for meeting specific goals, including micro-albumin screenings. The staff members who are also responsible and encouraged to order the tests do not have any incentives for achieving the goals. Providing a tangible reward such as a team member apparel item each month for the staff who has the highest rate of ordering micro-albuminuria on diabetic patients who are due may encourage staff to continue screening at high rates.

Implications of the Findings

The interventions, organizational resources, and staff participation in this project contributed to an improvement in diabetic kidney screenings compliance. With 86% of staff participation in the educational sessions and high quiz scores at the beginning of the project, staff involvement seemed to contribute to the success of this project. An increase in kidney screenings was clearly evident throughout the project implementation period. The cost of educating and increasing kidney screenings is relatively low compared to the many compounding costs of kidney disease both in the early and end stages. Identifying patients at risk early for kidney disease through routine screening can combat further complications associated with the disease. The cost to care for a patient with a pre-kidney illness is much less compared to those with kidney disease. According to Golestaneh et al. (2017), the mean annualized costs increase

exponentially with kidney disease, from $7537 (no CKD) to $76,969 in the commercial group and $8091 to $46,178 in the Medicare group. These high costs add to kidney disease's financial burden on the health care system.

During site visits by the project lead, ongoing conversations with staff strengthened the knowledge of the importance of screening and the screening process. Over the twelve-week period, continual improvement in screening compliance was noted. The project's site staff appeared confident by the end of the project on how to screen and how to identify diabetic patients who need a kidney screen. The updated protocol that addresses screening and the process of ordering diabetic screenings was incorporated into the workflow and will continue after project completion.

Implications for Patients

The diabetic population has many compounding health concerns, with 40% of them developing kidney disease (NKF, 2016). Once a diabetic is diagnosed with kidney disease, a significant number will develop end-stage renal disease that requires dialysis or, worse, a kidney transplant (NKF, 2016). Screening diabetic patients for kidney disease can identify kidney disease at its earliest stage and prevent future kidney damage (Gaitonde et al., 2017). Slowing the progression of kidney disease improves the care and outcomes of diabetic patients, allowing them to live a healthier, prolonged life. Recognizing kidney disease at the early stages gives providers vital information to alter treatment regimens for diabetic patients. Optimizing the plan of care for patients who are showing signs of kidney damage can lead to fewer hospitalizations and a significant decrease in the per capita cost of health care (Gaitonde et al., 2017).

Implications for Nursing Practice

Caring for patient's health is essential to nursing practice. By increasing patient screenings for an illness that could be thwarted or prevented, the highest quality of care is being provided. Ordering kidney screenings is a simple act that has far-reaching nursing implications. When a positive microalbumin results, utilization of appropriate resources can be initiated. This often leads to patients being referred to specialists such as nephrologists, endocrinologists, or dieticians. These referrals often result in collaboration between health care disciplines and strengthen the care being provided to patients (Morley et al., 2017). This collaboration has been proven to increase patient participation and engagement in their care and leads to better patient outcomes.

Furthermore, due to the education provided in this project, clinical staff have increased knowledge of the need to screen for kidney disease and the "why" behind the screening. This knowledge provides staff the confidence to educate diabetic patients about kidney disease. Communicating knowledge between clinical staff and patients generates trust with patients, which in turn increases patient's adherence to strategies and medications to help them take control of their illness (Morley et al., 2017). Education is essential to nursing practice and the health of diabetic patients. The more the patient understands his or her disease process, the more likely that appropriate health actions are taken.

It is of the utmost importance for nurses to take the lead in quality initiatives to improve patient outcomes (Altman et al., 2016). This project supports nurses in leading quality improvement initiatives and in collaboration by improving a work process, collaborating with others, and translating and applying research findings into practice. When nurses are involved in quality change, collaboration with interprofessional teams is enhanced, and better outcomes are

experienced. This project involved clinical teamwork in increasing the number of diabetic patients screened for chronic kidney disease (CKD) and relied heavily on collaboration between the site champion, project lead, lead physician, and the clinical staff.

Impact for Healthcare System

Kidney disease is a widespread disease that affects the health system on many levels. In 2017 the total Medicare spending per person for those with kidney disease was $80,000 (CDC, 2020). In 2016 Medicare spending for kidney failure patients cost $35 billion (University of California San Francisco(UCSF), 2019). Hemodialysis alone costs the Medicare system an average of $90,000 per patient, and spending for transplant patient care is $3.4 billion. Screening for kidney disease has financial benefits within the organization and promotes the health and wellness of the community at large. The healthcare system will have less cost burden of caring for kidney disease by identifying it early before it can progress and initiating crucial treatments (Gaitonde et al., 2017). Achieving the benchmark of over 95% for diabetic kidney screening also leads to financial reimbursement to this project organization through payer contract measures.

This project supports the Healthy People 2020 (2020a, 2020b) goals that address kidney screening in diabetic patients by increasing those who are screened for kidney disease, increasing persons with diabetes and CKD who receive medical evaluations with microalbuminuria, and reducing the proportion of the U.S. population with chronic kidney disease. Healthy People 2020 aims to increase the proportion of persons with CKD who know they have impaired renal function. This project does this by directly screening patients for early identification of CKD. This project aligns with the Triple Aim Initiative by improving diabetic screening for kidney disease and enhancing patient experience by initiating needed treatments and leads to decreases in overall healthcare costs.

Sustainability

The workflow changes that occurred to incorporate kidney screenings at this primary care clinic are self-sustaining. The newly developed process of ordering screenings by the medical assistants and providers will continue. The staff's knowledge of the updated protocol and when to order micro-albuminuria on diabetic patients has been enhanced and will continue to be utilized in the daily care of diabetic patients. The team has a better understanding of how the diabetic kidney screening metric is tracked, where to locate the EMR alerts regarding the screening, and how to identify if a screening is due. The kidney screening posters will remain with the staff in the pod areas and continue to remind them to screen long after project completion. The built-in EMR alert flags as a reminder for staff to screen for diabetic kidney disease. The knowledge gained by staff allows for peer education between new hires and current staff.

The quality metric team is a part of the organization that impacts sustainability and will continue to track the metric and communicate information to the staff regarding the kidney screening metric. The team will continue to generate quarterly data reports that will provide updates on the status of health maintenance goals to staff.

The site champion at the organization, who is also the practice manager, assisted significantly with this project along with the lead primary care physician. They were responsible for encouraging providers in achieving the goals for financial reimbursements and improved patient care. The primary physician strives to meet patients' health goals and has a strong interest and commitment to the project's sustainability.

Dissemination Plan

On March 30, 2021, the project's overview and findings were presented in person to the project site champion and the site's clinical lead physician. A virtual poster presentation was

provided to the University College of Nursing faculty on April 6, 2021. At the completion of the project, the paper will be submitted to the University Scholarship Repository for public access. A project abstract will be submitted to the 2021 14th National Doctor of Nursing Practice Conference. This conference discusses quality care in nursing, and this project directly addresses improving quality care for diabetics in primary care. A paper submission along with an electronic poster will be submitted for review by May 1, 2021, for the International Conference on Clinical Nephrology and Diagnosis of Kidney Diseases held digitally on June 17, 2021. This DNP project directly addresses screening for nephropathy and diagnosis of kidney disease in the diabetic population and would be appropriate to present at this conference.

Section VI. Conclusion

Limitations

Several limitations were identified during the project. An initial limitation was being unable to meet with the entire staff at the project site to present an overview of the project and project details. Originally a meeting was scheduled at the project site that would take place during the lunch hour. However, due to the global COVID 19 pandemic, the project lead was asked to create an electronic format of the presentation and email it to staff instead. Being unable to present to all the staff in real-time led to minimal initial participation. The presentation was redistributed a week later with a small incentive to encourage participation.

Initially, the project lead had planned to schedule group meetings throughout the project to discuss progress, concerns, answer questions, etc. However, during the site visits, the project lead was unable to schedule times to meet with groups. This was partly due to the site not allowing more than four individuals to meet at a time due to the COVID 19 pandemic. There were also limitations in staff availability related to provider's and staff's busy schedules and time away from patient care. Due to these factors, staff was met with individually.

A barrier identified during the project was with one provider and her panel of patients. This provider did not always adhere to the protocol with ordering the routine screenings, which included the nephropathy screening. This provider's numbers for screening were significantly lower, which would bring the overall screening percentages down. This was identified during weeks five and six during the data collection review. .

Another barrier was related to data extraction. A third party was responsible for retrieving this data. At times, the system's electronic process for the extraction was inoperable. Another time the responsible party for data extraction was away from the office, and the staff member

who was covering was unsure how to send the data via email. After several phone calls and attempts, the data was successfully sent to the project lead for evaluation and only led to minor delays in interpreting data.

Recommendations for Others

Several recommendations for others are noted. It would be beneficial in the planning process to request data from the agency on the past screening rates for several months prior to implementation. This data would help strengthen the implementation process by helping the project lead know the providers and staff who were consistently ordering or not ordering the screenings. By having this information, follow-up could include visits with individualized education to address specific barriers and concerns. Offering incentives would provide staff encouragement to participating in the presentation. Scheduling a live webinar to present the project's material would be beneficial. This would engage staff in open discussions immediately following the presentation and could further increase participation. Rewarding staff with incentives as the organization achieves its goal can lead to staff satisfaction as well as compliance with screening.

Although the project organization had a quality metric team, they were limited with staffing, and there were not enough team members to address each quality metric with each staff member. Consideration of additional staff within the quality metric department would help the organization ensure all quality metrics are met, including nephropathy screening.

For evaluation, the data extraction was tedious because the project lead could not retrieve it without assistance. If a quality metrics team were relied upon to get data, a recommendation would include establishing a relationship with the individual who generates the reports. This

could be done by scheduling time with a quality team to review data extraction every several weeks to build that relationship.

Recommendations Further Study

There are many ways this project could be expanded or tailored to a specific organization. More research on the recommended interventions to treat abnormal microalbuminuria results could be integrated into this project. Additional research on how organizations could engage lab team members in increasing micro-albumin screenings could also be included. Considering ways to involve diabetic patients that were due for nephropathy screenings but not scheduled for an appointment could be an additional component to consider. This may include identifying ways to have patients come in for microalbumin urine screenings only without an office visit with the provider.

Additional areas for further study would be identifying reasons why specific micro-albuminuria screenings are not being obtained. For example, did the patient refuse? Did the lab forget to have the patient leave a urine sample? Did the provider order the screening but not direct the patient to the lab? Is the EMR alert not firing even when a diabetic kidney screening is due, etc.? Future projects could be designed to address these specific concerns.

References

Ahmad, T., Ulhaq, I., Mawani, M., & Islam, N. (2017). Microalbuminuria in type-2 diabetes mellitus; the tip of iceberg of diabetic complications. *Pakistan Journal of Medical Sciences,* 33(3), 519-523. doi:10.12669/pjms.333.12537

Alicic, R. Z., Rooney, M. T., & Tuttle, K. R. (2017). Diabetic kidney disease: Challenges, progress, and possibilities. *Clinical Journal of the American Society of Nephrology,* 12(12), 2032-2045. doi:10.2215/CJN.11491116

Altman, S. H., Butler, A. S., Shern, L., (2016) Committee on the Robert Wood Johnson Foundation, Institute of Medicine (U.S.). Committee for Assessing Progress on Implementing the Recommendations of the Institute of Medicine Report The future of nursing: *The National Academies Press*. https://doi.org/10.17226/21838

American Diabetes Association (2019) *Standards of Medical Care in Diabetes 2019 Abridged for Primary Care Providers.* https://clinical.diabetesjournals.org/content/diaclin/early/2018/12/16/cd18-0105.full.pdf

Bowe B., Xie Y., Li T., Mokdad A., Xian H., Yan Y., Maddukuri Y., Al-Aly Z., (2018) Changes in the US Burden of Chronic Kidney Disease From 2002 to 2016: An Analysis of the Global Burden of Disease Study. *JAMA ;1(7):*e184412. doi:10.1001/jamanetworkopen.2018.4412

Butts, J. B., & Rich, K. L. (2018). *Philosophies and theories for advanced nursing practice* (3rd ed.). Burlington, Massachusetts: Jones & Bartlett Learning.

Center for Disease Control (2020). *Chronic Kidney Disease Basics* https://www.cdc.gov/kidneydisease/basics.html

Center for Medicare and Medicaid Services (2019), Quality ID #119 Diabetes: *Medical Attention for Nephropathy* https://qpp.cms.gov/docs/QPP_quality_measure_specifications/CQM-Measures/2019_Measure_119_MIPSCQM.pdf

Chen, T., Knicely, D., & Grams, M. (2019). Chronic Kidney Disease Diagnosis and Management: A Review. *Journal American Medical Association 322(13):*1294–1304. doi:10.1001/jama.2019.14745

Cockwell, P., & Fisher, L. (2020). The global burden of chronic kidney disease. *The Lancet, 395(10225)*, 662-664. doi:10.1016/S0140-6736(19)32977-0

Crowfoot, D., & Prasad, V. (2017). Using the Plan–Do–Study–Act (PDSA) cycle to make change in general practice. *Innovait,10*(7), 425-430. https://doi:10.1177/175573801770472

Deem, M., Rice, J., Valentine, K., Zavertnik, J. E., & Lakra, M. (2020). Screening for diabetic kidney Disease in Primary Care: A quality improvement initiative. *The Nurse Practitioner, 45*(4), 34-41. doi:10.1097/01.NPR.0000657316.97157.e4

Deming, W. Edwards 1900-1993. (William Edwards). (2000). *The New Economics: For Industry, Government, Education* (2nd ed.). Cambridge, Mass: MIT Press

Duru, O. K., Middleton, T., Tewari, M. K., & Norris, K. (2018). The Landscape of Diabetic Kidney Disease in the United States. Current diabetes reports, 18(3), 14. https://doi.org/10.1007/s11892-018-0980-x

Electronic Clinical Quality Improvement (2018) *Diabetes: Medical Attention for Nephropathy.* https://ecqi.healthit.gov/sites/default/files/ecqm/measures/CMS134v8.html

ElSharkawy, M. M. S., Abdelmohsen, W. A. M., Elsaed, H. M., & Saeed, M. (2016). mp236the use of kidney injury molecule - 1 (kim1) as a predictor of acute kidney injury in patients undergoing cardiac surgery. *Nephrology Dialysis Transplantation, 31*(1), 418 . doi:10.1093/ndt/gfw187.42

Gaitonde, D. Y., Cook, D. L., & Rivera, I. M. (2017). Chronic kidney disease: Detection and evaluation. American Family Physician, 96(12), 776-783.

Galbraith, L. E., Ronksley, P. E., Barnieh, L. J., Kappel, J., Manns, B. J., Samuel, S. M., Jun, M., Weaver, R., Valk, N., & Hemmelgarn, B. R. (2016). The See Kidney Disease Targeted Screening Program for CKD. *Clinical journal of the American Society of Nephrology* , *11*(6), 964–972. https://doi.org/10.2215/CJN.11961115

Golestaneh, L., Alvarez, P., Reave, N., Funk, S., McGaughey, J., Romero, A., Brenner. M., Macaulay, O. (2017) All-Cause Costs Increase Exponentially with Increased Chronic Kidney Disease Stage. *American Journal of Managed Care. https://www.ajmc.com/view/all-cause-costs-increase-exponentially-with-increased-chronic-kidney-disease-stage-article*

Hasanato, R. M. (2016). Diagnostic efficacy of random albumin creatinine ratio for detection of micro and macro-albuminuria in type 2 diabetes mellitus. *Saudi medical journal, 37*(3), 268–273. https://doi.org/10.15537/smj.2016.3.13567

Healthy People 2020 (2020a). *Chronic Kidney Disease.* https://www.healthypeople.gov/2020/topics-objectives/topic/chronic-kidney-disease/objectives

Healthy People 2020 (2020b) *Diabetes Objectives # 4* https://www.healthypeople.gov/2020/topics-objectives/topic/Diabetes/objectives#4109

Karar, T., Alniwaider, R., Fattah, M., Tamimi, W., Alanazi, A., & Qureshi, S. (2015). Assessment of microalbuminuria and albumin creatinine ratio in patients with type 2 diabetes mellitus. *Journal of Natural Science, Biology and Medicine, 6(3),* 89-92. doi:10.4103/0976-9668.166095

Koyal, J., & Mottl A., (2015) Comprehensive Care for People with Diabetic Kidney Disease Diabetes Spectrum. https://doi.org/10.2337/diaspect.28.3.187

Krause, T. M., Ganduglia-Cazaban, C., & Finkel, K. W. (2018). Rates for HEDIS Screening for Diabetic Nephropathy Quality Measure May Be Overstated. *Managed Care, 27*(8), 45–49 http://web.b.ebscohost.com/ehost/pdfviewer/pdfviewer?vid=1&sid=9e221f92-ac53-4cf3-8b6e-d5922f5019da%40pdc-v-sessmgr02

Kumela Goro, K., Desalegn Wolide, A., Kerga Dibaba, F., Gashe Fufa, F., Wakjira Garedow, A., Edilu Tufa, B., & Mulisa Bobasa, E. (2019). Patient awareness, prevalence, and risk factors of chronic kidney disease among diabetes mellitus and hypertensive patients at Jimma University Medical Center, Ethiopia. *BioMed Research International,*(na). https//doi:10.1155/2019/2383508

McGrath, K., & Edi, R. (2019). Diabetic Kidney Disease: Diagnosis, Treatment, and Prevention. *American Family Physician, 99(12),* 751–759.

Morley, Lyndon, M., & Cashell, Angel, M. (2017). Collaboration in health care. *Journal of Medical Imaging and Radiation Sciences, 48(2), 207-216*. doi:10.1016/j.jmir.2017.02.071

National Kidney Foundation (2012) KDOQI *Clinical Practice Guidelines for Diabetes and CKD: 2012 update*. https://www.ajkd.org/article/S0272-6386(12)00957-2/pdf

National Kidney Foundation (2016) *Diabetes and Chronic Kidney disease.* https://www.kidney.org/news/newsroom/factsheets/Diabetes-And-CKD

National Kidney Foundation (2018) *Chronic Kidney Disease Change Package.* https://www.kidney.org/contents/chronic-kidney-disease-change-package

National Kidney Foundation (2020a) ACR. *https://www.kidney.org/kidneydisease/siemens_hcp_acr*

National Kidney Foundation (2020b) *Spring Clinical Meetings abstracts.* https://www.ajkd.org/article/S0272-6386(20)30149-9/pdf

Papadakis, M. A., McPhee, S. J., & Rabow, M. W. (2020). *Current medical diagnosis and treatment 2020.* New York, N.Y: McGraw-Hill Education LLC.

Rysz, J., Gluba-Brzózka, A., Franczyk, B., Jabłonowski, Z., & Ciałkowska-Rysz, A. (2017). Novel biomarkers in the diagnosis of chronic kidney disease and the prediction of its outcome. *International Journal of Molecular Sciences, 18*(8), 1702 https://doi:10.3390/ijms18081702

Salvador Madero (2015). Biomarkers in chronic kidney disease, from kidney function to kidney damage. *World Journal of Nephrology 4(1),* 57-73. doi:10.5527/wjn.v4.i1.57

Selby, N. M., & Taal, M. W. (2020). An updated overview of diabetic nephropathy: Diagnosis, prognosis, treatment goals and latest guidelines. *Diabetes, Obesity and Metabolism, 22*(S1), 3-15. http://doi:10.1111/dom.14007

Shah-Khan, S. M., Cumberledge, J., Shah-Khan, S. M., Gannon, K., & Kupec, J. T. (2019). Improving bone mineral density screening in patients with inflammatory bowel disease: A quality improvement report. *BMJ Open Quality, 8*(3), 624. https://doi:10.1136/bmjoq-2019-624

Sinclair, P. M., Day, J., Levett-Jones, T., & Kable, A. (2017). Barriers and facilitators to opportunistic chronic kidney disease screening by general practice nurses. *Nephrology* , *22*(10), 776-782. http://doi:10.1111/nep.12856

United States Renal Data System, (2018a) *Healthcare Expenditures for Persons with CKD* https://www.usrds.org/2017/view/v1_06.aspx

United States Renal Data System, (2018b) *Identification and Care of Patients with CKD* https://www.usrds.org/2018/view/v1_02.aspx)

University of California San Francisco, (2019) *The Kidney Project* https://pharm.ucsf.edu/kidney/need/statistics

Wasung, M. E., Chawla, L. S., & Madero, M. (2015). Biomarkers of renal function, which and when? *Clinica Chimica Acta, 438*, 350-357. https://doi:10.1016/j.cca.2014.08.039

Willison, A.,Tully, V., & Davey, P. (2016). All patients with diabetes should have annual UACR tests. why is that so hard? *BMJ Quality Improvement Reports, 5*(1), 209185.w3747. http://doi:10.1136/bmjquality.u209185.w3747

Xu, M., Bi, Y., Huang, Y., Xie, L., Hao, M., Zhao, Z., G. (2016). Type 2 diabetes, diabetes genetic score and risk of decreased renal function and albuminuria: A mendelian randomization study. *Ebiomedicine,* 6, 162-170. doi:10.1016/j.ebiom.2016.02.03

Zhou, Z., Chaudhari, P., Yang, H., Fang, A. P., Zhao, J., Law, E. H., Seifeldin, R. (2017). Healthcare resource use, costs, and disease progression associated with diabetic nephropathy in adults with Type 2 diabetes: A retrospective observational study. *Diabetes Therapy, 8(3), 555-571. doi:10.1007/s13300-017-0256-5*

Appendix A

Literature Matrix

/critique of the article/methods	strong data review (28,348,363 claims), supports basis for project	QI project focused in primary care, only implemented in several locations, good example of a DNP project relating directly to my topic	relevant to reiterate importance of the project problem
Subject Charac.	n/a	n/a	n/a
Sample method	data analysis	n/a	n/a
Sample Size	n/a	n/a	n/a
Instr. Used/design	data evaluation, expert opinion, clinical trial	n/a	Systemic review and synthesis of information
Themes concepts and	diabetic screening	evidence for screening for CKD in diabetics/ current national guidelines	prevalence of diabetic kidney disease/ Stats reported on prevalence of CKD in
Level of Evidence	I	VI	I
Purpose and take home	kidney disease is under screened & overstated	quality improvement initiative for kidney screening in diabetic pts.	Further reiterates that diabetes is strongly linked to kidney disease & is the single
Journal	*MediMedia USA*	*The Nurse Practitioner*	*Diabetes, Obesity and Metabolism*
Article Title	Rates for HEDIS Screening for Diabetic Nephropathy Quality Measure May Be Overstated	Screening for diabetic kidney disease in primary care: A quality improvement initiative	An updated overview of diabetic nephropathy: Diagnosis, prognosis, treatment goals and latest guidelines
Year Pub	**2018**	2020	2020
theory			
Authors (APA citation)	Krause, T. M., Ganduglia-Cazaban, C., & Finkel, K. W. (2018). Rates for HEDIS Screening for Diabetic Nephropathy Quality Measure May Be Overstated. Managed Care (Langhorne, Pa.), 27(8), 45–49.	Deem, M., Rice, J., Valentine, K., Zavertnik, J. E., & Lakra, M. (2020). Screening for diabetic kidney disease in primary care: A quality improvement initiative. The Nurse Practitioner, 45(4), 34-41. doi:10.1097/01.NPR.0000657316.97157.e4	Selby, N. M., & Tail, M. W. (2020). An updated overview of diabetic nephropathy: Diagnosis, prognosis, treatment goals and latest guidelines. Diabetes, Obesity and Metabolism, 22(S1), 3-15. doi:10.1111/dom.14007

study found low level of pt. awareness correlates to high prevalence of CKD. Elevated BG is a predictor CKD	supports basis of project	supports basis of project
diabetic, hypertensive patients	n/a	n/a
interview, EMR review	n/a	n/a
9772	n/a	n/a
cross-sectional study/ Multivariate logistic regression	evidence synthesis	evidence synthesis
low patient awareness of kidney disease	Guideline	clinical guideline/Benchmark
IV	I	I
Screening of patients at risk for CKD using objective measures found that 29% of those patients had CKD, though, only 7% of them were aware of having kidney disease. Predictors	Screening - At least once a year, assess urinary albumin (e.g., spot	33.6 percent of Medicare beneficiaries with diabetes had an
Biomed Research international	*Electronic Clinical Quality Improvement*	*Healthy People 2020*
Patient Awareness, Prevalence, and Risk Factors of Chronic Kidney Disease among Diabetes Mellitus and Hypertensive Patients at Jimma University Medical Center, Ethiopia	Medical Attention for Nephropathy	Increase the proportion of persons with diagnosed diabetes who
2019	2018	2019
Kumela Goro, K., Descaling Wolide, A., Kerga Dibaba, F., Gashe Fufa, F., Wakjira Garedow, A., Edilu Tufa, B., & Mulisa Bobasa, E. (2019). Patient awareness, prevalence, and risk factors of chronic kidney disease among diabetes mellitus and hypertensive patients at jimma university medical center, ethiopia. BioMed Research International, 2019, 2383508-8. doi:10.1155/2019/2383508	Electronic Clinical Quality Improvement (2018) Diabetes: Medical Attention for Nephropathy.https://ecqi.healthit.gov/sites/default/files/ecqm/measures/CMS134v8.html	Healthy People 2020 (2020) Diabetes https://www.healthypeople.gov/2020/topics-objectives/topic/Diabetes/objectives#4109

strong study -195 countries evaluated, shows rise of CKD	small sample size. Shows alternative ways of screening CKD	small sample size, results were consistent with other similar studies.
n/a	Patients	patients with T2D
n/a	assigned based on CKD 40 with and 40 without	n/a
n/a	80	100
established GBD methodology in their	analytic ross-sectional study	retrospective chart review
Chronic kidney disease, global impact	CKD- test	microalbuminuria is a strong predictor for kidney disease
I	IV	V
CKD in on the rise Since 1990, the prevalence of CKD has increased by	Biomarkers are just as comparable for testing CKD as UACR	The presence of microalbuminuria is highly predictive of initial nephropathy. Type 2 DM patients must be screened frequently for micro
The Lancet	*Pan African Medical Journal*	*Journal of Natural Science, Biology & Medicine*
The global burden of chronic kidney disease	The use of kidney injury molecule - 1 (kim1) as a predictor of acute kidney injury in patients undergoing cardiac surgery.	Assessment of microalbuminuria and albumin creatinine ratio in patients with type 2 diabetes mellitus
2020	2016	2015
Cockwell, P., & Fisher, L. (2020). The global burden of chronic kidney disease. The Lancet, 395(10225), 662-664. doi:10.1016/S0140-6736(19)32977-0	ElSharkawy, M. M. S., Abdelmohsen, W. A. M., Elsaed, H. W. M., & Saeed, M. (2016). mp236the use of kidney injury molecule - 1 (kim1) as a predictor of acute kidney injury in patients undergoing cardiac surgery. Nephrology Dialysis Transplantation, 31(suppl_1), i418-i418. doi:10.1093/ndt/gfw187.42	Karar, T., Alniwaider, R. A., Fattah, M., Al Tamimi, W., Alanazi, A., & Qureshi, S. (2015). Assessment of microalbuminuria and albumin creatinine ratio in patients with type 2 diabetes mellitus. Journal of Natural Science, Biology and Medicine, 6(3), 89-92. doi:10.4103/0976-9668.166095

emphasizes the importance of screening due to increase in deaths from DKD	Guideline from 2012- no updated guideline from National Kidney Foundation regarding diabetes and kidney	Large sample size, not the strongest design	Shows support for microalbumin screening vs. 24 hour urine sample-small sample size, only conducted
n/a	N/A	Participants were predominantly female	T2D
n/a	N/A	Semi structured telephone interviews	n/a
n/a	N/A	2014, 6329	112
Literature review	clinical guideline/ synthesis of evidence	convenience sample approach	retrospective study
increasing rise of death from DKD	microalbumin & GFR are needed to accurately	strong relationship btw CKD and diabetics. Emphasizes	Albuminuria & detection of kidney disease in T2D
I	I	II	VI
Between 1990 and 2012, the number of deaths attributed to DKD rose by 94% (10). This dramatic rise is one of the highest	Measurement of GFR (e.g., eGFR and microalbuminura to DX CKD	"Targeted screening identified a high proportion of individuals with risk	Random Albumin checks in diabetics is just as accurate in detecting kidney damage in
Clinical Journal of American Society for nephrology	*National Kidney foundation*	*Clin J Am Soc Nephrology*	*Plos one*
Diabetic Kidney Disease- Challenges, Progress, and Possibilities	KDOQI CLINICAL PRACTICE GUIDELINE	The See Kidney Disease Targeted Screening Program for CKD	Diagnostic Efficacy of Random Albumin Creatinine Ratio for Detection of Micro
2017	2012	2016	2016
Alicic, R. Z., Rooney, M. T., & Tuttle, K. R. (2017). Diabetic kidney disease: Challenges, progress, and possibilities. Clinical Journal of the American Society of Nephrology : CJASN, 12(12), 2032-2045. doi:10.2215/CJN.11491116	National Kidney Foundation (2012) KDOQI Clinical Practice Guidelines for Diabetes and CKD: 2012 update (2012).https://www.ajkd.org/article/S0272-6386(12)00957-2/pdf	Galbraith, L. E., Ronksley, P. E., Barnieh, L. J., Kappel, J., Manns, B. J., Samuel, S. M., Jun, M., Weaver, R., Valk, N., & Hemmelgarn, B. R. (2016). The See Kidney Disease Targeted Screening Program for CKD. Clinical journal of the American Society of Nephrology : CJASN, 11(6), 964–972.	Hasanato R. M. (2016). Diagnostic efficacy of random albumin creatinine ratio for detection of micro and macro-albuminuria in type 2 diabetes mellitus. Saudi medical journal, 37(3), 268–273. https://doi.org/10.15537/smj.2016.3.13567

shows genetic link btw T2D & CKD, large sample size, important findings	supports basis of project	increase in burden of CKD in the US, supports basis of project
Chinese	n/a	n/a
analysis of data	n/a	n/a
11,502	n/a	n/a
Mendelian randomization (similar to random controlled trial)	synthesis of evidence	synthesis of evidence
T2D & CKD	Clinical guideline	data review
IV	I	I
relation between T2D and CKD may be causal	At least once a year, assess urinary albumin (e.g., spot urinary albumin-to-creatinine ratio) and	US Saw a substantial increase of CKD burden from 2002-2016 52%
EBioMedicine	*American Diabetes Association*	*The Journal of the American Medical Association*
Type 2 Diabetes, Diabetes Genetic Score and Risk of Decreased Renal Function and Albuminuria: A Mendelian Randomization	Standards of Medical Care in Diabetes—2019 Abridged for Primary Care	Changes in the US Burden of Chronic Kidney Disease From 2002 to 2016 An Analysis of the Global Burden of Disease Study
2016	2019	2018
Xu, M., Bi, Y., Huang, Y., Xie, L., Hao, M., Zhao, Z., G. (2016). Type 2 diabetes, diabetes genetic score and risk of decreased renal function and albuminuria: A mendelian randomization study. Ebiomedicine, 6, 162-170. doi:10.1016/j.ebiom.2016.02.032	American Diabetes Association(2019) Standards of Medical Care in Diabetes—2019 Abridged for Primary Care Providershttps://clinical.diabetesjournals.org/content/diaclin/early/2018/12/16/cd18-0105.full.pdf	Bowe B., Xie Y., Li T., 3 , Mokdad A., Xian H., Yan Y., Maddukuri Y., 1 Al-Aly Z., Changes in the US Burden of Chronic Kidney Disease From 2002 to 2016: An Analysis of the Global Burden of Disease Study. JAMA Netw Open. 2018;1(7):e184412. doi:10.1001/jamanetworkopen.2018.4412

Shows positive microalbumin in diabetics and prevalence of this.. Supports intervention	Strong study looked at labcorp reports based on ICD codes. However, at risk	small sample size. Shows barriers to CKD screening in primary care. Supports intervention
T2D pts.	diabetics/hypertensive pts.	nurses in primary care
all pt.	data analysis	questionnaire
1280	n/a	26
Logistic regression	n/a	frequency analysis
prevalence of microalbumin T2D	data review	CKD screening
IV	I	VI
diabetics and positive microalbumin	CKD is under screened in at risk populations	barriers to CKD screening in primary care
Pakistan Journal of Medical science	*America Journal of Kidney disease*	*Renal Society of Australia*
Microalbuminuria in Type-2 Diabetes Mellitus; the tip of iceberg of diabetic complications	Spring Clinical Meetings abstracts	Barriers and facilitators to opportunistic chronic kidney disease screening by general practice nurses
2017	2020	2017
		Theory of Planned Behavior
Ahmad, T., Ulhaq, I., Mawani, M., & Islam, N. (2017). Microalbuminuria in type-2 diabetes mellitus; the tip of iceberg of diabetic complications. Pakistan Journal of Medical Sciences, 33(3), 519-523. doi:10.12669/pjms.333.12537	National Kidney Foundation (2020) Spring Clinical Meetings abstracts https://www.ajkd.org/article/S0272-6386(20)30149-9/pdf	Sinclair, P. M., Day, J., Levett-Jones, T., & Kable, A. (2017). Barriers and facilitators to opportunistic chronic kidney disease screening by general practice nurses. Nephrology, 22(10), 776-782. doi:10.1111/nep.12856

supports use of biomarkers for detecting CKD. Additional research is needed as well as a cost-effectiveness analysis before this screening will replace micro albumin	screening in primary care reduces burden of CKD. Supports the need for the intervention	screen with spot UACR is preferred. Supports intervention
N/A	n/a	n/a
N/A	n/a	n/a
N/A	n/a	n/a
synthesis of evidence	literature search	Double Blind Peer Reviewed
biomarkers of CKD	systematic review	Practice Guidelines
II	I	VI
biomarkers are used to detect and diagnosis CKD	Why screening for CKD is important in primary care	Screening for early DKD is best done with annual spot
International Journal of Molecular	*Journal of the American Medical Association*	*American Family Physician*
Novel biomarkers in the diagnosis of chronic kidney disease and the prediction of its outcome.	Chronic Kidney Disease Diagnosis and Management	Diabetic Kidney Disease: Diagnosis, Treatment, and
2017	2019	2020
Rysz, J., Gluba-Brzózka, A., Franczyk, B., Jabłonowski, Z., & Ciałkowska-Rysz, A. (2017). Novel biomarkers in the diagnosis of chronic kidney disease and the prediction of its outcome. International Journal of Molecular Sciences, 18(8), 1702 https://doi:10.3390/ijms18081702	Chen TK, Knicely DH, Grams ME. Chronic Kidney Disease Diagnosis and Management: A Review. JAMA. 2019;322(13):1294–1304. doi:10.1001/jama.2019.14745	Mcgrath, K., & Edi, R. (2019). Diabetic Kidney Disease: Diagnosis, Treatment, and Prevention. American Family Physician, 99(12), 751–759.

Appendix B
Screening for Diabetic Nephropathy Protocol

Diabetes Nephropathy Monitoring
Definition: The proportion of persons in the Diabetes Registry population, who have a documented nephropathy screening test or has been prescribed or is taking an ACE/ARB medication for nephropathy during the current rolling 12-month measurement period.

Inclusions:

Person's age is ≥ 18 as of the last day of the current measurement period. **AND** at least one of the following:

- A problem of Diabetes Mellitus
- TWO HbA1c level ≥ 6.5%
- HbA1c level ≥ 9.0%
- Estimated Average Glucose level ≥ 140 mg/dL, or ≥7.8 mmol/l

OR A start date for any Diabetic Medication (EXCLUDING Insulin, Metformin and Incretin Mimetic Medications) within the 18 months prior to the end of the current measurement period.

OR A diagnosis of Diabetes Mellitus Type 1 within the last 12 months **AND**

- Fasting Plasma Glucose > 126 mg/dL during the current measurement period or the prior measurement period.

OR A diagnosis of Diabetes Mellitus Type 2 or Diabetes Mellitus Other within the last 12 months **AND** at least one of the following:

- Fasting Plasma Glucose > 126 mg/dL.
- A start date for any Incretin Mimetic Medication within the 18 months prior to the end of the current measurement period.

Exclusions: Gestational diabetics and those enrolled in hospice

How to Meet the goal and screen for CKD:

Nephropathy Screening Test during the current measurement period.

OR person is prescribed ACE inhibitor/ARB therapy medication overlapping the current date, **however** this is not a substitute for screening for CKD.

Documentation of one of the following conditions in EMR in the measurement period will satisfy the benchmark and no need for screening will be needed:

- Diabetic Nephropathy
- End Stage Renal Disease
- Chronic Renal Failure
- Acute Renal Failure
- Proteinuria

- Chronic Kidney Disease
- Glomerular Disorder
- Hypertensive Chronic Renal Disease
- Renal Transplant

Appendix C
Permission for ADA Guideline Quiz

Good Afternoon Dr. Deem,

I hope you are doing well. My name is Elizabeth, and I am a current DNP student at East Carolina University. I came across your quality improvement initiative for diabetic kidney disease.
I am currently working on a DNP project that implements a kidney screening protocol in diabetic patients at a primary care office. I enjoyed reading your project and learned a lot from it. It gave me a better understanding of how to go about implementing my DNP project. I was wondering if I could use the six- multiple-choice questions regarding the ADA guidelines that you utilized in my project?

Thank you,

Elizabeth S. Baumgartner

From Michelle Deem,

Sure- and good luck- It was actually a fun project.

MICHELLE DEEM, DNP, APRN, FNP-BC
CLEMSON UNIVERSITY

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Department of Public Health Science
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Building People and Communities

Appendix D

Post-ADA Guideline Quiz

1. According to the ADA, when should patients with T2DM first be screened for DKD?
   a. When they develop clinical signs of the disease
   b. At the time of diagnosis
   c. Five years after onset of the disease
   d. There are no current guidelines regarding screening protocol

2. What is the recommended way to screen for DKD?
   a. A urine dipstick
   b. A spot UACR
   c. A 24-hour urine for protein collection
   d. A renal ultrasound

3. What factors might create false-positive DKD screening results?
   a. A recent viral infection
   b. Menstruation
   c. Advanced congestive heart disease
   d. All the above
   e. None of the above

4. What is the recommended treatment for DKD?
   a. A low-protein diet
   b. An ACE inhibitor or ARB
   c. Both an ACE inhibitor and an ARB
   d. Observation until the disease becomes advanced
   e. There is no recommended treatment

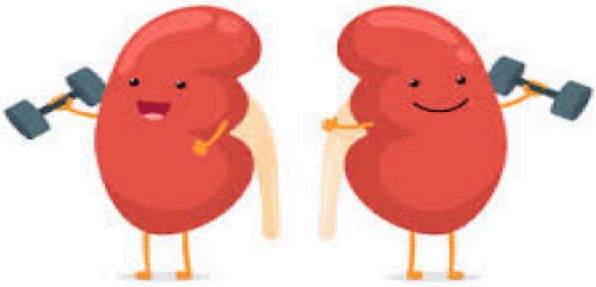
5. Patients with T2DM should be screened annually for microalbuminuria.
   a. True b. False

6. A positive UACR is:
   a. a ratio greater than 15 mg/g.
   b. a ratio greater than 30 mg/g.
   c. proteinuria +1 on dipstick.
   d. none of the above.

Appendix E
Diabetic Kidney Screening Poster

STOP AND SCREEN for CKD

- **DIABITIC PATIENTS SHOULD BE SCREENED YEARLY FOR CHRONIC KIDNEY DISEASE**
- **1 IN 3 ADULTS WITH DIABETES MAY HAVE KIDNEY DISEASE**
- **ORDER A MICRO-ALBUMINURIA (MICRO- UACR)**



COMMON ICD 10 CODES
TO LINK to Micro-UACR

- E11.8
- E10.00
- E11.12

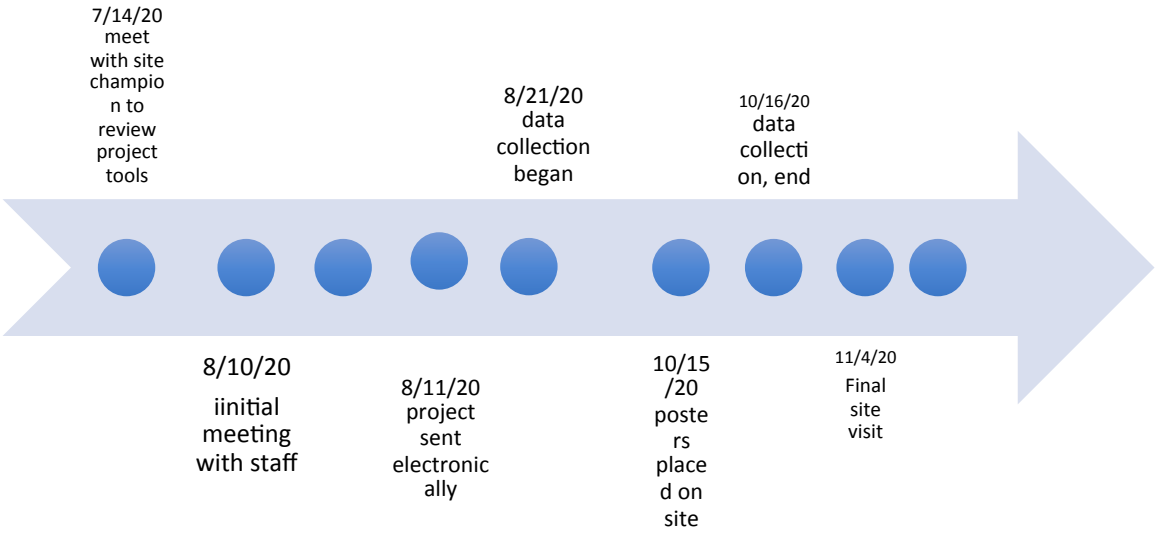
Appendix F

Data Collection Tool

Week 1- Week 12	Number of diabetic patients eligible for CKD screening	Number of patients who received CKD screenings	Total percent of patients who had screenings completed	Was the benchmark of 95% met
Week 1				
Week 2				
Week 2				
Week 4				
Week 5				

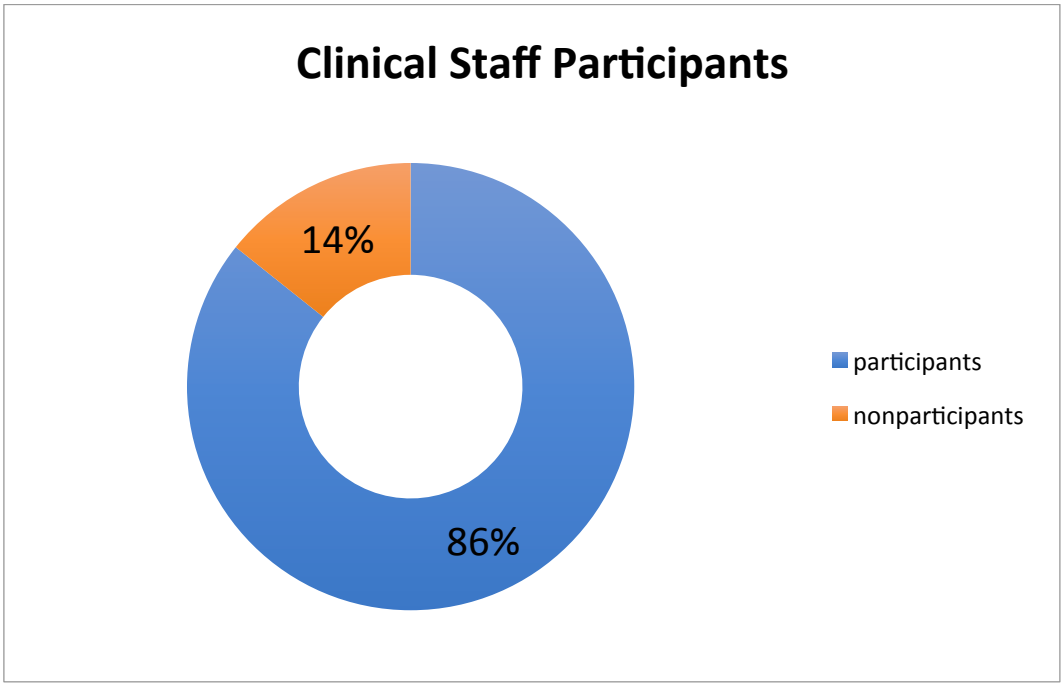
Appendix G

Project Timeline



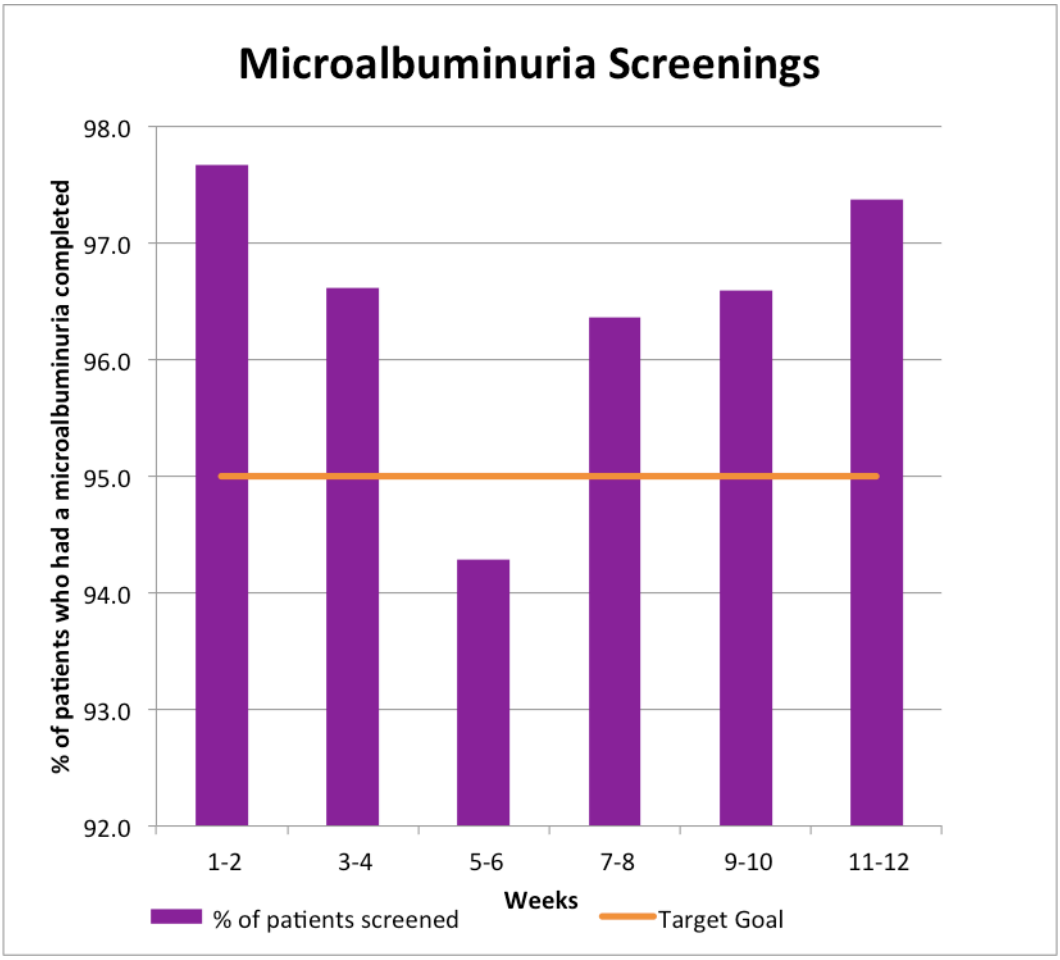
Appendix H

Clinical Staff Participation



Appendix I

Microalbuminuria Screening Graph



Appendix J

Measures Evaluated

Weeks	1-2	3-4	5-6	7-8	9-10	11-12
# of patients who have CKD screening satisfied	42	57	66	53	85	74
# of patients eligible for micro-albuminuria	43	59	70	55	88	76
% of patients who have CKD screening satisfied	97.7	96.6	94.3	96.4	96.6	97.4

Appendix K

Project Cost

Item	Cost
10 Lamination posters	$25
Printer Paper	$5
Staff food Incentive	$15
	Total: $ 45

DNP Essentials Mapping

Doctor of Nursing Practice Essentials

	Description	Demonstration of Knowledge
Essential I ***Scientific Underpinning for Practice***	**Competency** – Analyzes and uses information to develop practice **Competency** -Integrates knowledge from humanities and science into context of nursing **Competency** -Translates research to improve practice **Competency** -Integrates research, theory, and practice to develop new approaches toward improved practice and outcomes	• Information for this project was integrated from many different sources to reflect a well-rounded understanding of the topic. • The literature review was done in many areas, including humanities and science. These findings led to the development of this project's strategy, data collection tools, and review process to improve practice. • The information was translated into this project after critically reviewing studies. With this base and wealth of knowledge, the DNP student formulated implementation strategy for this project.
Essential II ***Organizational & Systems Leadership for Quality Improvement & Systems Thinking***	**Competency** –Develops and evaluates practice based on science and integrates policy and humanities **Competency** –Assumes and ensures accountability for quality care and patient safety **Competency** -Demonstrates critical and reflective thinking **Competency** -Advocates for improved quality, access, and cost of health care; monitors costs and budgets **Competency** -Develops and implements innovations incorporating principles of change **Competency** - Effectively communicates practice knowledge in writing and orally to improve quality **Competency** - Develops and evaluates strategies to manage ethical dilemmas in patient care and within health care delivery systems	• This project communicated vital information regarding a quality care measure to staff. Each PDSA cycle completed was reflected on and critically analyzed to make changes to the implementation plan. • This project incorporated a change in the way the staff thought about and ordered urine screenings on diabetic patients.

		• The project's poster, updated protocol, presentation, and site visits aided in incorporating the change to advocate for improved quality of care. • The overall act of screening for diabetic kidney disease early also affects the overall burden of cost. It reduces that cost on the health care system. • There is direct reimbursement to the project site through payer contract measures when the diabetic kidney screening metric is met.
Essential III ***Clinical Scholarship & Analytical Methods for Evidence-Based Practice***	**Competency** - Critically analyzes literature to determine best practices **Competency** - Implements evaluation processes to measure process and patient outcomes **Competency** - Designs and implements quality improvement strategies to promote safety, efficiency, and equitable quality care for patients **Competency** - Applies knowledge to develop practice guidelines **Competency** - Uses informatics to identify, analyze, and predict best practice and patient outcomes **Competency** - Collaborate in research and disseminate findings	• An in-depth literature review was completed using a quantitative evidence pyramid. The review incorporated multiple resources and an in-depth evaluation process using the revised SQUIRE tool. A literature matrix hierarchy was used to sort the research and determine the most appropriate and strongest evidenced was used. • The knowledge gained from this review was incorporated into this project to create the tools used. • Collaboration took place between the DNP student, peers, the project advisor, and the project site champion.

Essential IV ***Information Systems – Technology & Patient Care Technology for the Improvement & Transformation of Health Care***	**Competency** - Design/select and utilize software to analyze practice and consumer information systems that can improve the delivery & quality of care **Competency** - Analyze and operationalize patient care technologies **Competency** - Evaluate technology regarding ethics, efficiency and accuracy **Competency** - Evaluates systems of care using health information technologies	• Technology was utilized to present the project's presentation by use of PowerPoint, Excel, WebEx, Zoom & EMR. • Data was pulled electronically biweekly and sent to the DNP student for analysis. • Excel was used to display, track and analyze data. • The technology in the EMR was incorporated into this project to improve compliance with the project's goal. • Aspects of the EMR were reviewed with staff that were pertinent to this project.
	Description	**Demonstration of Knowledge**
Essential V ***Health Care Policy of Advocacy in Health Care***	**Competency**- Analyzes health policy from the perspective of patients, nursing and other stakeholders **Competency** – Provides leadership in developing and implementing health policy **Competency** –Influences policymakers, formally and informally, in local and global settings **Competency** – Educates stakeholders regarding policy **Competency** – Advocates for nursing within the policy arena **Competency**- Participates in policy agendas that assist with finance, regulation and health care delivery **Competency** – Advocates for equitable and ethical health care	• Aligns with Healthy People 2020 goals by increases the total number of diabetics screened for kidney disease, increasing the number of diabetics aware they have kidney disease, increasing diabetics who are treated for kidney disease, and decreasing the overall healthcare burden of kidney disease • This project lowers the cost of healthcare by initiating early interventions for patients who have kidney disease • Increases the quality of care for diabetic patients

		• Decreases the amount of diabetic patient who will have end-stage kidney disease
Essential VI ***Interprofessional Collaboration for Improving Patient & Population Health Outcomes***	**Competency**- Uses effective collaboration and communication to develop and implement practice, policy, standards of care, and scholarship **Competency** – Provide leadership to interprofessional care teams **Competency** – Consult intraprofessionally and interprofessionally to develop systems of care in complex settings	• Communication was at the core of this project. Without effective communication, the project's content would not be relayed to staff. • The project's tools were developed to address a gap in care and to increase the diabetic screenings for kidney disease. • Site visits by project lead were used to evaluate and implement change strategies. Collaboration with the DNP site champion and clinical staff forged interprofessional relationships throughout the process of this project. • There were discussions between the quality metric staff and the DNP student to further understand the system and where the breakdown of ordering kidney screenings was.
Essential VII ***Clinical Prevention & Population Health for Improving the Nation's Health***	**Competency**- Integrates epidemiology, biostatistics, and data to facilitate individual and population health care delivery **Competency** – Synthesizes information & cultural competency to develop & use health promotion/disease prevention strategies to address gaps in care **Competency** – Evaluates and implements change strategies of models of health care delivery to improve quality and address diversity	• Screening for diabetic kidney disease is a major part of health promotion. This project's main goal was to increase diabetic kidney screenings to catch kidney disease early on and protect the

		diabetic population. This is a disease prevention strategy that directly promotes health. • There were different ways of going about this project, and different models and strategies were reviewed to formulate the best implementation process that could have the highest effectiveness on change. • The project's tools addressed a critical need in a health care system that affected a diverse group of patients regardless of culture or background.
Essential VIII ***Advanced Nursing Practice***	**Competency**- Melds diversity & cultural sensitivity to conduct systematic assessment of health parameters in varied settings **Competency** – Design, implement & evaluate nursing interventions to promote quality **Competency** – Develop & maintain patient relationships **Competency** –Demonstrate advanced clinical judgment and systematic thoughts to improve patient outcomes **Competency** – Mentor and support fellow nurses **Competency**- Provide support for individuals and systems experiencing change and transitions **Competency** –Use systems analysis to evaluate practice efficiency, care delivery, fiscal responsibility, ethical responsibility, and quality outcomes measures	• Creating and cultivating interprofessional relationships led to increased compliance with the goals. • Demonstrated support to fellow clinical staff during the four site visits. Mentorship took place between the DNP student and the staff as well as between the project adviser and project lead. • Provided support to the clinic to help increase this screening goal on many levels. • The PDSA was used to analyze and evaluate the nursing interventions. This allowed for the DNP student to critically evaluate practice and

		make clinical judgments to improve and promote quality in health care.