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Improving Foot Care and Kidney Disease Screening Through Implementation of American Diabetes Association Standards–2016 in The Primary Care Setting

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IMPROVING FOOT CARE AND KIDNEY DISEASE SCREENING THROUGH
IMPLEMENTATION OF AMERICAN DIABETES ASSOCIATION
STANDARDS—2016 IN THE PRIMARY CARE SETTING

by

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University of the Incarnate Word, 2016

The purpose of this quality improvement project was to increase adherence to the *American Diabetes Association Standards of Medical Care in Diabetes—2016* recommendations for foot care and kidney disease screening for patients with diabetes mellitus type II in a primary care setting. Diabetes mellitus type II affects approximately 18.9-19.9 million, or 90-95%, of all diagnosed cases in the United States. Early detection and management decrease the risk of developing microvascular complications that may lead to neuropathy and nephropathy. Adults with diabetes mellitus type II, 20 years of age and older, accounted for approximately 73,000 non-traumatic lower-extremity amputations in 2011. Diabetes is the leading cause of kidney failure representing 44% of all new cases of renal failure. This quality improvement project was implemented by providing education for medical assistants and the provider. A pre-intervention audit of 50 charts revealed 10% documentation of foot care performed, 6% screening of kidney disease via microalbumin/creatinine testing, and 0% documented provision of educational handouts in patients with diabetes mellitus type II. For the quality improvement project the clinic began to perform and document foot care and order urine microalbumin/creatinine test more consistently with these recommendations. A post-intervention audit of 50 charts showed 50%, achievement in foot care performed and documented, 26 % achievement in microalbumin/

creatinine testing, and 0% documentation of educational material. This project led by a Doctor of Nursing Practice student encompasses a higher level of clinical evaluation, organizational leadership and responsibility in providing evidence-based care.

Keywords: Diabetes type II, Foot Care, Kidney Disease Screening, ADA Standards of Care

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Diabetes is a significant chronic disease in the United States (Centers for Disease Control and Prevention [CDC], 2015a). Diabetes mellitus type II (DMT2) is the body's inability to metabolize glucose properly due to improper insulin production of the pancreas or the body's resistance to insulin (Mayo Clinic, 2016). The U.S. population with diabetes is 29.1 million or 9.3% and only 21.0 million persons with the disease have been diagnosed (CDC, 2015a). Diabetes mellitus type II makes up 90% to 95%, or approximately 18.9-19.9 million, of all diagnosed cases in the United States (CDC, 2015a). The CDC (2015a) reports that 8.1 million people with diabetes in the United States remain undiagnosed.

Adults diagnosed with DMT2 in Texas account for 10.8% of the state's population or an estimated 2.9 million people, which is the most recent data reported in 2014 (CDC, 2016a). In 2012, adults in Texas who remained undiagnosed with DMT2 were an estimated 440,468 (University Health System, 2016). The prevalence rate, updated December 2015, for DMT2 Hispanics in Texas is 12.7% while non-Hispanic whites' prevalence rate in Texas is 9.9% (Texas Department of State Health Services [DSHS], 2016a).

The Doctor of Nursing Practice (DNP) quality improvement (QI) project was conducted in a primary care clinic located in a suburban city that encompasses three counties. The prevalence rates of diabetes for these counties are: Guadalupe county-9.3% (13,122 persons); Comal county-7.2% (8,390 persons); and Bexar county-14.2% (263,533 persons) [CDC, 2016; City of San Antonio Metropolitan Health; City-Data.com, 2016; DSHS, 2014]. No datum is available regarding undiagnosed cases at the county level. Comparatively these statistics are of concern, although the prevalence rates of diabetes in Guadalupe and Comal counties are not as high, the Bexar county rate is considerably higher than the national prevalence rate at 9.3%.

Statement of the Problem

The DNP quality improvement project was geared to improve the care of a patient population with DMT2 seen at a primary care clinic through utilization of evidence-based practice guidelines and interprofessional collaboration. The decision to work with patients with DMT2 was mutually determined by the DNP student and the provider, project mentor. During spring 2016, after a brief chart review, conducted with the provider's approval, it was evident that the *American Diabetes Association (ADA) Standards of Medical Care in Diabetes—2016* recommendations for foot care and kidney disease screening were not being met. These two recommendations were selected because they are of utmost importance and appeared to be achievable given the state of organization of the practice in the fall of 2015. Another reason for concentrating on only these two recommendations stems from the disorder and inadequacy of leadership perceived during the practice assessment in the fall of 2015. In consultation with the project mentor and the committee chair, it was decided that focusing on two *ADA Standards of Care—2016* recommendations (foot care and kidney disease) would be the most beneficial aim of the project and that data were to be collected from only one provider, the project mentor. Data collection and project implementation were confined to one provider per his request.

The problem at the project clinic consisted of the gap between the adherence to the *ADA Standards of Care—2016* recommendations and the actual implementation of the standards for patients with DMT2 in the primary care setting. Specifically, there was a need for documented foot care, provision of patient self-care education, and annual screening for kidney disease (urine microalbumin/ creatinine [M/C] ratio test) in patients with DMT2 in this primary care setting. The significance of the problem also stemmed from the organizational culture which made any changes in current processes a challenge. There was some staff resistance to change

and there was a strong need for further education on the impact of the electronic health record (EHR) that had been implemented approximately three years ago. See comparison in Table 1.

Table 1

ADA Standards of Medical Care—2016 Recommendations for Foot care and Kidney Disease Screening and Preliminary Chart Review

Category	Standard	Frequency	%Adherence
Examination and Treatment	Foot Examination	Annual	10
Lab	Urine for M/C ratio test	Annual	6
Prevention	Patient self-care education	Ongoing	0

Note. The table depicts the recommended standards of care versus the current practice standards of care. The data in column 2 and 3 are from the “American Diabetes Association Standards of Medical Care in Diabetes—2016,” 2016, *Diabetes Care, Volume 39, Supplement 1*, p. S72-80. Copyright 2016 by the American Diabetes Association. Adapted with permission.

Background and Significance

Approximately 80% of diabetes medical care is provided in a primary care clinic; therefore, it is crucial to strive for improvement in care provided in this setting including, care that adheres to the *ADA Standards of Care—2016* (O'Connor et al., 2011). Multiple researchers assert that provider adherence to evidence-based standards of care support improved quality of care and may prevent complications for patients with diabetes (Baus, Wood, Pollard, Summerfield, & White, 2013; Lugtenberg, Burgers, Han, & Westert, 2014; Umar-Kamara, & Adams Tufts, 2013). Preventive care practices have proven to decrease diabetic complications

such as foot amputations by 45-85% and kidney disease by approximately 35% (Oxendine, Meyer, Reid, Adams, & Sabol, 2014).

Diabetic complications can progress to death (CDC, 2015a). The CDC (2015a) reported that in the United States in 2010, diabetes was the seventh leading cause of death based on 69,071 certificates in which diabetes was recorded as primary reason of death. In that same year, a sum of 234,051 certificates referred to diabetes as cause of death (CDC, 2015a). The CDC (2015a) suggests that deaths related to diabetes are possibly not reported accurately. Diabetes mellitus type II is one of the leading causes of increased rates of stroke and heart disease, infections leading to amputations, chronic kidney disease, retinopathy, neuropathy, hospital admissions, and is related to decreased life expectancy (Baus et al., 2013; Oxendine, Meyer, Reid, Adams, & Sabol, 2014; Pérez-Cuevas et al., 2012; Umar-Kamara & Adams Tufts, 2013). Total estimated diabetes costs in the United States increased by 41% from \$147 billion in 2007 to \$247 billion in 2012 (ADA, 2015; Oxendine et al., 2014). Furthermore, the ADA (2015) states that 43%, or approximately \$75 billion, of the direct medical costs (\$176 billion) for patients with diabetes are related to hospital costs and 18%, or approximately \$31 billion of direct medical costs are related to medications to treat complications of diabetes.

Individuals with diabetes have a 15-40 times higher risk of an amputation than those without diabetes (DSHS, 2016b). In 2010, Texas reported 8,876 hospital admissions for lower limb amputations, averaging \$80,072 in hospital charges per year per admission with an estimated \$710,720,892 in total charges per year (DSHS, 2016b). The Amputee Coalition (2016) states 60% of lower limb amputations are preventable. The three most effective ways to decrease amputations related to diabetes are regular provider visits for appropriate foot care, patient education, and proper footwear (Amputee Coalition, 2016). Foot ulcers are the major cause of

the nontraumatic limb amputations in patients with diabetes (McCulloch, 2014). McCulloch (2014) states that foot ulcers develop by excessive pressure, foot malformation, external injury, sensory loss, infection, and inadequate blood perfusion, or any combination of these. Therefore, when caring for patients with diabetes, foot inspection and/or examination when caring for patients with diabetes is important in the prevention of foot ulcers that may lead to lower limb amputations (McCulloch, 2014).

Diabetic nephropathy, or diabetic kidney disease, is a complication of diabetes, and affects 20-40% of people with diabetes (CDC, 2015a; Mohammad, 2013). Kidney disease is a progressive condition measured by the kidney's estimated glomerular filtration rate (eGFR), or function in stages: stage 1 (>90 mL/min), stage 2 (60-89 mL/min), stage 3A (45-59 mL/min), stage 3B (30-44 mL/min), stage 4 (15-29 mL/min), and stage 5 (<15 mL/min) or end-stage renal disease (ESRD) [CDC, 2016b]. ESRD is the complete failure of the kidneys (CDC, 2016b). As of 2012, ESRD due to diabetes in Texas accounted for 215.8 per 100,000 of the population with diabetes (CDC, 2016a). Diabetic nephropathy is asymptomatic and laboratory testing is the only way to monitor kidney disease (National Institute of Diabetes and Digestive and Kidney Diseases [NIDDK], 2014). Urine M/C ratio test serves as a detection of albuminuria which is the earliest sign of kidney disease, which may can lead to ESRD (Hellemons, Denig, de Zeeuw, Voorham, & Lambers Heerspink, 2013; Mohammad, 2013).

The ADA (2016) recommends annual urine M/C testing for patients with DMT2 to screen for the potential development of kidney disease. Diabetic nephropathy occurs when the kidneys fail to filter protein and other wastes from the urine (Bakris, 2015). The urine M/C test measures the amount of albumin in the urine, and the normal measure is ≤ 30 mg/g of creatinine (ADA, 2016). Microalbuminuria is a result > 30 mg/g of creatinine persistent in two of three

specimens taken 3-6 months apart and is a marker for developing diabetic nephropathy in patients with DMT2 (ADA, 2016; NIDDK, 2012). Subsequently, treatment with angiotensin-converting enzyme (ACE) inhibitors or angiotensin receptor blockers (ARBs) can be initiated and a referral to nephrology may be appropriate (ADA, 2016).

Current Practice Assessment

Provider Assessment

The practice assessment conducted during the fall of 2015 revealed the provider averaged 225 patient visits per week or 42 patients per day. The average of patient visits was taken during a five-day work week. The provider's patient schedule was usually overbooked with 5-6 patients per hour, and the clinic hours usually ran beyond the eight-hour day. The provider's weekly average of patients with diabetes was estimated at 20.3% or approximately 43 patients per week as depicted in Table 2. As the provider assessed each patient there was the possibility of risk of omitting certain *ADA* recommendations due to time constraints, which may increase the risk of diabetic complications.

The physician has over twenty years of primary care practice experience. The provider's initial perception regarding the care of patients with DMT2 was that he was following the *ADA Standards of Care—2016* but he expressed confidence to rely mainly on his many years of experience. It was noted by the DNP student that the provider sporadically performed foot care but it was not consistently documented in the chart. The standard of care for the clinic was to perform and document a foot exam in the EHR annually in January for all patients with diabetes. The problem with this method was that it was not possible to see all the patients with diabetes in January. Thus, many patients with diabetes were not receiving their foot exams. The provider was aware of the need and importance of these recommendations, however, in the midst of an

extremely busy day with a high volume of patients scheduled, this important preventive care practice was not being implemented according to the *ADA Standards*.

Table 2

Average Number of Patients Weekly

Work Week 8-5	Patients seen by Provider	Patients with DMT2
Monday	48	10
Tuesday	30	8
Wednesday	49	7
Thursday	35	10
Friday	49	8
Totals	211	43

Note. Average number of patients weekly. DMT2=diabetes mellitus type II.

During the preliminary chart review, the lack of screening for kidney disease, M/C ratio test, for patients with DMT2 was also noted by the DNP student. According to the *ADA Standards of Care—2016* this urine test should be completed annually for all patients with DMT2. In discussion with the physician, he acknowledged that this recommendation was often overlooked and was committed to correct this oversight.

Staff assessment

During the DNP student assessment of the clinic operations, the medical assistants' role as patient advocate appeared diminished in the rushed chaos of the workflow. Because of time constraints medical assistants (MAs) did not engage the patients in their needs to understand their disease. Additionally, MAs did not provide educational materials to patients because none

were available in the clinic. Routinely, the MAs prepared the patients to see the provider by taking vital signs and reviewing medications. However, patients with DMT2 were not asked for a urine specimen for kidney disease screening, nor did they prep the patient by having them remove their shoes and socks for foot inspection or exam. Based on the DNP student's conversation with the MAs, they did not have an understanding of why foot care and urine M/C ratio tests are performed or the importance of early identification of potential diabetic complications. During the needs assessment conducted in spring of 2016, interviews with the MAs revealed limited knowledge on the *ADA Standards of Care—2016* recommendations, the purpose of foot care, or the rationale for urine M/C ratio tests. Optimally, team meetings would have been a great platform for staff education and communication, however, these meetings were absent.

Patient assessment

Observation during patient care processes uncovered deficiencies in patient awareness of routine foot care and screening for kidney disease. The examination rooms did not have any health information displayed. Also, diabetic educational materials were not readily available for patients. Patients with DMT2 were accustomed to questions about their average blood sugar levels and symptoms of hypoglycemia and hyperglycemia, but further evaluation was not a part of the standard examination by the MAs. Information on the potential diabetic complications of neuropathy and nephropathy was not imparted to patients. The provider could have further engaged them in their chronic disease plan of care and management. Informed patients may have prompted questions to the provider therefore enhancing the provider-patient relationship related to standards of care (CDC, 2015b).

Readiness for Change and Stakeholder Engagement

The success of a QI project that requires behavioral change in practice is best adopted and sustained with participation from all levels of the healthcare team (Kirchner et al., 2012; Lugtenberg et al., 2014). The provider and the practice administrator realized changes were needed not only to improve patient care, but also to avoid the potential of penalties in the future by meeting Centers for Medicare & Medicaid Services (CMS) Clinical Quality Measures (CQMs) programs. Time constraints and hectic schedules were the challenges in obtaining input from this healthcare team; nonetheless, some motivation was determined from the team to participate in the QI project. The provider, MAs and clinical manager's perspectives on the patient care processes and preference of intervention for the QI contributed significantly to a favorable outcome of the project (Kirchner et al., 2012; Lugtenberg et al., 2014). Adoption of this QI project necessitated changes in patient care workflows and processes which was challenging, however, the provider was committed to the project. Kirchner et al. (2012) states leadership staff must demonstrate support by providing time needed for education and information on project activities. Brief meetings by the DNP student with MAs and one-to-one communication sessions with the project mentor were conducted during spring of 2016 in preparation for the project. Furthermore, it was hoped that sustainability could be achieved with the leadership staff recognition for improvement, continued encouragement, and report on progress (Kirchner et al., 2012; Lugtenberg et al., 2014). The provider and practice administrator stated the expectation was to sustain the new patient care processes and workflows for the sake of improved quality care.

Project Identification

Early detection and optimal management of diabetes can reduce the risk of life-altering

complications including limb amputations and kidney disease (CDC, 2015c; O'Connor et al., 2011; Oxendine et al., 2014; Umar-Kamara & Adams Tufts, 2013). A need to improve the process of health care for patients with DMT2 in accordance with the *ADA Standards of Care—2016* was identified in this family medicine primary care practice. By working on the patient care process, the expectation was to increase adherence to the *ADA Standards of Care—2016* related to foot care and kidney disease for patients with DMT2. Adherence to these standards could decrease their risks of diabetic complications such as foot ulcers and kidney disease.

The provider was interviewed regarding his preference of intervention, method of implementing the project, and re-evaluating his beliefs regarding the standards of care. The objectives and outcomes anticipated for this QI project, listed in Table 3, were followed during education and collaboration with the health care team. The first goal of the project was for the provider to demonstrate an 80% increase in adherence and documentation of the *ADA Standard of Medical Care in Diabetes—2016* recommendations for foot care. The second goal was for the provider to demonstrate an 80% increase in adherence to and documentation of the *ADA Standard of Medical Care in Diabetes—2016* recommendations for kidney disease screening through an annual urine M/C ratio test in patients with DMT2. The third goal was for the MAs to demonstrate a 100% increase of provision and documentation of educational material handed to patients with DMT2 as part of the *ADA 2016* prevention recommendation. The goal date for completion of this project was the end of August 2016.

Summary and Strength of the Evidence

The literature states provider adherence to evidence-based recommendations continues to be a challenge (Barbach et al., 2013; Lugtenberg et al., 2014; O'Connor et al., 2011; Umar-Kamara & Adams Tufts, 2013). Several reasons, such as time constraints, provider's opinion of standards of

care, need for reminders, and underutilization of EHR system tools account for the lack of provider adherence to clinical guidelines for diabetic care (Lugtenberg et al., 2014; O'Connor et al., 2011; Oxendine et al., 2014; Umar-Kamara & Adams Tufts, 2013). O'Connor et al. (2011) conducted a study on the use of an EHR-based clinical decision support system (CDSS) which demonstrated an improvement on evidence-based care guidelines. This study on the impact of EHR-based CDSS required changes in workflow, which were designed according to the best and most convenient access of the CDSS and the physician's ease to operate in the EHR (O'Connor et al., 2011).

Table 3

Objectives and Outcomes

Objectives	Outcomes
1. Provider will increase adherence to the <i>ADA Standards of Medical Care in Diabetes-2016</i> for foot care.	1. Foot care exams and EHR documentation will increase to 80% during June 27-August 19, 2016 Possible secondary outcome: Based on the results of foot care, the provider will prescribe appropriate footwear and generate referrals to vascular specialist or podiatry
2. Provider will increase adherence to the <i>ADA Standards of Medical Care in Diabetes-2016</i> for annual screening of kidney disease.	2. Annual spot urine for microalbumin/creatinine ratio will increase to 80% during June 27-August 19, 2016. Possible secondary outcome: Based on urine M/C ratio test results, the provider will order repeat M/C ratio test and/or generate nephrology referrals.
3. MAs will provide educational materials on foot care and diabetic kidney disease: <i>Taking Care of Your Feet; Diabetes and Kidney Disease</i> educational material available in English and Spanish.	3. 100% of patients with diabetes will receive written information on foot care and diabetic kidney disease as evidenced by documentation in the EHR.

Note. Expected outcomes to the projects three objectives at completion.

Each of these barriers as stated in the literature held true for the primary care clinic in which the QI project took place. Keiffer (2015) suggests that providers should abandon the individualistic behavior in the way they practice as this leaves room for error, incomplete and poor quality of care, and should replace their methods with evidence-based practice. Lugtenberg et al. (2014) recommended that providers be given instructional guidance, reminders or computer support interventions, and an evaluation and a progress report on the status of the interventions.

Further review of the literature revealed that there is evidence that supports the use of an EHR system to assist the health care provider in meeting evidence-based targets for patients with diabetes (Barbach et al., 2013; Herrin et al., 2015). Herrin et al. (2015) conducted an observational study over two years that showed the use of the EHR made a considerable improvement on documentation of microalbumin tests, eye exams, aspirin prescriptions and foot exams for patient with DMT2. Graetz et al. (2015) examined the combination of team cohesiveness and the use of EHR when caring for patients with diabetes which suggested team cohesiveness is important and proved to improve patient health care outcomes. One study asserted that instruction with random reinforcement submits learners to be more attentive and cognitive during teaching sessions (Dayan, Averbeck, Richmond, & Cohen, 2014). Even so, there are studies that did not find improved patient care outcomes and reduction of office visits with the use of EHR (Crosson, Ohman-Strickland, Cohen, Clark, & Crabtree, 2012; Reed, et al., 2013). The consensus is that more extensive research is needed on long-term use of EHR and its impact on patient outcomes.

Umar-Kamara and Adams Tufts (2013) conducted a retrospective study on the impact of a quality improvement project on provider adherence to clinical guidelines which showed a significant improvement on foot exams, up to 52% from 4%, and urine M/C ratio tests, which

increased to 28% from 0%. This evidence supported positive improvement given that the current status of the family medicine clinic stood at approximately 10% for documented foot care and 6% urine M/C ratio test ordered. Carls et al. (2011) and Miller et al. (2014) provide strong evidence that support reduced risk of foot ulcers and medical costs with early preventive care measures and timely referrals to podiatrists for specialized foot care. Carls et al (2011) demonstrated that over a 2-year period there was a commercial plan cost savings of \$13,474 and a lower cost savings of \$3,624 in Medicare plans by having podiatrist, with their specialized skills in early foot ulceration prevention and intervention, manage high-risk patients with diabetes.

A notable national benchmark, Healthy People 2020, suggests that the rate of annual foot exams for patients with diabetes should increase from the 2008 guideline of 68% to 74.8% by year 2020 (Healthy People, 2016). In Texas, the current status on foot exams for patients with diabetes in 2014 was at 59% (CDC, 2016a). The QI project goal for foot care was set at 80% given the national goal of 74% and the state's rate at 59%. During discussion with the project mentor, setting the goal at 100% seemed unrealistic, however, it was agreed upon aiming above the national standing with intent to motivate the team.

Healthy People 2020 advocates a goal that 37.0% of patients with diabetes should be screened for kidney disease via urinary microalbumin (Healthy People, 2016). The national standing for annual urinary microalbumin screening, reported only on Medicare beneficiaries with diabetes in 2011, was at 40.8% (Healthy People, 2016). The CDC (2016) did not report a state benchmark for annual urine M/C ratio tests. The goal was set for 80% of patients with DMT2 will have urine M/C ratio test ordered in the EHR. The goal of 80% was agreed upon

because urinary microalbumin testing was a new task for the provider and the MAs in the process of workflow and was consistent with the foot care goal.

Methods

Project

The first step was to appraise the EHR technology system used for charting and the potential to implement or activate a feature that would help the provider comply with the *ADA Standards of Care—2016* recommendations related to foot care and screening for kidney disease. After much exploration and inquiries of the EHR software, the direction of improving adherence to the *ADA Standards of Care—2016* was coordinated in the process of improvement on CQMs. The recommendations from the *ADA Standards of Care—2016*, were part of the 15 CQMs the practice intends on reporting to CMS for year 2016. The intention was to provide simultaneous education and EHR documentation training of *ADA Standards of Care—2016* and CQMs.

The DNP student and the practice administrator worked with the EHR software representative to ensure the information would be correctly documented in the EHR for reporting purposes. A documentation guide was created to educate the provider and the MAs of the appropriate sections in the EHR to document in structured data format. The new documentation was not complicated, rather merely entered in different sections in the EHR.

Provider

The instructional activities to achieve the goals for the QI project occurred at the beginning of the implementation which began on June 6th. During the first week, the provider was updated on the *ADA Standards of Care—2016* and educated on changes in documentation in structured data format in the EHR. A short outline of steps guided the documentation for foot

care needed to be entered in the *Examination* section of the EHR, by scrolling down to *Foot Exam*, then clicking on *Observation*. Then the provider had to choose from the values or enter narrative in *Notes* next to *Values*. In addition, he was instructed on the *Alerts* (Appendix A) tab, an EHR tool, that was activated, as it was not being utilized.

The EHR feature, *Alerts*, was set up as a diagnosis specific reminder to order labs. The problem with this feature was that the provider had to purposely click on the tab to open and read labs that were due. System reminder tools such as these can be helpful but require reinforcement with help from the team to prompt opening the *Alerts* tab. The MAs were also informed of the *Alerts* tab and asked to encourage the provider to open the *Alerts* tab for labs due, if deemed necessary. The urine M/C ratio test was ordered in *Treatment* section and corresponded with the diabetes diagnosis under the *Lab* tab in the EHR. During the course of the project, random reinforcement of the new processes and frequent evaluations were done to ensure the changes were in place.

Staff (MAs)

Through one-on-one sessions, education was provided for the MAs on the rationale for foot care, urine M/C ratio tests, diabetes complications, and the purpose and significance of screening for neuropathy and nephropathy. MAs were given handouts on proper foot care and the effects of diabetes and kidney disease during the instructional phase of the project between June 6th and June 24th. This activity was coordinated with the approval of the clinical manager. The DNP student met with each of the four MAs and the clinical manager to provide the information about diabetes, explain the process of the project and their roles in the project. With authorization of the provider, when the patient was brought back for a vital sign assessment, the MAs were to ask the patients with diabetes to provide a urine specimen. In order to perform foot

exams, patients with diabetes were prepped for the provider as the MA asked them to remove their shoes and socks and 10-gram nylon monofilament and 128 Hz tuning fork were set up for the provider. MAs were encouraged by the DNP student to distribute pamphlets to the patients on foot self-care and kidney disease so that the patients could develop an understanding of their disease process. MAs were also instructed on the new way of documentation in order for data to be recognized by the system and facilitate the generation of reports. The DNP student developed a short teaching guide for the MAs that gave instructions on patient education. This information was to be entered in the *Preventive Medicine* section of the EHR. In order to do this the MAs had to first click on *Preventive Medicine* then *Counseling* then *Handouts* then *Notes* to select from the *Values* drop down menus. However, the provider was responsible for documentation of the foot care and giving the MAs an order for the M/C ratio test. Educating the MAs on proper documentation of foot care, provision of educational material, and ordering the M/C ratio test in the EHR kept everyone informed and maintained consistent care.

When the patient was taken to the exam rooms, the MAs were instructed to provide the patient with the educational materials and document appropriately. Handouts *Taking Care of Your Feet* (Appendix B), Spanish version, *El Cuidado de los Pies* (Appendix C), and *Diabetes and Kidney Disease* (Appendix D) Spanish version, *Diabetes y las Enfermedades Renales* (Appendix E) were provided for prevention education for patients with DMT2 (ADA, 2016b). The reading level for the patient education is 6th-8th grade level. The DNP student posted a foot care poster with the following statement: *If You Have Diabetes Please Remove Your Shoes and Socks* (Appendix F) in the exam room as a reminder during the visit for the patient and the provider (DSHS, 2015).

The project activities during the QI project are depicted in Table 4 and occurred over 12 weeks from June 6th through August 26th. Instructional sessions occurred during the first three weeks of the project. During the implementation phase, verbal reminders and written reminders assisted the provider to document the foot care and/or order the M/C ratio test. These reminders were not the ideal solution since part of the intervention was for the provider to learn and utilize the EHR system reminder, *Alerts* tab. Behavior modification was most challenging with this QI project in this clinic. These written reminders were created at the end of week three of implementation in attempt to improve adherence to standards of diabetic care. The MAs were provided with laminated, bright colored reminder cards, for foot care prep, urine M/C ratio test, and provision of patient education, which were placed close to the exam room computers.

Setting and population. The project clinic is located in a suburb of San Antonio, Texas. It is approximately 17 miles northeast of San Antonio. This town sits in Guadalupe County, but does encompass small parts of Bexar and Comal counties. In 2013, the diabetes age-adjusted annual mortality rate (AAMR) in Texas was 21.7 per 100,000 of the population (DSHS, 2016b). As of 2013, the AAMR, in Bexar, Comal, and Guadalupe counties account for 23.1, 22.2, and 18.8 per 100,000, respectively (DSHS, 2016b). As stated previously, kidney disease is one complication that can stem from diabetes; its AAMR, in Texas, as of 2013, is 15.9 per 100,000 (DSHS, 2013). Bexar, Comal and Guadalupe counties' AAMR is 18.1, 16.2, and 20.5 per 100,000, respectively, which are higher than the state rate (CDC, 2016a).

The population census for the northeast suburb last reported in 2013, which was 35,929; the city is growing with a population positive change of 92.2% since the year 2000 (City-Data.com, 2015). City-Data.com (2015) describes the population of this community almost evenly divided female and male, predominantly White, non-Hispanic. The community

Table 4

DNP Project

Weekly Activities	DNP Student	Provider	Medical Assistants
Week 1 June 6-10	On the first day, exam rooms were set up foot care posters, and ensured assessment tools were available for the provider	On second and third days, began educational phase- Updated on <i>ADA Standards of Medical Care-2016</i> Educated on <i>Alerts</i> , EHR tool, newly activated Educated on new areas of documentation in structured data format Provider approved workflow processes for MAs	On third and fourth days, began educational phase- Educated on <i>ADA Standards of Medical Care-2016</i> Educated on the newly activated EHR tool, <i>Alerts</i> Educated on the new workflow process and new areas of documentation
Week 2 June 13-17	Received notice that original educational materials were out of stock, submitted alternative handouts for approval to the University IRB Continued with instructional sessions for provider and staff	Continues to learn the new areas for documentation Attempts to keep <i>Alerts</i> feature in mind when caring for patients	Continue to learn the new workflow processes and documentation of the provision of patient educational materials
Week 3 June 20-24	Placed newly approved educational material in exam rooms	Guidance on documentation and new <i>Alerts</i> feature	Coaching on new workflow processes and documentation
Implementation Phase			
Week 1 June 27-July 1	Implementation/ Observation Phase	Implementation phase initiated Performing and documenting on foot care Order for M/C ratio test	Implementation phase initiated Prepping patients for foot care Asking for urine specimen

Week 2 July 4-8	Observation and evaluation of the project	Performing foot care and documentation Ordered some M/C ratio test	Prepping patients for foot care and asking for urine specimen Forgetting to document provision of educational material
Week 3 July 11-15	Created laminated reminders which were placed on the counter next to the computer keyboard	Worked with the provider's scribe, Nurse Practitioner (NP) student Educated the NP student on new areas of documentation and <i>Alerts</i> Provided the reminders	Provided reminders for MAs MAs struggled with change
Week 4 July 18-22	Oversight of project Reiteration of processes	Regressed to minimal documentation	MAs continued resistance to change
Week 5 July 25-29	Oversight of project Reiteration of processes	Regressed to minimal documentation	MAs continued resistance to change
Week 6 August 1-5	Oversight of project Reiteration of processes Feedback provided	Regressed to minimal documentation	MAs continued resistance to change
Week 7 August 8-12		Continued on his own	MAs continued on their own
Week 8 August 15-19		Continued on his own	MAs continued on their own
	Data Collection		
August 22-26	Data Collection and analysis begins	Met with Provider to provide preliminary results Invested in improving care with a new position for a Wellness nurse whose focus is quality measures.	MAs were curious of preliminary results Need of committed supervision on improved workflow processes

Note. Timeline of project activities.

population is depicted in Table 5. In addition, the average resident age is 35.6. The percent of people with health care coverage, last reported in 2013, is 87.6% and 12% have no health insurance (Towncharts, 2016).

Table 5

Gender and Race/Ethnic Background

	Number	Percentage
Gender		
Female	17,773	49.5%
Male	18,156	50.0%
Race		
White (non-Hispanic)	20,871	57.6%
Hispanic (White)	9,944	27.4%
Black	3,323	9.2%
Asian	1,022	2.8%
Two or more races	969	2.7%
American Indian	69	0.2%

Note. Community population characteristics. From City-Data.com, 2015, Website copyright 2016 by the Advameg, Inc. Adapted with permission.

The primary care practice patient population was reflective of the community. The patient population representation was White (non-Hispanic) 54.7%, Hispanic (White) 31%, Black 8.2%, and not reported 5.5%; information was obtained by a randomized chart review in the fall of 2015. Based on the charts reviewed it was noted that approximately 93% of the patient population had commercial health care insurance coverage, 5% had Medicare, and 2% were self-pay or no insurance. The practice administrator was able to generate the age and gender of the patients from the EHR system and is represented in Table 6. Other information was requested,

such as insurance payers, and most common diagnoses documented, however, it was not available. English is the primary language spoken by the patients in the clinic.

Table 6

Patients by Age and Gender

Year 2015				
Age range	Female	Male	Unknown	Total
65 Yrs or Older	762	536		1,298 = 11.4%
Between 18 - 64 Yrs	5,957	2,867		8,824 = 78%
Under 18 Yrs	578	615	1	1,194 = 10.6%
Summary	7,297	4,018	1	11,316

Note. Data of patient population for the clinic from EHR Practice Administrator, 2015. Reprinted with permission.

Organization facilitators and barriers. The physician and the practice administrator were very motivated which helped to facilitate the QI project. A study published in 2015 affirms that providers are motivated to adopt EHR system and meet their quality measure goals due to their concerns of Medicare payment reduction if goals are not met (Weeks, Keeney, Evans, Moore, & Conrad, 2015). It was hoped that improved workflow processes incorporated in the daily standard practice could enable increased adherence of the *ADA Standards of Care—2016* recommendations and simultaneously meet three of the fifteen CQMs. These CQMs were foot examinations for patients with diabetes, screening for kidney disease in patients with diabetes, and patient education. Clinical quality measures are tools that help measure and track the quality of health care services (CMS, 2015).

Another project facilitator was that no additional expenses were incurred to implement the project. The DNP student conducted the educational sessions of the *ADA Standards of Care—2016* for foot care and kidney disease screening and the proper route of documentation for the provider and the MAs. Also the patient education on self-care handouts were downloaded and printed from the *ADA DiabetesPro* patient education library at no cost.

The initial impression was that the EHR system software would have been a facilitator for the project as the DNP student had previously worked with it. However, the EHR system software turned out to be the biggest deterrent to the QI project because the practice did not have any staff members proficient in the features and utilization of the EHR system. The training, according to the provider and MAs, was minimal and consisted of onsite instructors for two days. There has been no further education or computer training since the EHR system was implemented approximately three years ago. The EHR system software had the potential to assist the provider with adherence to clinical practice guidelines but an expert was lacking as part of the healthcare team. Access to the EHR system support representative was limited to the practice administrator because of EHR vendor service fees which were not available at the time of project implementation. Comandé, Nocco, and Peigné, (2015) state providers' perception of adopting EHRs was not negative; however, a great majority emphasized the need for continuous education and computer training. Another study found EHR simulation training improved the provider's level of confidence and readiness prior to implementation (Vuk et al., 2015).

The leadership staff, practice administrator and clinic manager, were fairly new to the practice and were unable to demonstrate proficiency of the EHR software nor were there scheduled staff meetings to facilitate communication. The clinical manager's communication of new procedures was usually done verbally during clinical hours. Although the provider and

practice administrator were supportive, the clinical manager and MAs were resistant to change, in part, related to concerns about the workload and the time involved. Another barrier was that MAs were inclined to rush through taking vital sign assessment and review of medications during patient assessment.

Ethical considerations. This quality improvement project was approved by the University of the Incarnate Word Institutional Review Board (IRB). In lieu of an IRB approval at the clinic, a letter of support from the family medicine practice was provided by the physician (Appendix H). All participants were informed that the purpose of the QI project was to increase the adherence of the *ADA Standards of Care—2016* recommendations by the provider and staff. There was no risk involved with confidentiality of patient information since only aggregate data was collected without use of patient identifiers. Care provided was based on best practice improvement and no new intervention. Password protected EHRs maintained data about foot care and urine M/C ratio test and were used to collect the outcome data. The EHRs and data collected were maintained according to the Health Insurance Portability and Accountability Act standards as per family medicine practice policy.

Results

The provider's pre-intervention foot care performance and documentation was evaluated by a retrospective 50-chart audit of patients with DMT2 seen during the week of May 9th-13th, 2016. The aim of the quality improvement project was to increase the adherence of the *ADA Standards of Care—2016* for all patients with DMT2. The data collected through convenience sample of patients with DMT2 was analyzed by a post-intervention 50-chart audit. The outcomes were analyzed using a percent change pre-intervention to post-intervention comparison of documentation (Figure 1). The MAs outcomes of provision of educational materials were

measured by observation during patient care processes and by post-intervention chart audit for documentation. This outcome failed to show any improvement.

The first objective designed to increase foot care and documentation resulted in a 40% post-intervention improved performance from a 10% pre-intervention performance. The recommendations from the *ADA Standards of Care-2016* suggest the health care provider should inspect patients' feet at every visit and an annual comprehensive foot exam to ensure early identification of potential problems with diabetic neuropathy (ADA, 2016a; NIDDK, 2013). The anticipated outcome of 80% did not require a distinction between a foot inspection, which is a brief visual assessment, or a comprehensive foot exam. Most importantly, it was to compel the provider to remember to assess the patients' feet and document appropriately. As part of the team to improve on adherence to standards of care, the MAs were asked to prep patients for foot care and communicate any concerns to the provider. Beyond the QI project, an expectation of prepping the patients with diabetes for foot care was for them to learn that foot care should be done at every visit in accordance to preventive care. A consequential outcome from this QI project was the referrals of four patients to podiatry.

Annual screening of kidney disease was the second objective with results of 20% improvement in screening post-intervention from the 6% of patients screened pre-intervention. The goal of 80% was not attained. Szczech et al. (2014) sustains that an abnormal urine M/C ratio test repeatedly for three months or more serves as an early indicator of kidney disease and that there is low awareness of chronic kidney disease in patients with DMT2.

The third objective was the provision of educational material for patients, available in the exam rooms, measured by the documentation in the EHR by the MAs. The project failed to meet this objective as the 50-chart post-intervention audit did not reveal any documentation of

educational material provided for patients with DMT2. There is a dearth of evidence regarding patient education alone and the prevention of foot ulcers (Dorresteijn & Valk, 2012).

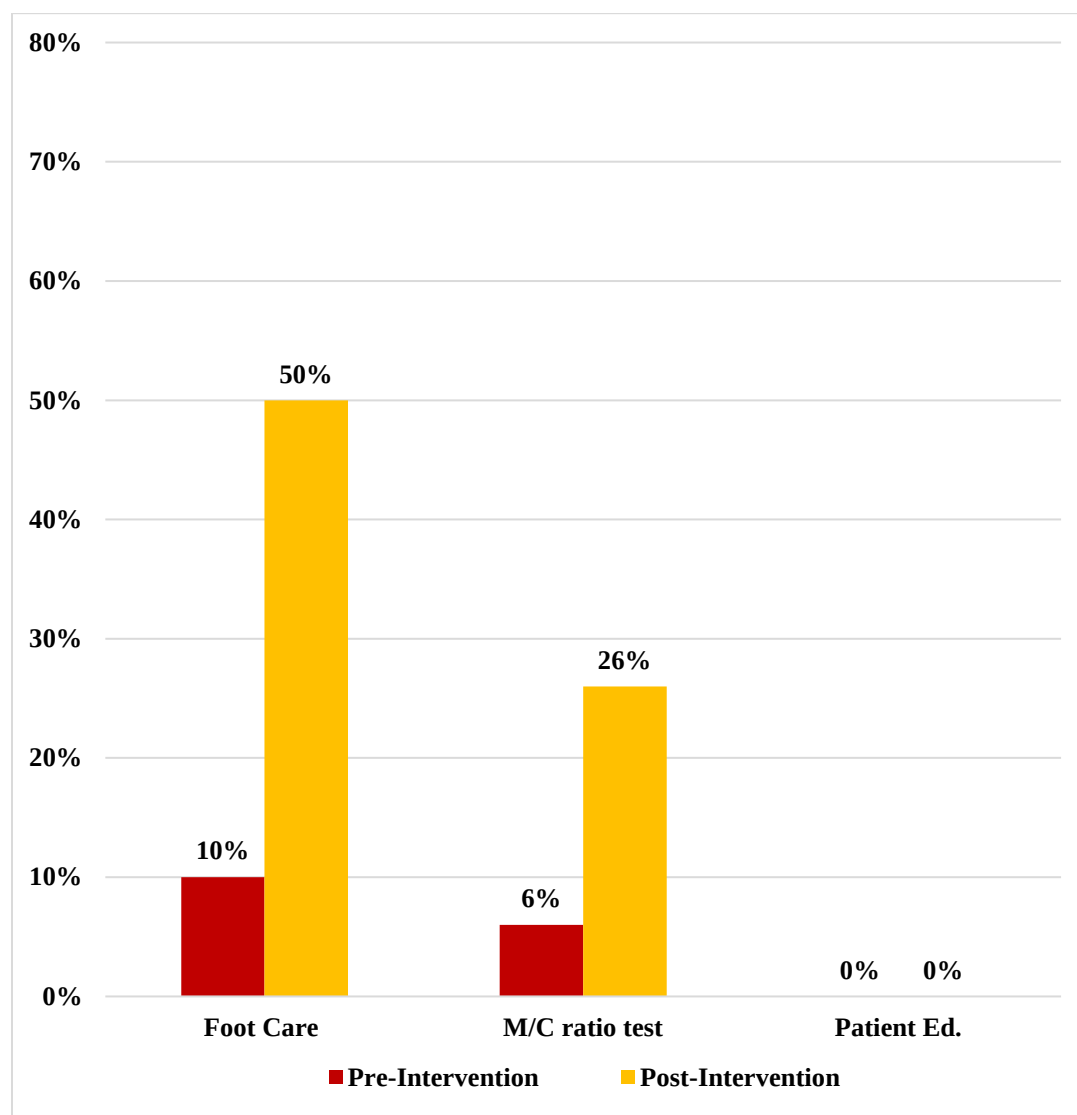


Figure 1. Pre-intervention and post-intervention chart audit graph, N=50.

Discussion

The QI project has uncovered the significance of adherence to the recommendations of the *ADA Standards of Care—2016* for foot care and screening for kidney disease in patients with DMT2 in this primary care setting. A notable change as a result of the project implementation was the physician's perception of evidence-based practice and standards of care. The project

initiated the assessment of all quality measures in the practice; CQMs are based from evidence-based practice guidelines and are now actively being improved upon (CMS, 2015). As a result, two new positions were created at the clinic; a licensed vocational nurse and a medical assistant were hired for management of clinical quality measures, essentially, creating sustainability for the QI project.

Although the workflow process for foot care was not completely new, it was not consistent. Standards of diabetic care should prove to continue to advance given more time to develop the preventive practices in this primary care setting. As part of improving foot care intervention, patients with diabetes should be provided with patient education. The absolute shortcomings of documentation for providing patients with educational material was unexpected as the MAs seem motivated, because the organizational culture lacks the urgency of education as a priority.

Reasons which may have contributed most to the screening for kidney disease outcomes include: (a) screening for diabetic kidney disease was a relatively new task for the provider as a urine M/C ratio test was rarely ordered, (b) 26% of the patients with diabetes were already diagnosed with chronic kidney disease, therefore, not requiring M/C ratio test. Related outcomes included one referral to nephrology and two repeat urine M/C ratio tests in 3 months due to abnormal results.

A major difficulty in implementing the QI project was the lack of proficiency of the EHR system by the leadership staff, provider and MAs. The DNP student worked to learn the correct manner of documenting in structured data format for the purpose of systematically reporting the CQMs and activating the *Alerts* tab. The EHR system representative was not readily available to the DNP student or the staff. Another example of an obstacle as a result of poor EHR knowledge

was with the inability to generate patient outcome reports. EHRs are intended to provide convenience to the provider and the patient while improving the quality of care (HealthIT.gov, 2016). When used to its full potential, EHR systems should provide safe, effective, patient-centered, timely, efficient, and equitable care in line with the six aims for improving patient care (Institute for Healthcare Improvement, 2016). Some examples of these are: (a) legible electronic prescribing, (b) clinical decision support tools, (c) shared patient's health information, and (d) interfaced labs and registries (HealthIT.gov, 2016).

Another struggle during this project was that team meetings and staff education sessions were not a priority which created a challenge for effective communication and team input. There was a sense of information control which inhibited transparency in the clinic. It is well documented that leadership skills include a demonstrative commitment to: (a) accurate and quality care, (b) specific direction, (c) the significance of the new workflow and consequences of non-compliance, (d) recognition for compliance, and (e) adaptability (Mohelska & Sokolova, 2015). The staff should be well-informed and given the opportunity to share their thoughts or concerns.

During the initial assessment of the practice in the fall of 2015, the mention of quality measures, goals and improving patient outcomes was hardly recognized. During the progression of the project, the provider and practice administrator became active in improving the quality measures of the clinic. The QI project was integrated with meeting quality measures for Health Effectiveness Data and Information Set, a tool set forth by the National Committee for Quality Assurance, Physician Quality Reporting System and Meaningful Use which are all intended to improve quality of patient care and their outcomes (CMS, 2015; National Committee for Quality Assurance, 2016). The provider recognized the DNP student's QI project had evoked the

importance of improved standards of care for optimal patient outcomes. The QI project may have had many challenges but ironically those challenges proved to be its strength to stimulate a positive change for continued quality improvement of patient care by increasing communication and learning to use the EHR system to its full potential.

Limitations

Limitations for the QI project include: (a) evaluation of only two recommendations of the *ADA Standards of Care—2016* due to the limited 12-week duration of the project and disarray of the practice, (b) small private practice with limited resources, and (c) no mechanism of communication between the staff. The 12-week duration and the state of disorganization observed in early assessments of this particular primary care setting posed a limitation which confined the DNP student to examine only two recommendations of the *ADA Standards of Care—2016*. The family medicine clinic was a small private practice with limited resources which did not include information systems department or support of additional EHR system vendor on-site training for the staff. The practice did not have any communication processes in place such as routinely schedule team meetings, weekly e-mails, or staff education. Management staff were greatly concerned with overtime, therefore did not view educational and instructional sessions for the QI project as a priority.

Recommendations

Team building would be ideal for this organization. Team leaders should commit to change, strive for improvement, and be an example for others. Everyone's opinion and input should be considered as it conveys the importance of each team member and inspires ownership to a task or project. In order to sustain the foot examinations for patients with diabetes, screening

for kidney disease in patients with diabetes, and patient education, leadership staff must provide the momentum for change.

Staff and patient education development should be considered in this primary care setting. When the initial assessment was done in fall of 2015, the MAs admitted to never providing the patients any type of education. The culture of the organization should include a patient-centered care concept, which requires the whole healthcare team to be educated. Patient-centered care should include the best form of communication and education, disease prevention, encouragement of healthy lifestyles for a focus population such as the clinic patients with diabetes (Greiner, Knebel, Institute of Medicine (US) Board on Health, Care Services, & Institute of Medicine (US) Committee on the Health Professions, Education Summit, 2003). Furthermore, patient-centered care calls for team collaboration, learning and engagement in evidence-based practice, implementation of QI, and learning and utilizing informatics available.

The EHR system requires continuous staff training for proficiency and full utilization of the features and capabilities. An example of one capability in the EHR system was the CDSS tool, which was never activated because it was not feasible in the amount of time to prepare for the project. The DNP student suggested for the practice to invest in educating two members of the healthcare team as EHR super users who could then share their knowledge with the rest of the team; the recommendation was well received and is being taken into consideration.

A recommendation that was heeded immediately was the lack of a clinical team member to continue the efforts to meet all CQMs, of which two were included in the QI project. The newly added team for quality care should continue to build on improving adherence to evidence-based practice extending the assessment of all the recommendations of the *ADA Standards of Care—2016*. This primary care setting would definitely benefit from adding a DNP-prepared

advance practice registered nurse (APRN) who would provide: (a) patient care (b) leadership to the clinical team (c) translation of research into evidence-based practice, and (d) nurse informatics to help improve patient outcomes (AACN, 2006). Other populations to be considered in this primary care setting included patients with hypertension and hyperlipidemia.

Implications for Practice

Implications for practice from the DNP project findings begin with the assessment of the primary care setting which revealed the lack of evidence-based practice in some areas such as adherence to the *ADA Standards of Care—2016*. This QI project uncovered deficiencies in the practice which warranted changes. This DNP project found many opportunities for future development and implementation of improved healthcare practices. The efforts to plan, direct, and evaluate a QI project by collaborating with the healthcare team are all reflective of *Essentials III: Clinical Scholarship and Analytical Methods for Evidence-Based Practice* of the *Essentials of Doctorate Education for Advanced Nursing Practice* (AACN, 2006).

The implication of the absence of an APRN denies the clinic of a more systems approach for educating and implementing evidence-based practice. Lathrop and Hodnicki (2014) state DNP-APRNs are prepared in identifying practice gaps, plan and change practice to align with the Preventive Healthcare Model which focuses on evidence-based preventive practice in primary care. In addition, the APRN demonstrates skills in line with the *Essentials IV: Information Systems/Technology and Patient Care Technology for the Improvement and Transformation of Health Care* which states the DNP-prepared APRN is a valuable component in health care information technology, providing for an integration of nursing science and health care information (AACN, 2006). The DNP-prepared APRN appropriately, ethically, and legally analyzes patient data and evaluates patient outcomes (AACN, 2006).

The focus of the DNP project was to increase the adherence to standards of care which certainly needs a continuum of quality improvement efforts. The lack of organizational leadership and communication skills has definite implications in the future of quality improvement of patient care. This primary care setting must adopt higher levels of communication for further development and evaluation of their current standards of care in all patient populations. This implication reflects the *Essentials II: Organizational and Systems Leadership for Quality Improvement and Systems Thinking* (AACN, 2006). The QI project requires the skills of a DNP-prepared APRN role which are higher level of establishing and assessing new processes, establish accountability, and successfully management of ethical predicaments faced in the primary care of patients with diabetes.

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Appendices

Appendix A: Alerts

Alerts

Patient Test, Patient
DOB:1/1/1989 Age:27Y Sex:M
Tel:508-329-3356
Acct No:9281, WebEnabled: Yes
Click Status

Info Hub All Alerts ▾

Health Maintenance

Generic/Dx/Rx Alerts Last Done Suppress Never Remind

☐	Type	Test	Frequency	Last Done	Result	Due Date	Notes	Suppl
	☐ Dx (E11)	HEMOGLOBIN A1	3 months	10/01/2013		01/01/2014		X
	☐ Dx (E11)	LIPID PANEL *	1 year			04/05/2016		X
	☐ Dx (E11)	COMPREHENSIV	6 months			04/05/2016		X
	☐ Dx (E11)	MICROALBUMIN/	1 year			04/05/2016		X

☐ All ☒ Overdue / Due in next 3 months

Patient Specific Alerts Add Update Suppress

Alert	Last Done	Due Date	Result	Notes

☒ Due Only

Close

Appendix B: Taking Care of Your Feet

 American Diabetes Association.
THE DIABETES ADVISOR**Taking Care of Your Feet****Check Your Feet Every Day**

- Look for cuts, bruises, or swelling.
- See your healthcare provider right away if there are any changes or if you hurt your feet.

Wash Your Feet Every Day

- Use warm water and a mild soap. Avoid soaking since it can dry out the skin and lead to cracks.
- Dry them carefully, especially between the toes.

Keep Your Skin Soft and Smooth

- Rub a thin coat of skin lotion (lotion, cream, or petroleum jelly) over the tops and bottoms of your feet, but not between your toes.

If You Can See and Reach Your Toenails, Trim Them When Needed

- Trim (and file) your toenails straight across.
- Ask for help trimming your toenails if you have trouble reaching them or cannot see well enough to do it safely.

If you have corns or calluses, ask your health care provider to trim them for you.

Wear comfortable shoes and socks that fit well and protect your feet.

Check the inside of your shoes each time you put them on to be sure the lining is smooth. Shake them out to remove any loose objects.



For more information about the American Diabetes Association, visit professional.diabetes.org/PatientEd or call 1-800-DIABETES (342-2383).

Appendix C: El Cuidado de Los Pies

SU CONSEJERO American Diabetes Association. DE DIABETES

El cuidado de los pies

Examínese los pies todos los días

- Revise si tiene cortes, moretones o hinchazón.
- Vaya al médico inmediatamente si nota cambios en sus pies o si se lastimó los pies.

Lávese los pies todos los días

- Utilice agua tibia y jabón suave. Evite remojarlos, ya que esto puede reseca demasiado la piel y causar que se agriete.
- Séquese bien los pies, especialmente entre los dedos.

Mantenga su piel suave y tersa

- Aplique un poco de loción para la piel (crema o vaselina) en la planta y parte de arriba del pie, pero no entre los dedos.

Si puede ver y alcanzar las uñas de los pies, recórtelas cuando sea necesario

- Use una lima de uñas para rebajar los bordes.
- Pida ayuda para recortarse las uñas de los pies si le resulta difícil alcanzarlos o si no ve tan bien como para recortarlas sin lastimarse.

Si tiene callos en las plantas de los pies o en los dedos, pídale a su médico que se los rebaje o lime.

Póngase zapatos y calcetines cómodos, que le queden bien y le protejan los pies.

Revise el interior de sus zapatos cada vez que se los ponga para asegurarse de que se encuentre liso. Sacuda bien sus zapatos para sacar cualquier objeto que se haya metido dentro.



Para más información sobre la Asociación Americana de la Diabetes, visite professional.diabetes.org/PatientEd o llame al 1-800-DIABETES (342-2383).

Corresponding English Advisor Taking Care of Your Feet

Appendix D: Diabetes and Kidney Disease



Diabetes and Kidney Disease

If you have diabetes, you're at risk for kidney disease, also called diabetic nephropathy. In fact, diabetes is the leading cause of kidney failure. But there are things you can do to prevent, delay, or treat kidney disease, including keeping blood glucose (sugar) and blood pressure on target.

WHAT DO MY KIDNEYS DO?

Your kidneys clean your blood by constantly filtering it through millions of tiny blood vessels.

The filters in the kidneys perform two important functions:

- They remove unwanted substances from your blood, such as extra fluid and the waste products made by normal processes within the body. To prevent unwanted materials from building up in the blood and making you sick, your kidneys remove them and send them to your bladder. The waste products and extra fluid then leave the body in the urine.
- The filters keep needed materials in the blood, such as protein and minerals. The cleaned-up blood is returned to your bloodstream.

Your kidneys perform other functions as well, such as helping to regulate blood pressure, stimulating your bone marrow to produce red blood cells, and helping your bones and your blood absorb calcium.

HOW CAN DIABETES HURT MY KIDNEYS?

Frequent high blood glucose levels over years can lead to changes in how the kidneys function. High blood glucose causes extra blood to flow through the filters, making the kidneys work harder than usual. Many people with diabetes have high blood pressure. High blood pressure in the kidney's tiny blood vessels also puts added strain on the kidneys. High blood glucose and blood pressure levels can lead to scarring inside the filters so they don't work as they should.

WHAT HAPPENS ONCE THE DAMAGE IS DONE?

Even though the filters aren't working properly, symptoms may not occur until most of the kidney's working capacity is lost. Before symptoms occur, substances such as protein leak through the walls of the filters instead of being retained. Protein then leaves the body in the urine.

HOW WILL I KNOW IF I HAVE KIDNEY PROBLEMS?

Because kidney damage can occur for years without symptoms, the best way to learn whether you have kidney problems is to have a sample of your urine checked once a year. This test, called a microalbumin (MY-kro-al-BYOO-min) test, can show whether your kidneys are leaking protein (also called albumin).

It's best to have this test when you're first diagnosed with type 2 diabetes and then once every year. Many people have protein in their urine when they're first diagnosed with type 2 diabetes or soon afterward because they may have had diabetes for years before it was detected. If diabetes is present, even if it hasn't been diagnosed, damage from high blood glucose levels can occur. If you have type 1 diabetes, you're unlikely to have kidney damage at diagnosis. But you'll need this test 5 years after diagnosis and every year after that.

More handouts about this and other topics can be found at <http://professional.diabetes.org/PatientEd>

For more information visit diabetes.org or call 1-800-DIABETES

Appendix E: Diabetes y Las Enfermedades Renales

SU CONSEJERO American Diabetes Association. DE DIABETES

Diabetes y las enfermedades renales

Si tiene diabetes, corre el riesgo de enfermarse de los riñones, lo cual también se llama nefropatía diabética. De hecho, la diabetes es la principal causa de fallo renal (de los riñones). Pero hay medidas que puede tomar para prevenir, retrasar o darle tratamiento a la enfermedad renal, entre ellas mantener la presión y la glucosa en la sangre dentro de los niveles deseados.

¿CUÁL ES LA FUNCIÓN DE LOS RIÑONES?

Los riñones limpian la sangre filtrándola constantemente a través de millones de pequeñísimos vasos sanguíneos.

Los filtros en los riñones realizan dos funciones importantes:

- Eliminan sustancias indeseables de la sangre, tales como líquido adicional y productos desechados en los procesos normales del organismo. Para evitar que los materiales no deseados se acumulen en la sangre y lo enfermen, los riñones los filtran y envían a la vejiga. Los productos de desecho y el líquido adicional luego salen del cuerpo a manera de orina.
- Los filtros retienen en la sangre materiales necesarios como proteínas y minerales. La sangre limpia luego retorna al torrente sanguíneo.

Los riñones también realizan otras funciones, como ayudar a regular la presión arterial, estimular la médula ósea para que produzca glóbulos rojos y ayudar a los huesos y la sangre a absorber calcio.

¿CÓMO LA DIABETES PUEDE DAÑAR LOS RIÑONES?

Si a menudo tiene elevado el nivel de glucosa en la sangre, esto con los años puede producir cambios en la función renal. La glucosa alta hace que más sangre fluya por los filtros, con lo que los riñones deben hacer más esfuerzo de lo normal. Muchas personas con diabetes tienen presión alta. La presión alta en los pequeños vasos sanguíneos del riñón también requiere que los riñones trabajen más. Si los niveles de glucosa y presión son altos es posible que surjan cicatrices dentro de los filtros que impidan que funcionen como deben.

¿QUÉ PASA UNA VEZ QUE EL DAÑO ESTÁ HECHO?

Aunque los filtros no funcionen adecuadamente, es posible que no se presenten síntomas hasta que se pierda la mayor parte de la función de los riñones. Antes de presentar síntomas, los filtros no funcionan bien y no retienen sustancias como proteínas. Las proteínas luego salen del cuerpo en la orina.

¿CÓMO SÉ SI TENGO PROBLEMAS RENALES?

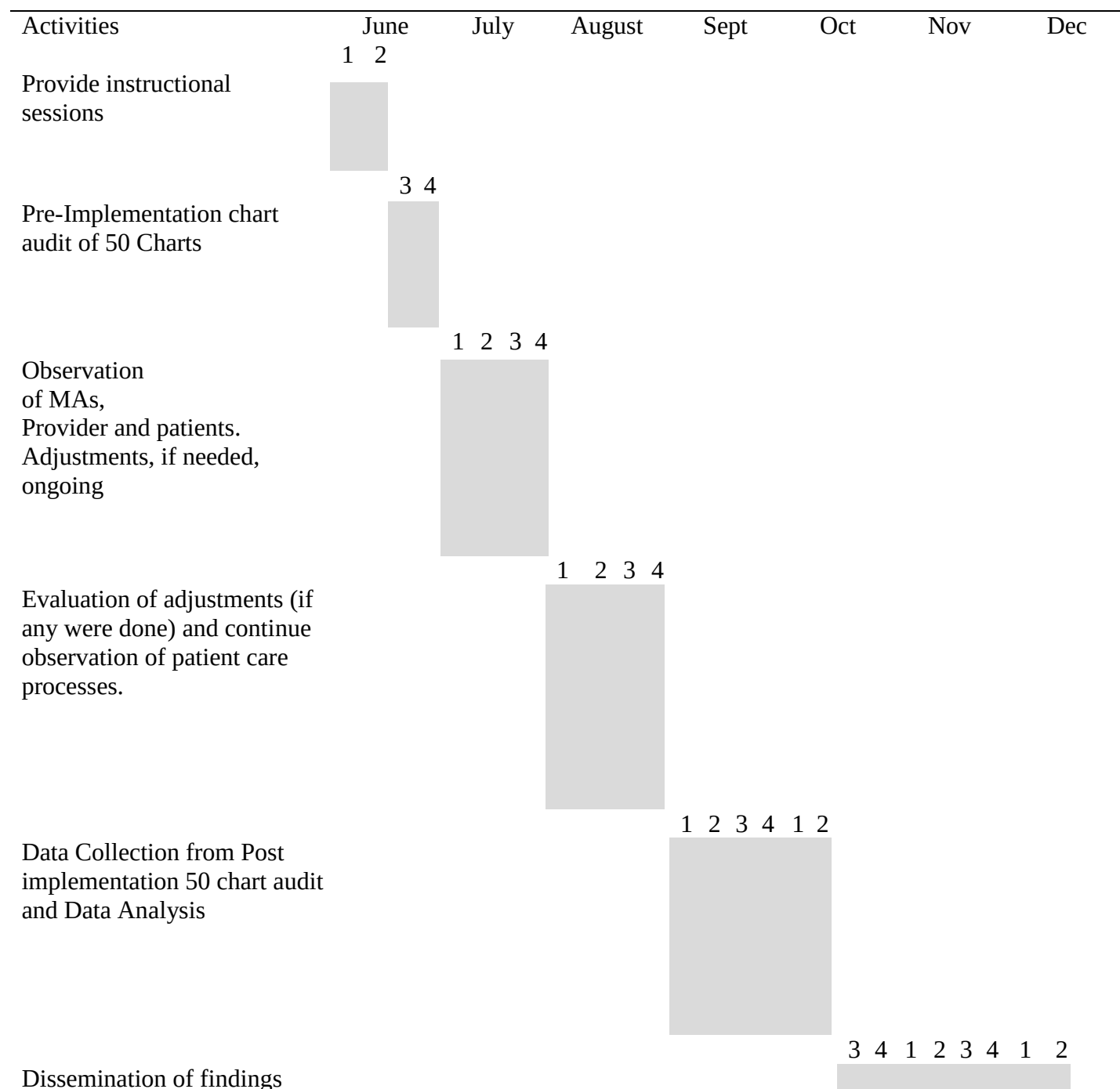
Ya que el daño renal puede ocurrir durante muchos años sin presentar síntomas, la mejor manera de enterarse si tiene problemas de riñón es hacerse un análisis de orina una vez al año. Esta prueba, llamada prueba de microalbúmina, puede indicar si los riñones no están reteniendo la proteína (también llamada albúmina) y esta se detecta en la orina.

Lo mejor es hacerse esta prueba cuando recibe el diagnóstico de diabetes tipo 2 y luego anualmente. Muchas personas tienen proteína en la orina cuando recién reciben un diagnóstico de diabetes tipo 2 o poco después, porque es posible que hayan tenido diabetes por años antes de su detección. Si tiene diabetes, por más que no se haya diagnosticado, un alto nivel de glucosa puede causar daños. Si tiene diabetes tipo 1, es poco probable que tenga daño renal cuando se le diagnostique. Pero debe hacerse esta prueba cinco años después del diagnóstico y anualmente después de eso.

Para obtener más información, visite diabetes.org/espanol o llame al 1-800-DIABETES

Corresponding English Advisor: Diabetes and Kidney Disease

Appendix F: Project Timeline



Appendix G: Letter of Support



3401 FM 3009
Schertz TX 781542711
210-945-2121

3/31/2016

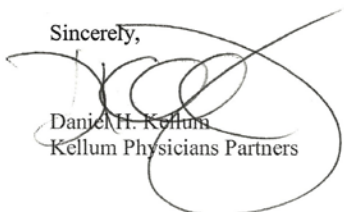
Date: March 30, 2016

Institutional Review Board
University of the Incarnate Word
4301 Broadway Street
San Antonio, Texas 78209

To Whom It May Concern:

I, Dr. Daniel H. Kellum, am aware of the Doctor of Nursing Practice project that will be conducted by Maricela Hernandez in the family practice clinic. I am aware the quality improvement project, *Improve Diabetic Management with Foot Care and Urine Microalbumin/Creatinine Ratio Tests by Increased Adherence to Standards of Care*, will be conducted over the summer of 2016 and Ms. Hernandez will be overseeing the project on site. I approve and support the implementation of this DNP project.

Sincerely,



Daniel H. Kellum
Kellum Physicians Partners