

PROMOTING THE USE OF STATIN THERAPY IN NAVAJO PATIENTS WITH  
TYPE 2 DIABETES

By

DeAnn Lynn Nelson

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As members of the DNP Project Committee, we certify that we have read the DNP Project prepared by DeAnn Lynn Nelson entitled “Promoting the Use of Statin Therapy in Navajo Patients with Type 2 Diabetes” and recommend that it be accepted as fulfilling the DNP Project requirement for the Degree of Doctor of Nursing Practice.

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Final approval and acceptance of this DNP Project is contingent upon the candidate’s submission of the final copies of the DNP Project to the Graduate College.

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SIGNED: DeAnn Lynn Nelson

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## DEDICATION

I would like to dedicate this project to my children, Bryant Ryan Harry, Leigha Rosemarie Bah, and Jaida Rita Rose.

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## ABSTRACT

**Background:** Type 2 diabetes mellitus (T2DM) is a major health concern among Navajo Indians. Native Americans and Alaskan Natives (NA/AN) currently have the highest rates of T2DM in the United States (Indian Health Service, 2016). The rate of diabetes on the Navajo Indian reservation is 22% (Partnersinhealth.org, 2009). Major health concerns for patients with T2DM include cardiovascular complications. Treatment is essential to prevent high-risk complications such as, cardiovascular disease (CVD).

**Purpose:** The purpose of this quality improvement project was to implement a clinical decision support tool (CDST) to increase primary care provider awareness of current American Diabetes Association (ADA) statin therapy guidelines. The first objective was to increase the prescription rates of statin medications by 10%. The second objective of this project was to increase the performance target rate by 10%.

**Setting:** This project was implemented at the Gallup Indian Medical Center (GIMC) Family Medicine Clinic. GIMC is located in Gallup, New Mexico.

**Participants:** Participants included primary care providers, six Medical Doctors, two Nurse Practitioners, and one Physician Assistant.

**Methods:** An evidence based clinical support decision tool (CDST) was generated the ADA statin therapy guidelines. Participants were educated on these practice guidelines and the CDST. The CDST was implemented into the electronic health record (EHR) over a four-week period. The provider used the CDST as a point-of-care guide when prescribing statin therapy to those with T2DM.

**Results:** There was a 0.5% increase in the GPRA performance rating at GIMC as well as a 10% increase in prescribed statin therapy medications. There were 253 newly prescribed statin medications during data collection.

**Conclusion:** While this project did not result in significant improvement of statin therapy GPRA performance ratings, a new EHR tool that providers can use to improve patient care was implemented. One outcome was met, there was a 10% increase in statin medication prescriptions. Further studies and future PDSA cycles will be required for testing the effectiveness of CDSTs.

## INTRODUCTION

### Background Knowledge

Type 2 diabetes mellitus (T2DM) is a growing epidemic among the Navajo Nation. The prevalence rate of diabetes on the Navajo Indian reservation is 22% (Partnersinhealth.org, 2009). The likelihood of American Indians and Alaskan Natives (AI/AN) to have diabetes compared to non-Hispanic whites is 2.2 times higher (American Diabetes Association [ADA], 2016). About 95% of AI/AN have T2DM (ADA, 2016). The presence of T2DM among AI/AN has caused a great deal of hardship and pain and has caused a devastating impact amongst the population (McLaughlin, 2010). Data has shown that AI/AN have a higher incidence of long-term complications related to diabetes (McLaughlin, 2010). One of the major complications of T2DM is cardiovascular disease (CVD) (Dunn, 2010). According to McLaughlin, (2010), CVD is the number one cause of death among AI/AN with diabetes.

Conditions such as dyslipidemia that co-exist with T2DM pose a greater risk for CVD (Frank & Gerhart, 2015). The incidence of CVD is due to associated abnormalities of plasma lipids and lipoprotein metabolism (Dunn, 2010). Diabetes increases the risk of serious health complications including heart disease, stroke, and premature death (Centers for Disease Control and Prevention [CDC], 2014). Due to the increased risk of a stroke and myocardial infarction related to CVD in patients with T2DM, it is necessary that treatment be implemented to manage these complications. Risk reduction strategies are needed to prevent and reduce CVD among AI/AN T2DM patients. The ADA standard of care recommends that statin therapy be initiated in T2DM patients, due to the high risk of cardiovascular events (Eldor & Raz, 2009). The American College of Cardiology/American Heart Association (ACC/AHA) 2014 guidelines state that

patients 40 to 75 years of age with diabetes mellitus should start or continue a moderate statin therapy. The ADA 2016 standards of care state that statin therapy has shown significant primary and secondary prevention of CVD events and death in patients with diabetes (Figure 1). The American Heart Association's research supporting the new heart disease and stroke prevention guidelines found that the risk of heart attacks and strokes drops by 20% for each 39mg/dl reduction in LDL cholesterol.

## 2016 ADA guidelines for statins in DM

**Table 8.1—Recommendations for statin and combination treatment in people with diabetes**

Age	Risk factors	Recommended statin intensity*
<40 years	None	None
	ASCVD risk factor(s)**	Moderate or high
	ASCVD	High
40–75 years	None	Moderate
	ASCVD risk factors	High
	ASCVD	High
	ACS and LDL cholesterol >50 mg/dL (1.3 mmol/L) in patients who cannot tolerate high-dose statins	Moderate plus ezetimibe
>75 years	None	Moderate
	ASCVD risk factors	Moderate or high
	ASCVD	High
	ACS and LDL cholesterol >50 mg/dL (1.3 mmol/L) in patients who cannot tolerate high-dose statins	Moderate plus ezetimibe

\*In addition to lifestyle therapy.  
 \*\*ASCVD risk factors include LDL cholesterol  $\geq$ 100 mg/dL (2.6 mmol/L), high blood pressure, smoking, overweight and obesity, and family history of premature ASCVD.

*FIGURE 1.* American Diabetes Association (ADA) 2016 Guidelines for Statins in DM

CVD is one of the leading causes of mortality and morbidity among T2DM patients (Ziaean, Dinkler, Guo, & Watson, 2016). According to current research, statin therapy has been shown to significantly reduce cardiovascular complications in adults, with T2DM; therefore, suggesting patients with diabetes should use moderate intensity statin therapy (Preiss

et al., 2011; Stone et al., 2014). Statins are drugs that provide beneficial effect on the reduction of CVD events (Wienbergen, Senges, & Gitt, 2008). With the knowledge that statin therapy does provide beneficial effects against dyslipidemia, it is medically prudent to implement CVD risk reduction strategies among the Native American population utilizing statin therapy.

Two objectives of the Healthy People 2020 initiative are to reduce the number of deaths related to diabetes and to improve lipid control. It is important that providers work to meet these objectives. According to Frank and Gerhardt (2015), the optimal approach to reducing residual vascular risk in patients with T2DM is the prevention and treatment of dyslipidemia. It is essential that health care providers take the initiative in addressing the CVD death rate among the AI/AN population. Primary care providers can play a key role in reducing the risk of CVD and by providing efficient and effective care to those with T2DM (Ziaeeian, Dinkler, Guo, & Watson, 2016). The initiation of statin therapy should be considered as a necessary strategy in preventing CVD (Eldor & Raez, 2009). It is essential that every health care provider deliver evidence-based care to improve outcomes and positively impact the quality of life in those with T2DM.

### **Local Problem**

Gallup Indian Medical Center (GIMC) is a hospital that is operated by Indian Health Services (IHS). GIMC is a federal health care facility that manages the medical service needs of American Indian/Native Americans (AI/NA). In addition to the Navajo Nation, IHS provides health care to about 1.9 million Native Americans belonging to about 556 federally recognized tribes (Indian Health Services [IHS], 2015). Meeting standards of care for statin therapy by IHS is mandated and is governed by the Government Performance and Results Act of 1993 (GPRA)

(IHS, 2016). GPRA is a law designed to improve government performance management. Agencies such as IHS comply with GPRA through strategic planning, performance planning, and analysis. IHS began adopting a reporting tool, the Clinical Reporting System (CRS) in 2016 to meet GPRA's requirement. The tool can report clinical performance. CRS is a software application known as the Resource and Patient Management System (RPMS). RPMS is used to design detailed clinical information that will be used in improving and monitoring the delivery and quality of health care among AI/NA populations.

One of the GPRA performance measures reported by IHS is the degree to which statin therapy is prescribed. In 2016, IHS established a GPRA target rate for statin therapy at 61.9% (IHS, 2016). Currently, GIMC is meeting the target with 65.4% of patients on statin therapy but this still leaves 35% of T2DM patients without statin therapy who are at a greater risk for CVD related events. Criteria for statin therapy at IHS includes patients ages 40 through 75 or 21 and older who have been diagnosed with diabetes prior to the report period with at least two visits in the past year and with documented CVD and/or LDL greater than 190mg/dl (IHS, 2016). Currently, GIMC is not meeting the American Diabetes Association standards of care by not having 35% of their T2DM patients on statin therapy. Due to the documented benefits of statin therapy, its use amongst Navajo Indians is clearly an effective management strategy. As such, it is important that IHS improve upon GPRA performance rates for statin therapy for T2DM patients.

### **Purpose**

The purpose of this quality improvement project was to implement a clinical decision support tool (CDST) to increase primary care provider awareness of current ADA statin therapy

guidelines and point of care decisions. The first objective was to increase the prescription rates of statin therapy in patients with T2DM by 10%. The second objective was to increase the GPRA performance target rate for statin therapy at GIMC by 10%.

### **Study Question**

This project answered the following question:

Will the implementation of a CDST among primary care providers increase the number of prescribed statin therapy medications by 10% among AI/NA with T2DM at GIMC Family Medicine Clinic?

## **FRAMEWORK**

### **Theoretical Framework**

Improving the quality of life among AI/NA with T2DM is a work in progress. Among the recommendations of the ADA to meet the standards of care for patients with T2DM is the initiation of statin therapy. One of the objectives addressed in the ADA strategies for improving care is to implement evidence-based guidelines and clinical information tools into practice (ADA, 2015). Facilitating the initiation of appropriate statin therapy to patients requires assessing provider's knowledge and use of current evidence based practice guidelines is imperative. The implementation of a usable CDST to screen patients and initiate statin therapy will require a change within the organization. The Kurt Lewin Change Theory was selected to guide this quality improvement project.

### **Kurt Lewin Change Theory**

The Kurt Lewin Change Theory model was developed back in the 1950s by Kurt Lewin. There are three stages in this theory, these are, the unfreeze stage, the change stage, and the

refreeze stage (Current Nursing, 2013). The first stage of this theory is the unfreeze stage. This stage focuses on finding a process to allow the people within the organization to let go of old patterns. During this stage, the desire for change will need to take place (Kaminsk, 2011). People within the organization will need to be convinced that the old way is past and the new way is better. The second stage in this theory is the process of change. In this stage, the act of change can happen through feelings, behavior, and thoughts (Kaminsk, 2011). The third stage is the refreezing stage. In the refreezing stage, the establishment of the new process becomes the standard. The process of refreezing is essential because many can backslide and go back to previous ways. The new changes that are implemented are frozen in place and are to be part of the normal working process (Kaminsk, 2011).

### **Application of Framework**

The initiation of the CDST to increase primary care provider awareness of statin therapy among T2DM patients started in the unfreezing stage. In this stage, the current use of a CDST for performance improvement at GIMC was explored and no use of CDSTs were found in the electronic health record (EHR). This organization only uses the CDSTs that are written and have not attempted to implement them into the EHR. GIMC's current protocol for statin therapy prescriptions recommendations was also explored. GIMC does not have a current protocol for statin therapy prescriptions recommendations. A need for changes to implement a protocol for statin therapy prescription recommendations was recognized during this stage. The need was addressed in this stage and was accomplished through provider education regarding ADA statin guidelines, standards of care recommendations, Healthy People 2020 objectives, and CDST implementation. The CDST was also presented in this stage to the providers in the Family

Medicine Clinic during a staff meeting. Providers stated that they were not familiar with the new ADA guidelines regarding statin therapy. They also stated that they still used lipid levels and the ASCVD calculator for determining if a T2DM patient qualifies for a statin medication. The education received enabled the providers to discontinue previous statin prescription risk calculators and utilize the new recommended statin therapy guidelines by the ADA.

The change stage involved the actual implementation of the CDST through the HER system at GIMC. The thoughts, feelings, and behavior of the participants regarding the implementation of the CDST was received. This information was shared with the performance improvement team at GIMC to help in future PDSA cycles and planning of other CDST models for quality improvement initiatives at GIMC.

The final stage, refreezing included establishment of the new change. The adoption of the CDST quality improvement and performance improvement measures can be established in this stage. Providers in this stage will continue to use the new evidence-based CDST as a prompt for considering prescribing statin medications for patients with T2DM.

### **Concepts**

Concepts used within this DNP project include: *AI/NA, T2DM, CVD, statins, awareness, CDST, and ADA Guidelines.*

#### **American Indian/ Native Americans (AI/NA)**

According to the 2010 United States Census, about 5.2 million people identified themselves as AI/NA (Norris, Vines, & Hoeffel, 2012). AI/NA refers to a person that has origins in any of the original peoples of North or South America (Norris, Jones, & Ramirez, 2010). According to the United States Census Bureau in 2015, there are 326 federally recognized

American Indian reservations and 566 federally recognized tribes. The Navajo tribe is one of the 326 federally recognized tribes in the United States.

### **T2DM**

Diabetes is a disease in which the blood glucose within the body rises higher than normal. T2DM is the most common type of diabetes (ADA, 2015). When the body cannot use insulin properly this can lead to insulin resistance, which then leads to T2DM. T2DM usually develops later in life but can also affect children and young adults. T2DM can be treated with lifestyle, oral medications or insulin.

### **CVD**

CVD refers to conditions that involve the narrowing or blockage of blood vessels that can lead to chest pain, stroke, or a heart attack. Heart and blood vessel disease includes many problems, which are often related to atherosclerosis. Patients with diabetes often have unhealthy cholesterols, which can lead to dyslipidemia (American Heart Association [AHA], 2013). Atherosclerosis develops when plaque builds up in the walls of arteries (AHA, 2013). The buildup of plaque narrows the arteries and makes it harder for the blood to flow, which can lead to many associated life - threatening conditions.

### **Statins**

There are certain medications that are used in the prevention of complications related to certain diseases. It is recommended by the ADA that a statin medication be prescribed in patients with T2DM (ADA, 2015). Statins, also known as hydroxymethyl glutaryl coenzyme A reductase (HMG-CoA) inhibitors, are commonly prescribed medications (Ramkumar, Raghunath, & Raghunath, 2016). According to the Federal Drug Administration, there are currently seven

approved statin medications in the United States and include pitavastatin, atorvastatin, rosuvastatin, pravastatin, simvastatin, lovastatin and fluvastatin. According to Ramkumar, Raghunath, and Raghunath, (2016) strong evidence has shown that 18 randomized control trials have found that statin therapy reduces all-cause mortality, cardiovascular events, and fatal/nonfatal cardiovascular events in patients with T2DM. There has been much debate on potential safety and potential side effects of statin therapy. Potential side effects and safety concerns of statin medications include onset of diabetes, myalgia, and stimulation of atherosclerosis and heart failure.

### **Awareness**

Awareness is the perception or knowledge of a situation or a fact. In health care, it is essential that providers take the time to know and acknowledge clinical practice guidelines. Providers need to be aware of current health care recommendations in order to provide patients with optimal evidence-based care. Clinical practice guidelines are systematically developed tools that provide recommendations and research evidence to direct healthcare throughout the world (Loudon et al., 2014).

### **CDST**

A CDST is a tool that is used by clinicians and patients to inform decisions about health care (Agency for Healthcare Research and Quality [AHRQ], 2015). This tool can have a variety of platforms including the internet, personal computers, electronic medical records, and written (AHRQ, 2015). CDST's used in electronic health record (EHR) systems can help providers with decision-making tasks about patients at point-of-care and can remind providers of clinical care guidelines (Foraker et al., 2016). The main goal of a CDST is to provide point-of-care

information to users (clinicians, patients and others) that can inform decisions about health care. The United States health care system is moving towards the wide spread use of EHR-based information systems and it is a new era for diabetes quality measurement (O'Connor et al., 2011).

### **ADA guidelines**

ADA guidelines are comprehensive annual guides that include updated and new/current recommendations to safeguard the psychological and physical health of people with diabetes (ADA, 2016). The ADA Standards of Care Guidelines are revised annually by a professional practice committee and they focus on the prevention, screening, diagnosis, and treatment and outcomes related to diabetes (ADA, 2016).

### **SYNTHESIS OF EVIDENCE**

To better understand the need for prevention of CVD and related morbidity and mortality in AI/AN T2DM patients using statin therapy, several literature searches were conducted. Literature searches were conducted by searching Google Scholar, PubMed, and Cumulative Index of Nursing and Allied Health Literature (CINAHL). Various key words and combinations were utilized in searches including: cardiovascular disease, prevention, diabetes mellitus type 2, statin, statin therapy, diabetes management, stroke, myocardial infarction and AN/AI. A total of 2500 articles were found using each of the search engines. Inclusion criteria for the articles included: published since 2008, full text availability, T2DM, and English language. Articles reviewed for this proposal includes those with information on the prevention of CVD in T2DM and statin therapy, clinical decision support tools, and ADA guidelines. There were 15 articles

used for the synthesis of this paper. Articles reviewed included randomized control trials and systematic reviews.

Articles reviewed mentioned an association between CVD and T2DM. In one article, the authors showed a correlation between CVD, statin therapy and T2DM (Stone et al., 2016). This study placed patients with T2DM in a high -risk population and recommended the use of statin therapy. In another article by Johansen et al., (2014), information using national representative data was used to conclude that patients with T2DM are at high risk for cardiovascular events. This article also mentions the under-treatment of statin therapy among this high-risk population. In an article by Ryan et al., (2014), an unexpected finding included the increasing level of lipid levels with increasing BMI in patients with T2DM. This finding may be due to the ADA recommendations of statin therapy without considerations of lipid levels in patients with diabetes who have CVD or who are at risk for CVD (Ryan et al., 2014). The article has therefore highlighted the need for blood pressure, lipid and A1C control in T2DM patients. Adel, Abdel-Salem, and Nammass, (2010), concluded in their research the correlation between the risk for major cardiovascular events and T2DM.

The effectiveness of statin therapy against cardiovascular disease was explored in three studies. Two of the studies were based on meta-analysis, focusing on the effects of cholesterol - lowering therapy in patients with T2DM. Mihaylova et al., (2012), data was sought to explore the effects of lower LDL cholesterol with statin therapy in people with a low risk for vascular events. At the conclusion of this study, individuals at risk for vascular events also had a reduction in major vascular events with the use of statin therapy. ACCORD Study Group et al., (2010), completed a randomized trial with T2DM patients (n=5518) and simvastatin therapy.

These participants showed a significant reduction in cardiovascular risk with this therapy compared to combination therapy of simvastatin and fenofibrate. In the last article reviewed for effectiveness of statin therapy, CTT et al., (2008), shared a meta-analysis study that analyzed data to resolve uncertainties about the effects of particular outcomes of statin therapy in patients with diabetes. The outcome of their data expressed the need for statin therapy among diabetic individuals.

Two articles examined healthcare provider's management and reasoning for not prescribing lipid-lowering medication in patients with T2DM. One article, AB et al., (2009), explored factors that underline the provider's decision not to prescribe lipid-lowering medication to T2DM patients. The study concluded that factors such as lack of knowledge or motivation between both the provider and the patient existed. This information may be useful for clinicians when considering interventions to increase statin therapy in T2DM patients. In a study by Williams et al., (2016), the authors sought to identify attitudes and practices among health care providers in the management of patients with T2DM. The results of this study found gaps in perception, knowledge, and management practices among these providers and should be addressed through education. Furthermore, this study proves the need for provider education when it comes to the management of patients with T2DM and current guidelines.

Three articles identified barriers interfering with the use of statin therapy to decrease the risk of CVD. Huntink, Wensing, Komp, and van Lieshout, (2015), aimed to identify determinants of cardiovascular risk management among health care providers and patients. Perceived determinants of CVD management were found to be related to patient behaviors and to the health care system. Perceptions of patient and health care providers regarding lack of

knowledge about CVD and self-management were considered and health care systems were considered determinates. The study concluded that knowledge of these determinates can open the door for more research involving improvement programs and CVD. Another article sought to balance the benefit and risk related to the association between the onset of diabetes and statin therapy (Ridker et al., 2012). In an article by Chogtu, Magazine, and Bairy, (2015), there was mention of statins having been found to increase glycosylated haemoglobin and fasting serum levels. This posed a barrier in the use of statin therapy. The analysis by the article's authors concluded that the benefit of decreased mortality with CVD exceeds the hazards of the onset of diabetes in those who choose statin therapy. Preiss et al., (2011), found intensive statin therapy was associated with increased risk of new-onset diabetes compared to moderate-dose statin therapy.

One of the strengths of the articles reviewed is the proven correlation of CVD and T2DM. Many of the articles identified T2DM patients as a high-risk group for CVD (Stone et al., 2016; Ryan et al., 2014; Adel, Adbel-Salem, & Nammass, 2010). Due to the identification of a high-risk group category, the need to decrease CVD risk factors among this group is essential. A second strength found in the articles included the effectiveness of statin therapy. Evidence-based practice is the focus of prevention among this group and has demonstrated the effectiveness of statin therapy, and the need for this therapy among high-risk groups such as those with T2DM (Mihaylova et al., 2012; ACCORD Study Group et al., 2010; CTT et al., 2008). Randomized control studies were used in evaluating the effectiveness of statin medication in reducing CVD in patients with T2DM.

One of the weaknesses in review of these articles is the need to understand the perceptions, beliefs, and values of those prescribing statin therapy. Upon searching for articles, few articles could help understand these concepts. In reviewing the literature, I was unable to find recent articles that related to Navajo Indians, statin therapy, and cardiovascular disease. Articles that correlated Navajo Indians and CVD dated back to the early 1990s. The articles that were found regarding Navajo and diabetes were related to the need to make diet and lifestyle modifications.

## **METHODS**

### **Design**

#### **Institute of Health Model for Improvement**

The project design for this study is a quality improvement initiative. Quality improvement designs are dependent on sources of knowledge and must be empirically based (Zaccagnini & White, 2014). The frameworks for this project is the Institute of Health Model for Improvement, which includes the Plan-Do-Study-Act (PDSA) cycle, and was guided by the Kent Lewin Change Theory.

Improving patient care and outcomes is the goal for changing a health care process (HRSA, 2011). The need for change is essential. Change will improve performance and quality within an organization. The method used to test for change for this project is the PDSA cycle, which is a part of the Institute for Healthcare Improvement (IHI) Model. The IHI model is implemented after the aim has been set and the test for change is determined (AHRQ, 2013). The IHI model is used to achieve rapid and significant improvements in care delivery and outcomes (IHI, 2017). Part one of the model involves a three-question guide. The questions for this model

are: 1) What is going to be accomplished with this change? 2) How will improvement be measured after the implementation of change? 3) What changes will be made after the change is completed and tested? Following these three fundamental questions, the PDSA cycle is implemented to determine change for improvement.

The PDSA cycle involves the use of four steps and tests the implementation of the change (HRSA, 2011). The PDSA cycle starts with the *Plan* stage. In this stage, the health care organization must understand the nature of the problem, the underpinning of the problem, what changes need to be made, and what will the change affect (HRSA, 2011). The second stage is the *Do* stage. This stage is where the change will take place. The health care organization will document the problems and unexpected findings. Data collection will also occur in this stage of the cycle. The third stage is the *Study* stage. The study stage involves the complete analysis of the data collected during the *Do* stage. The study stage also involves the comparison and prediction of the improvement. This stage will answer the question, was the objective of the improvement met (HRSA, 2011). The final stage of the cycle is the *Act* stage. In this stage, the health care organization will acknowledge the change and review the change. They will determine if further change is needed and possibly create start another PDSA cycle (HRSA, 2011). The continuous cycle of feedback will help to ensure quality improvement and sustainability.

### **PDSA Cycle**

A quality improvement (QI) team was established to implement the IHI Model for Improvement and a PDSA cycle in this study. The QI team included a pharmacist, a nurse, and a family nurse practitioner that specializes in diabetes management. The team for this project was

composed of three people and this DNP student for a total of four team members. The selection of team members was determined by the willingness to participate and the effort to meet with the team for regular discussion meetings. One member from each specialty was included in order to engage stakeholders. The team met weekly for one hour and discussed the implementation and progress of the quality improvement project.

The QI team had an initial meeting that discussed part one of the IHI model, which is the three questions that needed to be asked and answered prior to implementation of part two of the PDSA model. The first question asked was, “What is going to be accomplished with this change?” The team agreed that implementation of CDSTs at GIMC was needed to improve patient care and that paper CDSTs needed to be changed, updated, and implemented into the EHR. Team members agreed that paper CDSTs were sometimes hard to find and were not helpful. The change to the CDST in the EHR will be helpful and could potentially be used with other mandatory improvement measures at GIMC. Two benefits of the CDST on patient outcomes was also discussed. The second question discussed and answered was, “How will improvement be measured after the implementation of change?” The team discussed the use of graphs and run chart tools to measure the improvement. Another form of measurement will be the sustainability of the CDST in current practice. The last question that was discussed and answered was, “What changes will be made after the change is completed and tested?” Changes expected include, adoption and sustainability of the statin therapy CDST by GIMC and potential dissemination of the CDST to a remote clinic.

**Plan**

The *Plan* stage addressed the potential complications associated with T2DM and cardiovascular disease. Providers at the clinic were educated on the life-threatening complications such as a stroke and myocardial infarction. Providers were educated during a Wednesday morning staff meeting. The DNP student through a 30-minute verbal lecture educated the providers. The DNP student prepared handouts that were used during the lecture. The handouts contained information such as, the DNP project abstract, ADA statin guidelines and information on how the CDST would appear in EHR. Providers were reminded of these potential complications through a verbal lecture. Providers were also educated on the importance of preventing such complications through the prescription of statin therapy.

This stage also assessed the provider's knowledge of the ADA guidelines regarding statin therapy. Providers were asked individually about their knowledge of the statin guidelines. Two of the providers, a nurse practitioner and one physical assistant were the only providers aware of the ADA statin guidelines. Each provider was given a copy of the guidelines for review.

The DNP student introduced the statin therapy CDST in this stage. A copy of the CDST was given to each provider. On a projected screen, this DNP student showed the providers how the tool would be implemented in the HER and its application. Providers were given the opportunity try the CDST hands on during the presentation. Three providers volunteered to try the CDST in the EHR and found it easy to use.

The expected outcomes of this project were also discussed with the providers during this stage. The expected outcomes discussed were the need to increase statin therapy prescriptions among T2DM patients and the need to increase the performance rating for statin therapy at

GIMC. Each provider was given the opportunity to ask questions about the project and was given the option not to participate. All nine providers that attended the presentation decided to participate in this project.

## **Do**

In the second stage of the cycle, the *Do* stage, was the actual application of the CDST through EHR in the Family Medicine Clinic. The IT department assisted in placing the CDST in the EHR. One of the IT department employees was designated to assist with implementation of the CDST as well as with data collection. The CDST was implemented post provider education regarding the CDST.

The CDST was implemented over a four-week period. The EHR alerted the provider through a CDST that appeared on the screen of every patient with T2DM patient that was seen for primary care at the Family Medicine Clinic. The provider determined if the patient was eligible for statin therapy based on the CDST recommendations. Unexpected outcomes during implementation of the tool were documented. The time frame of the project was four weeks.

## **Study**

The third stage, the *Study* stage, included the analysis of the data that was collected. This DNP student reviewed the data and it was placed into an Excel spreadsheet. Run chart tools were created and presented.

The QI committee met on a weekly basis and discussed concerns that were documented regarding the CDST implementation. Concerns that were documented included technical difficulties with CDST, provider concerns with the pop-up of the CDST to take more time than necessary, and provider report of patient refusal of medication. QI team members were given the

opportunity to voice concerns regarding the project implementation. Providers were given the option to talk to the DNP student or any QI team member regarding the CDST tool and potential problems that they may be encountering with the tool.

The number of statin therapies prescribed to patients with T2DM over the study period was compared to the previous number of statin medications that were prescribed four weeks prior to the study. A total of 2,480 patients with T2DM attending the FMC were on statin medications prior to the study. A total of 253 new statin medications were prescribed over the four-week data collection period at the FMC, bringing the total to 2,733 T2DM on statin medication post CDST implementation. There was an increase of 10% of statin medication prescriptions over the study period, therefore an increase in patients with T2DM on statin therapy at GIMC. The baseline GIMC GPRA results showed 65.4% of patients on statin medications at GIMC before the study. After implementation of the CDST the GIMC GPRA results showed 65.9% of T2DM on statin therapy. The results also showed that the number of statin medications prescribed per month doubled from January to March (Figure 4). The study question was answered based on the data that were collected. There was a 10% increase in statin medications at GIMC and this met the 10% increase that was expected. In addition, there was an increase of GIMC GPRA results of 0.5% of T2DM patients on statin medication over the study period and this did not meet the 10% that was targeted.

## **Act**

In the final *Act* stage, the QI team met for a post intervention and data collection meeting to examine the project results. The DNP student opened the discussion and presented the results of the study to the team. Team members provided feedback regarding the process and objectives.

The team discussed perceived barriers that occurred over the data collection period including technical issues within the CDST during the study and the limited time for the study.

The QI team decided that the barriers could be better managed. These barriers could be the reason the study did not meet both objectives. The team decided that future studies should include one on one help with information technology technical help during the study and more time allotted for the study. The team decided that a repeat PDSA cycle will need to include a few new measures including more time allotment for implementation and collection. The QI team agreed that a repeat of this study will need new IRB approval and will take more time.

### **Ethical Considerations**

When conducting research, it is important to consider ethical principles. Principles such as integrity, confidentiality, justice, and beneficence should be considered when conducting research. When conducting research on human subjects, it is important to minimize harm and risks, respect human dignity, privacy, autonomy, and take special precautions with vulnerable populations (National Institute of Environmental Health Sciences, 2015). IRB approval was obtained through GIMC, the Navajo Nation IRB, and the University of Arizona IRB. Participants in this study can elect not to participate in the study at any time. This project was identified as a quality improvement project, which does not involve human subjects.

### **Setting**

This DNP project was implemented at the Family Medicine Clinic at GIMC. GIMC is located on the border of the Navajo Indian Reservation in Gallup, New Mexico. GIMC is a Federal Government facility managed by Indian Health Services. Clinical specialties at GIMC include cardiology, general surgery, internal medicine, and family medicine (Indian Health

Services, 2014). The Family Medicine Clinic is an ambulatory facility that serves federally recognized AI/NA tribes. There are several health care providers that work in this clinic, including five medical doctors, two family nurse practitioners, and one physician assistant. Services offered to their patients include chronic, acute, and preventive care. Many of the patients seen in these clinics suffer from a variety of chronic diseases. As previously mentioned, one of the major chronic diseases that is managed at the Family Medicine Clinic is T2DM. All patients at the Family Medicine Clinic are seen on an appointment basis.

### **Participants**

Participants for this project included primary care providers within the Family Medicine Clinic (FMC) at GIMC including medical doctors, nurse practitioners, and a physician assistant. Inclusion criteria for provider participation were: (a) having the skills and training to provide medical care; (b) licensed in the state; (c) having medication prescribing privileges; (d) caring for patients with T2DM; and, (e) employed at GIMC.

### **Data Collection**

The CDST (Appendix A) was implemented in the EHR for each patient who was diagnosed with T2DM and seen in the Family Medicine Clinic during the data collection timeframe. The DNP student and the IT department at GIMC along with feedback from the quality team generated the CDST. The provider used the CDST as a point-of-care guide in determining the need for a statin therapy prescription. If the provider chose to prescribe statin therapy, the provider completed the prescription utilizing the EHR. Collection of data for this project was accomplished through data extraction from the RPMS system at GIMC. The RPMS system calculated the number of statin medications that were prescribed over the data collection

period of four weeks. The study took place between March 8, 2017 and April 8, 2017. According to Weiskopf and Weng, (2013), the adoption of EHRs have made it easier to aggregate and access clinical data for research purposes. EHR data collection is currently being used to measure performance (Hirsch & McAlearney, 2014).

An employee of GIMC with authorized access to the EHR to extract data from the RPMS system at GIMC on a weekly basis. This DNP student did not have access to the RPMS to extract data and was not present during data extraction. Data extracted included the number of statin medications prescribed over the four -week period and a monthly percentage of patients on statin therapy at GIMC. The data were documented on a data extraction form (Appendix B) which was saved in a private and secured encrypted file in the Family Medicine Clinic, room 16. This DNP student was the only other individual to have access to the data form.

### **Method of Evaluation**

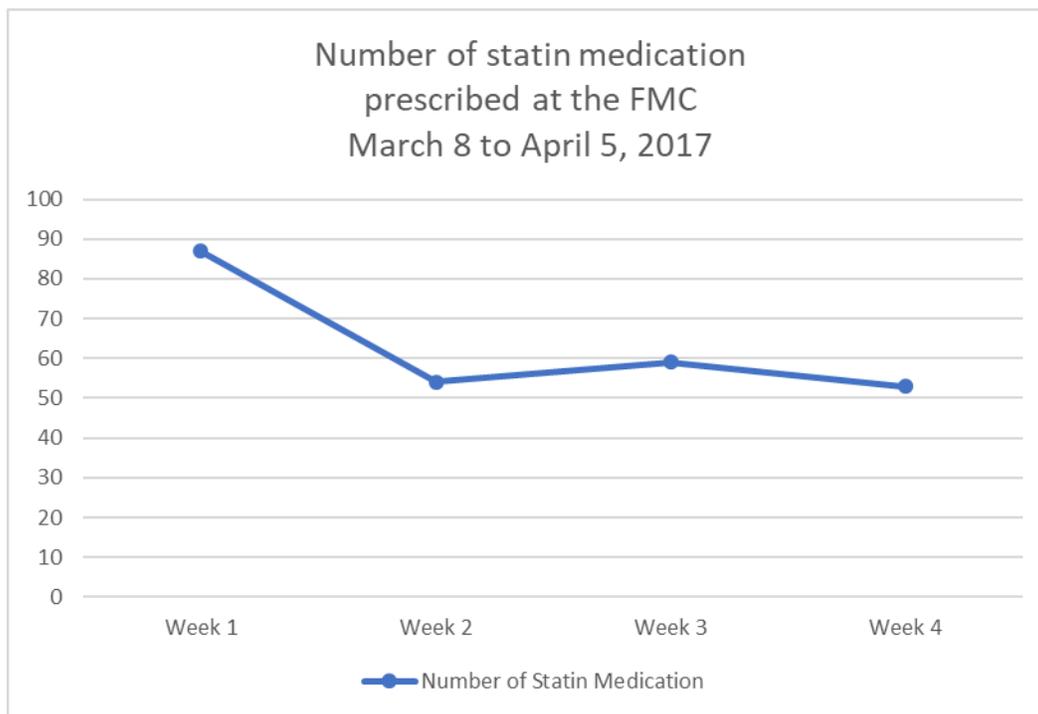
#### **Run Chart Tool**

For this project, a run chart tool in Excel was used for data analysis. According to the Institute for Healthcare Improvement, (2016), run charts-graph data over periods of time and are important tools for assessing the effectiveness of change. Run chart tools objectively help us to understand what changes are made to a process or system over a period of time that lead to improvements (Perla, Provost, & Murray, 2011). The plotted data on the run chart tool graph was useful in determining the change during implementation of the CDST over the four-week period.

### **Data Analysis**

The data collected were input into Excel and recorded every Wednesday after clinic hours. Data collected included the number of statin medications prescribed over the four weeks as well as totals prescribed in the prior months of January and February.

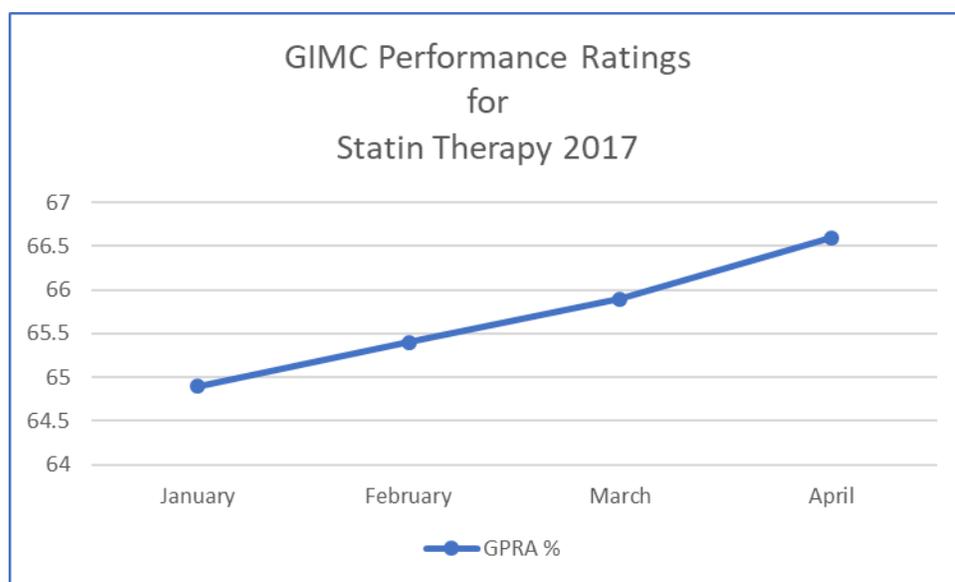
The number of statin medications that were prescribed over a four-week period was plotted on a run chart (Figure 2). Data plotted on this chart includes: week one with 87 statin medications prescribed, week two with 54 statin medications prescribed, week three with 59 statin medications prescribed, and week four with 53 statin medications prescribed. The chart shows a significant decline in the number of statin medications prescribed from week one to week two. Week one had the greatest amount of prescribed statin medications, this may be due to the provider's awareness, eagerness, and readiness to use this tool for the first time. It also shows a slight increase in prescriptions from week two to week three.



*FIGURE 2.* Run Chart Tool for Statin Medications Prescribed

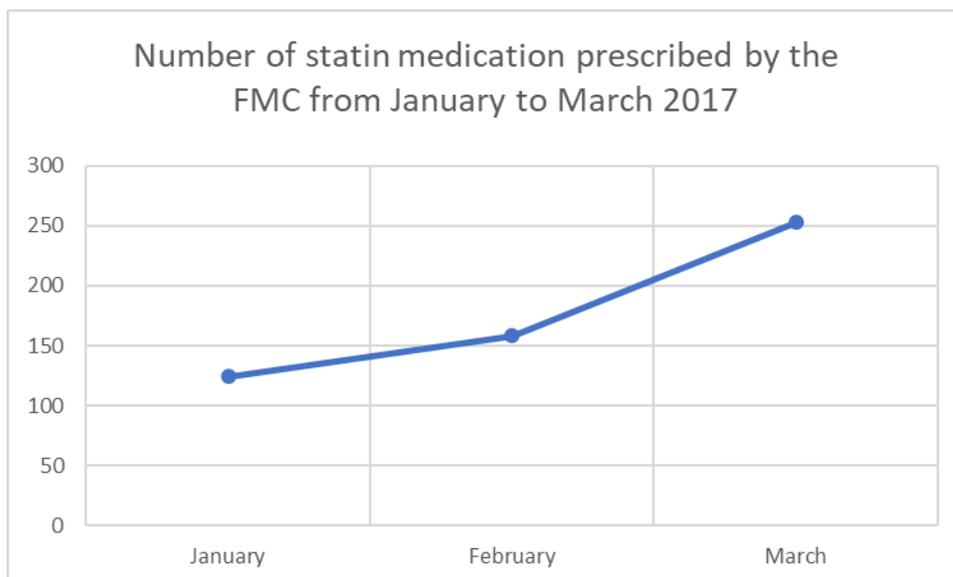
Statin therapy GPRA percentages at GIMC were also plotted on a run chart tool (Figure 3). Percentages of patients that are on statin therapy at GIMC from the month of January to April were plotted. Data plotted on this chart includes: January with 64.9% of T2DM statin users at GIMC, February with 65.4%, March with 65.9%, and April with 66.6%. This chart shows an increase in statin use at GIMC over a period of 4 months. Data shows an increase of 0.5% between the end of the month of February to the end of March. There was a total of 65.4% of T2DM patients at GIMC that were on statin medications at the end of February. At the end of March, there were 65.9% of T2DM patients at GIMC on statin therapy. The difference between these two percentages is 0.5%. The month of April percentages were included on the chart because the project study ended on April 8, 2017. At the end of April 66.6% of T2DM patients at

GIMC were on statin medications. The April percentage of 66.6% was calculated 22 days after the projected ended, therefore the April percentage was not used to determine the results of this project.



*FIGURE 3.* Run Chart Tool for GIMC Performance Ratings

The number of statin medication that were prescribed (during data collection) was compared to two prior months (Figure 4). Data collected for this chart are the number of statin medication that were prescribed for the given months at the FMC. Data plotted for this chart includes: January with 124 prescribed statins, February with 158 prescribed statins, and March with 253 prescribed statins. The chart shows a spike in statin medications for March. Data shows that twice as many statins were prescribed in the month of March compared to the previous two months. As previously mentioned, there were 2,480 patients at FMC that were on statin medication prior to the study. The number of statins prescribed through the project period was 253. This shows a 10% increase in statin medication prescriptions post project implementation.



*FIGURE 4.* Run Chart Tool for Prescribed Statin Medications over Three Months

### **Changes to Process of Care**

This project has opened the door for a new process of care opportunity for GIMC. Providers within the clinic were not familiar with the new ADA statin guidelines. During this study, providers used the CDST to make point-of-care decisions regarding statin therapy for each patient with T2DM. Providers were educated and were familiarized with the ADA statin guidelines, which enabled them to rethink the care they provided to patients with T2DM. The initiation of the CDST allowed GIMC to understand its value and future application in other areas. The diabetes clinic may decide to adopt the CDST. There are many ADA standards that must be met and this tool can be used to assist organizations and providers to meet these standards. Standards of care topics include glycemic targets, pharmacological approaches to treatments, cardiovascular disease risk management, and microvascular complications (ADA,

2015). With the help of this tool the care provided to these patients will more evidence based at point-of-care and positively impact outcomes.

### **Potential Patient Outcomes**

The results of this QI project showed a 10% increase in the number of Navajo patients with T2DM who received a statin medication. Diabetes can lead to serious life- threatening complications. The increase in the number of statin medication prescriptions will reduce the number of complications related to T2DM. According to the AHRC, (2015), there is evidence to show that statin use decreases cardiovascular mortality in patients with established cardiovascular disease. One anticipated patient outcome of this study is that increased use of statin therapy will lower cholesterol levels in patients with T2DM, which will decrease the incidence of life threatening complications such as CVD, strokes, and myocardial infarctions. CVD is one of the major causes of mortality and morbidity in individuals with diabetes (ADA, 2015). With the new prescribed statin medications, these Navajo patients with T2DM will decrease their chance of CVD and overall mortality and morbidity.

## **DISCUSSION**

### **Relationship to Evidence**

There are studies that have shown positive outcomes related to the implementation of CDSTs for quality improvement and patient care. Health information technology enables reliable exchange of information among patient and providers and makes significant improvement in the way that care is delivered (McBride, Delaney, & Titze, 2012). Health information technology such as the EHR have shown to provide pertinent patient information at the point of care (Jaeyong et al., 2017). In one study, a clinical decision support system was used to alert

practitioners while prescribing medications in order to prevent medication errors and improve prescribing behavior (Baypinar, Kingma, Hoeven, & Becker, 2017). Another study assessed the impact on effectiveness and cost of practice guidelines through a clinical decision support system (CDSS) for the management of hypercholesterolemia in primary care (Bassa et al., 2005). The method of this study included the implementation of a CDSS algorithm based on national clinical guidelines. The outcome of the study showed CDSS efficiency in the management of hypercholesterolemia and a cost reduction in the management of these patients. In this last study, a performance improvement project was implemented in 12 clinics to improve COPD outcomes with the help of decision support tool (Morganroth, Pape, Rozenfeld, & Heffner, 2016). Outcomes of this study included fewer COPD exacerbations and increased adherence to guidelines recommendations.

### **Impact of Results to Practice**

This study emphasizes the significance of the use of CDST's in clinical practice and the importance of evidence based practice interventions. DNP prepared practitioners must be able to use information systems/technology to support and improve patient care and health systems (Association of College of Nursing, 2016). This study was implemented to not only improve patient outcomes but to improve health systems. This study is an example of a DNP student's knowledge and application of information systems and technology. This study will be made available to nurses and other multidisciplinary health care providers to impact future studies, patient care, and outcomes.

As previously stated, the United States health care system is shifting toward the use of health information technology for diabetic quality measures. This study is an example of how

technology care be used for evidence-based quality improvement initiatives. This project is the starting point for future health care technology driven quality improvement projects at GIMC. The performance improvement teams at GIMC are currently completing several diabetes performance improvement projects. Quality improvement is an ongoing effort for performance improvement teams. This study can be a helpful tool and can be used for future quality improvement initiatives.

The use of the Kent Lewin Change Theory was beneficial in making change happen at the FMC by implementing a change in the management of patient with T2DM. The framework of the theory was used to bring change to the FMC at GIMC. The unfreezing stage occurred and it was discovered that polices regarding statin therapy initiation in patients with T2DM were not found. Providers made a change through the DNP student's educational lecture and application of the CDST during patient visits. This stage allowed a change to occur in the management of T2DM in the FMC. The refreezing stage occurred when GIMC decided to initiate a new policy on statin therapy guidelines in T2DM patients and the application of a CDST in a clinical setting.

### **Study Strengths**

One major strength of this QI project was the adoption of an electronic CDST at GIMC. GIMC currently does not use the EHR for any of their CDSTs. The administration at GIMC accepted this QI project and were willing to test the CDST in their family medicine clinic. The family medicine staff found the tool easy to use and provided positive feedback regarding the easy application of the tool during patient visits. GIMC's IT department also informed the QI committee that the tool was easy to create and they could modify or create other CDSTs if

needed. The implementation of a policy regarding the continued use of statin therapy CDSTs in the EHR will be sought at GIMC.

### **Study Limitations**

There were two study limitations with this QI project. The first limitation was the extraction of data from RPMS. The data extraction was a difficult process. The DNP student was not allowed to extract data RPMS. An experienced IT employee completed the data extracted from RPMS. This employee was not a health care employee. This employee had a degree in information technology and was not familiar with terms used to collect data. Data extraction took longer than expected which delayed the analysis of the data. This will pose a barrier for future researchers who wish to implement research at GIMC. For future studies, GIMC will need other healthcare providers such as active employees who work in collaboration with IT to collect needed data extracted for researchers.

The second limitation of this project was time. The project was implemented over a four-week period. There was a 0.7% increase in statin performance ratings. Providers that participated in the study stated that the project should have run over at least three months. The providers stated that not all T2DM patients are seen in one month, many are seen every three months for follow up care. If the project ran over three months, almost all T2DM would have been seen and there may have been a significant increase in the statin performance rating and number of prescriptions. Future DNP students may want to continue this project and complete two more monthly PDSA cycles and include post satisfaction surveys and patient education resources.

### **Dissemination**

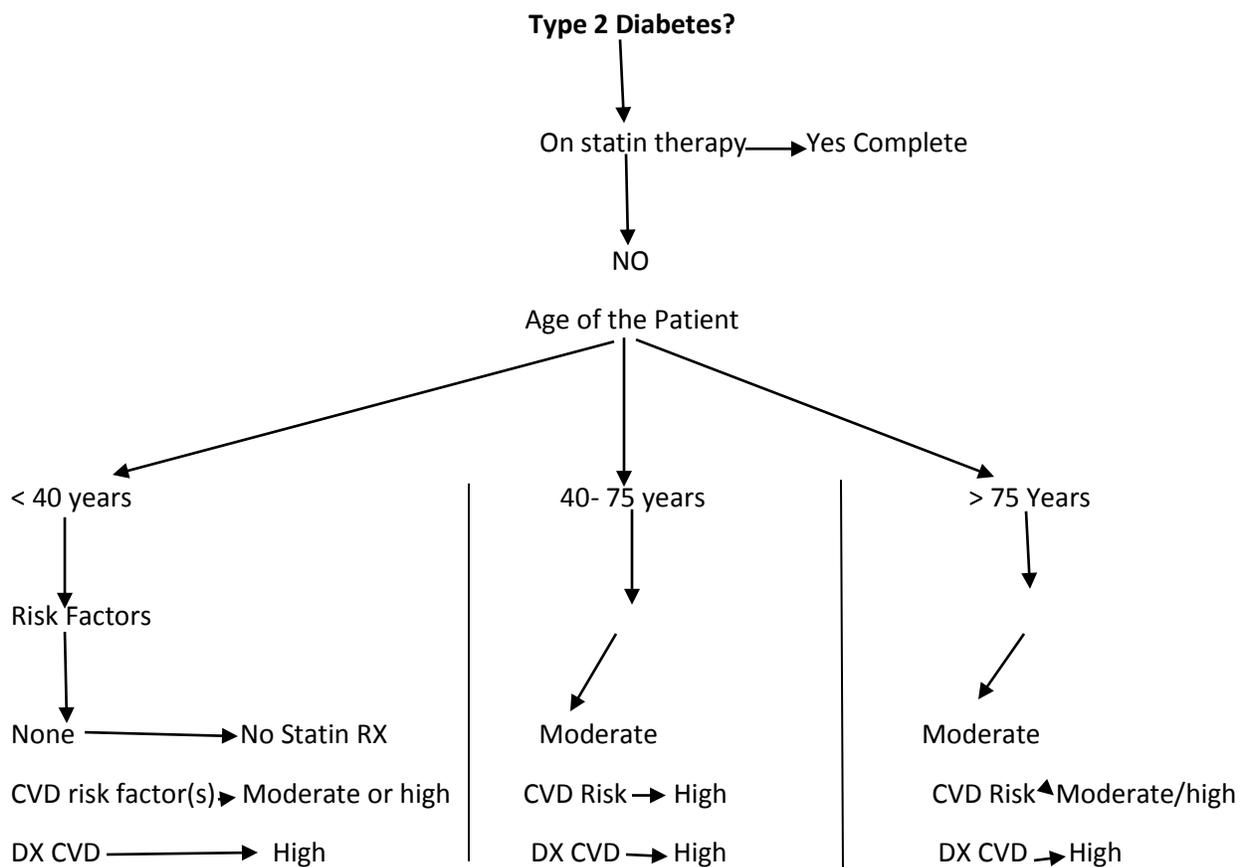
The results of this project were not only discussed among the QI team but also with the Family Medicine Clinic staff, special diabetes project staff and the administration. The staff at GIMC attend a monthly meeting called a town hall meeting. The town hall meetings are held to inform all staff at GIMC of new changes and the adoption of new policies. This project and results will be disseminated to all the staff at GIMC at this meeting through a poster presentation. CDSTs related to T2DM management are imperative at GIMC due the increasing prevalence of T2DM on the Navajo reservation. GIMC also supports and works the Tohatchi health clinic. This clinic is located 26 miles from their facility. This clinic is located in a remote area and resources are limited. The staff at this clinic will be given the opportunity to view the poster presentation. Due to lack of resources, many of Navajo patients seek care at this health clinic. This tool will benefit many of the Navajo patients who cannot obtain their care at GIMC due to limited resources.

### **Conclusion**

Although this QI project did not result in a significant improvement of statin therapy performance ratings and GIMC, it provided GIMC with a new EHR tool that providers can use to improve patient care and outcomes. This QI project focused on the implementation of a CDST to increase provider awareness of statin therapy. The 10% increase in statin medication prescriptions shows a positive outcome for the project. This study provided the basis for future projects at GIMC. The prevention of complications related to T2DM is ongoing and efforts to prevent such complications should be sought. This project was an example of one effort to improve quality evidence-based care in a clinical setting. Further studies are required in

determining the effectiveness of CDSTs in a clinical setting improve care for patients with T2DM and other chronic illnesses.

APPENDIX A:  
STATIN THERAPY CLINICAL DECISION SUPPORT TOOL



<b>Statin Medication</b>	<b>High Intensity dose</b>	<b>Moderate Intensity dose</b>
Atrovastatin (Lipitor)	40-80 mg	10-20 mg
Rosuvastatin ( Crestor)	20-40 mg	5-10 mg
Simvastatin ( Zocor)	N/A	20- 40 mg
Pravastatin ( Pravachol)	N/A	40 mg
Lovastatin ( Mevacor)	N/A	40- 80 mg
Fluvastatin ( Lescol)	N/A	80 mg

APPENDIX B:  
DATA EXTRACTION FORM

## Data Extraction Form

Baseline Statin Medications Prescribed in EHR: \_\_\_\_\_

Number of New Statin Prescribed:

Week One: \_\_\_\_\_

Week Two: \_\_\_\_\_

Week Three: \_\_\_\_\_

Week Four: \_\_\_\_\_

Total New Prescribed Statin medication over 4 weeks: \_\_\_\_\_

Baseline GPRA Target for Statin therapy at GIMC = 65%

Post GPRA Target after 4 week CDST implementation \_\_\_\_\_

APPENDIX C:  
NAVAJO NATION LETTER OF APPROVAL



PRESIDENT  
VICE PRESIDENT

THE NAVAJO NATION RUSSELL BEGAYE  
JONATHAN NEZ

March 02, 2017  
DeAnn L. Nelson, BSN, RN  
College of Nursing  
University of Arizona  
PO Box 210203  
Tucson, Arizona 85721

Dear Ms. Nelson,

This letter shall serve as the Navajo Nation Human Research Review Board (NNHRRB) Letter of Support for your Proposed Abstract Titled: Promoting the use of Statin Therapy in Navajo Patients with Type 2 Diabetes in Gallup Indian Medical Center, Gallup, New Mexico. The proposed Abstract does not meet the Navajo Nation Health Code and Human Research Act. Navajo Nation Human Research Board is in full support of your Project and extends Best Wishes and Good Luck with your Doctor of Nursing Practice Dissertation with University of Arizona. If you should need any additional documents on this matter, please do contact Michael Winney, IRB Coordinator for Navajo Research Program Office at 928-871-6929 or myself at 928-6972525. Thank you.

Sincerely,

A handwritten signature in black ink that reads "Beverly Becenti-Pigman". The signature is written in a cursive style.

Beverly Becenti-Pigman, Chair  
Navajo Nation Human Research Board  
Navajo Department of Health

cc: NNHRRB file.

APPENDIX D:

GALLUP INDIAN MEDICAL CENTER LETTER OF APPROVAL



DEPARTMENT OF HEALTH &amp; HUMAN SERVICES

PUBLIC HEALTH SERVICE  
INDIAN HEALTH SERVICE

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**Navajo Area Indian Health Service**  
**GALLUP INDIAN MEDICAL CENTER**  
516 East Nizhoni Boulevard  
P.O. BOX 1337  
Gallup, New Mexico 87301-1337

February 14, 2017

DeAnn Nelson  
College of Nursing  
University of Arizona  
PO Box 210203  
Tucson, Arizona 85721

Dear Ms. Nelson:

The Administration of the Gallup Service Unit has reviewed the Quality Improvement project proposal "Promoting the use of statin therapy in Navajo patients with type 2 diabetes." This project was proposed by DeAnn Lynn Nelson as the focus of her DNP project.

This proposal has been reviewed for:

1. The proposed project concerns an issue in a field consistent with the Mission, Vision and Values of the Gallup Service Unit.
2. As this is a tool for the care of a specific population of patients there is no direct patient contact there are no IRB requirements.
3. Dr. Loretta Christensen, Chief Medical Officer will serve as the liaison between the Investigator and the CEO.

This project has the endorsement of the Gallup Service Unit Administration to be presented to the College of Nursing, University of Arizona and the NAIHS/Navajo Nation IRB for final approval. All research must have both the Service Unit endorsement and the NAIHS/Navajo Nation IRB approval prior to initiation or publication. It is the duty of the researcher to assure that the Gallup Service Unit has received notification of approval before commencing research or publication.

Sincerely,

A handwritten signature in cursive script that reads "Vida J. Know".

Vida J. Know  
Chief Executive Officer  
Gallup Indian Medical Center

APPENDIX E:  
THE UNIVERSITY OF ARIZONA IRB LETTER OF APPROVAL



Human Subjects Protection Program

**Date:** March 07, 2017

**Principal Investigator:** DeAnn Lynn Nelson

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**Protocol Number:** 1703253666

**Protocol Title:** Promoting the use of statin therapy in Navajo patients with type 2 diabetes

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**Determination:** Human Subjects Review not Required

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The project listed above does not require oversight by the University of Arizona because the project does not meet the definition of 'research' and/or 'human subject'.

- **Not Research as defined by 45 CFR 46.102(d):** As presented, the activities described above do not meet the definition of research as cited in the regulations issued by the U.S. Department of Health and Human Services which state that "research means a systematic investigation, including research development, testing and evaluation, designed to contribute to generalizable knowledge".

- **Not Human Subjects Research as defined by 45 CFR 46.102(f):** As presented, the activities described above do not meet the definition of research involving human subjects as cited in the regulations issued by the U.S. Department of Health and Human Services which state that "human subject means a living individual about whom an investigator (whether professional or student) conducting research obtains data through intervention *or* interaction with the individual, or identifiable private information".

Note: Modifications to projects not requiring human subjects review that change the nature of the project should be submitted to the Human Subjects Protection Program (HSPP) for a new determination (e.g. addition of research with children, specimen collection, participant observation, prospective collection of data when the study was previously retrospective in nature, and broadening the scope or nature of the research question). Please contact the HSPP to consult on whether the proposed changes need further review.

The University of Arizona maintains a Federalwide Assurance with the Office of Human Research Protections (FWA # 00004218).

APPENDIX F:  
SYNTHESIS OF EVIDENCE

### Synthesis of Evidence

Reference	Research Question/Hypothesis	Study Design	Sample	Methods for Data Collection	Findings
Ridker et al., 2012 Cardiovascular benefits and diabetes risks of statin therapy in primary prevention: an analysis from the JUNIPER trial	Quantitative: Key Variables: Statin therapy, increase risk for diabetes Research Question: To address the balance of vascular benefits and diabetes hazard of statin use, despite the evidence that statin therapy increase diabetes risk	Analysis of a randomised, double-blind placebo-controlled trial	N: 17,802 men and women without previous CAD or DM	Standard lipids, apolipoproteins, hsCRP, and glucose measurements were performed in a central laboratory on fasting blood samples	Cardiovascular and mortality benefits are greater than the diabetes risk of statin therapy. This includes the participants who were high risk for developing diabetes.
Mihaylova et al., (2012). The effects of lowering LDL cholesterol with statin therapy in people at low risk of vascular disease: meta-analysis of individual data from 27 randomised trials.	Quantitative: Key Variables: Research Question: What are the net effects of statins in people at low risk of vascular events remain uncertain	Meta-analysis	Participant data from 22 trials of statin verses control N=134537	Analysis of data collected in 22 trials	Individuals at risk for major vascular events had an absolute reduction in major vascular events. 11 per 1000 over 5 years. The benefits have proven great benefit over the known hazards of statin therapy.

<b>Reference</b>	<b>Research Question/Hypothesis</b>	<b>Study Design</b>	<b>Sample</b>	<b>Methods for Data Collection</b>	<b>Findings</b>
Chou et al., (2016). Statins for Prevention of Cardiovascular disease in Adults Evidence Report and Systematic Review for the US Preventive Services Task Force	What is the selection of preventive therapy or statin selection and treatment strategies	Systematic review		Randomised clinical trials of statins vs placebo, fixed -dose vs titrated statins and higher vs lower intensity statins in adults without prior cardiovascular events	In adults at increased CVD risk but without prior CVD events statin therapy was associated with reduced risk of all caused and cardiovascular mortality and CVD events with greater absolute benefits in patients at greater baseline risk.
Adel, Abdel-Salam, & Nammass, (2010). Low-dose statin therapy improves endothelial function in type 2 diabetic patients with normal serum total cholesterol: a randomized placebo-controlled study	Quantitative Research Question: What are the effects of low dose atorvastatin on endothelial function in normocholesterolemic patients with DM2 without evidence of coronary disease.	Randomised, double-blind placebo-controlled trial	60 patients with Type two diabetes	Assessment of the brachial artery and blood flow velocity	Low dose atorvastatin improved endothelial function normocholesterolemic patients with DM2

<b>Reference</b>	<b>Research Question/Hypothesis</b>	<b>Study Design</b>	<b>Sample</b>	<b>Methods for Data Collection</b>	<b>Findings</b>
ACCORD Study Group et al., (2010). Effects of Combination Lipid Therapy in Type 2 Diabetes Mellitus	Quantitative Study: Research Question: to investigate whether combination therapy between a statin plus a fibrate or statin along in the reduction of CAD	Randomized trial	Randomly assigned 5518 patients with type two diabetes	Lab tests fasting lipid profile	The combination of fenofibrate and simvastatin did not reduce the rate of fatal cardiac events as compared with simvastatin alone
CTT, Kearney, Blackwell, Collins et al., (2008). Efficacy of cholesterol-lowering therapy in 18,686 people with diabetes in 14 randomised trials of statins: a meta-analysis	Quantitative Study : research Question: To prove uncertainties of the effects statin therapy	Meta-analysis	Data analysis of 14 randomised trials	Data analysis and collection	Statin therapy should be considered for all high risk diabetic patients
Johansen, Green, Sen, Kircher, & Richardson, (2014). Cardiovascular Risk and statin Use in the United States	Examine the relationship between statin use and cardiovascular risk, diagnosed of hyperlipidemia and other risk factors	Cross sectional analysis	Study sample: 16,712 individuals aged 30-79 years.	Analyzed data from the 2010 medical expenditure panel survey	Those people at high risk for cardiovascular events including coronary artery disease, diabetes or both were not receiving statins despite evidence that agents reduce adverse events.

<b>Reference</b>	<b>Research Question/Hypothesis</b>	<b>Study Design</b>	<b>Sample</b>	<b>Methods for Data Collection</b>	<b>Findings</b>
AB, E., Denig, P., van Vliet, T., Dekker, J., (2009)., Reason of general practitioners	To determine factors underlying general decisions not to prescribe lipid-lowering medications	Qualitative study	Seven health care providers	Interviews	Treatment quality will improve by addressing issues such as motivation and lack of knowledge
Williamson et al., (2016). Health care providers Management of patients with Type 2 Diabetes Mellitus: Analysis of Trends in Attitudes and Practices	Identify attitudes and practices of health care providers in the management of patients with T2DM	Qualitative Study	5-10 Clinicians	Virtual meetings	Education will address the gaps found in knowledge, perception, and management practices
Preiss et al., (2011). Risk of Incident Diabetes with Intensive - dose compared with moderate-dose statin therapy	To investigate whether intensive dose statin therapy is associated with increased risk of new-onset diabetes compared with moderate dose statin therapy	Meta-analysis	Randomized controlled endpoint trials that compared intensive - dose-statin therapy with moderate dose statin therapy.	Literature search data	Intensive dose statin therapy was associated with an increased risk of new-onset diabetes compared with moderate-dose statin therapy

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