Diabetes Education Referral from the Emergency Department to Improve Patient Care and Health Literacy

Chelsea D. Lovelace

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DIABETES EDUCATION REFERRAL FROM THE EMERGENCY DEPARTMENT TO IMPROVE PATIENT CARE AND HEALTH LITERACY

A Scholarly Project Submitted in Partial Fulfillment of the Requirements for the Degree of Doctor of Nursing Practice

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This Scholarly Project by: Chelsea D. Lovelace

Entitled: *Diabetes Education Referral from the Emergency Department to Improve Patient Care and Health Literacy*

has been approved as meeting the requirement for the Degree of Doctor of Nursing Practice in College of Natural and Health Sciences in School of Nursing, Program of Nursing Practice

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ABSTRACT

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Diabetes is a complex disease that can lead to increased morbidity and mortality. Inadequate disease management is considered when patients present to the emergency department (ED) for care related to this disease. Once out of the hospital or ED, it is imperative the patient receives timely follow-up care to effectively manage the disease to reduce morbidity and mortality and to decrease return visits to the ED. Primary care across the nation is facing a national shortage with provider time spent with patients decreasing and patients’ length of time spent waiting to get an appointment increasing (Medscape, 2017; Merritt Hawkins, 2017). Diabetes Education Centers are available in various settings throughout the Denver Metropolitan area. Diabetes education could provide acute self-management skills, lifestyle, and behavior modifications. Diabetes education is an intervention supported by the American Diabetes Association (2018) and paid for by most insurances including Medicaid and Medicare. Adding this modality to treatment helps diversify and intensify the patient’s own health literacy and ability in managing his/her diabetes disease.

The Medical Center of Aurora (TMCA) is a Level II Trauma Center in a large suburb of Denver, Colorado. Discharge practice includes referring diabetic patients to follow up within days at their primary care provider; this time frame could be
problematic for patients. This project evaluated current ED provider knowledge of outpatient follow-up care and outpatient diabetes services available to discharged ED patients. The Doctor of Nursing Practice student then provided an educational intervention to address identified gaps in knowledge and evidence regarding TMCA’s Diabetes Education Center as an adjunct in follow up the provider could then include in the discharge instructions. A post-intervention survey gauged providers’ new knowledge and probability of providing this referral to their ED patients in the future. Lastly, an initial implementation of making a referral to an outpatient diabetes center was observed and evaluation performed.
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CHAPTER I

INTRODUCTION

Statement of the Problem

As boarding and extended treatment time is becoming more common in emergency departments (EDs) across the nation, many acutely hyper/hypoglycemia patients have corrected glycemic values while remaining in the ED (McCarthy et al., 2017). With stabilization of hyperglycemia occurring, ED providers are then faced with making the consideration for discharge instead of hospital admission. Discharge planning is not incorporated into the Medical Center of Aurora’s (TMCA; 2018b) current diabetic ketoacidosis guideline (see Appendix A) or diabetes mellitus order sets. Discharge instructions are one to three pages of prepopulated information based on specific diagnosis, i.e., mild diabetic ketoacidosis, hypoglycemia, hyperglycemia, diabetes mellitus Type 1 or Type 2, and so forth. The discharge software (1,2,3 Discharge) allows the provider to fill in the follow-up care information; a detailed referral is completely dependent on the provider’s preference. They might either select “follow up with your primary care provider,” which does not contain detailed contact information, or the provider might search for the specific primary care provider (PCP) or clinic with which the patient is established and then import the contact information (address and phone number) from a prepopulated search field into the discharge instructions. Patients with no insurance or who do not have an established PCP are given
a referral to the Metro Community Provider Network (MCPN) clinic with a single phone number appointment line. Appointments for new patients for the MCPN clinic nearest TMCA typically take approximately two to four weeks to obtain an appointment for a new patient. An appointment at a MCPN clinic 30-45 minutes away from TMCA could be quicker and ranges approximately one and a half to three weeks out. The distance could be prohibitive to many patients due to fuel costs, public transportation fares, or time constraints. These wait times to get into see a provider are on track with the national wait time average in 2017 of 24 days (Merritt Hawkins, 2017). Additional resources for follow up such as TMCA’s Diabetes Education Center, or other regional diabetes centers currently are not given for follow up to ED patients. These centers can offer additional resources for patients, education classes, nutrition counseling, and treatment options, and can potentially bridge the gap or strengthen the care given at their PCP’s office.

Providers in the ED agree far more can be done for patients upon discharge from the department and this problem is a common concern between staff. Providers are enthusiastic about having additional resource(s) for patients to follow up with for improved outpatient care. It is common knowledge with providers and nursing staff alike that many patients present to the ED as well as make return visits to the ED including readmissions as they are unable to obtain an appointment with their PCP or have been unsuccessful in establishing a PCP. Patients with return ED visits and readmissions are not always returning to the same ED or hospital; for this reason, they can be difficult to track. The exact number of patients with this barrier is currently unknown as this metric is not tracked by TMCA.
**Background and Significance**

Healthcare delivery has become increasingly complex over the past decades and the cost of health care has increased faster than the rate of inflation (Patton, 2015). Primary care providers no longer can spend half an hour or longer discussing medication management for complex diseases such as diabetes. The average time spent with a patient by a provider is 12 to 24 minutes and sometimes less (Medscape, 2017). Patients who present to the ED for uncontrolled diabetes is a red flag to a greater problem--inadequate diabetes management (Stern, Calderon-Margalit, Mazar, Brezis, & Tirosh, 2009).

Diabetes is the eighth leading cause of death in Colorado (Colorado Department of Public Health and Education [CDPHE], 2015). Diabetes accounted for 800 deaths in 2011 and 2% of all deaths that same year were in Colorado. In 2014, the Centers for Disease Control and Prevention (CDC) estimated 22-million people nationally have diabetes (CDPHE, 2015). The incidence of diabetes is increasing in the United States. According to the American Diabetes Association (ADA; 2018), diabetes (Type 1 and Type 2) cost health care (patients, insurance and hospitals) $327 billion in 2017 to diagnose. Medical expenses are more than double on average for individuals with diabetes (ADA, 2018). In Colorado, 91% of adults with diabetes also have one or more other chronic conditions such as hypertension or obesity (CDPHE, 2015). Data from August 2017 until July 2018 show TMCA’s ED saw 1,103 patients with the diagnosis of diabetes mellitus; in this same 12-month timeframe, 540 patients were discharged and 563 were admitted to the hospital. Of patients admitted, inpatient average length of stay metric was not obtainable as this was not measured or captured in the TMCA’s current
software. The Medical Center of Aurora treats an average of 92 patients per month with diabetes as the primary diagnosis; this does not include diabetes as a secondary or confounding diagnosis (C. Duncan, personal communication, August 21, 2018). Of the 92 diabetic ED patients TMCA sees per month, 45 are discharged home while 47 are admitted to the hospital (C. Duncan, personal communication, August 21, 2018).

Over time, uncontrolled or poorly controlled glucose levels can negatively impact the body’s vasculature and nervous system, affecting many organs and tissues. Diabetes can lead to increased morbidity related to the microvascular insults higher than normal blood sugar levels can cause over an extended period of time: retinopathy leading to vision loss, nephropathy leading to renal failure, peripheral neuropathy leading to chronic foot pain, ulcers, and eventual potential for amputation of limb(s). Diabetes also causes autonomic neuropathy, which can lead to complications such as gastrointestinal dysfunction (i.e., gastroparesis), cardiovascular disease (i.e., atherosclerosis), genitourinary, and sexual dysfunction. The macrovascular insults of diabetes are what cause the increased risk of mortality to this patient population including hypertension and dyslipidemia. The chronic presence of these secondary diagnoses can lead to cardiovascular, peripheral vascular, and cerebral vascular disease. These diseases can lead to life-threatening myocardial infarctions, delayed wound healing, and increased risk for stroke.

Currently, none of the discharged patients from TMCA’s ED are seen by the ED case manager nor referred to TMCA’s Diabetes Education Center for additional resources. To ensure ED patients are given robust information for follow-up care, the provider needs knowledge of various outpatient resources available for patients with
which to follow up. Upon discussions with ED providers currently at TMCA, providers and nursing staff alike agreed more continuation of care and support to diabetes patients would be helpful. Providers have acknowledged the education provided and referral practice to ED patients at time of discharge are very limited; medical provider staff and RN staff identify this as a problem (F. Landsville, personal communication, August 21, 2018).

**Purpose**

This scholarly project evaluated the resources available to discharged TMCA ED patients regarding diabetes follow-up care and education resources. This project included a review of literature, a review of current diabetes outpatient education services, an assessment of providers’ awareness of services available to discharged diabetes patients via a survey, a pre-RE-AIM (reach, effectiveness, adoption, implementation, maintenance) evaluation of current practice, a needs-based focused education program created by the Doctor of Nursing Practice (DNP) student to ED providers, a second survey (immediately post education) that captured current knowledge of outpatient diabetes education services and their opinion regarding referral; the DNP student educated all ED providers regarding practice change, implemented referrals to the Diabetes Education Center for discharged ED patients, identified referral trigger(s) for providers, and performed a post-RE-AIM evaluation of project. The aim for this scholarly project was to ensure providers had adequate knowledge of area diabetes resources and TMCA’s outpatient diabetes program available to their ED patient population so they might select appropriate follow-up care to provide patients in their
discharge instructions. This would ensure patients had the opportunity to obtain increase intensity in diabetes management and health literacy.

**Summary**

The objective of this project was to increase the knowledge of ED providers regarding outpatient diabetes care, to help patients gain access, and to improve the delivery of diabetes care for TMCA’s patients. Patients present to EDs because their current management of diabetes is not adequate for their current state of health. Diabetes is a life-threatening condition and increasing the support patients receive for the complex care needed to control the disease can be beneficial to the patient and decrease the costs of associated care.
CHAPTER II

LITERATURE REVIEW

Introduction

As a foundation to doctoral level work, a literature review was conducted inquiring about evidence regarding diabetes follow-up care from the ED and patient outcomes regarding diabetes education. Terms including “diabetes education” and “emergency room” or “emergency department” were utilized in a search of the following databases: CINAHL and Cochran Database of Systematic Reviews. The same search terms were used for a search in Medline with the addition of diabetes education “or patient education.” Medline yielded 200 articles, CINAHL yielded 53 articles, and Cochran returned none. A search of PubMed utilizing terms such as “emergency nursing” or “emergency treatment” or “emergency service, hospital” or “emergency medicine” or “emergency medical services” and “diabetes mellitus” and “patient education as topic” produced 45 unique articles. Studies not published in English were eliminated from the review. Inclusion criteria focused on high quality literature pertinent to the scope of this scholarly project and its ability to inform practice regarding ED discharge and follow up, transitioning care from the ED to the outpatient setting, health literacy in the diabetic and ED population, and outpatient diabetes education. In all, 25 studies published between the years 1985 and 2018 were included. Of articles selected for inclusion in this review, all provided a list of citations that were reviewed for potential
inclusion as well. Additionally, a reverse type citation conducted via Google Scholar was performed on the original articles found from the databases; this forward search found newer articles that were also relevant to this review. This backwards and forwards citation search provided the DNP student with robust information for examination.

The main search feature on the Agency for Healthcare Research and Quality (AHRQ) was used; the term “diabetes+education+ER” produced 120 results. Most were duplicated multiple times within the single search and all were in one article, which was applicable to the project of study--“Health Literacy” (AHRQ, 2018).

The literature review included studies containing designs of randomized control trials, prospective randomized control trial, population cohort studies, retrospective cohort studies, retrospective matched cohort studies, prospective non-random cohort studies, case controls, nested case controls, community case studies, prospective non-random pilot interventions, observational studies, retrospective chart reviews, convince sampling surveys, random survey sampling, systematic reviews, literature reviews, qualitative interviews, investigational descriptive studies, and an anonymous cross sectional survey.

**Diabetes Education and the Emergency Department**

Diabetes education is an intervention that has been examined in the literature for nearly three decades. Hopper and Schechtman (1985) examined factors associated with control of diabetes and healthcare utilizations in older, low-income individuals in a qualitative interview. The results suggested health educators could positively influence control of the disease and lower negative healthcare utilization patterns such as ED visits and hospitalizations (Hopper & Schechtman, 1985). The following year, in a diabetes
education study, Mazzuca et al. (1986) examined the results of patient and physician diabetes education. The study design was a randomized control trial of over 500 diabetic patients in an urban medical center clinic; the education included didactic instruction, diabetic skills exercises, and behavior modification techniques, showing a significant improvement in self-care skills and diabetic compliance behaviors resulting in significantly greater decreases of fasting blood glucose and HgA1c (Mazzuca et al., 1986). Contrasting the diabetes education study, a separate randomized control trial conducted by Bloomgarden et al. (1987) with just over 300 participants in a large urban medical clinic in New York City found no statistical significance in difference of HgA1c among participants who attended the monthly diabetes education classes but did find improved cognitive and behavioral diabetes knowledge. Participants in the education class saw improvement in average HgA1c of 0.7 versus 0.3 in the control group as well as a decrease in fasting blood glucose by 44mg/dl and 14mg/dl in the participants and control group, respectively (Bloomgarden et al., 1987). Diabetes education courses have developed and strengthened over the years.

Emergency Department Discharge and Follow Up

The emergency department (ED) is a safety net for any and every medical condition that cannot be managed as an outpatient in a provider’s office due to various reasons. A nested case control study performed in 2004 in West Jerusalem, Israel examined the quality of care in over 900 Type 2 diabetes mellitus (T2DM) patients in relation to presentation to the ED, finding an inverse relationship between quality of primary care and visits to the ED (Stern et al., 2009). Diabetic patients who present to the ED are patients in crisis; their disease is either inadequately controlled by their
provider or they are unable to appropriately self-manage their acute diabetic needs (Stern et al., 2009). It is appropriate for patients to follow up with their PCP promptly after presenting to an ED for changes in their disease and for the ED provider to recognize the patient’s need for intensification in disease management.

In a prospective, non-randomized pilot intervention, Magee et al. (2013) found the primary reasons for diabetic patients to present to the ED were an inability to obtain an outpatient provider appointment or the patient did not have a provider. Similarly, Jackson et al. (2017) found in a community case study of 30 complex diabetic ED patients in a suburb of Memphis, Tennessee, that one in five patients did not have a PCP and/or had difficulty in accessing a provider. Also, a study containing 60 qualitative interviews from patients discharged from an ED after a return visit within nine days of an initial visit revealed patients returned for two primary reasons: inability to obtain timely follow up care and fear regarding change in disease (Rising et al., 2015).

**Transitioning Care from Emergency Department to the Outpatient Setting**

Models of transition for diabetic patients from ED to discharge have not been studied. The following information regards transitioning diabetic patients from inpatient to outpatient. Sufficient factors for successful transition from direct provider led care to outpatient care performed primarily by the patient need to be addressed. While Donihi (2017) addressed hospitalized T2DM patients, the problem remained the same—patients presenting to a hospital for acute diabetes mellitus (DM) needs require initiation or intensification of their outpatient regimen. Through a literature review, Donihi identified personalized diabetes education instructions including diabetes survival skills to be addressed with the patient throughout their hospital visit and the need for follow-up
appointments with an outpatient provider and outpatient diabetes education. Through a review of literature, Garnica (2017) also examined transition needs for diabetic patients, finding that without appropriately addressing a patient’s transitions needs, the patient is at higher risk for returning to the ED and having a 30-day readmission. Additionally, Garnica stressed the need for increased attention to different aspects of patient discharge planning--not just basic disease management and follow-up care but the inclusion of diabetes education, utilization of hospital resources, inclusion of a current medication list with dosages, care coordination, and follow-up appointments.

**Effectiveness of Emergency Department Discharge Instructions**

Upon stabilization of an acute glycemic event, patients are typically discharged from the ED with instructions regarding disease management, signs and symptoms of worsening, when to return to the ED, and outpatient follow-up care. A retrospective cohort study in Boston by Ginde, Pallin, and Camargo (2008) reviewed 436 patients with confirmed hypoglycemia from three adult-EDs in the United States for discharge instruction content and adequacy. In summary, the authors determined the instructions given to patients for disease management in the interim until appropriate follow up was obtained were insufficient in delivering the needed education for patients with hypoglycemia (Ginde et al., 2008).

Communication at discharge from health workers is critical in a patient’s understanding of diagnosis, disease management, potential for medication modification, and when to return to the ED. In their literature review from 1980 to 2010, Samuels-Kalow, Stack, and Porter (2012) found multiple studies indicating ED patients had
insufficient comprehension upon discharge and were unable to state their diagnosis, relay a disease management plan, or report reasons for return.

In a systematic review, Haatainen and Tervo-Heikkinen (2014) examined adult ED patients’ experiences with discharge instructions. Since patient turnover could be rapid in the ED versus a well-planned and orchestrated process in the hospital, Haatainen and Tervo-Heikkinen found in multiple studies the time allotted to provide discharge education was short in EDs. Findings showed many patients returned home without a deep understanding of pertinent information such as “their discharge diagnosis or medication changes,” leaving patients at risk for a return visit and/or admission (Haatainen & Tervo-Heikkinen, 2014, p. 80).

**Health Literacy in the Diabetic Emergency Department Population**

The AHRQ (2018) has published patient safety recommendations regarding diabetic patients and health literacy. Discrepancies in patient instructions for disease management and patient understanding can have profound health implications in this patient population such as taking the wrong dose or taking the right dose of the wrong medication, etc. The Institute of Medicine (cited in AHRQ, 2018) and AHRQ released a joint statement first addressing health literacy in 2004; they cited a survey from a year prior that found one-third of the U.S. population had basic or below basic health literacy levels and only 12% had an above average or proficient health literacy level at which most healthcare employees and providers operated. Health literacy is not only the patient’s ability to read medication and discharge instructions, it includes the patient’s writing ability to correctly fill out medical forms, ability to listen and comprehend healthcare members, ask appropriate questions regarding their health, follow directions,
perform math--insulin dosing, keeping track of health data over time--glucose meter readings and medication doses, being engaged in maintaining health and managing disease(s), and the ability to share in healthcare decision-making with providers (AHRQ, 2018). A patient’s health literacy level can change with ebbs and flows of life including illness, stress, and emotional liability (AHRQ, 2018).

National agencies including the AHRQ (2018) highlighted serious implications health literacy has on our national health as well. The Joint Commission (2007), U.S. Department of Health and Human Services (2018), and the Institute of Medicine (IOM; 2010) have all published statements addressing the seriousness of acknowledging and mitigating poor health literacy. The AHRQ made the following recommendation for providers and organizations: “Create a shame-free environment, simplify information, listen carefully, confirm comprehension, improve support for navigating health care contexts, and support patients in their health management efforts” (para. 5).

As the AHRQ (2018) stated, health literacy is a growing problem facing patients who have chronic diseases such as diabetes. In an anonymous cross-sectional survey of over 1,000 Southern California ED patients, over 11% had diabetes; these patients were often less educated, older, had lower self-reported physical health ratings, and were limited English speakers (Menchine, Vishwanath, & Arora, 2010). This study identified the need for diabetes education and health literacy to be addressed in this patient population. In the same geographic region, just under 300 ED patients or their caregivers were asked in a convenience sampling survey about their diabetes-specific knowledge; both patients or family caregivers had poor disease-specific knowledge, again identifying the need for diabetes education (Arora, Marzec, Gates, & Menchine, 2011).
Outpatient Diabetes Education

Diabetes Self-Management Education

**Cost savings.** A retrospective chart review study conducted in New Jersey by Burton et al. (2017) found no significant difference in cost savings nor a decrease in any (not DM specific) ED or hospital utilization between diabetic participants who attended the diabetes self-management training and those who did not. Although some clinical indicators did improve among participants, i.e., decrease in HgA1c, decreased LDL and triglycerides, the authors found them not to be statistically significant. Although these improvements in health indicators could lead to cost savings in the long term, Burton et al. stated no short-term (one to three years) savings were found. Contrasting the Burton et al. study, Strawbridge, Lloyd, Meadow, Riley, and Howell (2017) performed a pre-matched population, observational study with over 180,000 participants that looked at one-year outcomes of a diabetes self-management training. Strawbridge et al. found participants had fewer diabetes-related ED visits or hospital admissions (plus a 14% reduced odds for any hospitalization) and averaged $830 less Medicare expenditures over a one-year period.

**Efficacy.** Balamurugan, Ohsfeldt, Hughes, and Phillips (2006) evaluated an Arkansas diabetes self-management education (DSME) program in a retrospective matched cohort study for effectiveness. They found a year after over 200 Medicaid participants completed an initial individual needs assessment followed by group education classes that they had a decline in HbA1c and had fewer ED visits, hospital admissions, and outpatient visits. The long-term benefits were also reviewed at 10 years; results indicated participants who completed the program had 12% fewer coronary
disease events and 15% fewer microvascular disease events (Balamurugan et al., 2006). Another DSME program was evaluated in a prospective, non-randomized cohort study for its efficacy, which found significant improvement in six-month diabetes outcomes of the 360 participants in inner-city District of Columbia—a decrease in HbA1c, increase in number of prescriptions written for lipid-lowering drugs (although no improvement in LDL or hypertension was observed), and approximately a 66% reduction in ED visits for uncontrolled glucose (Magee et al., 2011). A third study with a prospective randomized control design also examined DSME efficacy in an urban ED in Washington, DC (Lewis, Benda, Nassar, & Magee, 2015). The learner-centered training was provided by a certified diabetes educator to uncontrolled T2DM participants to impart critical knowledge and skills; the study resulted in a significant increase in diabetes knowledge and improved meter and insulin injection knowledge and use among participants (Lewis et al., 2015).

**Need for Diabetes Education**

Unexpected health problems affecting insulin or dietary needs are challenging for diabetics to manage alone and were found to be primary reasons patients presented to the ED. An investigational qualitative descriptive study (Coates, McCann, Posner, Gunn, & Seers, 2015) found among 45 patients between two ED sites in the United Kingdom that even though patient-provider partnerships included some degree of “problem solving, decision making, and resource use related to disease management...action planning and self-tailoring,” diabetic skills were lacking (p. 2152). This study concluded diabetes education is important and a greater focus on patient empowerment with self-management skills would help patients develop the ability to be successful in managing
their disease when unexpected health problems develop (Coates et al., 2015). A pre- and post-retrospective study (Schmidt et al., 2015) with a control group examined adult T2DM patients who obtained diabetes care at a single primary care clinic in the Dallas metro area. Patients who were enrolled in a diabetes education program with a DSME curriculum had a significant reduction in hospitalizations, had a decreased length of stay when they were inpatients, and, in turn, had a decrease in healthcare costs following participation in the diabetes education program (Schmidt et al., 2015). This study indicated patients who participated in diabetes education along with follow up at a primary care might gain more than those only seen by their PCP.

In a four-week randomized control trial, DM education was initiated in the ED to 100 T2DM and hyperglycemia patients and it was found diabetes education could be started safely and successfully and continued education completed in the outpatient setting (Magee et al., 2015). This study found a decrease in short-term glycemic (blood glucose) outcomes and improved medication compliance (Magee et al., 2015). While it might be impractical (time consuming and costly by requiring more nursing hours) to provide a structured diabetes education focused on discharged ED patients, outpatient Diabetes Education Clinics are available at most major medical centers in the Denver area.

Patient preference regarding diabetes self-management support was elicited from 374 respondents who were randomly surveyed from four U.S. urban hospital systems; more than half of the participants stated they would be interested in group medical visits (Sarkar et al., 2008). The results from this study found based on patient race/ethnicity, language preference, and health-literacy, the individuals preferred different modes of
diabetes self-management support (Sarkar et al., 2008). A population-based cohort study (Hwee, Cauch-Dudek, Victor, Ng, & Shah, 2014) based in Ontario examined diabetes education administered through group classes (12,234 patients), individual counselling (55,761), and a mixture of both (9,829 patients). In the following year, adult diabetic patients who went to group classes had fewer incidences of acute complications (an ED visit for hypo/hyperglycemia) and both group and mixed groups showed improvements with healthcare delivery (adequate lipid and HgA1c testing and on statin therapy; Hwee et al., 2014). Group therapy is less resource intensive and has evidence to support care outcomes.

**Literature Synthesis**

Patient turnover in the emergency department (ED) is typically rapid, limiting the time allocated for unit staff to provide needed discharge patient education in the department (Haatainen & Tervo-Heikkinen, 2014). Discharge instructions given to ED patients are insufficient in delivering the education and adequate guidance in disease management for patients upon returning home (Ginde et al., 2008; Haatainen & Tervo-Heikkinen, 2014). Patients and/or their caregivers lack the understanding needed to comprehend their diagnosis and plan of care for disease management (Menchine et al., 2010; Samuels-Kalow et al., 2012). Discrepancies between discharge content and a patient’s comprehension could have serious health repercussions, especially when one-third of the U.S. population is health illiterate (AHRQ, 2018). This knowledge gap has the potential of leaving patients at risk for an increased chance of a return ED visit (Garnica, 2017; Haatainen & Tervo-Heikkinen, 2014; Rising et al., 2015). As AHRQ (2018) safety recommendations stated, a patient’s health literacy level can be limited and
acutely blunted by changes in their own health including illness and stress changes affecting a patient’s diabetes mellitus disease. Providing detailed diabetes education in the ED is not best practice; rather, streamlined communication is recommended (AHRQ, 2018).

Stern et al. (2009) found an inverse relationship between quality of primary care management of diabetes and visits to the ED. This presents an opportunity for the ED provider to recognize the patient’s need for diabetes management intensification (Donihi, 2017; Stern et al., 2009). The primary reason diabetic patients present to the ER is their inability to obtain an outpatient provider appointment or the patient does not have an established PCP (Jackson et al., 2017; Magee et al., 2013). This is also one of the two reasons why diabetic patients bounce back to the ER (Rising et al., 2015). Coates et al. (2015) indicated while some important aspects of diabetic disease management are addressed in primary care, action planning and self-tailoring diabetic skills were lacking.

According to the Metro Community Provider Network (Miriam Cotello, personal conversation, 2018), ED patients who do not have a PCP wait two to four weeks as a new patient until they can get into the clinic provided to them at time of discharge. Current wait time for new patients to obtain an appointment at TMCAs Diabetes Education Center is one to two days (B. Foxhoven, personal communication, August 29, 2018).

Diabetes health education can positively influence patients’ control of the disease (Hopper & Schechtman, 1985). Participants in education classes have measurable improvements in health indicators, i.e. fasting blood glucose and HgA1c (Bloomgarden et al., 1987; Mazzuca et al., 1986). Balamurugan et al. (2006) found 10 years after
attending diabetes education, participants had 12% fewer coronary disease events and 15% fewer microvascular disease events.

A very large (180,000 subjects) observational study with chart review examining cost savings found patients who attended diabetes education had fewer DM-related ED visits or hospital admissions (Strawbridge et al., 2017). Studies found an improvement in participants of diabetes education classes in obtaining decreased fasting blood glucose and HgA1c; these improved health indicators could lead to healthcare cost savings in the future (Burton et al., 2017; Strawbridge et al., 2017). The efficacy and potential healthcare cost savings of diabetes education have been established. Diabetes education empowers patients with self-management skills by helping patients navigate their disease when unexpected changes occur in their diabetes (Coates et al., 2015). Schmidt et al. (2015) determined those diabetes patients with a PCP in conjunction with education classes potentially gained more than individuals who only saw a PCP. Starting diabetes education in the ER is safe and effective, although it might be limited in implementation due to budgetary constraints. It is practical for ED patients to begin diabetes education as soon as possible after discharge (Magee et al., 2015). Diabetes education delivered via group classes or a mixture of group classes and individual counseling have exhibited positive patient outcomes including adequate monitoring of lipid and HgA1c blood values and taking prescription statin therapy (Hwee et al., 2014).

The need for the Medical Center of Aurora (TMCA) to address patients discharge needs including diabetes education, utilization of additional hospital resources, and potential ability for the ED to coordinate care with follow up referral was reviewed in a planned gap analysis survey (Garnica, 2017). Evidence supported the inclusion of an
outpatient diabetes education referral for follow-up care. Due to rapid patient turnover, known nurse staff shortages in the department, and cost associated with creating and implementing diabetes education in the ED, making a referral to an established outpatient Diabetes Education Center run by a diabetes educator who is dual certified as a registered dietician is best practice for TMCA’s ED. The Diabetes Education Center at TMCA provides evidence-based practice in didactic instruction, diabetic skill exercises, behavior modification techniques, and group and/or individual education to increase patient literacy, self-empowerment, and competence in navigating their disease (B. Foxhoven, personal communication, August 29, 2018). Providing this referral to patients at time of discharge could help support patients in their navigation of improved healthcare as suggested by the AHRQ (2018).

**Theoretical Frameworks**

**Stetler Framework for Nursing Integration of Evidence-Based Practice**

The need exists to inform and apply current evidence into practice by identifying perceived lack of knowledge regarding the need and effectiveness of outpatient diabetes education. The Stetler (2001) framework of nursing integration of evidence-based practice was utilized for this scholarly project as it could assist in streamlining the transition of placing evidence into practice. Stetler’s work was formulated in 1976 and refined in 1994 as the nursing metaparadigm evolved and then it was again updated to be current with the field in 2001 (Keele, 2012). Using a current nursing theory helped guide this project and validated the work. This nursing model consists of five phases:
preparation, validation, evaluation/decision making, translation/application, and evaluation (Stetler, 2001).

- **Phase I: Preparation.** The first step of this framework is preparation. This stage helped the DNP student identify the purpose of the scholarly project and propose a need to modify current practice. In this stage, all data were gathered and synthesized. By identifying a practice or knowledge gap and a statement of the problem, the significance of project was articulated.

- **Phase II: Validation.** Next, the purpose of the project was validated with a review of evidence. A detailed inquiry of the literature assessed the evidence for relevancy to the purpose of the project, credibility, and value of proposals for improved practice.

- **Phase III: Comparative Evaluation/Decision-Making.** Upon review of the literature and exploration of TMCAs Diabetes Education Center services, an exploratory knowledge inquiry was performed (survey one). A panel of ED providers was recruited for voluntary participation via electronic mail (e-mail) to give their feedback regarding diabetes follow-up care and community resources. The panel of experts had various education backgrounds and years of experience among ED providers. Medical doctors, Doctors of Osteopathic Medicine, nurse practitioners, and physician assistants were limited to those currently employed at TMCA’s ED. The data were qualitative and quantitative in nature to obtain a baseline knowledge regarding diabetes outpatient needs. In addition, the data were collected and compared to the literature and a pre-RE-AIM framework was
drafted to help in establishing gaps in current practice, leading to the next step in the framework.

- **Phase IV: Translation/Application.** Next, a translation of this information, respondents’ results from survey one, was addressed by an educational presentation (Power Point or Prezi) prepared by the DNP student and tailored to the identified knowledge gaps of TMCA’s ED providers in available diabetes outpatient services. Immediately following this educational presentation, provider knowledge was reexamined (survey two) and self-reported estimates obtained regarding providers’ likelihood of including additional follow up referrals for this patient population.

- **Phase V: Evaluation.** Lastly, a DNP scholarly project included a reevaluation using the post-RE-AIM of the entire process and future needs of diabetes education referral as identified from the second survey such as triggers to implement to aid providers in remembering to include additional referrals for this patient population. Evaluation of the diabetes education referral included a review of outcome measures in relation to the project’s purpose.

**Reach, Effectiveness, Adoption, Implementation, Maintenance Framework for Evaluation**

The RE-AIM framework components include reach, effectiveness, adoption, implementation and maintenance (Faris, Will, Khavjou, & Finkelstein, 2007). This framework allows for a more robust measurement of interventions besides evaluating just reach and effectiveness; other measures are included (adoption, implementation, and
maintenance), allowing for an evaluation of dimensions considered most significant to real-world implementation. The expanded inclusion of these measures helps capture the value of complex programs involving healthcare interventions and studies aimed to change an individual’s behavior including a new referral during the discharge process.

The framework was utilized twice--once to evaluate current practice (pre-RE-AIM) and secondly to evaluate the change in practice (post-RE-AIM). For the pre-RE-AIM, the reach of this project was the adult diabetic patients being discharged from TMCA’s ED, effectiveness of project was evaluated, adoption and implementation were evaluated by provider self-report of his/her current discharge practice, and maintenance of current practice evaluated the need for change. For the post-RE-AIM, reach and effectiveness were compared similarly, adoption of referral practice by ED providers was measured, consistency in implementing the additional referral and any adaption that might be made was captured, and lastly what the practice change had on the department and the education center, which helped guide maintenance of the new process. Detailed RE-AIM measures are clarified further in Chapter III in objectives two and four. Using the RE-AIM helped the DNP student understand the strengths and weaknesses so the program might be improved for sustained adoption of the process change and effective implementation.
CHAPTER III

METHODOLOGY

Design

Phase One

Phase one began with an exploratory inquiry into identifying a practice and/or knowledge gap. The DNP student developed a statement of the problem and then articulated its significance for this scholarly project.

Phase Two

The first step in phase two entailed a detailed review of current literature regarding diabetes education related to the emergency department. Upon examining the literature, it was apparent there is benefit in diabetes education that could help discharged ED patients in intensifying their disease management. The DNP student presented a project proposal to the DNP committee for validation, detailing the literature examined for relevancy to the purpose of the project, credibility, and value of this project for improved practice. Next, approval obtained from the University of Northern Colorado’s Institutional Review Board (IRB) prior to project implementation completed the second phase (see Appendix B).

Phase Three

Preparation for phase three necessitated inquiring about emergency department (ED) provider knowledge of outpatient diabetes services available to their patients. This
helped the DNP student identify knowledge gaps between practice and the literature to ascertain components that would need to be included within the education intervention. Volunteer provider participants were sent an email containing a link to a Qualtrics survey; this survey contained a click consent also called a no signature required consent (see Appendix C). Participants were assigned a number to identify them so responses were anonymous; the participant number was used to analyze data between survey one and survey two. Survey one questions are provided in Appendix D. A pre-RE-AIM framework was completed based on the literature and survey one responses helped confirm gaps in diabetes discharge referrals and the current discharge process. This pre-RE-AIM evaluation was used to compare with the post-RE-AIM evaluation of the project.

**Phase Four**

Phase four involved the development of an educational presentation deliverable via electronic format--PowerPoint. Review of this presentation was again by providers on their own time and participation remained voluntary. The education came from identified gaps in provider knowledge as stated previously in phase one. The content was evidence-based data from the literature review and informative regarding content of materials contained in TMCA’s Diabetes Education Center courses available to TMCA discharged patients. Since the content was delivered via electronic mail, the education program had the potential to be shared between providers and outside of the TMCA ED group. This was monitored and tracked by the DNP student when the participant registered for the post-education survey; at this time, each individual was assigned a number so responses were anonymous. The next step of phase four consisted of an
immediate post-education survey (survey two) that collected demographic data from providers who volunteered to participate as well as their knowledge of outpatient diabetes education resources available to discharged ED patients. Each survey was summarized and reviewed independently. It was hypothesized there would be a decrease in knowledge gap among providers as well as an increased likelihood of future patient referrals to the outpatient Diabetes Education Center as measured by self-report in survey two and obtained by patient metrics captured at the diabetes center. Also, suggestions for implementation and triggers to help providers in remembering all pertinent referrals for this patient population were gathered.

**Phase Five**

Phase five included distribution of information regarding outpatient diabetes resources for patients being discharged from the ED to all providers for implementation of referral when indicated. This phase explored the logistics of developing a referral trigger from survey participants in phase three to prompt providers to make diabetes education referrals at time of discharge. This involved collaboration from other departments and agencies, information technology (IT), and/or an electronic medical records software developer or technician.

During this final phase, the tools for measurement--the RE-AIM framework--were utilized. Similar concepts were captured in this post-RE-AIM evaluation as in the pre-RE-AIM evaluation. Additional measurements during this last phase included

1. presence of referral use as obtained by patient metrics collected at TMCA’s Diabetes Education Center, e.g., the department or provider practice from which the patient obtained a referral.
2. The percent of patients who contacted the Diabetes Education Center as captured by comparing the number of patients given referral in the ED and number of these patients who contacted the center.

3. The number of patients who attended the class(es), which was captured at the Diabetes Education Center.

The RE-AIM served as a framework for evaluation and helped identify a potential need for an updated teaching plan or for the education piece to be repeated. The last phase was captured during a two-week data collection period for each survey.

Setting

The city of Aurora, Colorado had a population of 366,623 citizens as of 2017; the Medical Center of Aurora (TMCA) serves this population and surrounding areas (U.S. Census Bureau, 2018). From August 2017 to July 2018, TMCA’s ED treated 1,103 patients with the primary complaint of diabetes (C. Duncan, personal communication, August 21, 2018). Currently, four major hospitals serve the city of Aurora: Children’s Hospital of Colorado, Veterans Affairs Hospital, University of Colorado Hospital, and TMCA. The latter two facilities offer care to the general population it serves.

The emergency department (ED) at TMCA is a leading Denver suburb Level II Trauma Center seeing approximately 180 patients daily. The center is also nationally recognized by the Leap Frog Group for leading the field in patient safety. A statement of agreement (see Appendix E) was entered into between the DNP student and TMCA. This mutual agreement embodied the mission of TMCA (2018b): “Above all else we are committed to the care and improvement of human life” (Mission, para. 1), and outlined the corporation’s values of “iCare: integrity, compassion, accountability, respect, and
excellence” (Values). These mutual values guided the scholarly project and agreement for a specific patient population improvement process.

This project involved the cooperation and collaboration of the DNP student, TMCA, ED providers, and TMCA’s outpatient Diabetes Education Center and staff. To that end, TMCA signed an agency agreement with the DNP student for participation in this scholarly project to examine and potentially improve the ED patient discharge education and referral process for diabetes patients. Emergency department providers’ participation was voluntary and done on their own time. Recruitment was solicited by the DNP student via work e-mail. A single $50 gift card to Amazon.com was offered in a late November drawing to providers who completed both surveys. The Diabetes Education Center sent educational hand outs and course information to the DNP student at the start of this project and remained open to answering the DNP student’s questions as they arose. The Diabetes Education Center is a for-profit entity that increases physician knowledge about services offered at the Center with the potential for increased patient referrals that support the Center’s business model. All involved agencies and individuals were enthusiastic about identifying any potential gap in practice and mediating this for improved patient care.

Mission and Vision

The mission of this scholarly project was to allow the DNP student to apply acquired knowledge into practice. It is imperative that nurses practice to the full breath of their education; a detailed scholarly project allows for nurses to create a meaningful contribution to the healthcare profession (IOM, 2010). Researching, collaborating, and developing a process improvement for diabetic patient follow-up instructions would
allow the DNP student to lead an inter-professional team with peers and create a meaningful practice in their own community. The DNP student’s vision was to help implement the findings into practice to create a positive impact on healthcare quality and patient outcomes.

**Project Objectives**

As depicted by the literature review, patient understanding and interpretation of ED discharge instructions and ability to obtain prompt follow up care are often variable and inconsistent. There is potential for inadequate diabetes management that could be serious and might lead to increased morbidity and mortality. Objectives for this scholarly project included:

1. Evaluation of current discharge practice to identify if a gap in practice was present; identify current discharge practice, examine relevant literature, and outpatient diabetes education resources.

2. Gather information regarding provider knowledge and specific discharge practices provided to adult diabetes patients who presented to TMCA’s ED.
   a. Obtain qualitative and quantitative data via Qualtrics survey from providers to gauge familiarity regarding outpatient diabetes education services to help identify gaps in knowledge. Email with link to survey was sent to provider’s work email.
   b. Pre-RE-AIM. The RE-AIM framework involved measurement of:
      reach--(a) total number of providers in department, (b) total number of providers who participated in survey one, (c) number of providers to whom survey one was sent; effectiveness--(a) number of patients
currently referred to diabetes education, (b) number of patients who presented to TMCA ED per month with chief complaint of diabetes; adoption--physician reception received from survey one regarding need for practice change; implementation--review current workflow process or EMR discharge practice; and maintenance--relay pre-RE-AIM findings to providers at beginning of education program so need for practice change could be seen and provide reinforcement of the importance of program.

3. Develop an outpatient diabetes education presentation (PowerPoint) with general service information and detailed information geared towards identified provider knowledge gaps. This informative presentation was sent via email to providers to increase knowledge regarding benefits of diabetes education to discharged diabetic patients.

4. Plan an implementation and evaluation using the RE-AIM framework of outpatient diabetes education referral for inclusion at ED discharge of diabetic patients. The RE-AIM framework involved measurement of reach --(a) total number of providers in department, (b) total number of providers who participated in education intervention and survey-two, and (c) number of providers to whom education was sent; effectiveness--(a) number of patients referred to diabetes education prior to provider education, (b) number of patients referred to diabetes education since provider education as measured at one-month post implementation, and (c) number of new patient referrals who presented to the Diabetes Education Center from the
ED; adoption--number of patients referred to diabetes education since provider education as measured at one-month post implementation; implementation--review which ‘triggers’ were acted upon and integrated into workflow process or EMR; and maintenance –(a) measure number of referrals from one-month period to the next, (b) re-evaluate need for continuing education or modification in teaching plan, and (c) relay RE-AIM findings to providers so potential for positive impact from practice change could be seen and provide reinforcement of this change.

**Project Plan**

Amending a gap in practice to support evidence-based outpatient diabetes education to patients was supported by the agency, TMCA. As an American Nurse Credentialing Center Magnet designated facility, TMCA (2018a) leads its peers in nursing excellence, innovation in nursing practice, and quality nursing care. A thoroughly researched outpatient Diabetes Education Center and perceived need for patient referral would help providers deliver consistent referrals for continued quality diabetic care that is evidence-based, which in turn would reduce incidences of healthcare indicators associated with morbidity and mortality. An investigational survey was employed to inquire about knowledge gaps regarding services offered at TMCA’s Diabetic Education Center and potential for other outpatient referrals.

**Instrumentation and Analysis**

Data were analyzed from two surveys. Qualtrics was used for hosting the web-based surveys. The first survey was both qualitative with information gathering questions to help the DNP student formulate current practice and provider knowledge and
quantitative with demographic data asking “yes or no” questions. The results were descriptively compared between survey one and survey two. The RE-AIM framework was utilized to evaluate the education and instrumentation.

**Timeline**

This scholarly project was ready for proposal Fall 2018. This placed the final scholarly project ready for defense Spring 2019. The timeline for developing a guideline was as follows:

1. **Pre-development**
   - Develop scholarly project idea--August 2018
   - Needs assessment--August 2018
   - Literature review completion--August 2018
   - Defense of scholarly project proposal--September 2018
   - Obtain approval from IRB--September and October 2018

2. **Develop project**
   - Obtain qualitative and quantitative data (survey one) from TMCA ED providers regarding outpatient DM education program awareness and knowledge--November 2018
   - Evaluate findings, identify any gaps in provider knowledge, and create a presentation geared toward these potential gaps--November 2018
   - Disseminate presentation via email to providers and then obtain post education survey (survey two) regarding TMCA’s outpatient Diabetes Education Center programs and potential for utilization--December 2018
3. Completion of project
   - Analyze findings from surveys one and two. Create a plan for implementation and evaluation--December 2018 and January 2019
   - Implement new diabetes discharge process including a referral to the outpatient diabetes center--January 2019
   - Perform a post-RE-AIM evaluation--January 2019
   - Develop conclusion and finalize scholarly project--February 2019
   - Final defense of scholarly project--March 2019

4. Post-completion of project. The DNP student recommended TMCA address any identified areas needing amendments or re-structuring such as possible re-education of staff regarding process change, implementation of additional triggers, and involvement of other agencies or departments such as ED case managers.

   **Resources: Personal, Technology, and Budget**

Research, organization, development, and completion of this project were donated by the DNP student. Use of computer, printer (including paper and ink), and work space with electricity were donated by the DNP student as well. Time spent by the panel of experts to review findings and complete surveys to address provider knowledge regarding diabetes referral and outpatient education services were graciously donated. There were no foreseen expenses to TMCA.
Ethical Considerations

This scholarly project was a synthesis of current best evidence related to the utilization of outpatient diabetes education and was not experimental in nature. No patients were directly involved and no patient health information was used.

Summary

A perceived practice gap was identified with referral resources for discharged diabetic patients from the emergency department at the Medical Center of Aurora (TMCA). The American Association of Colleges of Nursing (AACN; 2006) referenced the Institute of Medicine’s (2010) recommendations in their essentials of doctoral education for advanced nursing practice; graduate nursing education should prepare “individuals for practice with interdisciplinary, information systems, quality improvement, and patient safety expertise” (p. 5). This DNP scholarly project encompassed those essentials with a literature review, integration of the Stetler (2001) model with use of RE-AIM framework, and collaboration with peers. In all, this project took many months from development to completion.
CHAPTER IV

DATA ANALYSIS AND RESULTS

This Doctor of Nursing Practice (DNP) scholarly project sought to evaluate the resources available to discharged emergency department (ED) patients at The Medical Center of Aurora (TMCA) regarding outpatient diabetes follow-ups, education resources, along with identifying and addressing gaps in current practice. The DNP student created survey questions based on evidence found in the literature and knowledge of the healthcare setting and population. The purpose of each survey was to gather information from a panel of experts regarding ED discharge, obtain knowledge of outpatient diabetes education, and gather impressions regarding referral to an outpatient diabetes education center. The questions were structured to assess knowledge about TMCA’s outpatient diabetes center, current ED discharge practices, and elicit opinions about discharge referral to TMCA’s outpatient diabetes center. The initial survey was live for 16 days and is provided in Appendix D. The final survey was live for 14 days and is available in Appendix F. All experts who participated in the initial survey were invited to participate in the final survey. The initial survey generated a 28% response rate with 13 participants. Eight responded to the final survey for a 17% response rate.
Survey One

Participants

Survey one’s first four questions helped capture demographic data of participants. Forty-six TMCA providers were sent an email from the ED Medical Director on behalf of the DNP student. The initial survey consisted of 17 questions modeled after capturing RE-AIM data. Thirteen ED providers participated in the initial survey (two physician assistants and 11 physicians); of these, the highest level of education held among participants included two master’s degrees, two Doctor of Osteopathic Medicine degrees and nine Doctor of Medicine degrees. At the time the survey was administered, no nurse practitioners were employed as providers at this emergency department. Participants had a mean of 12.5 years of experience in emergency medical care with a range of 2 to 31 years.

Descriptive Statistics

Survey one began phase three of the scholarly project, providing means of gathering expert opinions and attitudes for a comparative evaluation. Providers stated they saw an average of 80 patients per month who had a personal medical history of diabetes or diabetes as the cause for their ED visit with a range from 25 to 120. Twelve of 13 providers stated they referred diabetic patients back to their primary care provider (PCP) upon discharge from the department. One provider stated he/she referred diabetic patients to their PCP and/or their endocrinologist. When asked if providers historically found diabetic patients needed intensification of disease management after presenting to the ED, six answered “yes,” three answered “no,” and four answered “sometimes.” With regard to discharged patients obtaining timely follow-up care, six providers agreed this
was a problem for patients, one said it did not seem to be a problem, and six providers were unsure if patients were able to obtain timely follow-up care upon being discharged from their emergency care. When presented with a list of services offered through TMCA’s outpatient Diabetes Education Center (see Appendix D, Question 9), 11 providers stated the list was complete and two stated the list was incomplete. Additional suggestions for inclusion of services included (a) help patients to access wound care and podiatry clinics, (b) educate patients on the dangers of extreme glycemic levels as well as signs and symptoms of hypo/hyperglycemia, (c) if the clinic had the ability to accurately manage and/or prescribe insulin and other glucose lowering medications, and lastly (d) if the outpatient clinic could come into the ED to provide patients with these bedside services. Providers were asked to rate their knowledge of services offered at TMCA's outpatient Diabetes Education Center; six responded “no knowledge,” five responded they had “little knowledge.” and two responded they had “moderate knowledge.” When asked if they had experienced a gap in knowledge among providers regarding outpatient diabetes services, 10 providers stated “yes,” two said “no,” and one was “unsure.” The team of providers all unanimously agreed they thought diabetes education would help patients gain diabetes care and management skills until they were able to get their first appointment after having been in the ED. Additionally, all providers agreed patients should attend diabetes education. A list of TMCA’s discharge referral practice was outlined in a step-wise fashion for providers to consider (see Appendix D, Question 13) and then comment if the list was complete; one provider did not respond to this question, 11 answered “yes, the list was complete.” One provider indicated a need for current discharge software to populate the TMCA Diabetes Education Center in the referrals
available for providers to select and another provider suggested if there was a new diabetes diagnosis to have an education packet available in the ED with follow up information for the patient. One provider did not answer yes or no but rather commented, “Maybe add an order for a HgbA1c so a baseline can be established early in the management - not essential” (Survey Participant, 2018). The following suggestions were made when providers were asked what triggers would help in reminding them to include a diabetes education referral and filling out the one page ‘provider order’ for the patient to bring to his/her initial education appointment:

- A diabetes symbol
- Linked discharge instructions
- Readily available forms and a pop-up flag reminder when any patient has diabetes
- Occasional email reminders--no need for a pop-up
- When placing a discharge order in the electronic medical record (EMR), have it populate with a reminder (pop-up) for patients with diabetes
- Rather than filling out a form, make it an EMR order similar to what already exists with wound care
- There are system limitations, which require more analysis and discussion
- Have the outpatient diabetes center referral in the discharge software and the referral page print into the discharge paperwork
- “I don’t want to have to fill out another piece of paper, so not keen on a one page provider order” (Survey Participant, 2018). Therefore, it would be
better to have follow up information included in the discharge software under diabetes-related diagnosis.

Providers were then asked if they thought a folder handed to the patient near discharge or as part of the discharge paperwork containing outpatient Diabetes Education Center information and a formal referral order would help; 11 providers answered “yes” and two answered “no.” Regarding a folder or packet handed to patients at time of discharge, one provider mentioned this would help but only minimally as most patients ended up throwing away their discharge instructions. Another provider commented based on prior experience that a problem with handouts in the ED was staff had not heard of them, and/or were not empowered to provide them to patients without providers actually doing it themselves. The last question asked for additional comments providers wanted to furnish, which included two statements: make this project/process most effective by decreasing the work load to an already busy ED staff to facilitate success and another commented,

Access and education is everything. In the past and somewhat currently, it has been difficult to admit newly diagnosed diabetic patients from the ED due to lack of diabetic education on the inpatient side of the hospital, it is great to hear about outpatient opportunities. (Survey Participant, 2018)

Educational Intervention

To address the purpose of this project, a needs-based, focused education intervention (see Appendix G) was created by the DNP student to address information gaps identified in survey one of providers’ awareness in outpatient diabetes services for patients as outlined in Phase IV (translation/application) of this project. This targeted
education was delivered to ensure providers had sufficient knowledge of diabetes resources in the area and TMCA’s diabetes center was available to their patient population so they might choose adequate follow up for their patients upon discharge.

Some providers were unsure how long it took patients to obtain follow up care and some providers did not think it was a problem for patients to obtain care. Some providers had stated in their comments they knew it took longer for those without an established PCP to obtain new patient appointments and it took even longer for those with Medicaid or no health insurance. Addressing the identified gap of providers’ knowledge regarding length of time for patients to obtain follow-up care, the DNP student shared the following data. Primary care across the nation is facing a national shortage with provider time spent at bedside decreasing and patients’ length of time spent waiting to get an appointment increasing (Medscape, 2017; Merritt Hawkins, 2017). Providers recommend patients follow up with their PCP in two to three days after being discharged from the ED. Those without a PCP are referred to Aurora Family Medicine Center or the Metro Community Provider Network (MCPN) clinic to establish a PCP for recommended continuation of care. The Aurora Family Medicine Center has a single location near TMCA and no longer accepts uninsured/self-pay patients nor do they accept Medicaid or Tri-Care (Diana Castaneda, personal communication, 2018). Patients discharged from the ED with an accepted insurance can schedule an appointment with the clinic and can be seen in one to two weeks (Diana Castaneda, personal communication, 2018). Providers also refer patients to the MCPN clinic as this clinic accepts self-pay using a sliding scale fee system, Medicaid, and Medicare (Miriam Cotello, personal communication, 2018). Appointments for new patients at the MCPN clinic nearest
TMCA typically takes approximately three-weeks to obtain an appointment for a new patient (Miriam Cotello, personal communication, 2018). These wait times to see a provider are on track with the national wait time average of 24 days (Merritt Hawkins, 2017).

Almost all providers rated their knowledge of diabetes outpatient services as having ‘no knowledge’ or ‘little knowledge’ of service. To provide additional resources for this identified gap, the following information was shared. Diabetes education can offer additional resources for patients such as education classes, nutrition counseling, treatment options, and can potentially bridge the gap or strengthen the care given at their PCP office. This outpatient education can provide acute self-management skills, lifestyle and behavior modifications, including diet modification. These resources are part of an evidence-based intervention supported by the American Diabetes Association (2018) and paid for by most insurances including Medicaid and Medicare. Adding this modality in treatment helps diversify and intensify the patient’s own health literacy and the ability to manage his/her diabetes disease.

There was a discrepancy between providers regarding if patients who visited the emergency department (ED) related to their diabetes seemed to need intensification in their outpatient management of diabetes. To address this identified gap, the following information was shared. It is considered an indication of inadequate disease management when patients present to the ED for care related to their disease (Stern et al., 2009). Patients who present to the ED for uncontrolled diabetes is a red flag to a greater problem and inadequate diabetes management (Stern et al., 2009).
Some providers were unaware there was outpatient diabetes education available and some had thought the center had closed. To educate providers regarding this identified gap, the following information was shared. The Medical Center of Aurora’s (TMCA) Diabetes Center has not moved; it is still located at TMCA’s North Campus (in the basement). A Denver wellness and nutrition company, Sodexo, runs the services offered, which include diabetes education program, group and individual classes, assisting with managing diabetes at home, sick day guidelines, common glucose plans and insulin management instruction, meal planning education and assistance, instruction on medication administration, diabetes drug (oral and/or insulin) education, morbidity education, and additional information for low cost diabetic resources. The Diabetes Center accepts no insurance/self-pay, Medicaid/Medicare, and other insurances, decreasing barriers to access. Also, most appointments for new patients can be made within one to two days for a quick follow up after being discharged from the ED to help bridge the gap in time between ED discharge and PCP follow up.

To help facilitate the referral process, inquiry into “triggers,” which could help providers and the possibility for adoption of patient hand-out folders, was reviewed. Due to significant system limitations in the EMR mentioned by a provider who was the liaison for IT, it was decided to begin with more readily accessible options identified by the providers--having the outpatient center referral integrated into the discharge software, utilization of a patient education folder, as well as educating and empowering other clinical staff regarding referral process. Education to registered nurses (RNs), emergency medical technicians (EMTs) and unit secretaries was provided via email to help prompt all care providers to attach a referral folder to patient discharge paperwork to empower
care team members building camaraderie. To make it as easy as possible for providers, a single page referral needed to be signed by providers upon discharge of patient from the ED. This allowed insurance and billing to be succinct and decreased barriers for patients to obtain needed follow up. Also, patients took a signed order from a provider with more weight (Kathleen Dunemn, personal communication, 2018). The Diabetes Center has yellow and green folders stocked that are full of streamlined education for patients. The first page inside the folder is the single page referral providers should sign and place back in the folder to go home with patients. The “go live” date of this new evidence-based intervention was set for January 1, 2019. The Medical Center of Aurora’s main ED and two satellite EDs will be stocked with folders near the discharge racks; laminated signs are in place to help identify folder location and suggested use.

**Survey Two**

**Participants**

The final survey consisted of 19 questions and was modeled toward capturing RE-AIM data to evaluate education intervention effectiveness as part of Phase V. Eight providers participated in the final survey; all had participated in the initial survey so there were no new participants in the final survey. The final survey consisted of one physician assistant and seven physicians; highest degree obtained from the provider sample was one master’s degree, five medical doctor degrees, and two doctor of osteopathic medicine degrees. The mean years of experience in emergency medicine increased to 15.9 with a range of 2 to 31 years.
Descriptive Statistics

The second survey started with question six as all participants had also completed survey one; the demographic data and reach (data captured in questions one through five) were estimated to remain stable in the one-month time lapse that occurred between surveys. No new providers participated in survey two. Providers were asked to review an educational PowerPoint (see Appendix G) targeting knowledge gaps identified in the initial survey and then were asked to immediately complete the final survey. Six providers stated they would refer patients to their PCP upon discharge from the ED without additional follow-up. Two providers stated they would refer patients to PCPs and the Diabetes Center; one of these stated he/she would add the addition of an endocrinologist and other referrals. When asked if providers noticed patients needed intensification with their diabetes management, only one provider responded “sometimes” and the remaining seven stated “yes.” Providers were asked if they had experienced patients having trouble receiving follow-up care; four answered “yes,” three answered “sometimes,” and one answered “no. When provided a list of services offered at the outpatient diabetes center (see Appendix D, Question 9), five providers stated the list was complete, one stated additional information about consequences of uncontrolled diabetes could help stress the importance of controlling the disease to patients, another provider stated the education provided at the center should be in coordination with the patients PCP or endocrinologist, and, lastly one provider stated the list needed to be shorter as it was too long for ED providers to digest. At this point in the survey, one of the eight participants no longer answered additional questions and was not included when drawing survey conclusions. Providers were then asked to rate their knowledge of
services offered at the outpatient diabetes center; four answered “moderate,” two answered “a great deal,” and one answered “none.” All providers unanimously agreed an outpatient diabetes education center would help patients gain care and disease management until they obtained their first provider follow-up appointment and all agreed patients should attend diabetes education. An unchanged list of TMCA’s discharge referral practice was outlined in a step-wise fashion for providers to consider (see Appendix D, Question 13). Six providers stated the list was complete and one mentioned the need for inclusion of a step for the referral packet to the diabetes center and a provider referral form to be signed. One provider did not think the current workflow was listed accurately. When asked if a folder handed to the patient near discharge with referral information and a one-page referral order form would help, four providers said “yes”; one said “yes” if the folders remained stocked but ideally it should be part of the discharge print out; one provider said “yes” but the folder needed to be part of the nursing discharge process, similar to the pediatric concussion hand-outs; and one said “no”—he/she did not think adding a new order, document, or folder was the right approach.

Providers were asked what triggers might help them in remembering to include the diabetes education referral and completing the single-page referral form. The responses were as follows:

- Have nursing staff place the packet on the patient’s chart
- Have the referral built into the discharge software and the one-page order form. Populate automatically with this software so it prints off with the discharge instructions
• Have the one-page referral autogenerate when selected in the discharge software and have this print as the first page in discharge papers

• When a patient has diabetes, hypoglycemia, or hyperglycemia, the discharge software populates a referral to the Diabetes Education Center

• There is too much paper work already. A referral without a form, something in the EMR for the outpatient center to access.

• There is already current ordering processes and workflow processes--let’s not add another one.

Accessing and including diabetes education referral in the discharge software would assist providers--all providers agreed this needed to be included. When soliciting opinions regarding use of diabetes center referral folders, two providers said “yes”--this would work, two said “no”--this would not work, one stated there was a 50/50 chance the folder would be tossed out by the patient, one stated the referral should be made through the EMR, and one stated he/she will always try to make the referral via discharge software as the referral folder likely would not always be available. After completion of the educational PowerPoint, all seven providers stated they felt their knowledge gap had closed. As far as any additional comments, one was obtained in the second survey--a provider stated the ideal scenario would be if the Diabetes Education Center had a provider available to manage patients’ medication changes when needed.

**Results**

The first objective was to evaluate current discharge practice to identify if a gap in practice was present compared to the literature reviewed. Evidence showed diabetes education could help patients better manage their disease, thereby reducing healthcare
costs and producing measurable health indicators (Bloomgarden et al., 1987; Hopper & Schechtman, 1985; Mazzuca et al., 1986; Strawbridge et al., 2017). The second objective was to gather information regarding provider knowledge and specific discharge practices provided to adult diabetes patients who presented to the Medical Center of Aurora (TMCA) ED, which included an initial survey to help identify providers’ gaps in knowledge and completion of a pre-RE-AIM evaluation. The third objective was to develop an education presentation geared toward identified gaps in provider knowledge regarding TMCA’s outpatient Diabetes Education Center. The fourth, and last objective, was to implement an outpatient diabetes referral for inclusion at the point of discharge to diabetic patients and a final evaluation of implementation of an evidence-based practice using the RE-AIM framework.

**Objective One**

The first objective was met through three processes: examination of related literature, identification and exploration of outpatient diabetes education resources, and review of TMCA’s work flow process. The literature findings were reviewed and summarized in Chapter II. The emergency department (ED) presented an opportunity for providers to recognize patients’ need for intensification in their diabetes management due to the fact that timely appointments were not attainable with the patients’ PCPs or a lack of adequate PCP care and/or follow-up (Donihi, 2017; Jackson et al., 2017; Magee et al., 2013; Rising et al., 2015; Stern et al., 2009). The Medical Center of Aurora (TMCA) has an outpatient diabetes center not utilized by ED providers. A review of services found the center provides didactic instruction, diabetic skill exercises, behavior modification techniques, focused-based knowledge to improve patient literacy of disease, and group
and/or individual counseling (B. Foxhoven, personal communication, August 29, 2018). Over 1,000 diabetic patients are seen annually at TMCA’s ED and there is potential some patients could benefit from adjunct outpatient diabetes mellitus (DM) therapy. This was confirmed when an initial survey of providers stated they all referred patients back to their PCPs and none referred patients to an outpatient diabetes center. One provider stated he/she referred diabetic patients to their PCPs and/or their endocrinologist. Currently, the Medical Center of Aurora (TMCA) does not have an endocrinology specialist on-call for a built-in referral; if a patient is referred to an endocrinologist, it is because the patient is already established in the specialist’s care.

Objective Two

The second objective was met through the first survey. The initial survey collected both qualitative and quantitative data via a 17-question Qualtrics survey that solicited providers’ knowledge regarding TMCA’s outpatient diabetes education services. In both surveys, the response rate was rather small; however, the percent of findings was used to illustrate the differences for ease in comparison.

Part one. Findings from the survey identified gaps in knowledge of services among providers. While nearly half of providers (46%) were unsure if patients obtained timely follow-up care after leaving the emergency department (ED), the same number (46%) of providers stated there was some difficulty for patients in obtaining follow-up care and 8% said it did not appear to be a problem for patients. Providers reiterated this in their comments, stating most patients could get into their PCP “in less than two-weeks, … ideally, these patients would be seen one to three days” after their ED visit (Survey Participant, 2018). Another provider stated, “Patients often complain they are unable to
get in with their PCP and is why they are presenting to the ED” (Survey Participant, 2018). Survey one also confirmed a gap in provider knowledge regarding additional resources they could potentially include for patients in their discharge practice. Providers rated their knowledge of services offered at the outpatient diabetes center—46% had “no knowledge,” 39% had “little knowledge,” and 15% had “moderate knowledge.” When asked if they had experienced a gap in knowledge among providers regarding outpatient diabetes services, 77% of providers stated “yes,” 15% stated “no,” and 8% were “unsure.” When presented with a list of services offered through TMCA’s outpatient Diabetes Education Center (see Appendix D, question 9), 85% stated the list was “complete” and 15% stated the list was “incomplete” and offered suggestions for additional services to be incorporated. The team of providers all unanimously agreed they all thought diabetes education would help patients gain diabetes care and management skills until they were able to get their first appointment after ED discharge. Additionally, all providers agreed patients should attend diabetes education.

**Part two.** The survey questions were modeled to ensure RE-AIM framework data were captured for evaluation. A pre-RE-AIM was employed to assist the DNP student in establishing gaps in current practice and for comparative evaluation when a later post-RE-AIM was used for measure of outcomes. The following pre-RE-AIM components were measured:

- Reach—(a) total number of providers including doctors of medicine, doctors of osteopathic medicine, and physician assistants in department was 46 and all providers were emailed twice requesting their participation and (b) total
number of providers who participated in survey one was 13, which equated to a little over 28% of provider participation.

- Effectiveness--(a) number of patients currently referred to diabetes education was zero and (b) number of patients who presented to TMCA ED per month was approximately 92 with the chief complaint of diabetes. This was 1,103 patients over a 12-month time frame (August 2017 till July 2018); of these patients, 540 patients were discharged from the ED.

- Adoption--(a) physician reception received from survey one regarding need for practice change; when asked if they thought diabetic patients needed intensification in their disease management, 46% responded “yes,” 23% responded “no,” and 31% responded “sometimes.” Yet all (100%) respondents stated outpatient diabetes education could help patients and they thought all diabetic patients should attend.

- Implementation--a review of current work flow process or EMR discharge practice; question 13 targeted this metric and 92% of participants who answered the question agreed the list was complete.

- Maintenance--pre-RE-AIM findings were relayed to providers at the beginning of the education program via email so need for practice change could be seen and reinforcement of the importance of the program made to provider participants.

**Objective Three**

The third objective was completed through development of an outpatient diabetes education presentation. A Microsoft PowerPoint presentation was emailed to participants
to review (see Appendix G). The informative presentation contained general service information about the Medical Center of Aurora’s (TMCA) diabetes center as well as detailed information geared toward identified gaps in provider knowledge as captured by the initial survey. The purpose of the educational intervention was to increase providers’ knowledge regarding the benefits of DM education to discharged diabetic patients. Between the first and second surveys, five of seven providers rated their knowledge of TMCA’s outpatient diabetes center had increased.

**Objective Four**

The fourth objective was met by planning and implementing a referral to an outpatient Diabetes Education Center for inclusion in emergency department (ED) discharge of diabetic patients. The DNP student took cues from triggers identified by providers in the initial survey. An email was sent to managers at each facility, asking them to forward the email to all clinical staff; RNs, EMTs and US; the email identified what the referral folder was, why it mattered, where it was located, and when to use it--for diabetic patient population and time starting January 1, 2019 with no end date. Due to time constraints of this scholarly project, survey two triggers identified were utilized in recommendations to agency for continued development of evidence-based practice integration of outpatient diabetes education referrals. It was decided to start implementation of project upon completion of survey two while the education was fresh in providers’ knowledge. An implementation period of two-weeks was selected to allow enough time for the DNP student to gather a minimum of information to review the new referral process. Similar to the pre-RE-AIM framework, the RE-AIM was applied again for measurement of outcomes.
• Reach--(a) total number of providers in department was 46; (b) total number of providers who participated in education intervention was 13 (28%) and eight (17%) responded to the second survey; and (c) 28% of department providers received the detailed PowerPoint education, 17% reviewed the education, and all (100%) of providers were sent two separate emails giving a summary of the education and information regarding the evidence informed quality improvement initiative.

• Effectiveness--(a) number of patients referred to diabetes education prior to provider education was zero, (b) number of patients referred to diabetes education since provider education was 10 as measured at two-week post implementation, and (c) number of new patient referrals who presented to the Diabetes Education Center from the ED was zero.

• Adoption--number of patients referred to diabetes education since provider education and measured at two-week post implementation was 10.

• Implementation –(a) review of which “triggers” were acted upon and integrated into workflow process or EMR, (b) diabetes education folders with referral information were made by the DNP student and placed at TMCA and its two satellite free-standing EDs, (c) the diabetes center address and phone number were added to the discharge software for ease in provider selection for inclusion in their workflow, (d) an initial email was sent as well as a shorter reminder email to providers regarding folder use and inclusion of DM center referral in discharge software.
• Maintenance--due to time constraints of this project, it was recommended by the DNP student that the agency obtain the following: (a) measure number of referrals from one-month period to the next; (b) re-evaluate need for continuing education or modification in teaching plan, email reminders to clinical staff and providers as mentioned by a provider in survey as well as investigate inclusion of provider referral form order to be integrated into EMR for ease in utilization also suggested by providers in survey; and (c) relay RE-AIM findings to providers so potential for positive impact from practice change could be seen and provide reinforcement of this change.


Summary

Survey one confirmed gaps in practice were present between current practice and evidence-informed practice. The DNP student created a referral process informed by evidence in collaboration with providers utilizing survey comments to implement a process change to include a diabetes education referral from the emergency department (ED). A detailed education intervention was created, shared, and reviewed by 17% of department providers and a summary of education and evidence-informed process change was then sent to 100% of department providers. An initial two-week launch of the referral process went live and then the RE-AIM framework for evaluation was reviewed. All objectives of this scholarly project were met and reviewed for completion. This project created an opportunity for patients to receive outpatient diabetes education
referral so they might intensify their diabetes management and increase their health literacy.
CHAPTER V

DISCUSSION

As supported by the literature review and surveys, referral of diabetic patients to outpatient diabetes education and resources has been absent. Lack of adequate diabetes knowledge and skills in managing disease on behalf of patients could lead to return emergency department (ED) visits and/or increase healthcare spending, both of which could potentially lead to increased morbidity or mortality (Coates et al., 2015; Hwee et al., 2014; Schmidt et al., 2015). It was imperative that ED providers have the necessary knowledge of community resources available to them so they might appropriately include outpatient diabetes education referral in order to augment the disease burden to patients. Accordingly, identifying a gap in practice stemming from a knowledge deficit was addressed by providing an educational presentation to assist providers at the Medical Center of Aurora’s (TMCA) ED to deliver comprehensive discharge information and evidence-based referral resource for outpatient education as defined by the Stetler (2001) model.

Sample Characteristics

The ED has 46 providers; 13 participated in the pre-test (survey one) and eight participated in the post-test (survey two) with education experience at the master’s and doctoral level. All experts who participated in survey one were invited to participate in survey two.
**Setting Characteristics**

Implementation of an evidence-informed referral from the ED to an outpatient diabetes center was made at an urban Medical Center in Aurora, Colorado near Denver. This center sees an average of 180-220 ED visits per day and approximately 80 diabetic patients per month.

**Data Collection Description**

Data collected from surveys were gathered between November and December 2018. Questions were intended to garner attitudes, opinions, and current practice regarding knowledge and referral to an outpatient diabetes education center. Surveys one and two were sent through company email. A single drawing for an Amazon $50 gift was provided after both surveys were completed and closed. Providers who participated in both surveys were entered to win the gift card and one provider was drawn mid-January 2019 and notified via email.

**Major Findings**

Overall, the surveys and education were seamless and went as anticipated. The majority of participants initially confirmed they had a gap in knowledge regarding outpatient diabetes services and all participants stated the gap was closed in the final survey after completion of the education intervention. There was some improvement in moving the consensus of providers in recognizing there was at minimum some difficulty for patients in obtaining follow-up care with providers upon leaving the ED. Providers’ identification also improved in recognizing diabetic patients needed intensification after visiting the ED as an ED visit could be a red flag for inadequate home management. There was improvement in providers’ self-rated knowledge of outpatient diabetes
services. All providers agreed diabetes education could help patients once discharged from the ED and patients should attend diabetes mellitus (DM) education.

One question seemed unchanged between surveys which bewildered this DNP student. Initially, all participants but one stated they would refer discharged patients back to their PCP; in the final analysis, all but two providers stated they would refer patients back to their PCP. Only two participants stated they would include the diabetes center in the discharge referral in the final survey. This DNP student had expected a distinct increase in referrals to the diabetes center. Reasons for this might include the question was written poorly, it was not located in a logical sequence of the survey, and/or providers might not have realized multiple selections could be made.

**Implementation**

Objective four was completed with the implementation (and evaluation) of the project, which occurred from January 1 to January 14, 2019. Collaboration between the DNP student and the Medical Director of Information Technology facilitated the provider’s suggestion of having the diabetes center contact information included in the discharge software for selection as a referral resource. Also, the DNP student collaborated with the diabetes center to gather patient education resources for inclusion in a referral folder as well as a single page provider referral to help facilitate seamless care for patients. The week prior to implementation, all ED providers were sent an email from the Medical Director of Emergency Services on behalf of the DNP student; it provided a one-page summary and key points made in the education presentation for all providers to review. Providers were made aware of the inclusion of the outpatient diabetes center in the discharge software and patient education with a referral order in a single folder to be
given to patients at point of discharge; both of these were triggers identified from providers in the initial survey. Folders were located near patient charts and discharge rack area with laminated signs pointing out folder location and application.

Objective four utilized the RE-AIM framework for measurement to evaluate evidence-based practice improvement. Implementation incorporated triggers identified from participants response included having nurses place the diabetes mellitus (DM) folder on patients’ chart, have the referral built into the discharge software, empower other clinical staff to assist providers in this process, and email reminders regarding the new process. A separate software was used for discharge instruction rather than the electronic medical record (EMR). Working with the Medical Director of Information Technology, the process took approximately two weeks to have TMCA’s diabetes center with address and phone number added to the referral selection list. This was the first Diabetes Education Center added to the Denver market of this hospital group’s emergency departments (ED). Providers were receptive to the idea of having diabetes education folders in the ED available to patients for outpatient use according to the first survey.

In the AHRQ’s (2018) safety recommendations, the organization discussed the acute changes in patients’ health including increased stress related to ED visits and how both could acutely limit patients’ health literacy while in the ED setting. For this reason, a folder with patient education for review after being discharged was created; information about the diabetes center as well as a single-page provider order was placed inside the folder. Providers were notified about the folder and their need to sign a referral order so the patient could immediately schedule care and have it covered by their health insurance,
both facilitating decreased barriers to care. Patients could then take the folder and call the center to arrange care. Referral folders were placed at TMCA and its two satellite, free-standing EDs; an initial email was sent on January 1, 2019 as well as a short reminder email on January 7, 2019 from the Medical Director to ED providers regarding folder use and inclusion of referral in discharge software. From January 1 until January 14, 2019, eight folders had been handed out to discharged patients at the Medical Center of Aurora’s (TMCA) ED and two folders from one of the satellite emergency departments. Of these 10 referrals made to patients, zero patients contacted the diabetes center or attended a diabetes class by January 14, 2019. However, since January 14, two patients have contacted the diabetes center and one has attended his/her initial appointment.

**Strengths and Limitations to Study**

**Key Facilitators**

Successful completion of this DNP scholarly project could be attributed to a couple key facilitators: agency and leadership support, provider interest and engagement in the concept of this scholarly project, and collaboration and support from the diabetes center. The agency and Medical Director of Emergency Services were open to all ideas the DNP student had; this support limited personnel barriers. Also, the Medical Director of Information Technology was one of the survey participants who facilitated the DNP student in implementation of triggers identified from the surveys.

Provider support in encouraging the DNP student was advantageous in moving this project forward. Providers participated in their limited spare time and were open in their communication, thereby helping the DNP student gain insight to creating a
meaningful practice change. The surveys were created through Qualtrics and linked to a single web address so participants could complete surveys during down time at work or from home; the ease of use of the Qualtrics platform was beneficial to this project.

The Medical Center of Aurora’s diabetes center provided the DNP student with color printed diabetes education, patient DM self-assessment, a one-page introduction to the center, and a one-page provider referral order form. These supplies made up the content of the patient referral folder to facilitate hand-off of information from TMCA to the patient. In addition, the diabetes center was receptive to communication, updating the DNP student each week regarding referrals even after the initial implementation time period had lapsed.

**Key Barriers**

Barriers limiting implementation included the hospital EMR, provider resistance to filling out a referral order, limits to communication regarding dissemination of project implementation, and patient autonomy regarding seeking recommended follow-up care.

The Medical Center of Aurora (TMCA) utilizes Meditech version 5.6.6 for its EMR. While newer versions may be used across the nation, TMCA utilizes a version that looks and runs like MS DOS. As one could imagine, this software system alone created many barriers as there was limited tracking capability with patients and its use was not intuitive. Patients could only be searched by chief complaint and a search option for diabetes as a secondary or contributing diagnosis could be obtained. This limited capturing the true measure of diabetic patient population seen at TMCA. Because the EMR software was cumbersome, it limited which triggers the DNP student could act upon within the time constraints of this project. Some resistance was was captured in
both surveys regarding providers needing to sign and filling out a single-page paper for patients. This resistance from providers might have been a barrier limiting project effectiveness. For this reason, it would have been beneficial if an option for an order to be placed through the EMR was available.

All levels of clinical staff often scan through work emails and do not fully read email content, which might have limited dissemination of project implementation information to the key players. This came up as the DNP student received anecdotal feedback with various TMCA providers after the initial implementation trial--providers continually showed interest and need for this process but stated they did not know about it or had not read the emails. Limited time was expressed by providers as a reason for not participating in the survey(s) as they had multiple competing demands. All survey participants worked in the ED and had a biased opinion; thus, selection of participants was not randomized. Some providers participated not because they received an email from their medical director but because the DNP student was a colleague to the provider and asked if they would be willing to participate.

**Issues**

As delighted as providers were with the project’s objectives, filling out a single page referral proved cumbersome. Resistance from providers in filling out this single page led to folders not being handed out at all. Lack of patient follow-through with provider recommendations could not be evaluated or tracked. Of the 10 folders handed out to patients in the two-week time frame, no one called the diabetes center to inquire about services or attempt to make an initial appointment during that time.
Practice Recommendations

As described in the literature review and supported by responses gathered in both Qualtrics surveys, diabetic follow up was limited to returning patients back to their PCP with lack of robust information given to patients aimed at increasing their diabetic health literacy and care upon emergency department (ED) discharge. Lack of adequate diabetes care could lead to return ED visits, poorly managed disease states, and overall increased healthcare costs. The following practice recommendations serve to address the problem statement made in this DNP scholarly project; additional resources for follow up such as TMCA’s Diabetes Education Center should be given to discharged diabetic patients so they might obtain education classes, nutritional counseling, and treatment options to help bridge the gap and strengthen care given at their PCP’s office. It is essential that ED providers be aware of services available to their patients for follow up as well as the timeliness of follow up. The development of a diabetes education referral from the ED addressed this deficiency in practice to support ED providers at the Medical Center of Aurora (TMCA) in making this evidence-informed change in their discharge practice as defined by the Stetler (2001) model.

Recommendations for Implementation

To increase the likelihood of successful use of referral to the diabetes center, the DNP student advises the following updates be made for effective, continued integration of the discharge referral practice. First, it would be essential to provide continued education to all staff members regarding the new referral option and folder use for diabetic patients. An educational presentation made at the monthly staff meeting for clinical staff and the monthly provider meeting to re-introduce the concept and discuss
how each individual; unit secretaries, nurses, emergency medical technicians (EMTs), and providers could help facilitate the process to aid the discharge referral. Nurses and EMTs are able to initiate the use of the discharge diabetes education folder and review folder contents with the patient at bedside. Nurses, EMTs, and unit secretaries could all place the folder on the patient’s chart for the provider to see at time of discharge when they attach discharge paper work to the chart and move it into the discharge rack. These care team members could also pull the one-page order form out of the folder, request the provider sign it, and then place it back into the folder for the patient; or they may fax it to the diabetes center before placing the order back into the folder.

Once it has been confirmed all staff members have been educated regarding the referral folder and process, a revolving implementation date and reevaluation date should be chosen by the agency, e.g., one-month intervals or quarterly. As with all discharge referrals, it is left to the provider’s discretion regarding the best location for patients to obtain follow-up care. However, healthcare providers should be encouraged to include the diabetes center in their list of referrals for patient follow-up care.

Triggers not acted upon include having the single page referral print as the first page in the discharge software, having IT build a referral option into the EMR for provider selection and completion that is then sent to the diabetes center in lieu of the one-page printed referral, and having a diabetes mellitus (DM) symbol for providers to click on in the EMR. Another suggestion was having a pop-up reminder in the EMR reminding clinicians to include the diabetes center referral; however, it was recommended a re-evaluation for consensus should be reached before acting on this concept. Since all these suggestions involve time-intensive processes to implement, it
was suggested the agency further evaluate and explore these ideas for implementation. The DNP student has reached out to the Medical Director of Information Technology to facilitate continued progression with EMR-related triggers.

**Recommendations for Evaluation**

Post-implementation evaluation was performed using the RE-AIM framework for measurement. The same tool could be used for ongoing evaluation as this framework was a practical means to obtain an evaluation to measure a health intervention. The Medical Center of Aurora (TMCA) has an ED-specific clinical education specialist; based upon current job responsibilities, taking on continued implementation and re-evaluation of this project would be well suited for this nurse leader. The DNP student has implemented an initial two-week trial of the new referral process; it is recommended that a longer period of no less than one month be the minimum duration until a repeat evaluation is performed. Upon completion of a set time (one month is suggested), another RE-AIM should be completed using the same measurement as defined in Chapter IV, allowing for ease in comparison. Over time, additional evaluation from providers might prove beneficial in garnering provider perception, identification of any needed revisions such as an updated teaching plan or education, changes to process, and to ascertain any positive or negative outcomes.

**Personal Goals and Contributions to Advanced Nursing Practice**

As part of the advanced practice nursing community, it was this DNP student’s goal to make positive changes in health care in hopes of improving the quality of life for diabetic patients by increasing their health literacy and decreasing the burden of disease morbidity and mortality. This project has allowed this DNP student to become an expert
in her field by demonstrating skills learned throughout her DNP program from interpreting and applying evidence-based practice, initiating a practice change for quality improvement in patient care to nuances of healthcare information technology, as well as use of the Stetler (2001) model and integration of the RE-AIM framework. This project helped the DNP student exhibit a skill set, breadth of knowledge, leadership, and problem-solving ability needed as an advanced practice nurse in today’s healthcare environment. In the dynamic field of healthcare, an advanced practice nurse has the potential to make even the smallest changes, leading to meaningful impact.

**Doctor of Nursing Practice Essentials**

In 2006, the American Association of Colleges of Nursing (AACN) created a list of eight essentials for the Doctor of Nursing Practice (DNP) degree. The goal of DNP education is to cultivate nursing professionals as experts in their practice (AACN, 2006). Many of these essentials were integrated and woven into this DNP scholarly project, demonstrating the extensive knowledge through the DNP student’s practice-focused DNP course work.

- **Essential I. Scientific Underpinnings for Practice**—The historical and current all-inclusive literature review and inquiry into evidence-informed practice met this goal.

- **Essential II. Organizational and Systems Leadership for Quality Improvement and Systems Thinking**—This scholarly project embodied the mission of the organization and identified an area for quality improvement in care provided to patients specific to the ED setting. This was completed by partnering with the organization to implement an evidence-informed
practice change, striving to provide improved opportunity for patient outcomes.

- Essential III. Clinical Scholarship and Analytical Methods for Evidence-Based Practice--By translating evidence into practice complementing the ED discharge practice to address an identified gap in practice met this essential.

- Essential IV. Information Systems/Technology and Patient Care Technology for the Improvement and Transformation of Health Care--Evident by use of Qualtrics Survey methodology, integration of referral into Diabetes Center software and recommendations to have the EMR populate a DM education order for referral met this essential.

- Essential V. Healthcare Policy for Advocacy in Healthcare--This project did not impact healthcare policy; rather, it advocated for enhanced access to outpatient diabetes services for improved patient health outcomes.

- Essential VI. Interprofessional Collaboration for Improving Patient and Populations Health Outcomes--Interprofessional collaboration was essential in the progression of this scholarly project. Improved health outcomes was the ultimate goal of this evidence-informed discharge referral for the diabetic patient population made from the ED setting.

- Essential VII. Clinical Prevention and Population Health for Improving the Nation’s Health--This scholarly project was focused on improving population health for diabetes patients being discharged from an ED in Aurora, Colorado.
Essential VIII. Advanced Nursing Practice—Waldrop, Caruso, Fuchs, and Hypes (2014) stated DNP projects “should address a complex practice, process, or systems problem in the practice setting, and use evidence to improve practice process, or outcome” (p. 301). This essential was met and is outlined in the following EC as PIE (enhances, culmination, partnerships, implements, evaluation) guideline.

**Enhances, Culmination, Partnerships, Implements, and Evaluation Guideline**

In 2006, the AACN outlined the essentials of doctoral education; with an increase in Doctor of Nursing Practice (DNP) programs across the nation, interpretation of the essentials was nebulous in interpretation for measurement. With the increased demand from interprofessional healthcare organizations, advanced practice nursing terminal degree programs have increased but without a standardized measure of these programs. Waldrop et al. (2014) created a guideline (EC as PIE--enhances, culmination, partnerships, implements, and evaluation) to ensure high quality rigor of DNP projects and was used to measure this DNP student’s scholarly project. To execute a successful DNP final project, five criteria must all be present to complete a pie (see Figure 1). This standard of measurement for clinical scholarship ensures numerous DNP programs uphold the benchmarks of doctoral education as outlined by AACN and ensures success of a DNP scholarly project.
The first outcome measure ensured the DNP project *enhances* health outcomes, practice, or policy (Waldrop et al., 2014). This DNP project was centered on diabetes patients by improving current discharge practice through an evidence-informed referral. This addition to current practice enhanced the opportunity for diabetic patients’ intensification of outpatient care and improved health literacy.

The second benchmark, which ensured a meticulous *culmination* of practice inquiry, was performed by the DNP student. This inquiry into knowledge should be "pragmatic and practical, used in the real-word, timely, reproducible, and sustainable fashion" (Waldrop et al., 2014, p. 302). A detailed literature review was scoured for historical and current data related to the purpose of this project to advise the DNP student of evidence-informed practice that could be translated into clinical scholarship in the current practice setting. The DNP student took into consideration the ED setting, the patient volume and acuity seen, and time constraints placed on providers and other clinical staff alike, allowing caregivers limited time in delivering comprehensive
discharge education. Therefore, it was decided best practice was to make a referral to an outpatient diabetes education center by means of a printed referral on the patient’s discharge instructions and/or a folder containing diabetes education and a provider ordered referral to an outpatient diabetes center. This folder could be handed to patients at time of discharge by ED providers, RNs, EMTs, or unit secretaries and reviewed by the patient on his/her own time after leaving the ED.

The third measurement required student engagement in partnerships. Advanced practice registered nurses should practice to the full extent of their training as stated by the Institute of Medicine (2010) and resonated by the AACN (2006). Thus, it was a necessity to develop and exercise one’s professional ability in fostering collaborative partnerships with multiple disciplines and professional peers within the healthcare setting. This scholarly project allowed the DNP student to work with management, regional healthcare leadership, IT, master’s and doctorate-prepared providers, nurses, EMTs, and unit secretaries to foster an evidence-informed referral practice improvement within an urban ER setting to improve diabetic outpatient resources and care.

The fourth dimension entailed taking evidence into practice by implementing, applying, and translating the data. The DNP student considered the specific setting and resources underutilized to enrich patient discharge. Evidence collected from the literature review was translated into best practice specific to TMCA’s ED, helping to identify practice gaps to inform practice change to improve patient outcomes. A pre-test survey helped focus the DNP student’s energy on how to best implement evidence discovered from the literature review into implementation at this particular ED setting. The cumulation of data was then applied into practice and is ongoing.
Lastly, the *evaluation* of the project must occur to measure the outcomes. An evaluation was performed after two weeks post-implementation to help inform the DNP student of strengths and limitations of the project thus far, identify any concerns that needed to be addressed, and, lastly, to make recommendations for continued implementation and ongoing evaluation by the agency. The RE-AIM framework was utilized pre- and post-implementation to measure project outcomes.

**Recommendations for Future Exploration of This Project Topic**

Initiating a referral to an outpatient diabetes education center from the ED at time of discharge has never been done. This project created new clinical scholarship for dissemination and further study. This DNP student plans to continue the project with refined implementation and reevaluation using the RE-AIM framework alongside the agency. Topics for future exploration include whether having a referral faxed or electronically sent from the EMR increased completed referrals and do patients who attended the outpatient diabetes center care have any associated healthcare cost savings related to ED utilization. Also, it might be possible with other EMRs to capture which DM patients did not return to the ED or those who did return and any associated healthcare cost savings; all of these questions for inquiry could be pertinent future research topics.

**Dissemination of Project Results**

The project results were summarized earlier in this chapter. Findings will be relayed via email to provider participants upon completion of this scholarly project. Plans for continued implementation and development will be relayed at that time as the DNP student has already made steps for further exploration of this topic within the
agency, such as reaching out to the Medical Director of IT to inquire about linking the referral through the EMR. The Medical Center of Aurora (TMCA) is a Magnet-designated facility and upon project completion this scholarly project, it will be submitted in its entirety for possible inclusion in TMCA’s Magnet document for reapplication of this distinguished designation.

**Conclusion**

The completion of a scholarly project distinguishes DNP programs from those of other graduate level degrees. This scholarly project has allowed the DNP student to demonstrate the application of her doctoral education and leadership abilities in a meaningful evidence-informed quality improvement initiative. The project concluded with the application of an outpatient diabetes referral made from the ED and remains an employed tool for provider utilization. Initial measurement did not demonstrate immense success of project implementation. While improving diabetes patients’ outpatient care and education was a goal of the project, the lack of completed referrals “does not mean that a project that fails to demonstrate significant change” does not meet the EC as PIE criteria (Waldrop et al., 2014, p. 303). Implementation of this project was just the beginning of refinement in a process of continued clinical scholarship.
REFERENCES


http://dx.doi.org/10.1016/j.annemergmed.2009.03.006


http://dx.doi.org/10.1016/j.annemergmed.2014.07.015


APPENDIX A

DIABETIC KETOACIDOSIS GUIDELINE
Medical Center of Aurora
1501 S. Potomac, Aurora, CO 80012
Diabetic Ketoacidosis Adm

Admission Code Status
All patients are FULL CODE unless new order entered for code status
Resuscitation Status
Priority: Routine Date: TODAY Time: NOW
>>> F9 to select status <<<
Comments:
Other

Change Bed/Unit Request
Change Bed/Unit Request
Priority: Routine Date: TODAY Time: NOW
Comment: Changes unit/bed requested to:

This is not a STATUS or TRANSFER order. Use only to update unit request.

Other

Nursing Orders
Vital Signs
Date: TODAY Time: NOW
Frequency: Per Unit Standard
Comments: Goal: SBP >90, HR <120 or as otherwise directed per VITAL SIGN
GOAL PARAMETERS
Vital Signs GOAL parameters
Date: TODAY Time: NOW
Vital Sign GOAL Parameters:
Temp (F) > < SpO2 (%) > < UO (ml/hr) />
SBP: > < DBP: > < ScvO2 />
HR: > < RR: > <
MAP: > < CVP > <
Comments:

Pulse Ox
Date: TODAY Time: NOW
Comment: Pulse ox with vital signs
Adult: Cardiac Monitor/Tele
Date: TODAY Time: NOW
Comment: Monitor per hospital policy
Intake & Output
Date: TODAY Time: NOW
Comment: strict I&O
Glucose Management
Date: TODAY Time: NOW
Comment: Fingersticks every hour
Weigh-Daily

**** Patient Information Label ****

Physician Signature
[Signature]
Diabetic Ketoacidosis Adm
### Medical Center of Aurora
1501 S. Potomac, Aurora, CO 80012

**Diabetic Ketoacidosis Adm**

**Date:** TODAY   **Time:** NOW

**Comments:**

1. Foley Insert/Manage
   **Date:** TODAY   **Time:** NOW
   **Indications for catheter placement:**
   **Comment:**
2. Discontinue NPO Policy
   **Date:** TODAY   **Time:** NOW
   **Comments:**
3. Notify MD-Adult VS
   **Date:** TODAY   **Time:** NOW

**Call Physician for:**

<table>
<thead>
<tr>
<th>Temp:</th>
<th>&lt; 101</th>
<th>SpO2 (%)</th>
<th>&lt; 90</th>
<th>DO (ml/hr):</th>
<th>&lt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBP:</td>
<td>&lt; 90</td>
<td>&gt; 130</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HR:</td>
<td>&lt; 50</td>
<td>&gt; 120</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAP:</td>
<td>&lt;</td>
<td>&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Comments:**

1. Notify MD-Lab
   **Date:** TODAY   **Time:** NOW
   **Comment:** Call physician if anion gap is >13 AND increasing
2. RT Oxygen Therapy/Pulse Ox
   **Priority:** Routine   **Date:** TODAY   **Time:** NOW
   **O2 Therapy:** KEEP SATS > 88%
   **Pulse Ox Monitor:** Continuous
   **Comment:**
3. FOC: ABG
   **Date:** TODAY   **Time:** NOW
   **Comment:** Order ABG if patient is lethargic pm
4. NG Tube Insert/Monitor
   **Date:** TODAY   **Time:** NOW
   **Tube Management:**
   - Flush with Sterile Water  mL (Amount)  Frequency
   - Clamp tube: Check for residual after  hours.
   **Comments:**
5. OG Tube Insert/Monitor
   **Date:** TODAY   **Time:** NOW

---

**Physician Signature**

[Signature] **Diabetic Ketoacidosis Adm**
Medical Center of Aurora
1501 S. Pottomac, Aurora, CO 80012
Diabetic ketoacidosis Adm

Date: TODAY Time: NOW

Foley Insert/Manage
Date: TODAY Time: NOW

Indications for catheter placement:

Comment:

Discontinue MED Foley
Date: TODAY Time: NOW

Comment:

Notify MD-Adult VS
Date: TODAY Time: NOW

Call Physician for:

Temp: < 101
SpO2 (%): < 90
UO (ml/hr): <
BP: < 90 > 170
RR: < 8 > 20
MAP: < >

Comment:

Notify MD-Lab
Date: TODAY Time: NOW

Comment: Call physician if anion gap is > 13 and increasing

RT Oxygen Therapy/Pulse Ox
Priority: Routine
Date: TODAY Time: NOW

O2 Therapy: KEEP SATS > 88%
Pulse Ox Monitor: Continuous
Comment:

POC: ABG
Date: TODAY Time: NOW
Comment: Order ABG if patient is lethargic prn

NG Tube Insert/Monitor
Date: TODAY Time: NOW

Tube Management:
Flush with Sterile Water mL (Amount) Frequency
Clamp Tube: Check for residual after hours.
Comment:

O2 Tube Insert/Monitor
Date: TODAY Time: NOW

**** Patient Information Label ****
<table>
<thead>
<tr>
<th>Item</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>QC Tube</td>
<td></td>
</tr>
<tr>
<td>Tube Management</td>
<td></td>
</tr>
<tr>
<td>Flush with Sterile Water</td>
<td>ML (Amount) Frequency Clump tube: Check for residual after hours.</td>
</tr>
<tr>
<td>Comments</td>
<td></td>
</tr>
<tr>
<td>Measure Cup</td>
<td></td>
</tr>
<tr>
<td>Date: TODAY Time: NOW</td>
<td></td>
</tr>
<tr>
<td>Comment</td>
<td></td>
</tr>
<tr>
<td>Elevate Head of Bed</td>
<td></td>
</tr>
<tr>
<td>Date: TODAY Time: NOW</td>
<td></td>
</tr>
<tr>
<td>Elevate Head of Bed: 10 Degrees</td>
<td></td>
</tr>
<tr>
<td>Comment</td>
<td></td>
</tr>
<tr>
<td>Bedrest</td>
<td></td>
</tr>
<tr>
<td>Date: TODAY Time: NOW</td>
<td></td>
</tr>
<tr>
<td>Comment</td>
<td></td>
</tr>
<tr>
<td>Up Ad Lib</td>
<td></td>
</tr>
<tr>
<td>Date: TODAY Time: NOW</td>
<td></td>
</tr>
<tr>
<td>Comment</td>
<td></td>
</tr>
<tr>
<td>Outside Records</td>
<td></td>
</tr>
<tr>
<td>Date: TODAY Time: NOW</td>
<td></td>
</tr>
<tr>
<td>Comment</td>
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<tr>
<td>Off:</td>
<td></td>
</tr>
<tr>
<td>Diet</td>
<td></td>
</tr>
<tr>
<td>Diet: NPO - Strict</td>
<td></td>
</tr>
<tr>
<td>Diet: NPO</td>
<td></td>
</tr>
<tr>
<td>Date: TODAY</td>
<td></td>
</tr>
<tr>
<td>Diet to Adjust (Initiate Medical Nutrition Therapy Protocol)</td>
<td>Y</td>
</tr>
<tr>
<td>NPO: NPO except ice</td>
<td></td>
</tr>
<tr>
<td>Diet: Diabetic</td>
<td></td>
</tr>
<tr>
<td>Date: TODAY</td>
<td></td>
</tr>
<tr>
<td>Diet to Adjust (Initiate Medical Nutrition Therapy Protocol)</td>
<td>Y</td>
</tr>
<tr>
<td>Diabetic Modifier: Liquid Consistency:</td>
<td></td>
</tr>
</tbody>
</table>

**** Patient Information Label ****
Medical Center of Aurora  
1501 S. Potomac, Aurora, CO 80012  
Diabetic Ketoadiposis Adb

Precautions:  
Other

**IV Access - Insert Periph and PICC**

**IV: Insert periph**
Date: TODAY Time: NOW
Comment:

**PICC LINE PLACED OVER 5 YRS**
Priority: Routine Date: TODAY Time: NOW
Order: details below
Reason for Exam:
Comment:
Comment:

Is the patient receiving dialysis?

Other

**IV Fluids: NS Boluses:**
500 mL bolus every 15 minutes up to 4 liters total, including any doses given in the Emergency Department, OR until vital signs goals are met.

<table>
<thead>
<tr>
<th>NSCL 0.9% 500 mL</th>
</tr>
</thead>
</table>
RANGE: AUDITED
DIRECTIONS: IV Q15MIN
Start Date: TODAY Time: NOW
Stop Date: TODAY Time: 120

Label: Comment: 500 mL bolus every 15 minutes up to 4 liters total, including any doses given in the Emergency Department, OR until vital signs goals are met.

Other

**IV Fluids: (Step 1) After Boluses and Vital Signs OK**

<table>
<thead>
<tr>
<th>NaCl 0.9% 1000 mL</th>
</tr>
</thead>
</table>
RANGE: 150 ML/HR
DIRECTIONS: IV Q8H4OM
Label: Comment: After boluses and vital signs OK (SBP > 90, HR < 120 unless otherwise specified)

Other

**IV Fluids: (Step 2) When BS <= 200 select BOTH:**

**Provider: Select Both IV Fluids**

Once blood glucose is LESS than or EQUAL to 200 mg/dL, change IV fluids as follows:

a. D5W with 0.45% NaCl at 150 mL/hr (if serum Na > than or = to 140 mg/dL)

b. D5W with 0.9% NaCl at 150 mL/hr (if last serum Na is < than 140 mg/dL).

D5W/0.45% NaCl 1000 ML
RANGE: 150 ML/HR
DIRECTIONS: IV Q8H4OM BS<200 & Na>140 POST BOLUSES
Label: Comment: Once blood glucose < or = 200 mg/dL following all

| Patient Information Label |

Physician Signature  
Date/Time  
[ADEAM092a] Diabetic Ketoadiposis Adb
Medical Center of Aurora  
1501 S. Potomac, Aurora, CO 80012  
Diabetic Ketoacidosis Adm  

1. 
**D5W/0.9% NaCl 1000 ML**  
**RATE:** 150 ML/HR  
**DIRECTIONS:** IV  
**Label Comment:** Once blood glucose < or = 200 mg/dl following all fluid boluses and serum Na < 140 mg/dl

1. 
**IV Electrolyte Replacements (KCL/KPhos)**  
Further electrolyte replacement per Electrolyte order set:  
**Potassium Phosphate:**  
**POTASSIUM PHOSPHATE 20 MMOL in: HAC 0.9% 250 ML**  
**RATE:** 125 ML/HR  
**DIRECTIONS:** IV  
**Label Comment:**  
**Potassium Chloride:**  
**KCL 100 QK/STERILE WATER 100 ML (premix)**  
**RATE:** 100 ML/HR  
**DIRECTIONS:** IV  
**Label Comment:**  
**# of Doses:** 2

1. 
**Medications:**  
**Insulin BOLUS and DRIP**  
**Insulin bolus (optional):**  
**INSULIN, HUMAN REGULAR 0 UNITS IV BOLUS**  
**Insulin DRIP (rate needed):**  
**INSULIN, HUMAN REGULAR 50 UNITS in: HAC 0.9% 50 ML**  
**RATE:** TITRATE  
**DIRECTIONS:** IV CONT

**Label Comment:** CCBG = 1 UNIT/ML  
**DOSING:** DO NOT DC UNTIL ORDERED BY PHYSICIAN  
A. **GOAL GLUCOSE:**  
   - First 8 hours** 150-200 mg/dl  
   - After 8 hours** 100-200 mg/dl  
B. Titrate insulin drip to reduce  
   - blood glucose by 50-100 mg/dl per hr  
C. Titrate if this goal IS NOT being met with current insulin drip rate:  
   - 141-200 NO CHANGE in drip rate  
   - 201-250 INCREASE by 2 units/hr  
   - 251-300 INCREASE by 3 units/hr  
   - 301-350 INCREASE by 3 units/hr  
   - 351-400 INCREASE by 4 units/hr  
   - >400 INCREASE by 5 units/hr
   
  **Call MD if pt needs MORE than***

---

**Physician Signature**

**Date/Time**

---

[Signature] Diabetic Ketoacidosis Adm
Diabetic Ketoacidosis Adm

10 units/hr
*If BG drops BELOW 150 mg/dl:
   Call MD and do the following:
1. Administer D5W 25 gm IV x 1 dose
2. Reduce insulin drip by 1 unit/hr

ADMINISTRATION CRITERIA
Initiate Insulin Drip:
   a. Regular insulin drip at [units/hour]
   Goal Glucose:
      ** First 8 hours ** 150-250 mg/dl
      ** After 8 hours ** 180-200 mg/dl
   b. Titrate insulin drip to reduce blood glucose by 50-150 mg/dl per hour

TITRATE if this goal IS NOT being met with current insulin drip rate:

   GLUCOSE  Insulin drip rate change
   141-200  NO CHANGE in drip rate
   201-250  INCREASE by 2 units/hr
   251-300  INCREASE by 2 units/hr
   301-350  INCREASE by 3 units/hr
   351-400  INCREASE by 4 units/hr
   > 400    INCREASE by 5 units/hr

Call MD if pt needs MORE than 10 units/hr
If BG drops BELOW 150 mg/dl: Call MD and do the following:
   Administer D5W 25 gm IV x 1 dose
   REDUCE insulin drip by 1 unit/hr

Medications: D5W for Hypoglycemia treatment:
D5W 50 mg IV PRN 3X3 INSTRUCTIONS
Label Comment: *If BG drops BELOW 150 mg/dl: Call MD and do the following:
1. Administer D5W 25 gm IV x 1 dose
2. Reduce insulin drip by 1 unit/hr

VTE Prophylaxis: Reminders
If no prophylaxis ordered, document contraindication in T&P section of pDOC note
within 24 hours of admit
Refer to Order Set: (loc/ADV01) MU VTE PROPHYLAXIS

Laboratory
CBC AUTO DIFFERENTIAL
Priority: Stat Date: TODAY Time: HH:MM
Comment to Lab:
Add to specimen already in lab?
LIVER PROFILE

***** Patient Information Label *****

Physician Signature Date/Time
Medical Center of Aurora
1501 S. Weomac, Aurora, CO 80012
Diabetic Ketoacidosis Adm

Priority: Stat Date: TODAY Time: NOW

Comment to Lab:
Add to specimen already in lab?

COMP METABOLIC PANEL
Priority: Stat Date: TODAY Time: NOW

Comment to Lab:
Add to specimen already in lab?

BASIC METABOLIC PANEL
Priority: Stat Date: TODAY Time: NOW

Comment to Lab:
Add to specimen already in lab?

BASIC METABOLIC PANEL
Priority: Timed
Directions: 06H Count: 3

Comment to Lab:
Add to specimen already in lab?

MAGNESIUM
Priority: Stat Date: TODAY Time: NOW

Comment to Lab:
Add to specimen already in lab?

MAGNESIUM
Priority: Timed
Directions: 06H Count: 3

Comment to Lab:
Add to specimen already in lab?

PHOSPHOROUS
Priority: Stat Date: TODAY Time: NOW

Comment to Lab:
Add to specimen already in lab?

PHOSPHOROUS
Priority: Timed
Directions: 06H Count: 3

Comment to Lab:
Add to specimen already in lab?

CALCIUM
Priority: Stat Date: TODAY Time: NOW

**** Patient Information Label ****

Physician Signature
[Signature]

Date/Time
[Date/Time]

Diabetic Ketoacidosis Adm
### Diabetic Ketoacidosis Admission

<table>
<thead>
<tr>
<th>Test</th>
<th>Priority</th>
<th>Date/Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium</td>
<td>Timed</td>
<td>TODAY Time:NOW</td>
</tr>
<tr>
<td>Lactic Acid (Lactate)</td>
<td>Stat Date:</td>
<td>TODAY Time:NOW</td>
</tr>
<tr>
<td>Prolactin</td>
<td>Stat Date:</td>
<td>TODAY Time:NOW</td>
</tr>
<tr>
<td>Glycolal, Ethylene &amp; Propylene</td>
<td>Stat Date:</td>
<td>TODAY Time:NOW</td>
</tr>
<tr>
<td>Alcohol (Ethanol) Blood</td>
<td>Stat Date:</td>
<td>TODAY Time:NOW</td>
</tr>
<tr>
<td>Urine Drugs of Abuse Triage</td>
<td>Stat Date:</td>
<td>TODAY Time:NOW</td>
</tr>
<tr>
<td>Urine HCG Qual</td>
<td>Stat Date:</td>
<td>TODAY Time:NOW</td>
</tr>
<tr>
<td>Thyroid Stimulating Hormone</td>
<td>Stat Date:</td>
<td>TODAY Time:NOW</td>
</tr>
</tbody>
</table>

---

**Patient Information Note:**

Physician Signature: [Signature]

Date/Time: [Date]

[Diagnosis Code]: Diabetic Ketoacidosis Adm
<table>
<thead>
<tr>
<th>Test</th>
<th>Priority</th>
<th>Date/Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>LACTIC DEHYDROGENASE</td>
<td>Stat</td>
<td>TODAY Time: NOW</td>
</tr>
<tr>
<td>MRS SURVEILLANCE</td>
<td>Routine</td>
<td>TODAY Time: NOW</td>
</tr>
<tr>
<td>CULTURE URINE</td>
<td>Routine</td>
<td>TODAY Time: NOW</td>
</tr>
<tr>
<td>GLYCOXYLATED HEMOGLOBIN A1C</td>
<td>Timed</td>
<td>TODAY Time: NOW</td>
</tr>
<tr>
<td>AST/ALT</td>
<td>Stat</td>
<td>TODAY Time: NOW</td>
</tr>
<tr>
<td>LIPASE</td>
<td>Stat</td>
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</tr>
<tr>
<td>AMYLASE</td>
<td>Stat</td>
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</tr>
<tr>
<td>FIBRINOGEN</td>
<td>Stat</td>
<td>TODAY Time: NOW</td>
</tr>
<tr>
<td>DIC PROFILE</td>
<td>Stat</td>
<td>TODAY Time: NOW</td>
</tr>
</tbody>
</table>

**Physician Signature**

[Signature]

Diabetic Ketoacidosis Adm
Medical Center of Aurora
1501 S. Potomac, Aurora, CO 80012
Diabetic Ketoacidosis Adm

Radiology
1. XR CHEST 1 view AP PA
   Priority: Routine Date: TODAY Time: NOW
   Order
   Details below
   Reason for exam: 
   Comment: 
   Call Results to: [Name/Phone number]

2. XR CHEST 1 view AP PA
   Priority: Routine Date: TOMORROW Time: AM
   Order
   Details below
   Reason for exam: 
   Comment: 
   Call Results to: [Name/Phone number]

3. XR ABDOMEN KUB SINGLE V/W
   Priority: Routine Date: TODAY Time: NOW
   Order
   Details below
   Reason for exam: 
   Comment: 
   Call Results to: [Name/Phone number]

4. XR ABDOMEN KUB AND UP OR DEC 2 V/W
   Priority: Routine Date: TODAY Time: NOW
   Order
   Details below
   Reason for exam: 
   Comment: 
   Call Results to: [Name/Phone number]

5. XR ABDOMEN KUB SINGLE V/W
   Priority: Routine Date: TOMORROW Time: AM
   Order
   Details below
   Reason for exam: 
   Comment: 
   Call Results to: [Name/Phone number]

6. XR ABDOMEN KUB AND UP OR DEC 2 V/W

---

Physician Signature ____________________ Date/Time ________________

[Signature] Diabetic Ketoacidosis Adm
Medical Center of Aurora
1501 S. Potomac, Aurora, CO 80012
Diabetic Ketoacidosis Adm

Priority: Routine  Date: TOMORROW  Time: AM

Order
Details Below:
Reason for Exam: 
Comment: 

Call Results to: (Name/Phone number)

Cardiology

ERG 12 LEAD
Priority: Stat  Date: TODAY  Time: NOW

Indication for Exam: 
Comment: 

MRI URN:

Education

Educate/Teach Patient
Date: TODAY  Time: NOW
9 TO SELECT MULTIPLE ANSWERS. MAY ALSO FREE TEXT CRITERIA.
Education Topic: Diabetes
Comment: Hypoglycemia

Other

Therapy Services

PT Evaluate and Treat
Priority: Routine  Date: TODAY  Time: NOW
DME as needed: Front wheeled walker, 4 wheeled walker with brakes and seat, quad cane, cane, crutches, wc, walker platform, hemiwalker
Initiate PT Medicare Certification as Appropriate?
Comment:

OT Eval and Treat
Priority: Routine  Date: TODAY  Time: NOW
DME as needed: Commode, Shower Chair, Reacher, Sock Aid.
Initiate OT Medicare Certification as Appropriate?
Comment:

OT Evaluate and Treat
Priority: Routine  Date: TODAY  Time: NOW
Initiate OT Medicare Certification as Appropriate?
Comment:

Other

Consult - Wound Care

Wound/Otomy Care Consultation
Priority: Routine  Date: TODAY  Time: NOW
Reason for Referral:

**** Patient Information Label ****

Physician Signature

Date/Time

[Signature]  Diabetic Ketoacidosis Adm
Mediclinic Center of Aurora
1501 S. Potomac, Aurora, CO 80012
Diabetic Ketoacidosis Adm

*** Documentation of Order Set Version, Revision and Review Dates ***

APPLICATION: AKAADM02a VERSION: 02 ORDER SET NAME: Diabetic Ketoacidosis Adm
IMPLEMENTATION DATE: 03/28/14 REVISED DATE: 09/28/15 REVIEW DATE: 

APPROVAL TYPE: 

COMMENTS: change assoc Admit Status order set to Admission Change Requests

ASSOCIATED SETS:

[1CHANGE] Admission Change Requests
[2DEEMED04] General Med Coverage
[3LEVEL1001] Electrolye= Replace Order Set
[4SCALING01] Glucose Scalp insulin
[5INSINROB01] Insulin drip Order Set
[6NAMLAS01] Inactivated***AM Labs ICU
[7NAMLABS03] Inactivated ***AM Labs

**** Patient Information Label ****

Physician Signature:  
Date/Time:  

[AKAADM02a] Diabetic Ketoacidosis Adm
APPENDIX B

INSTITUTIONAL REVIEW BOARD APPROVAL
DATE: October 31, 2018
TO: Chelsea Lovelace, DNP
FROM: University of Northern Colorado (UNCO) IRB
PROJECT TITLE: [1317473-1] Diabetes Education Referral from the Emergency Department
SUBMISSION TYPE: New Project
ACTION: APPROVAL/VERIFICATION OF EXEMPT STATUS
DECISION DATE: October 31, 2018
EXPIRATION DATE: October 31, 2022

Thank you for your submission of New Project materials for this project. The University of Northern Colorado (UNCO) IRB approves this project and verifies its status as EXEMPT according to federal IRB regulations.

Chelsea -

Thank you for your patience with the UNC IRB process. Your application, materials and protocols are clear and thorough.

Please make the following changes to your consent form in order to be consistent with your narrative application and UNC IRB procedures:

1) include the incentive of the entry into a raffle/drawing for $50 gift card in the consent form; and

2) update the contact information for mistreatment as a research participant as follows, '....contact Nicole Morse, IRB Administrator, Office of Research and Sponsored Programs.....970-351-1910.'

These changes do not need to be submitted for subsequent review but must be made before the form can be used in participant recruitment and data collection.

Best wishes with your research.

Sincerely,

Dr. Megan Stellino, UNC IRB Co-Chair

We will retain a copy of this correspondence within our records for a duration of 4 years.

If you have any questions, please contact Nicole Morse at 970-351-1910 or nicole.morse@unco.edu. Please include your project title and reference number in all correspondence with this committee.
This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within University of Northern Colorado (UNCO) IRB's records.
APPENDIX C

CONSENT FORM FOR HUMAN PARTICIPATION IN RESEARCH--NO-SIGNATURE DOCUMENT
CONSENT FORM FOR HUMAN PARTICIPATION IN RESEARCH
UNIVERSITY OF NORTHERN COLORADO
Level II Trauma Center in Aurora, CO

INFORMED CONSENT – NO SIGNATURE DOCUMENT

Project Title: Diabetes Education Referral from the Emergency Department
Student Researcher: Chelsea D. Lovelace, BSN, RN, BSCJ, DNP-S
Research Advisor: Kathleen N. Dunemann, PhD, APRN, CNM, School of Nursing
Committee Member: Melissa Henry, PhD, School of Nursing
Committee Member: Bethany Summers, DNP, APRN

The purpose of this capstone project is to evaluate the resources available to discharged ED patients at a Level II Trauma Center in Aurora, CO regarding diabetes follow up care and education resources. This project includes a review of literature, and current regional hospital outpatient diabetes services. The aim for this scholarly project is to ensure providers have adequate knowledge of area diabetes resources and programs available to their ED patient population so they may select appropriate follow up care to provide patients in their discharge instructions. Objectives for this scholarly project includes:

1. Evaluate current discharge practice to identify if a gap in practice is present; identify current discharge practice, examine relevant literature, and outpatient diabetes education resources.
2. Gather information regarding provider knowledge and specific discharge practices provided to adult diabetes patients who present to TMCA ED.
   a. Obtain qualitative and quantitative data via Qualtrics survey from providers to gauge familiarity regarding outpatient diabetes education services to help identify gaps in knowledge.
   b. Compile all data up until this point to complete a pre-RE-AIM evaluation.
3. Develop an outpatient diabetes education presentation with general service information and detailed information geared towards identified provider knowledge gaps. This informative presentation will be sent out email to providers to increase knowledge regarding benefits of diabetes education to discharged diabetic patients.
4. Plan an implementation and evaluation using the RE-AIM framework of outpatient diabetes education referral for inclusion at ED discharge of diabetic patients.

The RE-AIM framework components include: reach, effectiveness, adoption, implementation and maintenance. This framework allows for a more robust measurement of interventions besides evaluating just reach and effectiveness, other measures included are: adoption, implementation and maintenance, allowing for an evaluation of dimensions considered most significant to real-world implementation. The expanded inclusion of these measures helps capture the value of complex programs involving health care interventions and studies aimed to change an individuals’ behaviors, such as including a new referral during the ED discharge process.

It is anticipated that two surveys will be necessary to adequately capture data needs to complete the pre and post RE-AIM evaluation. All Qualtrics surveys will be sent and returned electronically with a private e-mail account only accessible by the DNP student. It is estimated
that each participant will spend approximately 10-15 minutes in completion of survey questions within each round of the survey process.

Participation is voluntary and all responses collected from the surveys will be kept anonymous. The data collected will be kept on a password protected thumb drive that will have restricted accessibility; information collected will be available only to the DNP student and her Research Advisor. There are no anticipated risks to participants. This is a quality improvement project to increase the opportunity for providers to give appropriate referrals to diabetic patients so they have robust follow up once discharged from the ED.

You may decide not to participate in this study and if you begin participation you may still decide to stop and withdraw at any time. Your decision will be respected and will not result in a loss of benefits to which you are otherwise entitled. If you have any questions, please contact one of the undersigned.

Having read the above document and having had an opportunity to ask any questions, please complete the questionnaire “Survey One: Inquiry into Practice” if you would like to participate in this research. By completing and returning the questionnaire, through the Qualtrics website, it will be assumed that you have communicated consent in participation. Please print and keep this form for future reference.

If you know any providers that may be interested in participating in these surveys, please pass on or forward this email to them.

If you have any concerns about your selection or treatment as a research participant, please contact Sherry May, IRB Administrator, Office of Sponsored Programs, Kepner Hall, University of Northern Colorado, Greeley, CO 80639; Phone 970-351-1910.

This informed consent will be e-mailed and accompany each round of the study.

Student Researcher: Chelsea D. Lovelace, BSN, RN, BSCJ, DNP-S
E-mail: chelseadyan@gmail.com

Research Advisor: Kathleen N. Dunemm, PhD, APRN, CNM
E-mail: Kathleen.Dunemm@unco.edu
Phone: (970) 351-3081/ (303) 649-558
APPENDIX D

SURVEY ONE
Qualitative Demographics of participants

1. What is the highest degree you have obtained?_____.
2. What is your current title?_____.
3. How many years total have you worked in the medical field?_____.
4. How many years have you worked in your specialty?_____.

Reach
5. Approximately how many patients do you see per month who have diabetes as a diagnosis in the ER or a diagnosis for the patients’ personal medical history?_____.

Effectiveness
6. What is your current discharge referral practice for diabetes patients (i.e. hyperglycemia, hypoglycemia, etc)? a. PCP b. endocrinologist c. diabetes education center d. other (with open comment section)_____.
7. In your experience, do you find diabetes patients need intensification of disease management after presenting to the ED? Yes or No. Please explain_____.
8. Have you noticed the length of time from patient discharge till when the patient is able to obtain their follow up appointment with an outpatient clinic being delayed or troublesome? Yes or No. Please explain_____.

Effectiveness and Adoption
9. The classes taught at the Diabetes Education Center at TMCA is by a dual certified diabetes educator and registered dietician. The following services are offered: diabetes self-management treatment/education to
encourage independence; patient empowerment in disease management; tracking important in-range and out-of-range values for blood pressure; cholesterol and HbA1c; and lastly learning a healthy diet and the importance of being and staying active, taking medications as prescribed and checking blood glucose consistently. Outcomes from these types of intervention include: reduced fasting glucose levels, decreased HgA1c, improved health indicators and in the long term reductions healthcare costs (Balamurugan et al., 2006) (Bloomgarden et al., 1987) (Magee et al., 2011) (Mazzuca et al., 1986) (Strawbridge et al., 2017).

In your opinion is this list complete or would you add services to this list? _____.

10. What is your knowledge of services offered at outpatient diabetes education centers? a. None, b. Very little, c. Moderate, d. A great deal. Please explain_____.

Adoption

11. Do you think diabetes education would help patients gain diabetes care and management skills until they are able to get their first appointment after having been in the ED? Yes or No.

12. Do you think patients should attend diabetes education?_____.

Adoption and Implementation

13. To help identify key themes to guide creation of an education presentation to ED providers regarding diabetic patient discharge,
outpatient follow-up and patient’s attendance at a diabetes education center please consider if the following list is complete.

Discharge referral practice:

a. Provider stops by patient room to discuss discharge plan.
b. Select disease specific discharge information.
c. Populate referral choice(s).
d. Enter days (i.e. 1-2 days) from ED discharge to obtain follow-up.
e. Prescribe medications as indicated.
f. Print and flag for discharge.

Is this list complete? _____.

14. Have you experienced a gap in knowledge among providers regarding outpatient diabetes services? Yes or No. Please explain_____.

Maintenance

15. To help you in the referral process, what triggers would help in reminding you to include a diabetes education referral and filling out the one page ‘provider order’ for the patient to bring to their initial education appointment? _____.

16. Do you think a folder handed to the patient near discharge or as part of discharge paper work containing outpatient diabetes education center program information and a formal referral order help? _____.

RE-AIM – potential for each

17. Additional comments you would like to provide_____.
APPENDIX E

STATEMENT OF MUTUAL AGREEMENT
Statement of Mutual Agreement
University of Northern Colorado
Doctor of Nursing Practice Scholarly Project
Chelsea Dyan Lovelace
September 20, 2018

The purpose of the “Statement of Mutual Agreement” is to describe the shared view between The Medical Center of Aurora (TMCA) and Chelsea D. Lovelace, DNP Candidate from the University of Northern Colorado, concerning his/her proposed scholarly project.

Proposed Project Title: Diabetes Education Referral from the Emergency Department

Brief Description of Proposed Project: This capstone project will evaluate the resources available to discharged TMCA ED patients regarding diabetes follow up care and education resources. This project includes: a review of literature, review of current diabetes outpatient education services, assessment of providers awareness of services available to discharged diabetes patients via a survey, pre-RE-AIM evaluation of current practice, a needs based focused education program created by the DNP student to ED providers, a second survey (immediately post education) capturing their current knowledge of outpatient diabetes education services and their opinion regarding referral, educate all ED providers regarding practice change, implementation of referral to diabetes education center for discharged ED patients, help identify referral trigger(s) for provider, and perform a post-RE-AIM evaluation of project. The aim for this scholarly project is to ensure providers have adequate knowledge of area diabetes resources and TMCA’s outpatient diabetes program available to their ED patient population so they may select appropriate follow up care to provide patients in their discharge instructions. This will ensure patients have the opportunity to obtain increase intensity in diabetes management, and health literacy.

Goals of Scholarly Project: Objectives for this scholarly project includes: (1) Evaluate current discharge practice to identify if a gap in practice is present; identify current discharge practice, examine relevant literature, and outpatient diabetes education resources. (2) Gather information regarding provider knowledge and specific discharge practices provided to adult diabetes patients who present to TMCA ED. (3) Obtain qualitative and quantitative data via Qualtrics survey from providers to gauge familiarity regarding outpatient diabetes education services to help identify gaps in knowledge. This consists of emailing providers with link to survey and completing a Pre-RE-AIM evaluation. (4) Develop an outpatient diabetes education presentation (Power Point or Prezi) with general service information and detailed information geared towards identified provider knowledge gaps. This informative presentation will be sent out email to providers to increase knowledge regarding benefits of diabetes education to discharged diabetic patients. (5) Plan an implementation of project and evaluation using the RE-AIM framework of outpatient diabetes education referral for inclusion at ED discharge of diabetic patients.

Proposed On-site Activities: None.

Confidentiality of Patient Records and Facility: No personal identifiers will be included, and all data will be reported in aggregate form. TMCA is referred to as TMCA, Level II Trauma Center located in Aurora, CO, facility or hospital in the student’s work.

The DNP Scholarly Project will include a final report, an abstract, potential publication or oral presentation of the report. The author welcomes any comments or suggestions from the Agency
but reserves the right to publish findings and analysis according to professional standards and principles of academic freedom. For any work of a scholarly nature, the Author agrees to follow the Agency preferences in how it is to be named (or not) in the work.

Signature of DNP Student – Chelsea Dyan Lovelace

Signature of Agency Member – Lori McCormick

Signature of DNP Project Chair – Dr. Kathleen Dunemann
APPENDIX F

SURVEY TWO
This is a follow-up survey of 19 questions inquiring about your discharge process of ED patients whose visit is related to diabetes and your knowledge regarding TMCA’s outpatient diabetes services.

Please provide your random ID # provided to you by the DNP Student. If you have completed survey one, you may then skip to question six (Q6).

**Qualitative Demographics of participants**
1. What is the highest degree you have obtained? _____.
2. What is your current title? _____.
3. How many years total have you worked in the medical field? _____.
4. How many years have you worked in your specialty? _____.

**Reach**
5. Approximately how many patients do you see per month who have diabetes as a diagnosis in the ER or a diagnosis for the patients’ personal medical history? _____.

**Effectiveness**
6. What is your current discharge referral practice for diabetes patients (i.e. hyperglycemia, hypoglycemia, etc)? a. PCP b. endocrinologist c. diabetes education center d. other (with open comment section) _____.

7. In your experience, do you find diabetes patients need intensification of disease management after presenting to the ED? Yes or No. Please explain _____.

8. Have you noticed the length of time from patient discharge till when the patient is able to obtain their follow up appointment with an outpatient clinic being delayed or troublesome? Yes or No. Please explain _____.

**Effectiveness and Adoption**
9. The classes taught at the Diabetes Education Center at TMCA is by a dual certified diabetes educator and registered dietician. The following services are offered: diabetes self-management treatment/education to encourage independence; patient empowerment in disease management; tracking important in-range and out-of-range values for blood pressure; cholesterol and HbA1c; and lastly learning a healthy diet and the importance of being and staying active, taking medications as prescribed and checking blood glucose consistently. Outcomes from these types of intervention include: reduced fasting glucose levels, decreased HgA1c, improved health indicators and in the long term reductions healthcare costs (Balamurugan et al., 2006) (Bloomgarden et al., 1987)(Magee et al., 2011)(Mazzuca et al., 1986) (Strawbridge et al., 2017).
   In your opinion is this list complete or would you add services to this list? _____.
10. After reviewing the power point education provided how would you rate your knowledge of services offered at TMCA’s outpatient diabetes education center? a. None, b. Very little, c. Moderate, d. A great deal. Please explain_____.

Adoption
11. Do you think diabetes education would help patients gain diabetes care and management skills until they are able to get their first appointment after having been in the ED? Yes or No.

12. Do you think patients should attend diabetes education?_____.

Adoption and Implementation
13. To help identify key themes to guide creation of an education presentation to ED providers regarding diabetic patient discharge, outpatient follow-up and patient’s attendance at a diabetes education center please consider if the following list is complete.
   Discharge referral practice:
   a. Provider stops by patient room to discuss discharge plan.
   b. Select disease specific discharge information.
   c. Populate referral choice(s).
   d. Enter days (i.e. 1-2 days) from ED discharge to obtain follow-up.
   e. Prescribe medications as indicated.
   f. Print and flag for discharge.
   Is this list complete? _____.

14. Did the attached Power Point help close the information gap regarding TMCA’s outpatient DM education services? Yes or No, and please explain.

Maintenance
15. To help you in the referral process, what triggers would help in reminding you to include a diabetes education referral and filling out the one page ‘provider order’ for the patient to bring to their initial education appointment? _____.
16. Do you think a folder handed to the patient near discharge or as part of discharge paper work containing outpatient diabetes education center program information and a formal referral order help? _____.

17. What are your thoughts and opinions regarding use of the TMCA DM education referral in 1,2,3, Discharge?
18. What are your thoughts and opinions regarding use of the TMCA DM education referral folders?

**RE-AIM – potential for each**

19. Additional comments you would like to provide_____.
APPENDIX G

DISCHARGE REFERRAL FOR DIABETES MELLITUS PATIENTS
Discharge referral for DM patients
Chelsea D. Lovelace, RN, BSN, BSCJ, DNP-Candidate
University of Northern Colorado, School of Nursing

Diabetes Mellitus

- Diabetes is a complex disease which can lead to increased morbidity and mortality.
- It is considered an indication of inadequate disease management when patients present to the emergency department for care related to this disease. (Stern, Calderon-Margalit, Mazar, Brezis, & Tiross, 2009).
- Once out of the ED it is imperative the patient receive timely follow up care to effectively manage the disease reducing morbidity and mortality to the patient and to decrease return visits to the emergency department.
- Primary care across the nation is facing a national shortage with provider time spent with patients decreasing and patients length of time spent waiting to get an appointment increasing (Medscape, 2017)(Merritt Hawkins, 2017).
Discharge follow-up care

- Do you refer diabetic patients to follow up with MCPN?
- Appointments for new patients for the MCPN clinic nearest TMCA typically takes approximately three-weeks to obtain an appointment for a new patient.
- These wait times to get into see a provider are on track with the National wait time average from 2017 of 24-days (Merritt Hawkins, 2017).
- Additional resources for follow up such as TMCA's Diabetes Education Center, or other regional diabetes centers currently are not given for follow up to ED patients, these centers can offer additional resources for patients, education classes, nutrition counseling, and treatment options and can potentially bridge the gap or strengthen the care given at their PCP office.

Discharge follow-up care

- Do you refer diabetic patients to follow up with Aurora Family Medicine Center?
- This clinic has a single location near TMCA. They no longer accept uninsured/self-pay patients, nor do they accept Medicaid or TriCare. Patients discharged from the ED with an accepted insurance can schedule an appointment with the clinic and can be seen in 1-2 weeks.
Diabetes Mellitus education

- Diabetes Education Centers are available in various settings throughout the Denver Metro area.
  - Diabetes education can provide acute self-management skills,
  - Lifestyle and behavior modifications, including diet modification.
- Diabetes education is an intervention supported by the American Diabetes Association and paid for by most insurances, including Medicaid and Medicare (American Diabetes Association [ADA], 2018). Adding this modality in treatment helps diversify and intensify the patient’s own health literacy and ability in managing their diabetes disease.

Diabetes Mellitus education

- Providers in the ED agree far more can be done for patients upon discharge from the department, and this problem is a common concern between staff. It is common knowledge in the department, with providers and nursing staff alike, that many patients present to the ED as well as make return visits to the ED including readmissions as they are unable to obtain an appointment with their primary care or have been unsuccessful in establishing a primary provider.
What happens when patients leave the ED?

- Primary care providers no longer can spend half an hour or longer discussing medication management for complex diseases such as diabetes. The average time spent with a patient by a provider is 12 to 24 minutes, sometimes less (Medscape, 2017). Patients who present to the ED for uncontrolled diabetes is a red flag to a greater problem, inadequate diabetes management (Stern, Calderon-Margalit, Mazar, Brezis, & Tiros, 2009).

- Currently none of the discharged patients from TMCA's ED are seen by the ED case manager nor referred to TMCA's Diabetes Education Center for additional resources. To ensure ED patients are given robust information for follow up care the provider needs knowledge of various outpatient resources available for patients to follow up with. Upon discussions (and a survey) with ED providers currently at TMCA, providers agree more continuation of care and support to diabetes patients would be helpful.

TMCA’s Outpatient Diabetes Center

- TMCA’s Diabetes Center did not go anywhere! It is still located at TMCA-North Campus (in the basement), a Denver Wellness and Nutrition company, Sodexo, runs the services offered which include:
  - Diabetes education program, group and individual classes
  - Managing diabetes at home
  - Sick day guidelines
  - Common glucose plans and insulin management
  - Meal planning
  - Taking medications, oral and/or insulin
  - Morbidity education
  - Low cost resources

- The Diabetes Center accepts no insurance/self-pay, Medicaid/Medicare and other insurances, decreasing barriers to access.
Literature

- Attached to this link is a detailed summary of a current and historical literature review related to outpatient diabetes education and changes in health outcomes if you wish to review.
- https://bearsunco-my.sharepoint.com/:b:/g/personal/love8514_bears_unco_edu/EWiu9IjXTVOumTLJJQ2XF0BTd-Hg1kA4F4p6TGJBA6hNAte=5Z2ipl

What can you do?

- The Diabetes Center provides initial consultations to patients from a dual certified Registered Diabetes Educator and Registered Nutritionist. Patients are then evaluated for further need of group or individual classes.
- To make it as easy as possible for providers, a single page referral needs to be signed by you upon patient discharge from the ED.
  - Why? This allows insurance and billing to be succinct and less barriers for patient to obtain needed follow up. Also, patients take a signed order from a provider with more weight.
- The Diabetes Center has a yellow folder stocked full of stream lined education for patients. The first page inside the folder (right side) is the single page referral you should sign.
  - Education to RN, EMT and US will be provided to help prompt all care providers to attach a referral folder to patient discharge education. Care Team Members can all help each other out.
Order Form

Referral Folder

- Yellow Diabetes Education Program referral folder
Go Live!

Starting 1/1/2019 Please make a concerted effort to include this folder (preferably with a signed one-page referral form)

TMCAs Diabetes Education Program has been added to your Discharge print off as well.

TMCAs Diabetes Education Program will track referrals received from our EDs and this information regarding patient impact will be communicated to providers once available.

As of 1/1/2019 providers and other care team members at TMCAs, COP and the Bop will have been informed of the available DM education, referral folder for inclusion with discharge instructions.

Managers at each facility will be forwarding referral folder information on to RNs, ENs and Secretaries.

Survey Two

- Please click on the following link to complete the second survey
- https://unco.co1.qualtrics.com/jfe/form/SV_80rp4ktjTzikL