EFFECT OF AN EVIDENCE-BASED EDUCATIONAL INTERVENTION
ON LICENSED NURSING STAFF’S KNOWLEDGE OF TYPE 2 DIABETES
IN A LONG-TERM CARE SETTING

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Clinical Practice Guidelines, Evidence Based Practice
Abstract

Despite being the age group with the greatest prevalence of Type 2 Diabetes (T2DM), older adults have often been excluded from diabetes research. The paucity of studies about T2DM in long-term care (LTC) makes it difficult to apply conclusions from studies of younger diabetics to elderly diabetics who have shorter life expectancies and impaired functional/cognitive abilities.

This DNP project was conducted at two LTC hospitals to implement T2DM clinical guidelines for elderly diabetics aged ≥ 65 years and to educate the nurses about providing care to their diabetic patients. The Iowa Model was the conceptual framework for this project, conducted in four phases: 1) baseline chart review to examine pharmacologic treatment, most recent glycosylate hemoglobin (A1c) level; A1c lab standing order, sliding scale insulin (SSI) orders, and hyper/hypoglycemic events; 2) evidence-based (EB) educational interventions for LTC T2DM management; 3) nurses’ pre-test/post-test survey; and 4) chart review post intervention.

The literature review revealed that A1c and glycemic control are individualized, less stringent, and balanced with clinical and functional status; SSI is contraindicated in LTC; and ongoing EBP continuing education, nursing staff interventions, EB clinical guidelines and policies are needed in LTC.

The project’s expected outcomes were: A1c improvement; no orders for SSI; appropriate hyper/hypoglycemia management; accurate, concise reporting of patients’ status to providers; and increase in the nurses’ confidence in managing T2DM patient care. Descriptive statistics revealed improvement in nurses’ knowledge of T2DM, increased competence providing patient care, and reporting patients’ health status to medical providers. There was confusion regarding
appropriate A1c levels for elderly diabetics, and LTC requirements for providers to see patients. It is too early to determine if A1c values have improved. SSI continues to be ordered – indicating a gap in providers’ knowledge.

Implications: Ongoing EBP educational interventions are warranted for nurses and providers. A clinical leader/mentor is needed to support the staff as EBP is established.

Limitations: The chart reviews were paper charts, thus often illegible; fluid environment, where diabetics were discharged or died; small sample sizes, 62 nurses and 80 diabetic patients; project timeline was one-year – inadequate to completely engage nurses to adopt practice changes.
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Chapter 1. Executive Summary

Background/Problem

Despite being the age group with the greatest prevalence of Type 2 Diabetes (T2DM), older adults are often excluded from diabetes research (American Geriatrics Society, 2013). The paucity of T2DM studies in long-term care (LTC) make it difficult to apply conclusions from studies of younger diabetics to elderly diabetics in LTC with shorter life expectancies, and impaired functional and cognitive abilities (American Medical Directors Association, 2013). The LTC nurses, who are at the frontline of care provision, must be trained to care for this population (Benetos et al., 2013).

This Doctor of Nursing Practice (DNP) project is a quality improvement (QI) intervention implemented at two Honolulu LTC hospitals. The goal of this project was to implement T2DM clinical guidelines and empower the nurses with T2DM knowledge for providing care to LTC elderly adults. A T2DM educational intervention was provided for the nurses, whose knowledge and competency was then evaluated via pre-test/post-test surveys. This project focused specifically on diabetics ≥ 65 years in LTC.

Conceptual Framework. The Iowa Model of Evidence-Based Practice to Promote Quality Care (Titler et al., 2001) was the conceptual framework for this project. The clinical question was: “Can a series of short term educational interventions for the licensed nursing staff at two LTC facilities improve elderly diabetic patient outcomes via appropriate T2DM management, and increase nursing staff’s confidence in providing care to the diabetic residents?”

Literature Review & Synthesis. Four themes developed from the Review of Literature: 1) clinical practice guidelines (CPG); 2) LTC DM management; 3) registered nurse (RN) education and knowledge; and 4) EB CPG implementation. The evidence revealed that
hemoglobin A1c levels are individualized, less stringent, and balanced with clinical and functional status; and sliding scale insulin (SSI) is contraindicated. Further, ongoing EB education, nursing staff interventions, and EB policies are needed in LTC to maintain staff’s continued implementation of EB CPGs.

**Innovation/Objectives.** The objectives of this project were for the nurses to: (a) define hyper- and hypoglycemia; (b) implement EB guidelines to manage hyper-/hypoglycemia; (c) recall appropriate glycosylated hemoglobin A1c levels for LTC diabetics; and (d) report and chart appropriate and significant information to the medical providers about patients’ diabetic status.

**Methods/ Design.** The project was a sequential mixed methods QI intervention spanning a one-year period, from May 2014 to May 2015, and was conducted in four phases: (1) baseline chart review to examine pharmacologic treatment, A1c level; A1c lab standing order, SSI orders, and hyper/hypoglycemic events; (2) EB educational interventions for LTC T2DM management; (3) nurses’ pre-test/post-test survey; and (4) chart review post intervention.

**Practice Change Description.** The goal of the project was to empower the nursing staff with the knowledge of EB CPGs for managing the care of LTC elderly diabetics. The project outcomes were: (a) the diabetic patients will have improved and appropriate A1c levels based on their level of frailty, functional and cognitive ability, code status, and co-morbidities; (b) nurses will apply EB CPGs to appropriately manage hyper-/hypo-glycemic events; (c) the nurses can accurately and concisely report off to the providers about the diabetic patient’s status; and (d) nurses will articulate an increase in self-confidence in their abilities to care for elderly diabetics.

**Setting & Sample.** The project was implemented at Facility A and Facility B LTC hospitals to educate the nurses about the management of T2DM for patients aged ≥ 65 years.
Participants are the RNs and licensed practical nurses (LPNs) who are licensed to practice in Hawai‘i.

**Data Collection.** Baseline chart review total was 80 charts (Facility A =26 and Facility B =54) that recorded A1c level, A1c standing order lab, SSI orders, hyper-/hypoglycemic events, code status and co-morbidities. Anonymous pre-test/post-test surveys in Likert scale format were administered to the nurses: Facility A N=34 and Facility B N=28, for a total of 62 staff participants. The post intervention chart review examined 73 charts: Facility A N=26 and Facility B N=47.

**Description of Participants.** A total of 74 nurses participated in this QI project. The Facility A group included 34 participants (28 RNs, 3 LPNs, two Nurse Practitioner [NP] students, one RN student); and the Facility B total was 28 (17 RNs, 8 LPNs, 1 NP, 2 NP students).

**Data Analyses Findings.**

**Survey.** The pre-test/post-test surveys measured the nursing staff’s (1) knowledge and (2) competency through the use of a 10-item survey with five possible responses to each item (i.e., strongly agree, agree, neutral, disagree, and strongly disagree. Overall there was an increase in the staff’s knowledge and competency at both hospitals. However, there was confusion in two areas: how often the medical providers are required to see patients in LTC, and the appropriate A1c goals for elderly diabetics in LTC.

**Chart Review.** The post chart review revealed the following: (a) the A1c levels remained approximately the same; (b) A1c lab standing orders increased; (c) SSI decreased at Facility A and increased at Facility B; (d) charting for hyper-/hypoglycemic events increased. See Table 1 pre-/post-intervention chart review findings.
Table 1. Facility A and Facility B Pre-/Post-Intervention Chart Review Findings

<table>
<thead>
<tr>
<th>Item</th>
<th>Facility A</th>
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<tbody>
<tr>
<td></td>
<td>Pre N=26</td>
<td>Post N=26</td>
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<td>A1c Level</td>
<td>Range: 5.7 to 9.8</td>
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</tr>
<tr>
<td>A1c Lab Standing Order</td>
<td>7 patients</td>
<td>24 patients</td>
</tr>
<tr>
<td>Sliding Scale Insulin</td>
<td>2 patients</td>
<td>0</td>
</tr>
<tr>
<td>Hyperglycemic Event</td>
<td>1 patient</td>
<td>3 patients</td>
</tr>
<tr>
<td>Hypoglycemic Event</td>
<td>1 patient</td>
<td>3 patients</td>
</tr>
</tbody>
</table>

Discussion/Interpretation of Results. Post-intervention descriptive statistics revealed overall improvement in nursing staff’s knowledge of T2DM in LTC and increased competence in providing patient care. However, there was confusion about the appropriate A1c levels for LTC diabetics, and the LTC requirements for providers (e.g., physicians, NPs) to see patients. The expected outcomes were: A1c improvement; no orders for SSI; appropriate management of hyper/hypoglycemia; accurate, concise reporting of patients’ status to providers and increase in the nursing staff’s confidence in providing patient care. The last three outcomes were met. It is too early to determine if A1c levels improved. SSI continues to be ordered – indicating potential gap in providers’ knowledge.

Implications. Additional education needed for appropriate LTC A1c levels for elderly diabetics, and how often providers are required to see patients in LTC. Ongoing EB educational interventions are warranted for nurses and providers. Nurses want more continuing education.

Limitations. The retrospective chart reviews were paper charts, thus often illegible; fluid environment, where patients were discharged or died; small sample sizes, 62 nursing staff and 80 to 73 diabetic patients; and the project time span was one year which was not adequate to completely engage nursing staff to adopt practice changes or to note A1c improvements.
Chapter 2. Problem

Background of Problem

The unprecedented growth of the older adult population in the United States (U.S.) can be attributed to two phenomena: longer life spans and aging baby boomers (Vincent & Velkoff, 2010). These two factors will double the population of elderly adults aged 65 years and older during the next 25 years to about 72 million (National Center for Chronic Disease Prevention and Health Promotion, 2013). This aging of the population is a significant driver of a diabetes epidemic related to increased mortality, diminished functional status, and increased risk of institutionalization (American Geriatrics Society [AGS], 2013). The elderly diabetic patients who represent this fast growing population can be quite diverse in their physical and mental status, which can create challenges for their care (Kirkman et al., 2012).

Type 2 diabetes mellitus is most prevalent in LTC settings and is the result of a combination of resistance to insulin action, and the subsequent inability of the pancreas to compensate for this resistance by secreting enough insulin (American Medical Directors Association [AMDA], 2010). Care of the elderly diabetic is complex and heterogeneous because this vulnerable population is at a higher risk of premature death, coronary heart disease, and stroke. They have a higher prevalence of poor physical function, quality of life (QOL), disability, and frailty (AGS, 2013). The complexity of the elderly diabetic’s care can also be compounded by six relevant geriatric syndromes: depression, polypharmacy, cognitive impairment, urinary incontinence, injurious falls and persistent pain. Their variation in life expectancy, comorbidities, health status, and personal and caregiver choices related to healthcare contributes to the complexity of their care.
In addition to depression, other psychiatric disorders like dementia, anxiety, delirium and eating disorders are commonly seen in elderly diabetics. Some psychiatric disorder symptoms can overlap with diabetes symptoms, interfere with the correct diagnosis of certain clinical situations, and hinder treatment modalities (Doucet, Le Floch, Bauduceau, Verny, & SFD/SFGG Intergroup, 2012). Weight loss and lethargy can occur with depression and diabetes. Diaphoresis, tremors, and palpitations can occur with anxiety and hypoglycemia. The importance of mental health screening and recognition of psychiatric disorders in the elderly is vital to optimize diabetes management (Alagiakrishnan & Sclater, 2012).

The prevalence of Type 2 DM in LTC facilities may be underestimated. The AMDA reports the 1997 U.S. National Nursing Home Survey estimated that 14.5% of LTC residents were diagnosed with DM. A review of the Minimum Data Set recorded throughout the U.S. during 2002 identified nearly 145,000 residents with DM, nearly 10% higher than the 1997 estimate (AMDA, 2010). The inconsistencies of the facilities to evaluate the residents’ status, as well as the variance in identification methods, may be the primary reasons for the underreporting of LTC diabetics (AMDA, 2010).

Despite being the age group with the greatest prevalence of T2DM, older adults have often been excluded from research, randomized controlled trials (RCT), and treatment targets for diabetes and its associated conditions. The limited EB research related to diabetic treatment for the older adult has created challenges to determining standard intervention strategies appropriate for the elderly (AGS, 2013). In the absence of age appropriate EB research, the EB guidelines based on a younger, healthy population are indiscriminately applied to elderly adults (Mallery et al., 2013). In spite of the dearth of EB studies, the American Diabetes Association (ADA) (2014), the AGS (2013), the AMDA (2010), and The Beers Criteria for Potentially Inappropriate
Medication Use in Older Adults (Beers Criteria) (2015) have established clinical practice guidelines (CPGs) and algorithms specific to elderly diabetics and the LTC setting.

This DNP project was conducted at two LTC facilities on the island of Oahu, both part of the public hospital system: Facility A and Facility B Hospital. Both hospitals are extended care facilities. Facility A is located in East Honolulu, with 155 beds on five separate units (Facility A Hospital, 2014). Facility B is located in central Honolulu, with 158 beds on four separate units (Facility B Hospital, 2015). There were no clinical guidelines in place at Facility A and Facility B Hospitals to manage T2DM. Therefore, the purpose of this project was twofold: to provide EB guidelines to care for LTC elderly diabetics, and to empower the nursing staff with knowledge to appropriately manage T2DM in LTC, thus allowing the nurses to drive the plan of care for their elderly diabetic patients.

Research supports that the best clinical decisions for yielding positive patient outcomes are made when EBP is delivered in a culture or environment that supports EBP (Melnyk, Gallagher-Ford, Long, & Fineout-Overholt, 2014). The literature has extensively discussed the advantages of EBP as patient-centered, associated with higher quality of care, practitioner’s skills, and decreases in practice variation. From an administrative point of view the cost-effectiveness of EBP and improved ability to negotiate with funders are equally important outcomes (Wallen et al., 2010). Despite its numerous benefits, EBP is not the standard of care practiced consistently by clinicians (Wallen et al., 2010), which may be in part due to long lag times between the generation of research findings and their implementation in clinical settings (Melnyk et al., 2014). In its 2009 Roundtable of EB Medicine Charter and Vision Statement, the Institute of Medicine (IOM) expects an EB approach to healthcare to be the standard of practice by 2020. The IOM (2009) reports multiple barriers to EBP implementation including, shortfalls
in provider knowledge and accountability, inadequate care coordination and support, lack of insurance, poorly aligned payment incentives, and misplaced patient expectations. Melnyk et al., (2014) describes additional barriers:

- misperceptions by clinicians that it takes too much time
- inadequate EBP knowledge and skills
- academic programs that continue to teach the rigorous process of how to conduct research instead of an EB approach to care
- organizational cultures that do not support it
- lack of EBP mentors and appropriate resources
- resistance by colleagues, managers or leaders, and physicians.

This DNP Project is in alignment with Facility A and Facility B’s mission and vision to continuously strive for better ways to improve care and work processes (Facility A Hospital, 2014; Facility B Hospital, 2015) which, according to Wente & Kleiber (2013), significantly influences clinical practice guideline adherence. Facility A and Facility B’s implementation climate is also consistent with their mission. The context of implementation and adoption of EB practices allows the nursing staff to recognize that leadership remains consistent with organizational goals – so the staff can then focus on the EBP, resulting in implementation and adoption (Aarons, Horowitz, Dlugos, & Ehrhart, 2012).

This chapter will describe the conceptual framework that guided this project. A review of the literature pertaining to 1) CPGs; 2) LTC DM management; 3) RN education and knowledge; and 4) EBP clinical guideline implementation will be provided. A literature synthesis will be performed. Finally, the innovation and project objectives will be presented.
Conceptual Framework

The Iowa Model of Evidence-Based Practice to Promote Quality Care (Titler et al., 2001) is the conceptual framework that guided this project. This is a practice model, with the primary purpose of guiding clinicians to use EB research for the improvement of healthcare outcomes. The Iowa Model was chosen to guide this QI project to incorporate evidence findings and clinical guidelines for the management of elderly T2DM in LTC at Facility A and Facility B Hospitals.

The Iowa Model is comprised of seven phases (Titler et al., 2001):

1. Problem and knowledge focused triggers
2. Form a team
3. Assemble relevant research and related literature
4. Critique and synthesize research for use in practice
5. Pilot the change in practice
6. Institute the change in practice
7. Monitor and analyze structure, process and outcome data

**Problem and Knowledge Focused Triggers.** Phase one of the Iowa Model requires the clinician to formulate a question based on a clinical problem or as a result of new knowledge. The assessment of the current practice drives the formulation of a question or statement that can be answered from research, clinical judgment, and patient preferences (Titler et al., 2001). Problem-focused or knowledge-focused triggers assist with the formulation of the clinical question. The problem-focused triggers are:

- Risk management data
- Process improvement data
• Internal/external benchmarking data
• Financial data
• Identification of clinical problem

Knowledge-focused triggers are:
• New research or other literature
• National agencies or organizational standards and guidelines
• Philosophies of care
• Questions from institutional standards committee (Titler et al., 2001)

It is essential that the topic is a priority for the clinician’s organization. If it is not a priority, Titler et al., (2001) recommends the consideration of other triggers from which the organization and its patients will benefit. Determination of this DNP project’s trigger was obtained via a baseline retrospective chart reviews.

**The Chart Reviews.** Baseline retrospective chart reviews of all diabetic residents were conducted at Facility A Hospital during June 2014 and at Facility B Hospital during March 2015. Electronic Health Records (EHR) were not yet available at both facilities so the DNP student reviewed the paper charts manually. At Facility A Hospital 26 residents (18% of the census), aged 65 years and older, were identified with T2DM. There were 54 Type 2 diabetics aged 65 years and older (34% of the census) at Facility B Hospital. Specific data collected were pharmacologic treatment (insulin, oral medication, or both), current (A1c level, A1c lab standing order, orders for sliding scale insulin (SSI), hyper- and/or hypoglycemic events, code status, and comorbidities. The comorbidities of interest were dementia, obesity, hypertension (HTN), hyperlipidemia (HLD), congestive heart failure (CHF), coronary artery disease (CAD),
stroke (CVA), chronic kidney disease (CKD) indicated by < 60 glomerular filtration rate (GFR), and end-stage renal disease (ESRD) with hemodialysis (HD).

The goals of the chart reviews were twofold. First, it was important to note if the diabetic patients’ treatment plans were consistent with the guidelines set by the ADA (2014), AGS (2013), AMDA (2010) and/or Beers Criteria (2015). Most studies about glycemic control and morbidity/mortality are conducted on diabetics less than 70 years old. There is no clear evidence that elderly and younger diabetics should have the same therapeutic targets (Doucet et al., 2012). It was imperative to ascertain which guidelines the providers were following with respect to implementing a plan of care that was appropriate for the patients’ current A1c levels and ordering A1c labs. Additionally, it was important to know whether providers were ordering SSI, since it is contraindicated in LTC secondary to hypoglycemic tendencies (AGS, 2012; Beers Criteria Update Expert Panel, 2012; AMDA, 2010). Second, the frequency of hyper- and/or hypoglycemic episodes needed to be ascertained, as well as how the nursing staff managed those events. Appropriate management of hyper-/hypoglycemia begins with the correct identification of the diagnosis, implementation of appropriate treatment plans, notification of the medical provider with a correct, succinct assessment of the patient’s status, and accurate documentation of the event in the patient’s chart.

Based on the chart review, the triggers for this DNP project were problem-focused in that clinical problems were identified in the patients’ treatment plans, and knowledge-focused based on the nursing staff’s management and charting of hyper-/hypoglycemic events.

The chart reviews revealed problems with the residents’ treatment plans. The majority of the A1c levels at both hospitals were surprisingly appropriate based on the patient’s age, treatment regimen, code status, and comorbidities. According to ADA (2014), AGS (2013) and
AMDA (2010), A1c levels for elderly diabetics in LTC are less stringent and based on an individualized plan of care that takes into consideration the patient’s code status and co-morbidities. Additionally, A1c labs must be checked annually or twice a year based on the patient’s cognitive impairment or limited life expectancy. Standing orders for A1c labs were in place for 27% of the patients at Facility A (seven patients), and 55% of the Facility B patients (30 patients). Another problem was that four patients’ plan of care included SSI: two each at Facility A and Facility B. AMDA (2010) states that SSI is contraindicated in LTC, and the Beers Criteria (2015) strongly recommends that it should be eliminated completely from LTC settings.

The knowledge gap identified during the chart review was related to the management and charting of hyper- and hypo-glycemic events, as well as communicating the episodes accurately to the medical providers. There were two patients with documented hyperglycemia (Facility A =1; Facility B =1), and three patients with hypoglycemic events (Facility A =1; Facility B =2). Several of these patients experienced hyperglycemia and hypoglycemia on multiple days. Each charting entry for the hyper- and hypoglycemic events had errors ranging from: incorrect diagnosis of hypoglycemia, no follow up blood sugar check to see if the treatment resulted in improved blood sugar, medical provider was not contacted about the event, or charting was not completed. The management of the events was incorrect with respect to accurately identifying hyper- and hypoglycemia, appropriate treatment, not notifying the providers, and charting at both hospitals.

Problem-focused and knowledge-focused triggers about T2DM were identified via the chart review. Based on the results of the review, the educational intervention would need to comprehensively discuss the definitions, symptoms, treatment, and charting requirements for
hyper- and hypoglycemia. The intervention would also need to address appropriate A1c levels for LTC, A1c lab standing orders, and pharmacologic treatment to assist the nursing staff in driving the plan of care. Significant findings of the baseline retrospective chart reviews are listed below on Table 2.1: Facility A Hospital and Facility B Hospital Pre-Educational Intervention Chart Review Findings.

Table 2.1. Facility A and Facility B Pre- Intervention Chart Review Findings

<table>
<thead>
<tr>
<th>Item</th>
<th>Facility A</th>
<th>Facility B</th>
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<tbody>
<tr>
<td></td>
<td>Pre Intervention N=26</td>
<td>Pre Intervention N=54</td>
</tr>
<tr>
<td>A1c Level</td>
<td>Range: 5.7 to 9.8</td>
<td>Range: 5.1 to 11.1</td>
</tr>
<tr>
<td>A1c Lab Standing Order</td>
<td>7 patients</td>
<td>30 patients</td>
</tr>
<tr>
<td>Sliding Scale Insulin</td>
<td>2 patients</td>
<td>2 patients</td>
</tr>
<tr>
<td>Hyperglycemic Event</td>
<td>1 patient (2 events)</td>
<td>1 patient (3 events)</td>
</tr>
<tr>
<td>Hypoglycemic Event</td>
<td>1 patient (3 events)</td>
<td>2 patients (3 / 1 events)</td>
</tr>
</tbody>
</table>

**PICO.** The clinical question is arranged in a PICO format for ease of searching the literature, utilizing the following method to frame the question: P = Population of interest, I = Intervention, C = Comparison, O = Outcome (Titler et al., 2001). See Table 2.2: PICO.

Table 2.2. PICO

<table>
<thead>
<tr>
<th>P</th>
<th>Population of interest</th>
<th>Licensed nursing staff at two LTC Hospitals</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Intervention</td>
<td>Short-term EB diabetes educational interventions and implementation of EB clinical guidelines to manage T2DM in LTC</td>
</tr>
<tr>
<td>C</td>
<td>Comparison</td>
<td>No diabetic educational in-services and no EB clinical guidelines to manage T2DM in LTC at the time of the initial chart review</td>
</tr>
<tr>
<td>O</td>
<td>Outcome</td>
<td>Improved patient outcomes via EB guidelines for hyper- and hypo-glycemic management; and increase nursing staff’s confidence providing patient care</td>
</tr>
</tbody>
</table>
The clinical question for this DNP Project was: “Can a series of short term educational interventions for the licensed nursing staff at two LTC facilities improve elderly diabetic outcomes via appropriate T2DM management, and increase licensed nursing staff’s confidence in providing care to the diabetic residents?”

**Form a Team.** The benefits of forming a team include a broader knowledge base, greater creativity and perspective, better problem-solving, shared risk, shared workload, and more stimulating and motivating environment for work (Titler et al., 2001). The team members of this DNP Project consisted of the DNP student’s external advisor, who is a geriatric nurse practitioner (GNP) and Facility A Provider, the Facility B Director of Education, the Directors of Quality Assurance, and the Pharmacists. There is no physician on the team because the GNP provides daily patient care Monday through Friday at both hospitals, as well as guidance to the nursing staff on a regular basis, as needed.

**Literature Review**

The current CPGs for elderly diabetic management are published by the ADA (2014), AGS (2013) and AMDA (2010). The Beers Criteria (2015) is a guideline for healthcare professionals to help improve the safety of prescribing medications for older adults. All four guidelines are included in this literature review.

A systematic search of the literature was conducted based on the PICO question. The initial literature search strategy was created utilizing specific filters, relevant search terms, and databases and focused on T2DM management in LTC, RN education and knowledge, and implementation of EB clinical guidelines for LTC nursing staff. The filters applied were: Meta-analysis, systematic review, random controlled trial, English language, publication date within 5 years, and age greater than 65 years. An electronic search was conducted in PubMed Medline,
Google Scholar and Cochrane with the following terms: “geriatric patient”, “diabetes”, “long-term care”, “elderly”, “diabetes management”, “insulin therapy”, “pharmacologic therapy” and “nurse education”. Ten articles from ‘Related Citations’ were retrieved during the search. The search yielded 82 individual articles, of which 33 were relevant. Of these, ten articles were not available from the University of Hawai`i – Mānoa (UHM) Library system in a timely manner; and three articles were based on the CPGs containing duplicate information, and so were eliminated. A diabetes case study was selected for the educational intervention, but was eliminated when the DNP student’s external advisor chose instead to showcase a situation that occurred with a previous Facility A patient. Studies that focused on community dwelling elderly adults, and complex pharmacologic management were not considered. Twenty studies were eventually synthesized based on this initial search. A second search was implemented with the same filters, using search words, “RN knowledge, “diabetes knowledge”, “EB”, “EB practice”, “implementation” and “clinical guidelines”, yielding 311 articles, of which 16 were relevant. Twelve articles were eliminated: seven articles were not available from the UHM Library in a timely manner; three articles discussed information technology and EHR; and two articles referred to simulation training. After careful review, four articles were then synthesized for the project. For this project, 24 individual studies were critiqued utilizing Mosby’s Quality of Evidence tool. (See Table 2.3 Mosby Research Tool and Synthesized Articles.)

The Review of Literature (ROL) focused on four themes: (1) CPGs from the ADA (2014), the AMDA (2010), the AGS (2013) and the Beers Criteria (2015); (2) LTC DM management; (3) RN education and knowledge; and (4) EBP guideline implementation. A total of three systematic reviews (SR) were located in two categories (T2DM management in LTC [2] and RN education and knowledge [1]). There were no Level II articles.
Table 2.3. Mosby Research Tool and Synthesized Articles

<table>
<thead>
<tr>
<th>Mosby’s Quality Of Evidence</th>
<th>CPG</th>
<th>LTC DM Management</th>
<th>RN Education and Knowledge</th>
<th>EB Clinical Guideline Implementation</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level I</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meta-analysis &amp; Systematic Reviews</td>
<td>2 SR</td>
<td>1 SR</td>
<td>3 SR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level II</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Experimental design (RCTs)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Level III</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Quasi-experimental design</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Level IV</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Case-controlled, cohort, longitudinal studies</td>
<td>4</td>
<td>4</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Level V</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Correlation studies</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Level VI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Descriptive studies</td>
<td>4</td>
<td>1</td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Level VII</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Authority opinion or expert committee reports</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPG</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Review of Literature</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>5</td>
<td>10</td>
<td>5</td>
<td>4</td>
<td>24</td>
</tr>
</tbody>
</table>

The remaining 15 articles were at Level III through VII, as well as four CPGs and two literature reviews. There were no RCTs, which was not surprising, since the majority of the literature recommended that additional RCTs are needed for elderly diabetes in LTC.

Mosby’s Quality of Evidence was used to critique the level of evidence and internal validity of the literature. Articles were classified in Level I through Level VII, and “Other” which included CPGs and two ROL. (See Table 4, Mosby Research Tool and Synthesized Articles.) The Appraisal of Guidelines for Research and Evaluation (AGREE) II instrument for clinical practice guidelines evaluation is a tool designed to assist guideline users to assess the methodological quality of guidelines (AGREE Next Steps Consortium [AGREE], 2009). The AGREE II instrument was used to evaluate the four CPGs: ADA (2014), AGS (2013), AMDA
Clinical Practice Guidelines. Clinical guidelines were available from the ADA (2014), the AMDA (2010), the AGS (2013), and Beers Criteria (2015), and focused on elderly or frail elderly diabetics ≥ 65 years old in the long-term care setting. Frailty is identified with a five-item FRAIL questionnaire (Fatigue, Resistance [inability to climb stairs]; Ambulation [inability to walk one city block]; Illness [more than five major illnesses]; and Loss of weight, with frailty defined as the presence of at least three out of five measured variables (Mallery et al., 2013). The nine-item Clinical Frailty Scale is another tool for measuring frailty, and classifies frailty based on limitations in function, cognition, and mobility. Severe frailty is defined as a score of seven or higher, and indicates those patients who require assistance with basic activities of daily living (Mallery et al., 2013).

The literature search yielded two international clinical guidelines: European Diabetes Working Party for Older People [EDWPOP] (Sinclair et al., 2011) and Diabetes Care Program of Nova Scotia [DCPNS] Palliative and Therapeutic Harmonization Program (Canadian Journal of Diabetes, 2013; and Palliative and Therapeutic Harmonization [PATH], 2013). The decision was made to adhere to the U.S. guidelines only for this project. However, in reviewing the
international guidelines, their recommendations were similar to the ADA (2014), AGS (2013), AMDA (2010), and Beers Criteria (2015) in all areas of elderly diabetic care in LTC, except the international guidelines recommended acceptable A1c levels as high as 12% for the very frail with less than one year life expectancy (Sinclair et al., 2011) and 20% if the disease process is irreversible (PATH, 2013).

The ADA (2014), AGS (2013), AMDA (2010), and Beers Criteria (2015) clinical guidelines are consistent in their recommendations for the following:

- **Treatment**: should be individualized glycemic control based on comorbidities, QOL and health status
- **SSI**: not recommended in LTC
- **A1c levels**: 7% to 8%; AGS recommends up to 9% depending on health status and warns of potential harm for A1c less than 6.5%
- **A1c Labs**: every 6 months if well controlled or every 3 months if not.
- **Hypoglycemia treatment** is consistent with ADA recommendations
- **Staff education on diabetes management in LTC** should be ongoing.

Additionally, the AMDA (2010) and ADA (2014) recommended educational reviews and updates for the direct patient care staff, as well as facility policies and guidelines that are regularly reviewed and audited.

Moreover, the 2015 Beers Criteria update recommends the complete elimination of SSI from LTC settings. Glyburide is also contraindicated to treat elderly diabetics for the same reason that SSI is not a wise choice: both have hypoglycemic tendencies.

**LTC Diabetes Management.** The goal for the literature review was to continue searching for higher levels of evidence for the various aspects of managing DM in the LTC setting.
Themes consistent with the CPG recommendations (treatment modalities, SSI, A1c levels, hypoglycemia, ongoing staff education) were noted in many of the articles synthesized in this group.

_Treatment._ A Kaiser Permanente 4-year cohort study of 72,000 diabetics ≥ 60 years old by Huang et al. (2014) and a ROL by Tanwani (2011) contend that treatment goals should be individualized for each patient based on comorbidities and health status, especially in the LTC setting. An expert committee report by Kirkman et al. (2012) confirmed the opinions of Huang et al. and Tanwani about individualized treatment goals, and recommended additional RCTs should be conducted to further examine different treatment approaches to achieve elderly glycemic control. A cohort study by Hager, Loprinzi, & Stone (2013) discussed QOL for the elderly diabetic and how tight glycemic control did not meet QOL goals, and also recommended additional RCTs be conducted to evaluate this association further. These recommendations are consistent with the CPGs.

When the ADA made the recommendation that A1c levels should be at 7% or lower for all diabetics, that decision was not based on studies that included frail elderly diabetics. An AGS guideline implementation study was conducted by Lee et al. (2011) to determine hyper- and hypoglycemic outcomes associated with implementation of the AGS guideline for A1c level of less than 8% in frail older adult diabetics. Clinician education and a pre-test/post-test surveys were administered to various groups of clinicians ranging from 289 to 385 participants between October 2002 and December 2004 to determine level of knowledge or adherence to CPGs. To meet the required A1c level of less than 8%, the rates of insulin and oral anti-hyperglycemic medication use increased faster at the study facility, than those documented in national trends. The study results were positive and negative. There were more episodes of severe hypoglycemia
during the early implementation phase, and episodes of hyperglycemia and hypoglycemia were dramatically lower during the late period of the study. The implication of this study was that guideline implementation led to less hyperglycemic events, but more severe hypoglycemic events requiring emergency department visits in the early implementation period. It is the contention of Lee et al. (2011) that guideline implementation should be coupled with close monitoring of hypoglycemia in early stages. In usual clinic settings, frequent monitoring is not feasible and implementing an A1c target of less than 8% for frail older diabetics may lead to greater increases in severe hypoglycemia. The bottom line was tight glycemic control was not appropriate for frail elderly diabetics (Lee et al., 2011).

A prospective study by Zekry et al. (2012) sought to determine the specific impact of diabetes on long-term modality in very old diabetics with multiple comorbidities and functional disabilities. The participants were a cohort of 444 elderly diabetics, mean age 85 years. The results indicated that in the very old, diabetes is associated with multiple comorbidities especially HTN, overweight/obesity, and ischemic heart disease. The cohort also had functional disabilities with a poor overall health status indicating diabetes contributes to functional disabilities. The findings suggest that the active management of all comorbidities, rather than a select few, is essential to improving the prognosis for older diabetics.

SSI and Insulin. The Beers Criteria (2015) recently updated their previous 2013 guideline in which the recommendation was to avoid SSI in LTC. At this time the current 2015 recommendation is to completely eliminate SSI from LTC secondary to hypoglycemic tendencies. A systematic review by Van Brunt, Curtis, Brooks, Heinloth, & Castro (2013) reports that available data about insulin therapy in LTC diabetics is scarce, and the information they were able to locate revealed that treatments varied widely and, therefore, was difficult to
draw conclusions. Sliding scale insulin treatment was prevalent in LTC settings despite recommendations by ADA (2014), AGS (2013), and AMDA (2010) to avoid using that treatment modality in LTC settings.

A1c. Lowering A1c is one goal of a diabetes treatment program; however, there is no evidence that using medication to achieve tight glycemic control in older adults is beneficial. When evaluating A1c levels in LTC settings, Van Brunt et al. (2013) report that the numbers ranged from < 6.5% to 8.0% and that higher A1c values were associated with better patient outcomes (Van Brunt et al., 2013). This information is consistent with the CPGs.

Hypoglycemia. As mentioned previously, there is a paucity of research reported for the elderly diabetic residing in a LTC facility. A correlation study by Newton et al. (2013) discussed the tendency for hypoglycemia to increase with age. Hypoglycemic symptoms of lethargy, confusion, and diaphoresis can be mistaken for dementia—so it is important to assess the patient carefully to determine the cause of their change in health status. Hypoglycemia is associated with increased emergency room visits, hospitalizations, and higher mortality. Newton et al. (2013) contend that additional RCTs are needed to evaluate glycemic management. The AMDA (2010), and AGS (2013) recommend that LTC facilities implement a policy and procedures for treating hypoglycemia.

Staff Education. A cohort study by Hager et al. (2013) implemented a retrospective chart review of 224 diabetics in LTC settings to compare relevant outcome variables of published research with outcomes found in the LTC facility where the chart review occurred. The findings emphasized an interdisciplinary approach to patient care, ongoing mandatory staff training, and a person dedicated to “diabetes excellence” (i.e., an appointed nursing leader who will support the nursing staff and provide clinical guidance) were factors associated with better clinical outcomes.
in this group of diabetics. A cohort study by Feldman, Rosen, & DeStasio (2009) involved a retrospective chart review of 372 elderly diabetics to examine policies and guidelines for T2DM management in a LTC facility. This report found numerous opportunities for improvement in the quality of care and their recommendations were similar to those of Hager (2013) in that a multidisciplinary approach would be optimal to properly manage elderly diabetics. The report also recommended the development of EB protocols and algorithms for consistent, appropriate treatment.

**RN Education and Knowledge.** Registered nurse education and knowledge articles specific to the LTC setting were limited to five that were relevant to this project: four qualitative descriptive studies and one systematic review. A descriptive study by Barba, Hu, & Efird (2011) administrated a Geriatric Nursing Care survey to 298 LTC nursing staff to determine their satisfaction with the quality of geriatric care in their practice setting, and to identify obstacles that seemed to prevent the provision of quality geriatric care. The RNs responded that EB guidelines were needed to improve the quality of patient care at their facility and to promote RN autonomy.

A 2013 Plan-Do-Study-Act descriptive study by Boyle, O’Neil, Berry, Stowell, & Miller, included 83 physicians, administrators, RNs, certified nurse aides (CNAs), and nutrition staff at a LTC facility. Boyle et al evaluated qualitative and quantitative baseline care practices, as well as the overall health of the residents with diabetes, with focus-group interviews, a care-provider survey and chart review. The authors found that a multidisciplinary approach to care, with QI activities and educational in-services improved glycemic control, increased comprehensive diabetes management, decreased fragmented care, and empowered the staff. Raterink’s 2011 descriptive qualitative study, with its very small sample of 11 RNs, evaluated critical thinking in
practice utilizing a survey asking RNs to evaluate work-related factors that enhance or pose barriers to critical thinking on the job. In this study, the RNs felt that a collaborative team effort and staff support would facilitate critical thinking and foster confidence development. The study’s recommendations included: (a) efforts to challenge RNs cognitively as well as clinically were essential to developing critical thinking skills; and (b) RNs must feel supported by administration to ensure a positive environment that is conducive to role development, confidence, communication and energy to provide quality care through critical thinking (Raterink, 2011). A descriptive triangulation study by Wellard, Rasmussen, Savage, & Dunning (2013), consisting of 68 nursing staff and 20 chart reviews, identified staffing and organizational factors that influenced the poor quality of care for the LTC patients. The RNs felt that their T2DM knowledge was suboptimal, resulting in suboptimal patient care. The RNs were in agreement that continuing education about T2DM would improve their knowledge, resulting in better management of their elderly diabetic patients.

These four articles revealed a consensus of the LTC nurses that knowledge is power. The RNs wanted to develop skills specific to the LTC setting to provide best patient care. Dwyer’s (2011) systematic review, consisting of eight qualitative papers, evaluated the experiences of LTC RN managers who felt there was a lack of specific education focused on clinical leadership and health team management. The RN managers believe that geriatric nursing is a very specialized and complex area of healthcare that needs a current structured curriculum of learning and development as leaders and clinicians in order to support and mentor the nursing staff.

**EBP Guideline Implementation.** The advantages of EBP have been widely discussed in the literature, and yet is not always the standard of care by which healthcare professionals practice (Wallen et al., 2010). It is the contention of Melnyk et al. (2014) that the expectation of
healthcare systems is for RNs to engage in EBP, but there is uncertainty about what that means and what exactly that level of engagement encompasses. This lack of clarity about EBP expectations was the impetus for a committee of seven experts from clinical and academic settings to develop EBP competencies: 13 for RNs and 11 for NPs who are delivering care in real-world clinical settings. Competency is not a skill or task, rather characteristics required to act effectively in the nursing setting – and a particular competency “cannot exist without scientific knowledge, clinical skills, and humanistic values” (Melnyk et al., 2014, p. 7). The committee’s goal was for incorporation of the competencies into healthcare system expectations, orientations, job descriptions, performance appraisals, and clinical ladder promotion processes. The hope was that the competencies could drive higher quality, reliability, and consistency of healthcare, and reduce costs (Melnyk et al., 2014).

A quasi-experimental mixed methods study by Wallen et al. (2010) sought to determine the efficacy of a structured mentorship program to implement EBP in a clinical setting. The study consisted of three focused discussions with nurse leaders (including nurse managers, clinical nurse specialists, clinical educators, and nurse researchers) and leaders in the Shared Governance Nursing Practice Council. The RNs selected to participate in the program survey would ultimately serve as mentors to RNs at all levels and specialties. The comparison group included RNs randomly selected from various clinical practice areas. Additionally, pre- and post-intervention surveys were administered to both groups. Findings from the study revealed that participating in an EBP mentorship program improved RNs’ perceptions of EBP organizational culture and increased their readiness for EBP and EBP implementation (Wallen et al., 2010).
A 2012 descriptive study by Roe & Whyte-Marshall examined a mentoring project to increase RN implementation of EBP in a clinical setting. An associate professor of nursing served as the mentor to 101 RNs at an acute care hospital. The project goals were (a) enact the EBP mentor role; (b) provide educational opportunities for healthcare providers regarding EBP; and (c) use the findings of a survey on barriers to EBP to help plan the mentorship experience. Results from the survey revealed the following barriers: (a) the amount of research information is overwhelming and relevant literature is not compiled in one place; (b) insufficient time to review the literature; and (c) the RNs did not believe that they have authority to change patient care procedures (Roe & Whyte-Marshall, 2012). The barriers identified by the RNs in this study were similar to the barriers to practice reported by Melnyk et al. (2014). The project outcomes resulted in the implementation of an EBP mentor role, and EBP educational modules were prepared and approved for one hour of continuing nursing education credit. The survey results were addressed by the EBP mentor, staff development professionals, and agency staff (Roe & Whyte-Marshall, 2012).

A qualitative descriptive study by Dogherty, Harrison, Graham, & Keeping-Burke (2014) examined nurses’ tacit knowledge regarding facilitation in their previous experiences implementing EBP. During a knowledge translation symposium to examine what had worked and what had not during the implementation of EBP, themes arose associated with the successes and failures of participants’ efforts to facilitate EBP. Successful implementation of EBP was related to: (a) focus on a priority issue; (b) relevant evidence; (c) development of strategic partnerships; (d) use of multiple strategies to effect change; and (e) facilitator characteristics and approach. Negative factors that influenced the process included: (a) poor engagement or ownership; (b) resource deficits; (c) conflict; (d) contextual issues; and (e) lack of evaluation and
sustainability. What this means for the healthcare facility implementing EBP is that a wide array of factors influence facilitation of EBP including the individual staff member, the environment, organizational, and cultural environments.

**Literature Synthesis.**

*Clinical Practice Guidelines.* The consensus of the CPGs is that diabetes management for the elderly should be individualized based on comorbidities, geriatric syndromes, and life expectancy. Of equal importance is the ongoing enhancement of the patient’s QOL. For the most part, there was a consensus about how glycemic control should be achieved. The ADA (2014), AGS (2013), AMDA (2010) and Beers Criteria (2015) listed Metformin as the preferred first line medication unless contraindicated. An inconsistency that was evident was that the ADA (2014) recommended the use of glyburide for treating the elderly diabetic patient, and AGS (2013), AMDA (2010) and Beers Criteria (2015) did not because of the drug’s hypoglycemic qualities and impact on elderly T2DM patients. All guidelines stated that additional RCTs are needed for this population.

*LTC Diabetes Management.* These articles reiterated the theme of individualized, patient specific diabetes management, and patient quality of care. Tight glycemic control does not always improve the elderly diabetics’ health status and in some situations may increase the risk of hypoglycemia. Five of the articles stated the need for additional RCTs in this area, a theme consistent throughout literature.

*RN Education and Knowledge.* The four Level VI descriptive studies contained an ongoing theme: that continuing education about T2DM treatment for the elderly is valued and needed in LTC facilities. A limitation of this group of articles was the very small sample sizes in some studies (e.g., n=11). There was one systematic review that focused on RN managers’
contribution to implementing EBP in the LTC setting. The consensus was that a nursing leader is required to mentor and support the nursing staff for successful implementation of EBP.

**EBP Guideline Implementation.** These studies are consistent with current literature that extols the advantages of implementing EBP in clinical settings. The task at hand is determining the method to ensure efficacy of implementation. What seems to be prevalent in the literature is that a leader or a mentor or a facilitator is essential to the success of the implementation. Additionally, during the planning and doing phase, communication is key between the nursing staff, providers, and the leader(s). The mentorship has the potential to influence nurses so that the process will be a solid learning experience, and eventually a sustainable undertaking at the facility.

**Innovation/Objectives**

The purpose of this project was to implement EB guidelines for elderly diabetics in LTC and empower the nursing staff with the knowledge to provide appropriate patient care. Based on the ROL, an advantage of implementing CPGs in LTC would allow the nursing staff to be consistent in their patient care for the elderly diabetics.

This DNP Project required a short-term educational intervention for the licensed nursing staff at Facility A and Facility B Hospitals, specific to the elderly population in the LTC setting. The intervention curriculum was based on guidelines from the ADA (2014), AGS (2013), AMDA (2010), and Beers Criteria (2015) and focused on topics essential to improving diabetic patient care in the LTC setting: (a) general overview of diabetes and its pathophysiology; (b) EBA1c protocols for elderly diabetics in LTC; (c) estimated average glucose and glycemic control; (d) co-morbidities’ effect on glycemic control; (e) the effect of polypharmacy on glycemic control; (f) management of hyper-/hypoglycemia; and (g) medication contraindications for
elderly diabetics. Ultimately the goal was to empower the nursing staff with the knowledge of EB clinical guidelines for managing care of elderly diabetics in LTC settings. Equally important was for the licensed nursing staff to be knowledgeable about EB diabetes management so they can drive the plan of care. The hope was that this educational intervention would result in improved patient outcomes, as well as the licensed nursing staff’s improved confidence in their ability to manage the Type 2 diabetics.

The objectives for this DNP project were that the nursing staff would be able to:
(a) define hyper- and hypoglycemia; (b) implement EB guidelines to manage hyper-/hypoglycemia; (c) recall appropriate A1c levels for diabetics in LTC; and (d) report appropriate and significant information to the medical providers about the patients’ diabetic status.

Summary

Clinical guidelines published by the ADA (2014), AGS (2012), AMDA (2010) warn against establishing tight glycemic control in elderly diabetics. It is imperative that glycemic control is balanced with the risk of hyper- and hypoglycemia and the patient’s clinical and functional status. The CPGs recommend avoiding SSI, and the Beers Criteria (2015) state SSI should be eliminated as a treatment option in LTC settings.

In the LTC setting, there is a need for continuing education, ongoing staff training and annual QI interventions for the RNs and staff. The LTC facilities need EB guidelines, algorithms and policies to maintain optimal patient care skills for their licensed staff. According to (Melnyk et al., 2014), organizations that set standards for practice and incorporate guidelines into their facilities set the stage for a positive attitude toward EBP by the nursing staff and serves to promote best practices. Moreover, the literature supports that a nurse leader or mentor is
needed to ensure EBP implementation is ongoing. The leader must be consistently present to follow up with the staff to ensure accuracy in their new skills.
Chapter 3. Methods

Many elderly T2DM diabetics in LTC facilities have multiple comorbidities and oftentimes multiple medications prescribed as part of their treatment regimen, which can increase the complexity of their care (AMDA, 2010). While this age group has the greatest prevalence of T2DM, they have been excluded from research, which creates challenges for providing optimum care. The lack of age-appropriate EB research has resulted in EB guidelines based on a younger, healthy population being indiscriminately applied to elderly adults (Mallery et al., 2013).

In the LTC setting, physicians are mandated to see their patients every 30 days for the first 90 days following admission for routine evaluation, and then every 60 days thereafter (Levy, Palat, & Kramer, 2007). In the interim, it then becomes the responsibility of the nursing staff to drive the patient’s plan of care. Based on the ROL and the baseline retrospective chart review, this DNP project focused on training the nursing staff via an educational intervention to improve patient care. The project goal was to empower the nursing staff with the knowledge of EB clinical guidelines for managing care of elderly diabetics in LTC. The T2DM educational interventions were based on guidelines from the ADA (2014), AGS (2012 and 2013), AMDA, (2010), and the Beers Criteria (2015). There were eight educational interventions each, held at Facility A and Facility B Hospitals.

This chapter will discuss the series of events initiated by this DNP project, to elicit significant clinical change at Facility A and Facility B Hospitals. Items that will be discussed include: project objectives, design, practice change description, operational definitions, setting and sample, data collection procedures, program evaluation plan, ethical considerations, human subjects considerations and project limitations.
**Objectives**

The conceptual framework that guides this DNP Project is the Iowa Model of Evidence-Based Practice to Promote Quality Care (Titler et al., 2001), which requires the formulation of a clinical question arranged in a PICO format.

- **P** = Licensed nursing staff at two LTC Hospitals
- **I** = Short-term EB diabetes educational in-services and implementation of EB clinical guidelines to manage T2DM in LTC
- **C** = No diabetic training at this time and no EB clinical guidelines to manage T2DM in the LTC setting prior to the initiation of the QI project
- **O** = Improved patient outcomes via EB guidelines for hyper- and hypo-glycemic management; and increase nursing staff’s confidence providing patient care

The clinical question for this QI project is: “Can a series of short term educational interventions for the licensed nursing staff at two LTC facilities improve elderly diabetic outcomes via appropriate T2DM management, and increase licensed nursing staff’s confidence in providing care to the diabetic residents?”

The LTC diabetic residents are part of a vulnerable group of patients whose prevalence of functional disability and multiple comorbid conditions increases the complexity of diabetes management. Hyperglycemia impairs cognition, decreases pain thresholds, impairs vision, impedes wound healing, and may increase the risk for falls (AMDA, 2010). Hypoglycemia, left untreated, may cause permanent neurological impairment, accelerate cognitive decline and, similar to hyperglycemia, may also increase risk for falls (AMDA, 2010). The limited EB research related to the diabetic treatment strategies for the older adult has created challenges to determining standard intervention regimens appropriate for all older adults (AGS, 2013).
establishment of EB policies for glycemic control and hyper-/hypoglycemia treatment can potentially improve patient outcomes and increase staff satisfaction (Kirkman et al., 2012). The literature clearly states that the implementation of EBP is associated with higher quality of care, improved practitioner’s skills, and decreases in practice variation. From an administrative point of view the cost-effectiveness of EB approaches to care and improved ability to negotiate with funders are equally important outcomes (Wallen et al., 2010).

Purpose: The purpose of this project was to implement EB guidelines for elderly diabetics in LTC and empower the nursing staff with the knowledge to provide appropriate patient care.

Objectives: At the end of this project, the nursing staff will be able to: (a) define hyper- and hypoglycemia; (b) implement EB guidelines to manage hyper-/hypoglycemia; (c) recall appropriate A1c levels for diabetics in LTC; and (d) report appropriate and significant information to the medical providers about the patients’ diabetic status.

Design

This DNP project was a sequential mixed methods QI intervention spanning a one-year period, from May 2014 to May 2015, and examined the efficacy of a short term educational program to improve licensed nursing staff’s knowledge of diabetic care for older adults in a LTC setting. The project was conducted in four phases: (1) baseline chart review to examine pharmacologic treatment, glycosylate hemoglobin (A1c) level, A1c lab standing order, sliding scale insulin orders, and hyper/hypoglycemic events; (2) EB educational interventions for LTC T2DM management; (3) nursing staff pre-test and post-test intervention survey; and (4) retrospective chart review post intervention.
Exemption From IRB

This DNP project meets requirements for exemption from the UHM Institutional Review Board (IRB) because it is a QI project. QI projects are exempt from the IRB. Additionally this project meets the following UHM IRB exemption categories:

- Category 2: Research will involve use of educational tests for participants ages 18 and older and information obtained is recorded anonymously; and
- Category 4: Research will involve use of existing data, documents or records that are recorded anonymously (University of Hawaii Office of Research Compliance Human Studies Program [UHM ORC], 2015).

Practice Change

Based on the retrospective chart review it was determined that T2DM EB clinical guidelines were needed at both hospitals to ensure consistency of patient care and to assist the nursing staff to drive the diabetic patients’ plan of care. The ROL supported the following EB practices to maintain the elderly diabetics’ QOL: treatment should be individualized based on patient’s comorbidities and health status; SSI is not recommended in LTC settings; appropriate A1c levels should be between 7% to 8% -- but may be as high as 9% depending on the patient’s health status; A1c labs should be drawn every six months if well controlled and every 3 months if not; hypoglycemia treatment is consistent with ADA (2014) recommendations; and staff education should be ongoing.

A series of educational interventions were conducted, eight each at both hospitals, and the curriculum was based on guidelines from the ADA (2014), AGS (2013), AMDA (2010), and Beers Criteria (2015) and focused on these topics: (a) general overview of diabetes and its pathophysiology; (b) EB protocols for A1c in LTC; (c) estimated average glucose, and glycemic
control; (d) co-morbidities’ effect on glycemic control; (e) the effect of polypharmacy on glycemic control; (f) management of hyper-/hypoglycemia; and (g) medication contraindicated for elderly diabetics.

**Rogers’ Diffusion of Innovations.** Rogers (2003) proposed that an innovation is an idea or practice perceived as new by an individual, group or organization, and diffusion is a process of change in which an innovation is communicated over time through certain channels among members of a social system. An individual’s decision to adopt an innovation or not is presented in several stages. First, an awareness of the innovation is realized, and an attitude toward it is then formed. The individual next determines whether to adopt or reject the innovation. If the innovation is adopted, it is then implemented, and finally the individual confirms their decision (Rogers, 2003). Rogers defines the perceived characteristics of an innovation as relative advantage, compatibility, complexity, trialability, and observability. Perceived attributes are an innovation’s characteristics that make it more or less appealing to the individual, and Rogers (2003) describes the characteristics of an innovation as follows:

- **Relative advantage** is the degree to which an innovation is perceived as better than the current idea or practice. The greater the perceived relative advantage of an innovation, the more rapid its rate of adoption will be;
- **Compatibility** is the degree to which an innovation is perceived as consistent with the individual’s existing values, beliefs, past experiences, and needs;
- **Complexity** is the degree to which an innovation is perceived as difficult to understand or use;
- **Trialability** refers to the degree to which users can alter or implement an innovation on a small scale;
- Observability is the degree to which the results of an innovation are visible to others. Rogers (2003) contends that innovations whose outcomes are easily observed tend to be adopted faster than those with more subtle evidence of desirable outcomes.

**Application of Characteristics of Innovation.** By understanding the definition and characteristics of each stage in the innovation diffusion process, new policies and procedures can be implemented more easily, resulting in individuals readily accepting change (Rogers, 2003). It was anticipated that the application of Rogers’ characteristics of innovation to this DNP Project would strengthen the probability of its adoption. The *relative advantage* of this DNP Project’s adoption at Facility A Hospital and Facility B Hospital was twofold: (1) it had the potential to improve patient outcomes; and (2) it could facilitate greater confidence in the licensed nursing staff’s critical thinking skills because it would allow a sense of control over the patients’ care plan. The DNP Project educational inservice’s *compatibility* needed to tie in to the licensed nursing staff’s care plans and nursing diagnoses. Including the EB guidelines in the assessment process could also assist with the practice change. The *complexity* of the adoption process would be neutralized by an Algorithm of EB guidelines for managing hypoglycemia in the LTC settings that was provided and reviewed prior to implementation. *Trialability* allows for ease of making changes or clarifying various aspects of the algorithm, based on feedback after the pilot was implemented. The final characteristic, *observability*, occurred post educational in-service, as a result of the licensing nursing staff’s charting and receipt of laboratory results for A1c levels. During the post chart review, the number of hypo- and hyperglycemic events will be recorded. Results of all trends will be provided to the licensed nursing staff via a memo posted on each unit. Keeping the staff updated is in keeping with Rogers’ (2003) contention that, “the
observability of an innovation, as perceived by members of a social system, is positively related to its rate of adoption”.

**Plan for Sustainment.** A plan for project sustainment was discussed at the onset of this project. One option was that at least one RN at each hospital might consider obtaining education to become a Certified Diabetes Educators (CDE) – which would provide an expert at both locations with whom the nursing staff could collaborate.

The CDE represents a diverse group of health professionals, including nurses, dietitians, and pharmacists (Sherr & Lipman, 2015). Results of a National Practice Survey of 4,855 CDE respondents assessed current diabetes education practices and trends in the U.S. While the individual (one-on-one) delivery of diabetes self-monitoring education was the most commonly reported activity, the CDEs also engage in group delivery of care, remote care, and interdisciplinary care. Monitoring of various factors related to diabetes care, like clinical elements (A1c, Lipids, Blood Pressure), microvascular, macrovascular, acute complications, and psychosocial elements confirms their clinical competence (Sherr & Lipman, 2015).

Currently there is no CDE employed at Facility A or Facility B Hospitals. During the educational interventions, the DNP student discussed the CDE role and responsibilities with the nursing staff, and inquired if there was any interest in earning CDE certification. There was interest: two RNs at Facility A and three at Facility B asked for additional information and stated they would consider the possibility. Results from the literature indicated the value of having a clinical leader to assist with implementation of EBP. Having a CDE who could step into the role of a mentor and facilitator for EBP T2DM management of the elderly would fill that need at both facilities.
Another option is to ensure that a clinical leader takes on the role of the “expert” who provides guidance for the nursing staff as the clinical guidelines are implemented. At this time there is a clinical nurse leader at Facility B Hospital only. Until a clinical nurse leader is appointed at Facility A, a recommendation would be for the Facility A Nurse Managers or Charge Nurses to step into that role to assist with guideline implementation and mentoring of the nursing staff. The DNP student will make this recommendation to the Medical Director at the Project Presentation for dissemination of information in late November 2015.

Operational Definitions

- **A1c**: is a lab test used to diagnose Diabetes and also measures how well the disease process is managed. An A1c greater than or equal to 6.5% is a positive diagnosis of Diabetes (ADA, 2014).

- **Benchmark**: a standard or point of reference against which things may be compared or assessed (Merriam Webster, 2015); a key tool for quality improvement that will change over time depending on the frequency of obtaining updated data (Agency for Healthcare Research and Quality [AHRQ], 2015)

- **Care Path**: part of the INTERACT system, an algorithm to manage a symptom or diagnosis (INTERACT, 2011).

- **Clinical Guidelines**: systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances (Agency for Healthcare Research and Quality [AHRQ], 2015).

- **Hyperglycemia**: blood glucose level higher than 200 mg/dL (ADA, 2014).

- **Hypoglycemia**: the prevalence of measured blood glucose below 70 mg/dL (ADA, 2014).
• **Implementation**: to begin to do or use something, such as a plan; to make something active or effective (Merriam-Webster, 2015).

• **Innovation**: an idea, practice, or object that is perceived as new by an individual or unit of adoption (Rogers, 2003).

• **INTERACT System**: The Interventions to Reduce Acute Care Transfers, or INTERACT system, is a nursing home quality improvement program designed to reduce the frequency of hospital transfers or admissions (INTERACT, 2011).

• **Intervention**: action taken to improve a situation or skill; intervening (Google Dictionary, 2015).

• **Licensed Nursing Staff**: RNs and LPNs licensed to practice in the state of Hawai`i.

• **Minimum Data Set**: standardized primary screening and assessment tool of health status that forms the foundation of the comprehensive assessment for all residents in a Medicare and/or Medicaid-certified LTC facility (Centers for Medicare & Medicaid Services [CMS], 2012).

• **SBAR**: communication tool is a component of the INTERACT program and was discussed during the educational intervention. SBAR is an acronym for **S**ituation, **B**ackground, **A**ppearance, **R**eview and **N**otify and is a form the licensed nursing staff use to communicate changes in the residents’ status to the provider (INTERACT, 2011).

**Sampling Plan**

**Setting.** Facility A and Facility B are part of a “Safety Net” for LTC in the state of Hawai`i. Facility A, located in East Honolulu, and Facility B, located in central Honolulu, are extended care facilities within that “Safety Net” system. Both facilities provide a wide range of services including short-term rehabilitation, adult daycare, and social services that include
assessment of psychosocial issues, advocacy for residents and families, decision-making, education on community resources and emotional support. Facility A Hospital delivers nursing care through five separate units, consisting of 155 beds. Facility B Hospital delivers nursing care through four units, consisting of 158 beds. The setting for this DNP Project was in the extended care sections of Facility A and Facility B Hospitals (Facility A Hospital, 2014; Facility B Hospital, 2015).

**Application of Social Systems.** The EBP guides Facility A and Facility B Hospitals’ nursing care. Previous innovations and current EBP principles assist the licensed nursing staff to provide best patient care services within this EBP environment (Facility A Hospital, 2014; Facility B Hospital, 2015). Titler (2010) discussed the concept of absorptive capacity, where the strength of the evidence alone is not enough to promote EBP adoption. Rather, an organization that puts new knowledge to good use will be better equipped to adopt new EBP. The Facility A and Facility B organizations and licensed nursing staff appear to be an “EBP-system fit” and “generally amenable to innovations”, which, according to Titler (2010, p.40), are essential in determining system readiness for EBP implementation.

Facility A and Facility B’s supportive leadership and EBP culture are aspects of their organizational attributes that have been helpful in the process to implement this DNP Project. The Director of Quality Assurance, Clinical Manager, Pharmacist, and a GNP have been engaged in this project. The DNP Project is in alignment with Facility A and Facility B’s mission and vision to continuously strive for better ways to improve care and work processes (Facility A Hospital, 2014; Facility B Hospital, 2015) which, according to Wente & Kleiber (2013), significantly influences clinical practice guideline adherence. Facility A and Facility B’s implementation climate is also consistent with their mission. The context of implementation and
adoption of EB practices allows the nursing staff to recognize that leadership remains consistent with organizational goals – so the nursing staff can then focus on the EBP, resulting in implementation and adoption (Aarons, Horowitz, Dlugos, & Ehrhart, 2012).

**Sample/Sample Size.** The target audience for the educational intervention was the licensed nursing staff at Facility A and Facility B Hospitals. A total of 62 RNs and LPNs participated. Facility A and Facility B Hospitals are teaching facilities, so NP students and RN students were invited to the interventions as well. The Facility A Hospital nursing staff included 34 participants, of whom 28 were RNs, three LPNs, two NP students and one RN student. At Facility B Hospital, 28 nursing staff participated: 17 RNs, eight LPNs, one wound care NP, and two NP students. The nursing staff was encouraged to attend and the in-services were scheduled so majority of the participants could be there on company time – before their shifts began, or at the shift’s end. All participants were paid by their respective facility if they attended.

The goal of this DNP Project was to educate 78% of the total licensed nursing staff. Per the DNP student’s external faculty advisor, who is also a provider at Facility A and Facility B Hospitals, there are no benchmarks in place at either site for the education goal. The goal of 78% is based on the external faculty’s experience with other educational interventions conducted at Facility A and Facility B Hospitals.

**Inclusion Criteria.** The inclusion criteria for this QI study were the licensed nursing staff at both facilities. The following employees at Facility A and Facility B were expected to attend the educational interventions and participate in the pre-test/post-test surveys: RNs, LPNs, NPs, and Clinical Educators. Additionally NP students and RN students were invited if they were on site.
**Recruitment.** Flyers were posted at all nursing stations announcing the DNP Quality Improvement Project. The DNP student’s external advisor discussed the project and encouraged nursing staff and nurse managers to attend. The Clinical Educators at both sites organized the presentation days with the DNP student and coordinated the nursing staff as their schedules allowed. Additionally, the Clinical Educators sent email messages to remind the nursing staff and nurse managers to attend the intervention. After the first two or three educational interventions, feedback from the nurses was that the nursing staff that had not yet attended was looking forward to the event – primarily because the information was important to providing best patient care. Word of mouth and positive feedback also served as effective recruitment tools to engage the nursing staff.

**Application of Users of Innovation.** In determining who adopts practice change, Rogers (2003) describes five adopter categories: innovators, early adopters, early majority, later majority, and laggards. Based on the normal frequency distribution, the mean and the standard deviation are used to create the five adopter categories. (See Appendix A, Rogers’ Adopter Categorization on the Basis of Innovativeness figure.) Standard deviations are indicated via vertical lines on either side of the mean, resulting in a standardized percentage of respondents in each category (Rogers, 2003). In reviewing the figure from left to right, the first section to the far left of the mean are the innovators, or the first 2.5 percent of individuals in a system to adopt an innovation. The next section represents the early adopters, who make up the next 13.5 percent adopters. The early majority comprises the next 34 percent of adopters. To the right of the mean are the next 34 percent, or late majority. The final section are the laggards, who make up the 16 percent of individuals who are the very last to adopt the practice change (Rogers, 2003). Upon completion of the educational in-services, administration of post-test surveys to the
licensed nursing staff, and all post-intervention chart reviews, Rogers’ adopter characteristics will be applied to all participants. The application of users of the innovation will then be discussed based on this DNP Project’s findings.

Data Collection Procedures

Chronological Order of Data Collection Procedures. The project was conducted in four phases: 1) baseline chart review; 2) EB educational interventions on T2DM; 3) pre-test/post-test survey; and 4) post intervention chart review.

During the first phase, a baseline retrospective chart review was conducted at both hospitals for all diabetics aged 65 years and older. The DNP student designed a data collection tool for recording the patients’ information that was used at both facilities for the pre- and post-intervention chart reviews. Patients’ names were replaced with alphabet letters to ensure an anonymous chart review. The following items were examined and recorded: gender, age, code status, pharmacologic treatment – including oral medication and insulin, glycosylate hemoglobin (A1c) level, A1c lab standing order, sliding scale insulin orders, and hyper/hypoglycemic events. Finally, the patient’s comorbidities were recorded, specifically looking at dementia, obesity, HTN, HLD, CHF, CAD, CVA, CKD with a GFR < 60, and ESRD with HD. The information was then synthesized to determine gaps in knowledge based on the patients’ plan of care and nursing staff’s charting. (See Table 3.1, Inclusion Criteria for Chart Reviews and Appendix B. The Data Collection Tool.)

An educational intervention was presented in phase two, featuring a one hour powerpoint, followed by an interactive case study. The intervention is described in detail on page 50, “Phase 2: EB Educational Intervention”. The power point can be viewed in Appendix C and the case study can be viewed in Appendix D. A general dialogue was then held and questions generated
by the intervention were discussed. Any questions that could not be answered were duly noted and the nurses were contacted later with the appropriate information. Later groups were kept appraised of previous questions and appropriate responses.

*Table 3.1. Inclusion Criteria for Chart Reviews*

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>Post-Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Facility A</td>
<td>Facility B</td>
</tr>
<tr>
<td>Patient Age: 65 years and older</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Diagnosis of T2DM</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>A1c lab standing order</td>
<td>After 7/2014</td>
<td>After 2/2015</td>
</tr>
<tr>
<td>SSI</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Hyperglycemic Event</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Hypoglycemic Event</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Comorbidities</td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>

✔ = Yes

The pre-test/post-test survey was conducted before and after the educational intervention. The survey was composed of ten statements that measured the nursing staff’s baseline knowledge and post educational intervention knowledge. Specifically, the survey measured the participants’ general diabetes knowledge that was covered in the intervention, as well as their thoughts about their competence providing care to the elderly diabetics. The survey was arranged in a Likert-type format. Participants received verbal instructions: (a) they were asked to circle the best answers that ranged from Strongly Agree, Agree, Neutral, Disagree to Strongly Disagree; (b) they were told they would also receive a post-test survey consisting of the same
Disagree; (b) they were told they would also receive a post-test survey consisting of the same information on the pre-test; and (c) they were assured that the survey was anonymous – so they were instructed to not write their names on the surveys. Post-educational intervention, the DNP student analyzed the surveys and the results were placed into two separate tables (Facility A n=34 / Facility B n=28). The percentages were then calculated based on the participants’ responses. The 11th statement in the survey, asked the participants to list three items or areas in which they feel additional training is needed. (See Appendix E. Pre-/Post-Test Nursing Staff Survey.)

The post intervention chart review was the last phase of the data collection process. Similar to the baseline chart review, the same data collection tool was used to obtain and record the diabetic patients’ information, which was then synthesized to note changes from the baseline review. The patients’ names were replaced with alphabet letters to ensure the survey was anonymous and to protect the patients’ information. (See Appendix F. Data Collection Procedures.)

**Required Resources.** The required resources for this DNP Project included human, capital, physical and budgetary components. Human resources were the licensed nursing staff, nursing managers, program champions, DNP student, DNP External Advisor and the Facility A and Facility B Administrators. Capital resources included flyers, laminated hypoglycemia algorithms posted at the nursing stations, and laminated pocket tools provided to the nursing staff. The educational intervention materials, and the pre- and post-test materials were also included in the capital resources. The physical resources included the Facility A and Facility B conference rooms where the interventions were held. The budgetary resources and expenditures were provided in kind by the Facility A and Facility B administrators who allowed the licensed
nursing staff to attend the educational interventions on company time. The final expenditure for this project was from the DNP student, who paid for the in-service meals and snacks.

**Process & Outcome Variables.** The project was conducted in four phases: 1) baseline retrospective chart review; 2) EB educational interventions on T2DM; 3) Pre-test/Post-test survey; and 4) post intervention chart review.

**Phase 1: Baseline Retrospective Chart Review.** A baseline retrospective chart review was conducted two months prior to the first educational intervention. Nurse Managers on each unit identified the diabetic patients, Facility A: N=26 / Facility B: N=54, and lists were prepared for the baseline chart review. Currently there is no EHR system at either hospital, so the DNP student conducted the review manually from paper charts. Patients’ names were replaced with alphabet letters to ensure an anonymous chart review. The following items were examined and recorded: gender, age, code status, pharmacologic treatment – including oral medication and insulin, glycosylate hemoglobin (A1c) level, A1c lab standing order, sliding scale insulin orders, and hyper/hypoglycemic events. Finally, the patient’s comorbidities were recorded, specifically looking at dementia, obesity, HTN, HLD, CHF, CAD, CVA, CKD with a GFR < 60, and ESRD with HD. The DNP student designed a data collection tool for recording the patients’ information that was used at both facilities for the pre- and post-intervention chart reviews.

**Phase 2: EB Educational Intervention.** The second phase of data collection was a 60-minute educational intervention, featuring a powerpoint consisting of 58 slides, “Evidence Based Recommendations for Elderly Type 2 Diabetics in Long-Term Care”. The curriculum was based on guidelines from the ADA, AGS and AMDA and focused on topics essential to improving diabetic patient care in the LTC setting, including: (a) general overview of diabetes and its pathophysiology; (b) EB protocols for A1c in LTC settings; (c) estimated average glucose,
glycemic control; (d) co-morbidities’ effect on glycemic control; (e) the effect of polypharmacy on glycemic control; (f) management of hyper-/hypoglycemia; and (g) medication contraindicated for elderly diabetics. The following items were also discussed:

- Interactive Case Study (Appendix D)
- Pharmacist’s slide: The RNs can save the hyperglycemic patient money by asking the provider to use Novolin Regular if the patient has that particular insulin in their medication bin, instead of ordering a new bottle of Novolog (rapid acting) – which in most cases is used once or twice by the expiration date and then discarded. The Novolin Regular is sufficient to lower the patient’s blood sugar and saves the patient the cost of a new bottle of Novolog.
- Certified Diabetes Educator (CDE): the advantages of obtaining certification for a CDE were discussed.
- Hypoglycemia Management Algorithm (Appendix G): This reference tool was printed out, laminated, and posted at all nurses’ stations, medication carts, and in the Pocket Cards (See Appendix G. Hypoglycemia Care Path Algorithm)
- Pocket Cards: two double-sided laminated 3”x 5” cards on which the following was printed: Hypoglycemia Care Path Algorithm, appropriate A1c levels, estimated average glucose calculations and treatment for hyper- and hypoglycemia (See Appendix G. Hypoglycemia Care Path Algorithm and Appendices H, I, and J: Pocket Cards.)

**Phase 3: Pre-test/Post-test Survey.** The third phase of data collection was a paper-and-pencil pre-test and post-test survey with participants serving as their own control group: Facility A: N=34; Facility B: N=28. The survey measured the nursing staff’s baseline knowledge and post educational intervention knowledge, and consisted of ten statements that assessed general knowledge regarding diabetes management in LTC, and the participants’ competence to provide care to elderly diabetics. It was arranged in a Likert-type format and participants were asked to circle the best answers that ranged from Strongly Agree, Agree, Neutral, Disagree to Strongly Disagree. In the final entry on the survey, participants were asked to list three areas in which additional training and education was needed to they could confidently provide care to elderly
diabetics in LTC settings. There were 19 responses for the final entry at Facility A (Pre: N=14 / Post: N=5) and Facility B (Pre: N=7 / Post: N=12).

**Phase 4: Post Intervention Chart Review.** The fourth and final phase of the data collection was the post educational intervention chart review of the diabetic patients, conducted six months post intervention at Facility A, and three months post intervention at Facility B. Initially this project was to be conducted at Facility A only; however, an executive decision was later made to include Facility B Hospital after the Facility A educational interventions were completed. As in the baseline chart review, a list was prepared of the diabetic patients, Facility A: N=26 / Facility B: N=47, and the manual paper chart review commenced. Patients’ names were replaced with alphabet letters to ensure an anonymous chart review, and similar to the baseline review, the same items were examined and recorded, including the patients’ comorbidities. See Table 3.2, Facility A and Facility B Hospitals’ pre- and post-chart review results.

**Table 3.2. Facility A & Facility B Pre-/Post- Intervention Chart Review Findings**

<table>
<thead>
<tr>
<th>Item</th>
<th>Facility A</th>
<th>Facility B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre N=26</td>
<td>Post N=26</td>
</tr>
<tr>
<td><strong>A1c Level</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range:</td>
<td>5.7 to 9.8</td>
<td>5.7 to 9.8</td>
</tr>
<tr>
<td><strong>A1c Lab Standing Order</strong></td>
<td>7 patients</td>
<td>24 patients</td>
</tr>
<tr>
<td><strong>Sliding Scale Insulin</strong></td>
<td>2 patients</td>
<td>0</td>
</tr>
<tr>
<td><strong>Hyperglycemic Event</strong></td>
<td>1 patient</td>
<td>3 patients</td>
</tr>
<tr>
<td><strong>Hypoglycemic Event</strong></td>
<td>1 patient</td>
<td>3 patients</td>
</tr>
</tbody>
</table>

**Outcome Variables.** The project outcomes were:

- Elderly diabetic patients will have improved and appropriate A1c levels based on their level of frailty, functional and cognitive ability, code status, and comorbidities.
• Nursing staff will be able to apply EB guidelines to appropriately manage hyper-/hypoglycemic episodes
• Functioning as a team member, nursing staff can confidently and appropriately communicate with the medical providers about patients’ health status.
• Nursing staff will articulate a growth in self-confidence in their abilities to care for elderly diabetics.

The long-term outcome variables were improved patient outcomes and QOL, and program sustainability. A Logic Model was developed for the short-, intermediate- and long-term outcomes for the project (See Appendix K. Logic Model.)

**Application of Communication Processes.** The *communication structure*, according to Rogers (2003), is the differentiated elements (groups or cliques) that exist within a social system. Choosing the best opinion leaders and change champions to support the change in practice, as well as implementing solid academic detailing are strategies that should assist with the DNP Project’s diffusion process. Rogers describes mass media channels (radio, television, newspaper) and interpersonal channels (face-to-face interaction) as options for reaching the desired audience. Of the two, Rogers states that the interpersonal channels are more effective in “persuading an individual to accept a new idea, especially if the interpersonal channel links two or more individuals who are similar in socioeconomic status, education, or other important ways” (Rogers, 2003, p.18). Another option is via the internet, where email messages, blogs, or wikis can assist if strategically utilized.

Previous diffusion studies have revealed that most individuals “do not evaluate an innovation on the basis of scientific studies of its consequences” (Rogers, 2003, p. 18) and that most depend primarily on subjective evaluation from others who have already adopted the
innovation. What this means is, despite being an EB guideline that will improve patient outcomes, the licensed nursing staff may not be amenable to adopting the practice change. Instead, they will look to their peers for guidance (Rogers, 2003). For the purpose of this QI project, finding the strategically placed champions was considered to be essential to the successful diffusion of the innovation.

**Measurements (Tools/Instruments).** Two instruments were utilized for data collection during the course of the project. The DNP student developed a data collection tool for the pre- and post-educational intervention chart review. The diabetic residents’ names were replaced with alphabetical letters to ensure an anonymous process. The tool consisted of columns to log demographic data, including patient’s gender, age, code status, as well as information related to the plan of care – including treatment regimen, A1c level, hyper-/hypo-glycemic events and outcome, co-morbidities, and laboratory test standing orders for A1c. (See Appendix B. Data Collection Tool for Chart Review.)

The pre-test / post-test survey was also developed by the DNP student and consisted of 10 statements that measured the participants’ knowledge about T2DM and competence providing care to the elderly diabetics. The survey utilized a Likert-type format with answers that ranged from Strongly Agree, Agree, Neutral, Disagree to Strongly Disagree. In the final entry on the survey, participants were asked to list three areas in which additional training and education was needed to they could confidently provide care to elderly diabetics in LTC. (See Appendix E. Pre-/Post-Test Nursing Staff Survey.)

**Timeline.** The projected timeline for this DNP Project was initiation of the QI project in April 2014 with the expected date of completion being December 2015. (See Appendix L. Project Timeline.)
Program Evaluation Plan

Stakeholders are the individuals, groups, or organizations that can affect or are affected by an evaluation process or its findings (Wholey, Hatry, & Newcomer, 2010). They have a unique role to ensure the success of a QI project. The stakeholders’ involvement in the development of the evaluation process will allow for their investment in the findings, as well as the likelihood of their belief in the findings. If the goal of the outcome evaluation is its use in future programs or policy decisions, then stakeholder involvement is essential. Stakeholder involvement can also improve the outcome assessment (Issel, 2009).

The Facility A and Facility B stakeholders for this DNP Project were the elderly diabetic patients and their families, nursing staff, nursing managers, providers, and Facility A administration. The diabetic patients’ vested interest in the success of the project was related to the goal of improving their health outcomes. From the patients’ perspective, regardless of life expectancy, their goal is to experience optimal QOL and cope with end of life. The roles of healthcare workers – in this project those were the licensed nursing staff, nursing managers and providers – was and remains focused on patient safety and quality of care. The IOM (2013) Quality Chasm report described the six aims of healthcare: to deliver care that is safe, effective, patient-centered, timely, efficient, and equitable. The QI project evaluation establishes accountability between the licensed nursing staff and residents, resulting in the licensed nursing staff taking a more active role in the project and its findings (Wholey et al., 2010).

Results dissemination for the stakeholders will take place via the following:

a. An executive summary will be reviewed during a meeting to present the project’s findings and implications;
b. Hard copies of the report and executive summary will be provided to all stakeholders; copies will be emailed as needed;
c. Feedback will be evaluated and program changes will be made accordingly. All stakeholders will be updated as changes are implemented.

Data Analysis. The assumption of this DNP Project was that short-term educational in-services would meet the project’s objectives. The objectives for the nursing staff were to be able to: (a) define hyper- and hypoglycemia; (b) implement EB guidelines to manage hyper-/hypoglycemia; (c) recall appropriate A1c levels for diabetics in LTC; and (d) report appropriate and significant information to the medical providers about the patients’ diabetic status.

The project goals reflect these assumptions. The methodology employed by this project measured nursing staff’s knowledge pre- and post-intervention, and diabetic residents’ chart reviews pre- and post-intervention determined if practice change had indeed taken place. The outputs and outcomes for this project are outlined in the Logic Model. (See Appendix K.)

Ethical Considerations

This project was developed to ensure that the rights of the human subjects were preserved. There was no randomization of subjects to different treatments. The practices implemented were evidence based. Data collection was anonymous and all patient identifying information was destroyed. Change in practice was the goal of this DNP Project, and no further risk was involved. The DNP student completed the University of Hawai`i required Collaborative Institutional Training Initiative (CITI) course in Human Subjects Protection. A committee of faculty and clinical experts reviewed this DNP project proposal to verify that human subjects would be protected.
Human Subjects Considerations

This DNP Project was a QI project and, therefore, qualified as being exempt from the need for IRB approval. The ‘Application for Exempt Status for Human Subjects Research / University of Hawai`i – Human Studies Program’ form was been completed and was forwarded to the DNP student’s academic advisor for her signature. The form was then filed with the UHM Human Studies Program.

Consenting Procedure. No consent was required for this DNP Project. All phases were voluntary for the Facility A and Facility B licensed nursing staff. Since the chart reviews were anonymous, resident consent was not required.

Limitations

Initially the major limitation of this QI project was the DNP student’s concern that the licensed nursing staff’s attendance at the educational in-services could not be mandatory, according to their union rules. Given that participation was essential to meet the project’s goal of educating 78% of the licensed nursing staff, their attendance in full force was vital. As the project progressed, attendance was not an issue. The Facility A and Facility B administrators allowed the licensed nursing staff to attend the in-services during company time, and at that point this concern became moot, and thus, no longer a limitation.

Facility A and Facility B Hospitals do not currently have an electronic health record (EHR) system, so the DNP student conducted manual chart reviews. Resident information/charts are kept in two locations. All records of procedures, diagnostics and medication administration for the current week are kept in a Medication Administration Record (MAR) on the medication cart. At the end of the week, the MAR information is then filed in the residents’ “official” chart, housed at the front desk of the nursing station. The chart review required access to both the
MAR and the “official” charts. Information is not always filed in a timely manner, so the possibility that the charts are incomplete was quite high. During the completion of the chart review, the DNP student observed firsthand that the charting at both hospitals could be illegible, misfiled, incomplete, and outdated – which then became another limitation for this project. To ensure a thorough chart review was conducted, the process was slow and tedious to ensure the required information was not overlooked. Illegible charting was a major limitation of the chart reviews.

This innovation was implemented in a fluid environment, where conditions were not constant and variables were not controlled. Licensed nursing staff could quit and residents could be discharged or die. The sample size of licensed nursing staff was 62 total and the total T2DM patients at Facility A and Facility B was 80 residents – both small samples. Another limitation was that the time span to complete this project was one year, which was not adequate to completely engage the nursing staff to adopt the practice changes. Lastly, the untested DNP student-developed instruments for data collection could potentially have influenced this project’s findings.

**Summary**

This chapter of the DNP Project discussed the Methods that were implemented to examine the effects of a short term EB educational intervention in two LTC settings. Rogers’ (2003) innovation-diffusion theory was applied to examine the LTC facilities’ licensed nursing staff’s adoption process of the knowledge gained via the intervention. Pre- and post-intervention tests were administered to determine the licensed nursing staff’s diabetes knowledge. Pre- and post-intervention chart reviews were conducted to determine if practice change had occurred.
Descriptive statistics and trend analysis were then utilized to examine the data generated during this year-long QI project.
Chapter 4. Results

Objectives

The purpose of this DNP project was to implement EB guidelines for elderly diabetics in LTC facilities and empower the nursing staff with the knowledge to provide appropriate patient care. The project sought to empower the nursing staff with the knowledge of EB clinical guidelines for managing care of elderly diabetics in LTC facilities. The clinical question that guided this QI project was: “Can a series of short term educational interventions for the licensed nursing staff at two LTC facilities improve elderly diabetic outcomes via appropriate T2DM management, and increase licensed nursing staff’s confidence in providing care to the diabetic residents?”

Based on a series of EB educational interventions, and the need for EB guideline implementation at both facilities, the following outcomes were expected:

- Elderly diabetic patients will have improved and appropriate A1c levels based on their level of frailty, functional and cognitive ability, code status, and comorbidities. See Chart Review Results for Facility A Hospital beginning on page 57 and Facility B Hospital beginning on page 63.

- Nursing staff will be able to apply EB guidelines to appropriately manage hyper-/hypoglycemic episodes. See Pre-/Post-Test Licensed Nursing Staff Survey responses to items 4, 5, 6, and 7.

- Functioning as a team member, nursing staff can confidently and appropriately communicate with the medical providers about patients’ health status. See Pre-/Post-Test Licensed Nursing Staff Survey responses to item 3.
Nursing staff will articulate a growth in self confidence in their abilities to care for elderly diabetics. See Pre-/Post-Test Licensed Nursing Staff Survey responses to items 1 and 10.

Description of Sample

The total number of participants for this QI project was 62. The inclusion criteria were the nursing staff at Facility A and Facility B Hospitals. The nursing staff consisted of 31 Facility A Hospital participants, of which 28 were RNs and three were LPNs; and Facility B Hospital’s 26 participants, was comprised of 17 RNs, eight LPNs, and one wound care nurse practitioner (NP). Since Facility A and Facility B are teaching facilities, the four NP students and one RN student doing their clinical rotations at the facilities during this DNP project implementation were invited to participate in the interventions: two each at Facility A and Facility B. The RN student participated at Facility A Hospital. The final breakdown of the sample was 34 participants from Facility A Hospital and 28 participants from Facility B Hospital. See Table 4.1 Project Participants.

Table 4.1. Project Participants

<table>
<thead>
<tr>
<th>Participant</th>
<th>Facility A</th>
<th>Facility B</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>RN</td>
<td>28</td>
<td>17</td>
<td>45</td>
</tr>
<tr>
<td>LPN</td>
<td>3</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>NP</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>NP Student</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>RN Student</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>34</td>
<td>28</td>
<td>62</td>
</tr>
</tbody>
</table>
**Trend Analysis for Process**

An anonymous five-point Likert-type survey was administered pre- and post-educational intervention with the following scale: Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree. The participants were asked to rate 10 statements based on two components: knowledge and competency. Five statements (Pre-/Post-Test Licensed Nursing Staff Survey items 2, 5, 6, 8, and 9) assessed participants’ knowledge of diabetes, specifically, the required number of visits by medical providers in LTC facilities, definitions of hyper- and hypoglycemia, A1c goals for elderly diabetics in LTC facilities and whether SSI was appropriate treatment for elderly diabetics residing in LTC facilities. The remaining five statements (See Pre-/Post-Test Licensed Nursing Staff Survey items 1, 3, 4, 7, and 10) assessed the nursing staff’s competency providing care to T2DM patients in the LTC setting, including statements that examined thoughts about their competency in discussing patients’ plan of care with medical providers, managing hyper- and hypo-glycemic episodes, whether they had received adequate education and training to provide care to LTC elderly diabetics, and their confidence level providing best patient care to elderly diabetics in LTC. Finally, the survey asked participants to list areas in which they felt additional training was needed to provide care confidently to their diabetic patients (See Pre-/Post-Test Licensed Nursing Staff Survey item 11). The results presented in this chapter will specifically review the Strongly Agree and Agree responses for items. An exception is that statements 2 and 9 will also have the Disagree and Strongly Disagree responses presented. Only Neutral responses that were considered significant will be presented. (See Appendix E. Pre-/Post-Test Licensed Nursing Staff Survey).
**Outcome Variables**

**Chart Review and Pre-/Post Survey.** The purpose of this study was to implement EB guidelines for elderly diabetics in LTC. Ultimately the project goal was to empower the nursing staff with the knowledge of EB clinical guidelines for managing the care of elderly diabetics.

**Facility A Chart Review Results.** The Facility A Hospital baseline chart review consisted of 26 patients for which the patients’ gender, age, code status, pharmacologic treatment (including oral medication and insulin), A1c level, A1c lab standing order, SSI orders, hyper/hypoglycemic events, and patient’s comorbidities were reviewed and recorded. Specific comorbidities that were reviewed and recorded included dementia, obesity, HTN, HLD, CHF, CAD, CVA, CKD with a GFR < 60, and ESRD with HD. The pre-intervention diabetics who met inclusion criteria consisted of 15 female patients (58%) and 11 male patients (42%). The patients’ ages ranged from 65 years to 93 years, and the average age was 82 years. The average female patients’ age was 82.7 years, within a range of 65 years to 93 years. The average male patients’ age was 89 years, within a range of 68 years to 90 years. The diabetic patients’ code status consisted of the following: (a) do not resuscitate (DNR) = 10; (b) no cardiopulmonary resuscitation (CPR) = 12; full code = 2; and CPR = 2.

The post-intervention Facility A chart review also consisted of 26 patients (17 female patients [65%] and 9 male patients [35%]). The patients’ ages ranged from 65 years to 102 years, and the average age was 86 years. The post chart review average female patients’ age was 87 years, within a range of 65 years to 102 years. The average male patients’ age was 83 years, within a range of 67 years to 96 years. During the post-intervention chart review there were the following orders: DNR = 18; full code = 2; CPR = 1; and no CPR = 5.
Table 4.2 presents Facility A pre- and post-intervention A1c levels for those patients with medically inappropriate levels. The baseline A1c levels ranged from 5.7% to 9.8%, and the post-intervention A1c levels ranged from 5.4% to 10.0%. Based on the patients’ age,

Table 4.2. Facility A Pre-/Post-Intervention Inappropriate A1c Levels

<table>
<thead>
<tr>
<th>Facility A Baseline Inappropriate A1c</th>
<th>Facility A Post-Intervention Inappropriate A1c</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A1c</strong></td>
<td><strong>A1c</strong></td>
</tr>
<tr>
<td><strong>In the past year</strong></td>
<td><strong>Lab Standing Order</strong></td>
</tr>
<tr>
<td><strong>A1c</strong></td>
<td><strong>Medication</strong></td>
</tr>
<tr>
<td><strong>Inappropriate</strong></td>
<td><strong>SSI</strong></td>
</tr>
<tr>
<td><strong>Oral</strong></td>
<td><strong>Basal</strong></td>
</tr>
<tr>
<td><strong>Medication</strong></td>
<td><strong>Insulin</strong></td>
</tr>
<tr>
<td><strong>5.7</strong></td>
<td><strong>Yes</strong></td>
</tr>
<tr>
<td><strong>---</strong></td>
<td><strong>---</strong></td>
</tr>
<tr>
<td><strong>Glipizide &amp; Metformin</strong></td>
<td><strong>---</strong></td>
</tr>
<tr>
<td><strong>---</strong></td>
<td><strong>---</strong></td>
</tr>
<tr>
<td><strong>DNR</strong></td>
<td><strong>---</strong></td>
</tr>
<tr>
<td><strong>Dementia, CHF, CAD, CKD with GFR &lt; 60</strong></td>
<td><strong>---</strong></td>
</tr>
<tr>
<td><strong>---</strong></td>
<td><strong>---</strong></td>
</tr>
<tr>
<td><strong>71y, DNR</strong></td>
<td><strong>---</strong></td>
</tr>
<tr>
<td><strong>---</strong></td>
<td><strong>---</strong></td>
</tr>
<tr>
<td><strong>HTN, HLD, CVA</strong></td>
<td><strong>HTN</strong></td>
</tr>
<tr>
<td><strong>---</strong></td>
<td><strong>---</strong></td>
</tr>
<tr>
<td><strong>87y, No CPR</strong></td>
<td><strong>---</strong></td>
</tr>
<tr>
<td><strong>---</strong></td>
<td><strong>---</strong></td>
</tr>
<tr>
<td><strong>Dementia, HTN, HLD, CAD, CVA</strong></td>
<td><strong>Dementia, HTN</strong></td>
</tr>
<tr>
<td><strong>---</strong></td>
<td><strong>---</strong></td>
</tr>
<tr>
<td><strong>HLD, CHF</strong></td>
<td><strong>---</strong></td>
</tr>
<tr>
<td><strong>---</strong></td>
<td><strong>---</strong></td>
</tr>
<tr>
<td><strong>84y, No CPR</strong></td>
<td><strong>---</strong></td>
</tr>
<tr>
<td><strong>---</strong></td>
<td><strong>---</strong></td>
</tr>
<tr>
<td><strong>Dementia, HTN, HLD, CAD, CVA</strong></td>
<td><strong>---</strong></td>
</tr>
<tr>
<td><strong>---</strong></td>
<td><strong>---</strong></td>
</tr>
<tr>
<td><strong>90y, No CPR</strong></td>
<td><strong>---</strong></td>
</tr>
<tr>
<td><strong>---</strong></td>
<td><strong>---</strong></td>
</tr>
<tr>
<td><strong>Dementia, HTN</strong></td>
<td><strong>---</strong></td>
</tr>
<tr>
<td><strong>---</strong></td>
<td><strong>---</strong></td>
</tr>
<tr>
<td><strong>Dementia, HLD</strong></td>
<td><strong>---</strong></td>
</tr>
<tr>
<td><strong>---</strong></td>
<td><strong>---</strong></td>
</tr>
<tr>
<td><strong>HLD, CHF</strong></td>
<td><strong>---</strong></td>
</tr>
<tr>
<td><strong>---</strong></td>
<td><strong>---</strong></td>
</tr>
<tr>
<td><strong>93y, No CPR</strong></td>
<td><strong>---</strong></td>
</tr>
<tr>
<td><strong>---</strong></td>
<td><strong>---</strong></td>
</tr>
<tr>
<td><strong>Dementia, HTN</strong></td>
<td><strong>Dementia, HTN</strong></td>
</tr>
<tr>
<td><strong>---</strong></td>
<td><strong>---</strong></td>
</tr>
</tbody>
</table>

= Yes; CPR = cardiopulmonary resuscitation; DNR = do not resuscitate.

code status, treatment regimen, and comorbidities, during the pre-intervention chart review, seven Facility A patients’ A1c levels were inappropriate, and during the post-intervention, there were four inappropriate A1c levels.
The pre-intervention inappropriate A1c findings were based on: patients’ A1c were < 7.0, and/or the pharmacologic regimen included oral medication or SSI or Basal insulin, and/or there was no A1c lab standing order, and/or patient’s age, code status and comorbidities were indicative of frailty or poor health status. The Chart Review findings for the Facility A Hospital Pre-/Post-Intervention Inappropriate A1c can be viewed on Table 4.2.

The Chart Review findings for the A1c, A1c lab standing orders and the SSI can be viewed on Table 4.3. There were seven patients with A1c Lab standing orders charted (27%) during the baseline chart review, and two patients (8%) post-intervention. Finally, SSI was part of the regimen for two patients’ baseline results (one patient had an inappropriate A1c level pre-intervention), and zero patients during the post-intervention chart review.

Table 4.3. Facility A Pre-/Post-Intervention Chart Review Findings

<table>
<thead>
<tr>
<th>Items Charted</th>
<th>Pre N=26</th>
<th>Post N=26</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1c Level</td>
<td>Range: 5.7 to 9.8</td>
<td>Range: 5.4 to 10.0</td>
</tr>
<tr>
<td>A1c Lab Standing Order</td>
<td>7 patients</td>
<td>2 patients</td>
</tr>
<tr>
<td>Sliding Scale Insulin</td>
<td>2 patients</td>
<td>0</td>
</tr>
</tbody>
</table>

Facility A Chart Review Results: Hyperglycemic and Hypoglycemic Events. The Facility A chart review findings of Pre-/Post-educational intervention hyperglycemic events can be viewed on Table 4.4. During the baseline chart review, two patients experienced hyperglycemic events, compared to three patients during the post-intervention reviews. Two of the patients experienced multiple hyperglycemic events on several different days. In reviewing how the nursing staff managed the patients’ hyperglycemic events, most notable is that a follow up blood sugar was not obtained for all the episodes to determine if the treatment resulted in lowering the patients’ blood sugar to < 200mg/dL, and the SBAR was not completed for all the
events as well. The nursing staff correctly identified hyperglycemia as a blood sugar greater than 200 mg/dL. Four out of the seven events did not indicate whether the patient was symptomatic.

Table 4.4. Facility A Chart Review Findings Pre-/Post-Intervention Hyperglycemic Events

<table>
<thead>
<tr>
<th>Facility A Baseline Hyperglycemic Events N=1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyperglycemia Correctly identified</td>
</tr>
<tr>
<td>----------------------------------------</td>
</tr>
<tr>
<td>Patient A</td>
</tr>
<tr>
<td>Event #1</td>
</tr>
<tr>
<td>Event #2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Facility A Post-Intervention Hyperglycemic Events N=1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient B</td>
</tr>
<tr>
<td>Event #1</td>
</tr>
<tr>
<td>Event #2</td>
</tr>
<tr>
<td>Event #3</td>
</tr>
<tr>
<td>Event #4</td>
</tr>
<tr>
<td>Patient C</td>
</tr>
<tr>
<td>Event #1</td>
</tr>
</tbody>
</table>

✓ = Yes.

In all the events except one, the provider was contacted for orders to treat the patient’s hyperglycemia. One of the RNs used the pocket card information sheet to estimate a patient’s A1c level and charted their calculations. The information was relayed to the provider and the patient’s basal insulin was increased.

The Facility A chart review findings of Pre-/Post educational intervention hypoglycemia events can be viewed on Table 4.5. In reviewing the hypoglycemic events during
Table 4.5. Facility A Chart Review Findings Pre-/Post-Intervention Hypoglycemic Events

<table>
<thead>
<tr>
<th>Facility A Baseline Hypoglycemic Events N=1</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypoglycemia Correctly identified</td>
<td>Patient is Symptomatic</td>
<td>Provider Contacted</td>
<td>Treatment ordered &amp; Administered</td>
<td>Follow-up Blood Sugar obtained</td>
<td>SBAR Completed</td>
</tr>
<tr>
<td>Patient A Event #1</td>
<td>✓</td>
<td>Not Charted</td>
<td>✓</td>
<td>“Gave juice and snacks”</td>
<td>No</td>
</tr>
<tr>
<td>Event #2 No (77mg/dL)</td>
<td>No Charted</td>
<td>✓</td>
<td>✓</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Event #3 No (79mg/dL)</td>
<td>No Charted</td>
<td>No</td>
<td>Treated with orange juice and snacks.</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Facility A Post-Intervention Hypoglycemic Events N=1</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient B Event #1</td>
<td>✓</td>
<td>Yes</td>
<td>✓</td>
<td>✓</td>
<td>The Accucheck dose was adjusted.</td>
</tr>
<tr>
<td>Event #2</td>
<td>✓</td>
<td>No</td>
<td>✓</td>
<td>✓</td>
<td>The nighttime basal insulin dose was adjusted.</td>
</tr>
<tr>
<td>Patient C Event #3</td>
<td>✓</td>
<td>Not Charted</td>
<td>No</td>
<td>2 packets sugar</td>
<td>✓</td>
</tr>
<tr>
<td>Event #4</td>
<td>✓</td>
<td>Not Charted</td>
<td>✓</td>
<td>“Gave juice with sugar”</td>
<td>✓</td>
</tr>
<tr>
<td>Patient D Event #5</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>“Gave juice with 2 packets sugar”</td>
<td>✓</td>
</tr>
<tr>
<td>Event #6</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>“Gave orange juice”</td>
<td>✓</td>
</tr>
</tbody>
</table>

✓ = Yes

the baseline chart review, one Facility A patient experienced hypoglycemia on three separate days, and post-intervention three patients experienced hypoglycemia on two separate days each.

The nursing staff improved greatly in their post-intervention T2DM management of hypoglycemic events, when compared to the baseline management of their diabetic patient’s hypoglycemia.

The baseline management findings were: (a) on two separate days hypoglycemia was not accurately identified based on the ADA (2014) guidelines; (b) whether the patient was
symptomatic was not charted; (c) the provider was contacted twice out of three separate episodes; (d) no follow up blood sugar was obtained after treatment was administered; and (e) no charting in the SBAR was noted.

The post-intervention management was noticeably improved. Hypoglycemia was accurately diagnosed during every hypoglycemic event, the provider was contacted on five out of six occasions, and the effort to treat hypoglycemia was completed with every hypoglycemic event. SBAR was completed 33% of the time and the follow up blood sugar – which should be re-checked after every treatment for hypoglycemia – was checked only 66% of the time.

**Facility B Chart Review Results.** The Facility B Hospital baseline chart review consisted of 54 patients, and post intervention there were 51 patients, for which the patients’ gender, age, code status, pharmacologic treatment – including oral medication and insulin, A1c level, A1c lab standing order, sliding scale insulin orders, hyper/hypoglycemic events, and patient’s comorbidities, specifically dementia, obesity, HTN, HLD, CHF, CAD, CVA, CKD with a GFR < 60, and ESRD with HD were obtained and recorded. The pre-intervention diabetics who met inclusion criteria consisted of 40 female patients (74%) and 14 male patients (26%). The patients’ ages ranged from 65 years to 97 years, and the average age was 81 years. The average female patients’ age was 87 years, within a range of 65 years to 97 years. The average male patients’ age was 81 years, within a range of 69 years to 89 years. The code status consisted of the following for the Facility B diabetic patients: (a) DNR = 35; (b) full code = 11; and CPR = 8.

The post-intervention Facility B Hospital chart review consisted of 47 patients (36 female patients [77%] and 11 male patients [23%]). The patients’ ages ranged from 65 years to 97 years, and the average age was 83 years. The post chart review average female patients’ age was
84 years, within a range of 65 years to 97 years. The average male patients’ age was 80 years, within a range of 69 years to 88 years. During the post-intervention chart review the diabetic patients’ code status were as follows: (a) DNR = 31; (b) full code = 4; (c) CPR only = 3; (d) no CPR = 7; (e) comfort measures = 1; and (f) limited interventions = 1.

The baseline A1c levels ranged from 5.1% to 11.1%, and post intervention A1c levels were 5.4% to 11.0%. Based on the patients’ age, code status, treatment regimen, and comorbidities, during the pre-intervention chart review, 10 Facility B patients’ A1c levels were inappropriate, and during the post-intervention, there were six inappropriate A1c levels. The baseline A1c level findings were based on: patients’ A1c was < 7.0, and/or the pharmacologic regimen included oral medication or SSI or Basal insulin, and/or there was no A1c lab standing order, and/or patient’s age, code status and comorbidities were indicative of frailty or poor health status. The Facility B Hospital Pre-/Post-Intervention Inappropriate A1c Findings are presented in Table 4.6.

There were 30 patients with A1c Lab standing orders charted (56%) during the baseline chart review, and 34 patients (67%) post-intervention. Finally, SSI was part of the regimen for two patients’ baseline results, and three patients during the post-intervention chart review.
Table 4.6. Facility B Pre-/Post-Intervention Inappropriate A1c Levels

<table>
<thead>
<tr>
<th>Patient</th>
<th>A1c in the past year</th>
<th>A1c Lab Standing Order</th>
<th>Oral Medication</th>
<th>SSI</th>
<th>Basal Insulin</th>
<th>Age, Code Status</th>
<th>Comorbidities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5.7</td>
<td>---</td>
<td>Metformin, Glimepiride</td>
<td>---</td>
<td>---</td>
<td>77y, DNR</td>
<td>Dementia, HLD</td>
</tr>
<tr>
<td>2</td>
<td>5.9</td>
<td>✓</td>
<td>Januvia, Glipizide</td>
<td>---</td>
<td>---</td>
<td>73y, Full Code</td>
<td>Dementia, HTN</td>
</tr>
<tr>
<td>3</td>
<td>6.0</td>
<td>✓</td>
<td>---</td>
<td>---</td>
<td>✓</td>
<td>89y, Full Code</td>
<td>Dementia, HTN, HLD</td>
</tr>
<tr>
<td>4</td>
<td>6.0</td>
<td>✓</td>
<td>---</td>
<td>---</td>
<td>✓</td>
<td>89y, DNR</td>
<td>Dementia, HTN, HLD</td>
</tr>
<tr>
<td>5</td>
<td>6.2</td>
<td>---</td>
<td>---</td>
<td>✓</td>
<td>✓</td>
<td>89y, Full Code</td>
<td>HTN, HLD, CVA</td>
</tr>
<tr>
<td>6</td>
<td>6.5</td>
<td>✓</td>
<td>Metformin, ---</td>
<td>---</td>
<td>✓</td>
<td>84y, DNR</td>
<td>Dementia, HTN, HLD, CAD, CVA</td>
</tr>
<tr>
<td>7</td>
<td>6.5</td>
<td>✓</td>
<td>Glipizide</td>
<td>---</td>
<td>---</td>
<td>67y, DNR</td>
<td>HLD, CKD with GFR&lt;60</td>
</tr>
<tr>
<td>8</td>
<td>6.6</td>
<td>✓</td>
<td>---</td>
<td>---</td>
<td>✓</td>
<td>80y, DNR</td>
<td>Dementia, CVA, CKD with GFR&lt;60</td>
</tr>
<tr>
<td>9</td>
<td>6.9</td>
<td>✓</td>
<td>Metformin</td>
<td>---</td>
<td>✓</td>
<td>89y, DNR</td>
<td>Dementia, HTN</td>
</tr>
<tr>
<td>10</td>
<td>11.1</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>84y, DNR</td>
<td>Dementia, HTN, HLD, CVA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Patient</th>
<th>A1c in the past year</th>
<th>A1c Lab Standing Order</th>
<th>Oral Medication</th>
<th>SSI</th>
<th>Basal Insulin</th>
<th>Age, Code Status</th>
<th>Comorbidities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5.1</td>
<td>✓</td>
<td>---</td>
<td>---</td>
<td>✓</td>
<td>65y, Full Code</td>
<td>HTN, ESRD with HD</td>
</tr>
<tr>
<td>2</td>
<td>5.7</td>
<td>✓</td>
<td>Januvia, Glipizide</td>
<td>---</td>
<td>---</td>
<td>73y, CPR</td>
<td>Dementia, HTN, CVA</td>
</tr>
<tr>
<td>3</td>
<td>5.9</td>
<td>✓</td>
<td>Metformin, Glimepiride</td>
<td>---</td>
<td>---</td>
<td>77y, DNR</td>
<td>Dementia, HLD</td>
</tr>
<tr>
<td>4</td>
<td>6.1</td>
<td>✓</td>
<td>Metformin</td>
<td>---</td>
<td>---</td>
<td>84y, DNR</td>
<td>Dementia, HTN, HLD, CVA</td>
</tr>
<tr>
<td>5</td>
<td>6.5</td>
<td>✓</td>
<td>Glipizide</td>
<td>---</td>
<td>---</td>
<td>68y, DNR</td>
<td>HLD, CVA</td>
</tr>
<tr>
<td>6</td>
<td>6.8</td>
<td>✓</td>
<td>---</td>
<td>---</td>
<td>✓</td>
<td>84y, DNR</td>
<td>HTN, CVA, ESRD with HD</td>
</tr>
</tbody>
</table>

✓ = Yes; CPR = cardiopulmonary resuscitation; DNR = do not resuscitate.

The Chart Review findings for the A1c, A1c lab standing order, and the SSI are presented in Table 4.7.
Table 4.7. Facility B Pre-/Post-Intervention Chart Review Findings

<table>
<thead>
<tr>
<th>Items Charted</th>
<th>Facility B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre N=54</td>
</tr>
<tr>
<td>A1c Level</td>
<td>Range: 5.1 to 11.1</td>
</tr>
<tr>
<td>A1c Lab Standing Order Charted</td>
<td>30 patients</td>
</tr>
<tr>
<td>Sliding Scale Insulin</td>
<td>2 patients</td>
</tr>
</tbody>
</table>

Facility B Chart Review Results: Hyperglycemic and Hypoglycemic Events. During the baseline chart review, one patient experienced hyperglycemia on multiple separate days. In looking at the post–intervention chart review, three patients experienced hyperglycemia, and one of the patients was listed with three separate episodes. In noting how the nursing staff managed the Facility B patients’ hyperglycemic events, a provider was contacted for every event, and the SBAR was not completed for any event. The nursing staff correctly identified hyperglycemia as a blood sugar greater than 200 mg/dL for each event. One of the NP students used the pocket card information sheet to estimate a patient’s eAg and charted their calculations. Two out of the seven events did not indicate whether the patient was symptomatic. Most of the treatment administered for hyperglycemia was with Novolog. One of the entries stated the provider was contacted, but did not state treatment ordered, despite having performed a follow up blood sugar check. An entry stated “give more fluids”, without further information, although the blood sugar was checked afterwards. Four of the seven entries re-checked the blood sugar post treatment administration. The Facility B Hospital Chart Review Findings Pre-/Post- Intervention Hyperglycemic Events management are presented in Table 4.8.
Table 4.8. Facility B Chart Review Findings Pre-/Post-Intervention Hyperglycemic Events

<table>
<thead>
<tr>
<th>Facility B Baseline Hyperglycemic Events N=1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyperglycemia Correctly identified</td>
</tr>
<tr>
<td>-------------------------------------</td>
</tr>
<tr>
<td>Patient A</td>
</tr>
<tr>
<td>Event #1</td>
</tr>
<tr>
<td>Event #3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Facility B Post-Intervention Hyperglycemic Events N=3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient B</td>
</tr>
<tr>
<td>Event #4</td>
</tr>
<tr>
<td>Event #5 Event #5 calculated by RN = 310</td>
</tr>
<tr>
<td>Event #6</td>
</tr>
</tbody>
</table>

✓ = Yes

There were 13 hypoglycemic events recorded during the post-intervention chart review.

Two Facility B patients experienced hypoglycemia during the baseline chart review, and one of the patients had multiple episodes. During the post-intervention chart review, six Facility B patients were listed with hypoglycemia, and three of those patients experienced multiple events.

The baseline management findings were: (a) hypoglycemia was accurately identified based on the ADA (2014) guidelines; (b) whether the patient was symptomatic was charted once out of four times; (c) the provider was contacted 50% of the time for hypoglycemia; (d) treatments administered appear to be appropriate; (e) no follow up blood sugar was obtained after treatment was administered for 50% of the entries; and (e) no charting in the SBAR was noted. The post-intervention management was consistent with the baseline entries.
The Facility B Hospital Chart Review Findings Pre-/Post-Educational Intervention

Hypoglycemic Events management are presented in Table 4.9. Hypoglycemia was accurately diagnosed during every hypoglycemic event. An NP student calculated the estimated average glucose (eAg) using the pocket cards distributed and determined that the patient’s A1c was too
low based on their health status. The GNP preceptor was notified and the patient’s glipizide dose was decreased. The assessments and plans of care for all symptomatic patients were charted each time there was a hypoglycemic event, with the exception of one patient. The provider was contacted four out of nine times when the patients experienced hypoglycemia. Overall the treatment regimen was consistent with the guidelines. Follow up blood sugar check post treatment administration was completed twice out of six episodes. The SBAR charting was completed once out of 13 total hypoglycemic events (8%) pre- and post- intervention.

**Pre-/Post-Educational Intervention Survey Results.** The educational intervention survey consisted of 10 statements that measured the nurses’ competency and knowledge. The final survey item, statement 11, asked the participants to list three items for which they felt additional training and education was needed to confidently provide care to elderly Type 2 diabetics in LTC.

**Facility A Pre-/Post-Intervention Survey Results: Competency.** In comparing the competency pre-educational intervention responses to the post-educational intervention responses, the Facility A nursing staff felt that their competence improved post intervention for providing patient care to diabetics, and in managing hyper- and hypoglycemia (Statements 1, 3, 4, 7, and 10). The biggest changes post intervention were noted in statements 1 and 3. In statement 1 pre-educational intervention, 50% of the nursing staff felt they received adequate education and training to provide care to the diabetic patients (Strongly Agree 6% + Agree 44%). That number nearly doubled post intervention at 91% (Strongly Agree 41% + Agree 50%). The nursing staff was asked to rate their competency in discussing the diabetics’ plan of care with the providers in Statement 3. The pre-educational intervention score was 70% (Strongly Agree 3%
Agree 67%) and the score increased to 94% post-educational intervention (Strongly Agree 32% + Agree 62%). (See Figures 4.1 and 4.2).

Competency statements 7 and 10 also showed an increase in the post-educational intervention scores. Statement 7 measured the participants’ competency in managing hypoglycemia, and had a pre-intervention score of 82% (Strongly Agree 15% + Agree 67%), with a post intervention increase to 100% (Strongly Agree 44% + Agree 56%). Statement 10 assessed confidence in providing care to the diabetics at Facility A. The pre-intervention score for statement 10 was 80% (Strongly Agree 32% + Agree 65%) and increased to 97% post-intervention (Strongly Agree 12% + Agree 68%).

*Figure 4.1. Facility A Statement 1: Pre-and Post-Intervention Results (N=34)*
Figure 4.2. Facility A Statement 3: Pre-/Post-Intervention Results (N=34)

Facility A Statement 3: I feel competent discussing the elderly Type 2 Diabetic resident's plan of care with the medical providers.

**Facility A Pre-/Post-Intervention Survey Results: Neutral Responses That Measure Competency.** The significant Neutral responses in measuring the participants’ competence occurred with Statements 1 and 10. The pre-educational intervention Neutral score for Statement 1, where the nursing staff felt they received adequate education and training to provide care to the diabetic patients, was 38% and post intervention decreased to 9%. In Statement 10 the nursing staff was asked to rate their confidence in their ability to provide best patient care to elderly diabetics. The pre-educational intervention Neutral score for Statement 10 was 17% and decreased to zero post intervention.

**Facility A Pre-/Post-Intervention Survey Results: Knowledge.** Statements 2, 5, 6, and 9, which measured the participant’s knowledge of diabetes, showed a post intervention increase in their scores. The post intervention score for statement 8 remained the same. Statement 2
measured whether the participants understood how often the medical providers were required to see their patients in LTC, specifically the statement was “Medical providers are required to see their patients in the LTC setting on a monthly basis”. The pre-educational intervention score was 65% (Strongly Agree 24% + Agree 41%) and post intervention the score was 39% (Strongly Agree 15% + Agree 24%). The correct statement is that the providers are required to see patients every 60 days in LTC. The expectation was a decrease in the Strongly Agree/Agree responses and an increase in the Disagree/Strongly Disagree responses, which is what occurred. Statement 5 measured whether the participants knew the definition of hypoglycemia, for which the pre-educational intervention score was 85% (Strongly Agree 20% + Agree 65%) and post intervention was 100% (Strongly Agree 59% + Agree 41%). Statement 6 measured whether the participants knew the definition of hyperglycemia. Responses pre-educational intervention were 65% (Strongly Agree 15% + Agree 50%), and post intervention was 97% (Strongly Agree 62% + Agree 35%).

Much time was spent discussing Statement eight’s topic during the educational intervention, yet majority of the participants responded incorrectly on the post intervention survey. Statement 8 measured an understanding of the appropriate A1c goal for diabetics in LTC facilities. An A1c of 7.5 – 8% is appropriate for most LTC residents with moderate co-morbidities and life expectancy < 10 years (ADA, 2014; AGS, 2013). The responses for this statement were 64%, and remained the same pre (Strongly Agree 12% + Agree 52%) and post intervention (Strongly Agree 29% + Agree 35%). The correct response for Statement 8 was in the Disagree and Strongly Disagree categories, where the pre-educational intervention response was 18% (Disagree 15% + Strongly Disagree 15%), and the post intervention response was 33%
(Disagree 18% + Strongly Disagree 15%). The moderate increase in the post intervention responses indicated an understanding of the concept by only one-third of the participants.

Finally, statement 9 measured whether the participants knew that SSI was inappropriate in management of elderly diabetics in LTC, “Sliding Scale Insulin is a good way to maintain glycemic control in elderly LTC diabetics”. This topic was discussed comprehensively during the educational intervention. The pre-educational intervention score was 35% (Strongly Agree 6% + Agree 29%) and the post intervention score was 23% (Strongly Agree 9% + Agree 14%). Sliding scale insulin is contraindicated in LTC because of its association with hypoglycemia (AMDA, 2010). The response expectation was a decrease in the Strongly Agree/Agree responses

Table 4.10. Facility A Pre-/Post-Intervention Scores (N=34)

<table>
<thead>
<tr>
<th>Facility A Statements</th>
<th>Pre-Intervention (%)</th>
<th>Post-Intervention (%)</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>50</td>
<td>91</td>
<td>41</td>
</tr>
<tr>
<td>2</td>
<td>65</td>
<td>39</td>
<td>26</td>
</tr>
<tr>
<td>3</td>
<td>70</td>
<td>94</td>
<td>24</td>
</tr>
<tr>
<td>4</td>
<td>85</td>
<td>94</td>
<td>9</td>
</tr>
<tr>
<td>5</td>
<td>85</td>
<td>100</td>
<td>15</td>
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<tr>
<td>6</td>
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<tr>
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<td>35</td>
<td>23</td>
<td>12</td>
</tr>
<tr>
<td>10</td>
<td>80</td>
<td>97</td>
<td>17</td>
</tr>
</tbody>
</table>
and an increase in the Disagree/Strongly Disagree responses, which is what occurred. The pre-
educational intervention Disagree/Strongly Disagree response was 50% (Disagree 35% +
Strongly disagree 15%) and the post intervention response increased to 74% (Disagree 18% +
Strongly Disagree 56%). (See Table 4.12 Facility A Hospital Pre/Post Intervention scores.)

Facility A Hospital pre-/post-intervention survey results: Neutral responses that
measure knowledge. The meaningful Neutral responses in measuring the participants’
knowledge occurred with Statements 8 and 9. In Statement 8 the nursing staff was asked to
comment on whether they agreed, or not, that the A1c goal for elderly diabetics in LTC was less
than 7%. The pre-educational intervention Neutral score for Statement 8 was 18% and post
intervention decreased to 3%. In Statement 9 the nursing staff was asked whether SSI is a good
way to maintain glycemic control in elderly diabetics in LTC. The pre-educational intervention
Neutral score for Statement 9 was 15%, and decreased to 3% post intervention. The significance
of the decrease in the Neutral responses is that the participants were able to make a definitive
decision about the information post intervention, moving beyond their pre-educational
intervention neutral stance – which was the intent of the intervention.

Facility A Hospital additional training and education. Statement 11 asked the Facility A
participants to list three areas for which additional training and education was needed to
confidently provide care to Type 2 diabetics in LTC. There were fourteen responses pre-
intervention, that requested training and education on a variety of topics including insulin and its
pharmacology, SSI, Accucheck, when to administer insulin, pharmacology of oral medication,
A1c, best practice for diabetic wound healing, recommendations for treating diabetics who are
ill, standardizing standing orders for high and low blood sugar parameters and when to contact
Table 4.11. Facility A Topics for Additional Training Pre: N=14 / Post: N=5

<table>
<thead>
<tr>
<th>Facility A Topics for Additional Training</th>
<th>Pre</th>
<th>Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulin topics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SSI – is it necessary?</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Use of SSI in LTC</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>Types of Insulin &amp; Insulin Action</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Accucheck in LTC</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>Oral diabetes medication</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pharmacology of oral medication &amp; insulin</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Pharmacology of oral DM medication</td>
<td>3</td>
<td>--</td>
</tr>
<tr>
<td>A1c</td>
<td></td>
<td></td>
</tr>
<tr>
<td>What does this lab measure?</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>What is it telling us about our patients?</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Best practice for diabetics’ wound healing</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>Recommendations for treating diabetics who are ill</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>Standardizing standing orders for parameters of high and low blood sugar and when to call the provider</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>Trainings/Seminars</td>
<td></td>
<td></td>
</tr>
<tr>
<td>More training, seminars and in-services</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>More Continuing Education</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Insulin in-service</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Up to date interventions, management of DM</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>EBP in-services</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>More handouts and educational materials</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Working with diabetics at the bedside</td>
<td>--</td>
<td>1</td>
</tr>
<tr>
<td>Management of newly-diagnosed diabetics in LTC</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>ADA recommendations for LTC diabetics</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

the medical provider, request for additional training and seminars, management of newly diagnosed diabetics, and ADA recommendations for treating managing diabetics in LTC. There were only five responses to Statement 11 noted on the Facility A post-intervention survey. Two participants requested additional information about insulin and SSI, specifically, types of insulin and its pharmacology, and whether SSI was necessary. The remaining three responses were related to Training/Seminars, where participants asked for more educational in-services and training to care for diabetics at the bedside. Facility A Hospital Topics for Additional Training can be found on Table 4.11.
Facility B Pre-/Post-Intervention Survey Results: Competency. In comparing the competency pre-educational intervention responses to the post-educational intervention responses, the Facility B Hospital nursing staff felt that their competence providing patient care to diabetics, and in managing hyper- and hypoglycemia improved post intervention (Statements 1, 3, 4, 7, and 10). The biggest changes post intervention was seen in statements 1 and 4. In statement 1 pre-educational intervention, 67% of the nursing staff felt they received adequate education and training to provide care to the diabetic patients (Strongly Agree 9% + Agree 58%). Post intervention response was 100% (Strongly Agree 64% + Agree 36%). The nursing staff was asked to rate their competency in discussing the diabetics’ plan of care with the providers in Figure 4.3. Facility B Statement 1: Pre-/Post- Intervention Results (N=28)

Facility B Statement 1: I have received adequate education and training at Facility B Hospital to provide care to Type 2 diabetics in the LTC setting.

Statement 4. The pre-educational intervention score was 82% (Strongly Agree11% + Agree 71%) and the score increased to 100% post-educational intervention (Strongly Agree 47% + Agree 53%). (See Figures 4.3 and 4.4).
Competency statements 3, 7, and 10 also showed an increase in the post-educational intervention scores. The nursing staff was asked to rate their competency in discussing the diabetics’ plan of care with the providers in Statement 3. The pre-educational intervention score was 85% (Strongly Agree 14% + Agree 71%) and the score increased to 100% post-educational intervention (Strongly Agree 50% + Agree 50%). Statement 7 measured the participants’ competency in managing hypoglycemia, and had a pre-intervention score of 89% (Strongly Agree 18% + Agree 71%), with a post intervention increase to 100% (Strongly Agree 61% + Agree 39%). Statement 10 assessed confidence in providing care to the diabetics at Facility B Hospital. The pre-intervention score for statement 10 was 89% (Strongly Agree 11% + Agree 78%) and increased to 100% post-intervention (Strongly Agree 46% + Agree 54%).

**Facility B Hospital Pre-/Post-Intervention Survey Results: Neutral Responses That Measure Competency.** All 10 of the Facility B competency Neutral responses for the post-
educational intervention was zero. The significant Neutral responses in measuring the participants’ competence occurred with Statements 1 and 9. The pre-educational intervention Neutral score for Statement 1, where the nursing staff felt they received adequate education and training to provide care to the diabetic patients, was 25% and post intervention decreased to zero. In Statement 9 the nursing staff was asked to rate their confidence in their ability to provide best patient care to elderly diabetics. The pre-educational intervention Neutral score for Statement 10 was 22% and also decreased to zero post intervention.

**Facility B Hospital Pre-/Post-Intervention Survey Results: Knowledge.** In the statements that measured the participant’s knowledge of diabetes, the post intervention score for Statements 2 and 8 decreased, which was the expectation, and increased for statements 5, 6, and 9. Statement 2 measured whether the participants understood how often the medical providers were required to see their patients in LTC, “Medical providers are required to see their patients in the LTC setting on a monthly basis”. The pre-educational intervention score was 75% (Strongly Agree 29% + Agree 46%) and post intervention the score was 46% (Strongly Agree 18% + Agree 28%). The correct statement is that the providers are required to see patients every 60 days in LTC settings. The expectation was a decrease in the Strongly Agree/Agree responses and an increase in the Disagree/Strongly Disagree responses, which is what occurred. The correct response for Statement 2 was in the Disagree and Strongly Disagree categories, where the pre-educational intervention response was 4% (Disagree 0% + Strongly Disagree 4%), and the post intervention response was 32% (Disagree 21% + Strongly Disagree 11%). The increase in the post intervention responses indicated an understanding of the concept by only one-third of the participants. The significance of this question is for the nursing staff to understand that in the interim, it is their responsibility to drive the plan of care – and in order to drive the plan of care,
they must understand how to manage Type 2 diabetes. Statement 5 measured whether the participants knew the definition of hypoglycemia, for which the pre-educational intervention score was 94% (Strongly Agree 22% + Agree 72%) and post intervention was 100% (Strongly Agree 71% + Agree 29%). Statement 6 measured whether the participants knew the definition of hyperglycemia. The pre-educational intervention response was 64% (Strongly Agree 18% + Agree 46%), and post intervention was 96% (Strongly Agree 71% + Agree 25%).

A great deal of time was spent discussing Statement 8 during the educational intervention, yet majority of the participants responded incorrectly on the post intervention survey. Statement 8 measured an understanding of the appropriate A1c goal for diabetics in LTC. An A1c of 7.5 – 8% is appropriate for most LTC residents with moderate co-morbidities and life expectancy < 10 years (ADA, 2014; AGS, 2013). The pre-educational intervention response for this statement was 92% (Strongly Agree 20% + Agree 72%) and post intervention was 68% (Strongly Agree 36% + Agree 32%). The correct response for Statement 8 was in the Disagree and Strongly Disagree categories, where the pre-educational intervention response was 4% (Disagree 0% + Strongly Disagree 4%), and the post intervention response was 32% (Disagree 21% + Strongly Disagree 11%). The moderate increase in the post intervention response indicated an understanding of the concept by only one-third of the participants.

Finally, statement 9 measured whether the participants knew that SSI was inappropriate for the management of elderly diabetics in LTC, “Sliding Scale Insulin is a good way to maintain glycemic control in elderly LTC diabetics”. This topic was discussed comprehensively during the educational intervention. The pre-educational intervention score was 50% (Strongly Agree 7% + Agree 43%) and the post intervention score was 4% (Strongly Agree 0% + Agree 4%). SSI is contraindicated in LTC because of its association with hypoglycemia (AMDA, 2010;
AGS, 2013). The expectation was a decrease in the Strongly Agree/Agree responses and an increase in the Disagree/Strongly Disagree responses, which is what occurred. The pre-educational intervention Disagree/Strongly Disagree response was 28% (Disagree 25% + Strongly disagree 3%) and the post intervention response increased to 96% (Disagree 57% + Strongly Disagree 39%). See Table 4.12 Facility B Hospital Pre/Post Intervention scores.

Table 4.12. Facility B Pre-/Post-Intervention Scores (N=28)

<table>
<thead>
<tr>
<th>Facility B Survey Results</th>
<th>Pre-Intervention (%)</th>
<th>Post-Intervention (%)</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>67</td>
<td>100</td>
<td>33</td>
</tr>
<tr>
<td>2</td>
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</tr>
<tr>
<td>3</td>
<td>85</td>
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<td>4</td>
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<td>5</td>
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<td>68</td>
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</tr>
<tr>
<td>9</td>
<td>50</td>
<td>4</td>
<td>46</td>
</tr>
<tr>
<td>10</td>
<td>89</td>
<td>100</td>
<td>11</td>
</tr>
</tbody>
</table>

Facility B Additional Training and Education. Statement 11 asked the Facility B participants to list three areas for which additional training and education is needed to confidently provide care to Type 2 diabetics in LTC. There were fourteen responses pre-intervention, that requested training and education on a variety of topics including insulin and its
pharmacology, SSI, Accucheck, when to administer insulin, pharmacology of oral medication, A1c, best practice for diabetic wound healing, recommendations for treating diabetics who are ill, standardizing standing orders for high and low blood sugar parameters and when to contact the medical provider, request for additional training and seminars, management of newly diagnosed diabetics, and ADA recommendations for treating managing diabetics in LTC. (See Table 4.13. Facility B Topics for Additional Training).

Table 4.13. Facility B Topics for Additional Training (Pre: N=7 / Post: N=12)

<table>
<thead>
<tr>
<th>Facility B Topics for Additional Training</th>
<th>Pre</th>
<th>Post</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Insulin topics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulin treatment vs PO medication</td>
<td>2</td>
<td>--</td>
</tr>
<tr>
<td>Types of Insulin &amp; Insulin Action</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td><strong>PO diabetes medication</strong></td>
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<td>pharmacology</td>
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<td><strong>Lifestyle Modifications</strong></td>
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<td>Family education on food intake and DM</td>
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<td>Hyperglycemia signs and symptoms in the</td>
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<td>**Hypoglycemia treatment without giving</td>
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<td><strong>Train CNA to provide care to elderly diabetics in LTC</strong></td>
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There were only five responses to Statement 11 during the Facility B post-intervention survey.
Two participants requested additional information about insulin and SSI, specifically, types of insulin and its pharmacology, and whether SSI was necessary. The remaining three responses were related to Training/Seminars, where participants asked for more educational in-services and training to care for diabetics at the bedside.

**Evolution of Project**

The initial intent was to conduct this DNP project at Facility A Hospital only. Upon completion of the educational interventions at Facility A, however, and after discussions with the DNP student’s external advisor, a decision was made to include the licensed nursing staff at Facility B Hospital in this QI project. The time between the last day of the intervention and the post-chart review was six months for Facility A and three months for Facility B. Ideally consistency at both sites would have been best, that is, to allow a six-month time period post intervention for the Facility B nursing staff to process and implement the information they learned during the sessions – similar to the time frame for the nursing staff at Facility A Hospital. However the time frame for the entire project was one year and needed to be completed by December 2015.

**Expected vs Actual Outcomes.**

The expected outcomes for this DNP project were:

- Elderly diabetic patients will have improved and appropriate A1c levels based on their level of frailty, functional and cognitive ability, code status, and comorbidities.
- Nursing staff will be able to apply EB guidelines to appropriately manage hyper-/hypoglycemic episodes
- Functioning as a team member, nursing staff can confidently and appropriately communicate with the medical providers about patients’ health status.
• Nursing staff will articulate a growth in self-confidence in their abilities to care for elderly diabetics.

Based on the post intervention chart review, implementation of the EBP clinical guidelines is occurring. Based on the pre-/post-test survey results, the nursing staff is confident in their abilities to provide patient care to the elderly diabetics, to manage hyper-/hypoglycemia, and to appropriately communicate to the medical providers about the patient’s health status. Additional time was needed to fully assess the expected outcomes.

**Facilitators.** The following facilitators are noted. The DNP student’s external advisor was the most important facilitator of the project. She is a GNP, a provider at Facility A and Facility B Hospitals during the week, and is the go-to person for questions and acute patient exacerbations by the nursing staff. They trust her and depend on her for guidance – which made implementation of this project easier. The DNP student is not employed at Facility A or Facility B, so it was the External Advisor's influence that enabled the project’s progression at both sites. The External Advisor was also a constant source of information post educational intervention and periodically quizzed the nursing staff about the intervention information.

The Clinical Educators at Facility A and Facility B Hospitals, who arranged and scheduled the nursing staff to attend the sessions, and who made reminder calls to the nurse managers and nurses the day before their respective sessions, were also essential to the success of the project. The Clinical Educators made calls to the nurses on the day of their scheduled sessions – especially if the turnout was particularly low. If a nurse was unable to attend on their assigned date, an alternate date was arranged. Every effort was made to promote the events and to make arrangements for all nursing staff to attend. Facility A and Facility B Administrators
paid the nursing staff to attend, at the end of their shifts (night crew) or at the beginning (the evening crew). That in-kind gesture demonstrated tremendous support for the nurses’ education.

An EB Hypoglycemia management algorithm was created and posted at each nursing station and on the medication cart at both hospitals. In collaboration with the External Advisor, the DNP student created laminated pocket cards and flyers containing EB information from the intervention: the Hypoglycemia Care Path algorithm, appropriate A1c levels, estimated average glucose calculations and treatment for hyper- and hypoglycemia were placed onto laminated pocket cards for easy reference and each nurse received a copy. These teaching materials promoted the information that was the focus of the DNP project and facilitated the learning process for the nursing staff.

**Barriers.** The following barriers were noted and will be discussed.

- **Lack of time.** The project timeline was too short which made it difficult to fully implement the project so that the nursing staff could benefit from the intervention and the planned follow up sessions. Lack of time also affected full implementation of the Iowa Model.

- **Lack of knowledge.** An assessment to determine RN actual and perceived knowledge should have been administered so gaps in knowledge could be identified and then included in the intervention.

- **Lack of access to correct clinical practice.** The nursing staff will float to different units, where there are variances in equipment, leadership, and practice.

- A perceived barrier prior to the project onset, was whether the nursing staff would appreciate someone (the DNP student) who is not employed at their facility, discussing what they should be doing to provide care to elderly diabetics. That notion never
materialized and seemed to not matter, as the participants were focused on the intervention content.

Summary

An educational intervention that provided EB clinical guidelines for provision of care to elderly diabetics was conducted for a group of healthcare professionals, 62 total, including the licensed nursing staff at Facility A and Facility B Hospitals, a wound care NP, NP students, and a nursing student at Facility A and Facility B Hospitals. The expected outcomes for this DNP project were: (1) improvement and/or control of resident A1c levels; (2) appropriate management by the licensed nursing staff of hyper- and hypo-glycemic episodes; and (3) increase licensed nursing staff knowledge of type 2 DM management and thus, increasing their confidence in providing care to diabetic residents.

Based on the post intervention chart review, implementation of the EBP clinical guidelines is occurring. Based on the pre-/post-test survey results, the nursing staff is confident in their abilities to provide patient care to the elderly diabetics, to manage hyper-/hypoglycemia, and to appropriately communicate to the medical providers about the patient’s health status. Additional time was needed to fully assess the expected outcomes. The participants received tools for managing hyper- and hypoglycemic episodes and estimating A1c.
Chapter 5. Discussion

The goal of this project was to implement EB T2DM clinical guidelines at Facility A and Facility B Hospitals. With the guidelines in place, the objectives were for the nursing staff to: (a) define hyper- and hypoglycemia; (b) apply the EB guidelines to manage hyper- and hypoglycemia; (c) recall appropriate A1c levels for diabetics in LTC; and (d) report appropriate and significant information to the medical providers about the patients’ diabetic status and chart said information. Ultimately the goal was to empower the nursing staff with EB T2DM knowledge and increase their confidence in providing best patient care.

The intent of this project was to develop baseline data for the nursing staff at Facility A and Facility B Hospitals independently of each other. At no time was this project about comparing the nursing staff at the two facilities. The information gathered revealed areas where improvement is needed at both sites, as well as areas in which the nursing staff excelled.

The results of this DNP Project are integrated into a discussion that begins with an interpretation of the findings. Next the implications and recommendations for the DNP Essentials will be reviewed. Lastly, plans for dissemination and a discussion of the Project presentation at Facility A and Facility B Hospitals will be summarized.

Interpretation of Findings

The Chart Review – Facility A. Based on the post-educational intervention chart review, the Facility A nursing staff showed an improvement in the following areas:

- recognize hyper-/hypoglycemic symptoms (67%)
- define hyper-/hypoglycemic, according to the ADA (2014) (100%)
- describe appropriate treatment for hypoglycemia as “two packet of sugar” and juice, instead of ‘juice and sugar’ or ‘juice and snack’ (33%).
A trend that developed post intervention was increased charting about hypoglycemic episodes (100%) which, as stated above, is indicative of the nursing staff’s improvement in recognizing hypoglycemic symptoms and knowing that a blood sugar less than 70mg/dL is a hypoglycemic state. The increase in charting could also be attributed to an improved self-confidence in the nursing staff’s ability to articulate their assessments and appropriately manage hypoglycemia.

A topic that remained the same post-educational intervention was when to contact the provider to discuss the patient’s hyper-/hypoglycemia treatment. Majority of the time (80%) the nursing staff contacted the providers to inform them of the patient’s health status hyper-/hypoglycemia.

Two areas in which no improvement occurred post intervention were: (a) follow up blood sugar check; and (b) charting via the SBAR. The trend for hyperglycemic events was zero follow up blood sugar and zero SBAR charting pre- and post-intervention. While the hypoglycemic events were similar to the hyperglycemic events – zero blood sugar checks and zero SBAR charting pre-intervention – the post-intervention follow up blood sugar checks improved (67%) and SBAR charting improved slightly (33%). The ability to recognize patient symptoms is important, but simply checking the blood sugar – something for which a provider order is not needed – is simpler and can accurately confirm a diagnosis. Finally, the nursing staff need to remember to chart their findings in the SBAR, which was never done during the pre- and post- intervention. Both areas will be reinforced during the follow up at Facility A.

The Chart Review – Facility B. The Facility B nursing staff’s proficiency at recognizing hyper-/hypoglycemia according to the ADA’s (2014) definition was consistent pre and post intervention (100%). The ability to recognize hyperglycemic symptoms improved post intervention (100%), as did recognition of hypoglycemic symptoms (87%).
The follow up blood sugar check for hyperglycemia was consistently performed pre-intervention (100%), but only 75% of the time post-intervention. Hypoglycemia follow up blood sugar check was performed 50% of the time pre-intervention, and less post-intervention (22%). The SBAR charting was never done for hyperglycemic events pre-and post-intervention. Pre-intervention hypoglycemia SBAR charting was never done and post intervention only slightly higher (11%). During hyperglycemic events, the nursing staff consistently contacted the providers pre-and post-intervention. During the hypoglycemic events, the providers were contacted 50% of the time pre-and post intervention.

Management of hypoglycemia was consistent pre and post intervention for the Facility B nursing staff: they understand how to treat hypoglycemic episodes (100%) pre and post intervention. The management of hyperglycemia is based on the provider’s order, so administration of the order was consistent pre and post intervention – but was never charted in the SBAR, as mentioned earlier.

The Pre-test/Post-test Survey. The pre-test/post-test survey measured knowledge of T2DM and competency in the nursing staff’s ability to provide best patient care. Overall the Facility A and Facility B nursing staff’s responses to the surveys indicated knowledge gained and confidence instilled.

Two areas proved challenging. The nursing staff was unsure of:

- how often the providers are expected to see their patients in LTC – every 60 days; and
- the A1c goal for elderly diabetics in LTC facilities, which is 7% to 8%.

One of the reasons for implementing this DNP project was to provide T2DM clinical guidelines for the nursing staff to provide the best patient care possible, so they are able to drive the plan of care, especially since the providers are only required to see their patients every 60
days in LTC facilities. An older ROL by Levy et al. (2007) summarized the characteristics of physicians who practice in nursing homes and the trend to reduce their nursing home caseloads, because of poor reimbursement, high volume of phone calls from the nursing homes, and time-consuming paperwork. In the interim, the nursing staff can drive the plan of care if they have the appropriate leaders and mentors, and EB clinical guidelines. The significance of this situation is that the nursing staff needs to understand that in the interim (i.e., between provider visits to assess patients), it is their responsibility to drive the plan of care in providing care to their diabetic patients – and in order to drive the plan of care, they must understand how to manage T2DM.

The post intervention neutral responses were significant for the Facility B nursing staff in that all neutral responses were zero indicating that the participants were able to make a definitive decision about the information post intervention, instead of taking a neutral stance.

**Implications/Recommendations for the Essentials**

The DNP Essentials clarify eight foundational competencies that are core to all advanced practice nursing roles (American Association of Colleges of Nursing [AACN], 2006). Findings from this DNP project emphasized various methodological and practical issues about the project that became more evident as the project progressed. The sections below will examine those implications with respect to the eight DNP Essentials.

**Essential I: Scientific Underpinnings for Practice.** This QI DNP project exemplifies Essential #1 as it relates to the application of evidence, the scientific and underpinnings for practice, as the basis for explaining a clinical problem (Zaccagnini & White, 2014). The purpose of the project was to implement EB guidelines so the Facility A and Facility B nursing staff could provide appropriate patient care to the elderly diabetics in their LTC facilities. Currently
there are no guidelines for providing care to elderly diabetics. The development of this project and implementation of CPGs at Facility A and Facility B would provide the foundational underpinnings that can ensure the delivery of care based on best evidence while improving patient outcomes.

**Essential II: Organizational and Systems Leadership for Quality Improvement and Systems Thinking.** Organizational and systems leadership are vital to improve patient and healthcare outcomes, so that the ultimate goal is to promote patient safety and excellence in practice (AACN, 2006). This project involved a systems-level change to implement EBP for the provision of care to elderly diabetics in the LTC setting. In order to ensure the success of this QI project, the stakeholders – Facility A and Facility B administrators, the nursing staff, and other healthcare professionals – needed to be on board with the project to form a supportive interprofessional group to improve the quality of health care.

As this DNP project progressed, it became clear that the development of a clinical leader or mentoring program was essential to ensure EBP clinical guidelines implementation and adherence to those clinical guidelines. Partnerships between academia and practice – where the faculty can serve as a mentor – or determining nursing staff interest for that position, or simply by hiring EBP-experienced RNs could meet that need. Supporting nurses to earn their CDE certification may assist as well. Nurses should be prepared with “sophisticated expertise in assessing organizations, identifying systems’ issues, and facilitating organization-wide changes in practice delivery” (AACN, 2006, p. 10).

**Essential III: Evidence-Based Practice/Translation Science.** This DNP project implemented an educational intervention to empower the nurses to drive the plan of care. A ROL was conducted, and relevant studies were synthesized to support the project in four areas:
(1) Clinical Practice Guidelines; (2) LTC DM Management; (3) RN education and knowledge; and (4) EBP Guideline Implementation. A sequential mixed methods QI intervention was implemented to develop an EBP program that could support the nursing staff at the bedside. The nursing staff needed a protocol-driven guideline, a step-by-step map to follow so they can assess, diagnose and provide care to their elderly diabetic patients.

**Essential IV: Information Systems/Technology.** The most obvious comment is that Facility A and Facility B Hospitals need to implement an EHR program system wide – not only to ensure legible medical records – but for so many other practical intentions: entering orders, ability to see nursing and provider notes, fall/incident reports, medication administration recording, access to other provider notes/documentation, to note trends in vital signs, and family/social histories. An EHR provides a mechanism to organize the patient’s chart so that the provision of best patient care can consistently and accurately be implemented, and evaluated. Moving away from paper charts should be a primary goal for the two hospitals.

The DNP student utilized technology for the extensive ROL, article synthesis and additional research that was vital to this DNP project. In this day and age, Information Technology is a way of life, an extension of one’s arm to access or send data and information in a simple keystroke.

**Essential V: Health Care Policy for Advocacy in Health Care.** Whether policy is created through governmental actions or institutional decision-making, it is a framework by which healthcare delivery can be facilitated or not. The engagement in the policy making process is essential to creating a system that meets the needs of the facility and its stakeholders, and can ensure the provision of quality healthcare (AACN, 2006). The Iowa Model was the Conceptual Framework that guided this DNP Project. Facility A and Facility B Hospitals are
currently on Step 5 of the Iowa Model, as they have completed a pilot to effect a change in practice. The final steps in the Model are to institute the change in practice and then monitor and analyze structure, process and outcome data. Through this process, the T2DM clinical guidelines will eventually become policy. The DNP student has assumed a leadership role to critically analyze the need or gap in knowledge at Facility A and Facility B, developed and implemented and EB clinical guideline, educated the nursing staff regarding the improvement in patient care outcomes, and advocated for the patients and their families.

**Essential VI: Inter-professional Collaboration for Improving Patient and Population Health Outcomes.** This DNP project required an interprofessional collaboration with the nursing staff, Clinical Educators, and the Quality Assurance Director. As a team member, the DNP student was able to contribute to empowering the nursing staff and improving their self-confidence as they implemented clinical guidelines for their elderly diabetics. A recommendation in the literature is that there is an identified leader or mentor who works with staff to ensure the successful implementation of EB practice changes. Options to have this type of role develop at Facility A and Facility B have been suggested as part of this project so that ongoing guidance for the staff is sustained as they learn new skills to implement the new clinical guidelines.

**Essential VII: Prevention and Population Health.** This DNP Project was a systems enhancement program that sought to implement an EBP clinical guideline at Facility A and Facility B Hospitals to improve practice and the practice environment. In essence, as it applies to Essential VII, it was about ensuring QOL for the elderly diabetics via health promotion and disease prevention. As the nursing staff gained knowledge and competence, they enhanced their skills to maintain and/or improve the patient’s QOL.
**Essential VIII: Advanced Nursing Practice and Education.** The LTC setting requires competence in providing care to the highly complex elderly diabetics. The current EB clinical guidelines that were implemented to improve patient outcomes, and the educational intervention in which the nursing staff participated will enhance the nurses knowledge with the expertise needed to work at Facility A and Facility B Hospitals, and to provide best patient care to this vulnerable population. The DNP student was the designer, educator, implementer, and guide to support the nursing staff to achieve excellence in nursing practice (AACN, 2006).

The goal of this DNP project for nursing staff attendance was 78%. The total number of RNs employed at Facility A is 40. With 31 Facility A nursing staff in attendance at the interventions, that goal was nearly met at 77.5%. Facility B employed 30 RNs during the time this project was implemented, and 26 of the nursing staff attended the interventions. The goal was met at Facility B with 87% nursing staff in attendance. These totals do not include the four NP students and one RN student who attended. The DNP project goal was met across both facilities with a total attendance of 81% -- which is promising for ongoing educational interventions.

**Plans for Dissemination**

This project’s findings will be presented at Facility A Hospital and broadcast via VTC to Facility B Hospital on November 29, 2015. The Executive Summary will be provided for all who attend and will also be emailed to the Facility B staff and administrators. The following recommendations will be made to the Medical Director: (1) To ensure sustainability, the nursing staff need to have an identified leader or mentor to assist with EBP implementation and evaluation of projects; (2) Consideration of additional pay if a nurse obtains CDE certification. Since the mean prevalence of diabetics across the two facilities was 25%, a CDE appears to be a...
worthwhile investment to assist and guide the nursing staff; and (3) Provide support for ongoing EB clinical interventions that are needed and appreciated by the nursing staff.

To ensure the staff receives T2DM support and ongoing EB clinical interventions, follow-up interventions are planned for next year, entitled “Diabetes Care, Part 2”. The DNP student and external advisor will include the following in the curriculum: (a) review of the previous information, especially the areas that were problematic for the nurses – appropriate A1c levels for elderly diabetics in LTC and how often the medical providers are required to see their patients in the LTC setting; (b) pre-test/post-test survey item 11, where the nurses listed areas they felt additional training would be helpful for providing best patient care. The topics for additional training can be seen at Table 4.11 (Facility A) and Table 4.13 (Facility B).

**Summary**

The goal of this project was to empower the nursing staff with the knowledge of EBP clinical guidelines for managing care of elderly diabetics in LTC. Implementing this project and documenting the results provides evidence that the staff at these LTC facilities is committed to working to improve patient outcomes. However, as the DNP student continued working on this project, it became clear that the nursing staff need a mentor, or leadership program, to assist with ongoing guideline or clinical policy implementation. It would be the leader’s responsibility to follow up daily regarding the implementation and evaluation of changes in practice or policy so that consistency in how things are being done on every unit is ensured. An original pilot study by Gifford et al., (2012) examined the possibility of developing leadership roles to improve nurses’ use of guidelines. While the results indicated no significant difference in the primary outcome, and suggested the need for future studies, the article discussed potential leadership strategies that participants found useful and worth pursuing (Gifford et al., 2012).
To ensure successful completion and implementation of this project, more time was needed. Additional time would have been helpful to evaluate the nursing staff’s process as they applied EB recommendations and to note improvements in patients’ A1c levels. Perhaps with additional time for implementation, the nursing staff’s charting could have been evaluated again (via another chart review) to note further progress in hyper-/hypoglycemia management. Item 11 on the educational intervention survey encouraged the nurses to list topics in which they felt more training and education was needed. Additional time would have allowed for a follow-up intervention that could include discussion of the topics listed, especially the topics that were listed multiple times pre-/post-intervention by the nurses at both hospitals.

The successful implementation of a protocol requires nurses to use and develop knowledge and skills related to research and the EBP process – that is, they must be familiar with the goals and expectations of EBP (Engvall et al., 2014). Ongoing educational interventions and periodic follow up are essential to keeping nursing staff accurate and consistent with the clinical guideline implementation. The EBP competencies should also be integrated into nursing practice including interview questions, orientation, job descriptions, performance appraisals, and clinical ladder promotion programs (Melnyk et al., 2014). A way to ensure successful implementation of this DNP project might be to change the mindset of the nursing staff so they are not task oriented. Instead of performing delegated patient care tasks, the nurses might be taught to incorporate a broader approach to health and wellness that EBP can offer (Zaccagnini & White, 2014).

Making changes in the system of care requires an institutional priority for providing high quality of care based on EB guidelines (ADA, 2015). The vision of Facility A and Facility B Hospitals support EBP. The missing piece at this time is the expansion of the role of teams or
staff, utilizing the expertise of a leader or mentor, and redesigning the processes of care to contribute to better patient outcomes. With the number of elderly diabetics aged 65 years and older expected to increase exponentially over the next few decades (ADA, 2015), it is essential that EB clinical teams, including appropriate leadership, are assembled sooner than later.
APPENDIX A: Adopter Categorization on the Basis of Innovativeness (Rogers, 2003)
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<th>P T</th>
<th>Gender</th>
<th>POLST, Code Status</th>
<th>INSULIN Type/Dose</th>
<th>PO Meds</th>
<th>Accucheck SSI</th>
<th>A1c Recent &amp; Previous (Include Dates)</th>
<th>Hyper-/Hypoglycemic Events BS Reading, Date(s)</th>
<th>Co-Morbidities A: Dementia B: Obesity C: HTN D: HLD E: CHF F: CAD G: Stroke H: CKD &lt;60 GFR I: ESRD w/ HD</th>
<th>A1c LABS Standing Orders</th>
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Evidence Based Recommendations for Elderly Type 2 Diabetics in Long-Term Care

OVERVIEW
- Chronic, progressive metabolic condition resulting from defects in insulin action, insulin secretion, or both
- Characterized by hyperglycemia
- Consequences of untreated DM: Microvascular and Macrovascular complications
  Cardiovascular disease, retinopathies, CKD, Blindness, limb amputation
  ESRD with dialysis

PREVALENCE
Prevalence of diabetes increases with age
- Facility A Type 2 Diabetics ≥65y: 25%
- Facility B Type 2 Diabetics ≥65y: 35%
- National statistics: 29%

DEFINITION
BLOOD SUGAR (or Blood Glucose)
- Fasting Blood Sugar (FBS) – 12h Fast
- Random Blood Sugar (RBS) – not fasting
- Daytime Average BS
- A1c – Hemoglobin A1c is also known as Glycosylated Hemoglobin or Glycated Hemoglobin

Diagnosis of Diabetes
FBS: Normal = 70 to 100mg/dL
- Two or more FBS > 126 mg/dL
- RBS ≥ 126 mg/dL on two separate occasions

DM Diagnosis:
A1c ≥ 6.5%
- Lab test used to diagnose diabetes and then to gauge how well the disease is being managed
- 5.7% - 6.4% = Pre diabetes
A1c
- Lab test that provides a "picture" of the average blood glucose control over the past 3 months
- Hemoglobin (Hgb) carries O₂ from the lungs to all the cells of the body.
- ‘sticky’ Glucose attaches to the Hgb
- The A1c measures the percentage of Hgb coated with glucose

More Glucose attached to the Hgb → higher A1c Level

A1c Labs
COMPREHENSIVE MONITORING is not recommended in LTC
- Twice yearly for elderly diabetics meeting treatment goals and have stable glycemic control
- Quarterly for patients not meeting glycemic goals

A1c Target for Elderly Diabetics
Must be individualized, based on the patient’s status

<table>
<thead>
<tr>
<th>Relative status</th>
<th>Target A1c</th>
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<tbody>
<tr>
<td>Relatively healthy older person with good functional status</td>
<td>7%</td>
</tr>
<tr>
<td>Life expectancy &lt; 5y; risks of tight glycemic control may outweigh the benefits</td>
<td>8%</td>
</tr>
<tr>
<td>Frail elderly</td>
<td>9%</td>
</tr>
</tbody>
</table>

Terminally ill / limited life expectancy
- Comfort measures
- Avoid hyper- / hypoglycemic events

Estimated Average Glucose (eAG)
- ADA recommends the use of a new term in DM management: Estimated Average Glucose or eAG.
- There is a relationship between A1c and eAG results

A1c and eAG

<table>
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<tr>
<th>A1c %</th>
<th>eAg mg/dL</th>
</tr>
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<tr>
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<td>11</td>
<td>269</td>
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<td>12</td>
<td>298</td>
</tr>
</tbody>
</table>

- A1c measures a percentage of how well BS is measured over 3 months
- eAG measures the average blood sugar over 24h

Hyperglycemia
> 200mg/dL (ADA, 2014)
Hyperglycemia in LTC
- Notify the provider if the patient’s BS is >400 mg/dL
- Be prepared with
  - Vital signs
  - previous BS readings
  - symptoms
  - UOP
  - recent intake
  - Current DM RX and doses
  - Ask for further instructions

Prognosis worsens with very old patients, coma and hypotension

Common Causes
- Infection
- MI
- Trauma
- Pancreatitis
- Certain drugs, new onset DM
- Cognitive impairment
- Trips to snack or gift shop

Signs & Symptoms in the Elderly
- Impaired cognition
- Decreased pain threshold
- Impaired vision
- Impedes wound healing
- Increased falls risk

Rx that may cause Hyperglycemia
- Antipsychotics
- Beta adrenergic agonists
- CCB
- Glucocorticoids
- Thiazide diuretics (HCTZ)
- Levodopa
- Megestrol acetate
- Opiates
- Phenytoin

NovoLOG vs NOVOLIN

<table>
<thead>
<tr>
<th>NovoLOG</th>
<th>Novolin (or Regular)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ONSET</td>
<td>15 minutes</td>
</tr>
<tr>
<td>PEAK</td>
<td>1 hour</td>
</tr>
<tr>
<td>DURATION</td>
<td>2 to 4 hours</td>
</tr>
</tbody>
</table>

Usually given before meals

INSULIN CHARACTERISTICS
- Onset = length of time before insulin reaches the bloodstream and begins lowering blood glucose.
- Peak = the time during which insulin is at maximum strength.
- Duration = how long insulin continues to lower blood glucose.
Hypoglycemia in LTC

First step: Assess the patient

- If pt is responsive and can drink
- Are they alert? Ask a question.
- SYMPTOM CHECK for tremor and sweating, confusion or lethargy.
- If alert and talking, not tremulous, not confused or sweaty, have pt eat their meal as soon as possible and contact their provider for any BS < 70mg/dL, EVEN IF YOU FEEL THEY ARE FINE FOR NOW.

Hypoglycemia in LTC

If patient is symptomatic

1. BS < 70mg/dL in symptomatic pt: Give 4 oz orange juice (15g CHO)
2. Re-check BS in 15 to 20 min. If still < 70mg/dL, Repeat #1: give 4 oz orange juice.

Hypoglycemia in LTC

If patient is symptomatic

3. For BS ≤ 60mg/dL Give 4 oz orange juice with two packets of sugar
4. Re-check BS in 15 to 20 min. If < 70mg/dL, but over 60 mg/dL: give 4 oz orange juice.
5. Once the pt is alert and able to talk, give a glass of milk or other regular food

Hypoglycemia in LTC

If patient is symptomatic

6. CALL THE PROVIDER for further instructions.
7. Be prepared with previous BS records, recent intake and medications for diabetes and doses and ASK FOR FURTHER INSTRUCTIONS.

** If CDE is on the floor, they may be able to help.
Hypoglycemia in LTC

If patient is symptomatic:
- One sugar pkt = 1 tsp sugar
  17 calories = 4.2g of CHO

Rapidly converted to glucose in the blood. More complex CHO such as those found in milk take about 40 min to be converted into glucose in the blood providing a more sustained rise in blood glucose.

Final Step?
USE THE SBAR!
Put copy in Provider Folder for review by MD or NP

Hypoglycemia in LTC

Symptoms are atypical in the Elderly:
- LTC residents may not be able to understand and/or may not be able to communicate hypoglycemic symptoms
- Unrecognized hypoglycemia may be misattributed to dementia, psychosis, behavior changes, cardiovascular events, or seizures... resulting in inappropriate treatment.

Hypoglycemia in LTC

Signs & Symptoms in the Elderly:
- Altered behavior
- Drowsiness, lethargy
- Confusion or disorientation
- Falls
- Generalized weakness
- Hallucinations
- Hunger
- Diaphoresis
- Irritability
- Pallor
- Poor concentration & coordination
- Seizures
- Stroke

Hypoglycemia in LTC

Symptoms are atypical in the Elderly:
- If the patient continues to have multiple hypoglycemic episodes, their POC must be adjusted
- If the patient has unpredictable eating patterns, their POC must be changed
Insulin
SLIDING SCALE INSULIN (SSI) is NOT RECOMMENDED for elderly Type 2 Diabetics because of its hypoglycemic tendencies.

MEDICATION
GLYBURIDE is NOT RECOMMENDED for elderly diabetics because of its hypoglycemic tendencies.
If the patient must be on a sulfonylurea, consider GLIPIZIDE.

METFORMIN is first line oral Rx. May be contraindicated in CKD w/ GFR <30 and other side effects, but is still considered first line regardless of age.

Elderly Diabetic Care Pearls
• Diabetes care in the LTC setting is very different from primary care.
• Evaluate the pt critically for s/s consistent with DM or diabetic complications.
• Cognitive impairment can cause decreased PO intake which could affect BS.
• Remember DM s/s may be atypical in the frail elderly.

Elderly Diabetic Care Pearls
Staff and practitioners should consider hyperglycemia or uncontrolled diabetes as a possible cause of an acute change of condition.

LTC DM Treatment Pearls
• Comprehensive monitoring of elderly diabetics is inappropriate in LTC.
• Treatment goals for older adults with functional and cognitive impairment, and limited life expectancy are individualized & relaxed. A1c = 9%
• Want to maintain comfort measures and avoid hypo- and hyperglycemic episodes.

LTC DM Treatment Pearls
Individualized therapy is key in the LTC setting for elderly diabetics. Must take into consideration:
• Cognitive and functional status
• Severity of disease
• Coexisting conditions
• Life expectancy
**Expected Treatment Outcomes**
- Greater individualization of care
- Enhanced patient quality of life
- Earlier identification of DM and its complications
- Better documentation of, and rationale for, patients’ personal goals and decision-making processes regarding their disease and its treatment

**Expected Treatment Outcomes**
- Decline in hypo- and/or hyperglycemic events
- Decline in the frequency of infection, electrolyte imbalance and dehydration
- Decline in the rate of DM progression, including its complications
- Reduction in ER visits and hospitalizations related to uncontrolled DM

**Expected Treatment Outcomes**
- Reduction in direct and indirect patient care costs as a result of increased appropriate resource utilization
- Decrease unnecessary costs and nursing time
- Improved monitoring and treatment protocols
- Improved staff education and awareness of DM

**In a Nutshell . . . .**

**What are the goals for elderly diabetics in LTC?**

**Goals**
- LTC elderly diabetics have their own set of protocols
- Don’t want unnecessary ER visits or hospital admissions secondary to DM

**Goals**
- Are A1c Labs getting done & are they at goal?
- How do daily BS correlate to the pt goals?
A1c and eAG

<table>
<thead>
<tr>
<th>A1c %</th>
<th>eAG mg/dL</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>126</td>
</tr>
<tr>
<td>7</td>
<td>154</td>
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<td>8</td>
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<td>212</td>
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<td>240</td>
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<tr>
<td>11</td>
<td>269</td>
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<tr>
<td>12</td>
<td>298</td>
</tr>
</tbody>
</table>

- A1c measures a percentage of how well BS is measured over 3 months
- eAG measures the average blood sugar over 24h

Hyperglycemia in LTC

What are the steps for providing care to the patient with a blood sugar greater than 400mg/dL?

Hypoglycemia in LTC

What are the steps for providing care to the patient with a blood sugar less than 60mg/dL?

Assess the patient

- If pt is responsive and can drink
- Are they alert? Ask a question.
- SYMPTOM CHECK for tremor and sweating, confusion or lethargy.
- If alert and talking, not tremulous, not confused or sweaty, have pt eat their meal as soon as possible and contact their provider for any BS < 70mg/dL, EVEN IF YOU FEEL THEY ARE FINE FOR NOW.
Hypoglycemia in LTC
If patient is symptomatic
3. For BS < 60mg/dL Give 4 oz orange juice with two packets of sugar
4. Re-check BS in 15 to 20 min. If < 70mg/dL, but over 60 mg/dL: give 4 oz orange juice.
5. Once the pt is alert and able to talk, give a glass of milk or other regular food

Evidence Based Recommendations
Currently, no Evidence Based protocols in place for Elderly Diabetics in LTC at Maluhia

Evidence Based Protocols
- Sliding Scale Insulin (SSI) is contraindicated because of its hypoglycemic indications
- Glyburide is contraindicated because of its hypoglycemic indications

Evidence Based Protocols
- Care for elderly Diabetics in LTC is individualized, based on patient’s status
- Quality of life is the priority for these pts
- Tight BS control is contraindicated in this pt population

Evidence Based Protocols
A1c and treatment plans are less stringent and based on patient’s status

| Relatively healthy older person with good functional status | ≤ 7% |
| Life expectancy ≤ 5y; risks of tight glycemic control may outweigh the benefits | 8% |
| Frail elderly | 9% |

Terminal illness / limited life expectancy
- Comfort measures
- Avoid hyper- / hypoglycemic events
**RNs EMPOWERED**

How will the protocols assist with patient care?

- In LTC, the more you stick to protocol → less mistakes
- Providers are required to see their pts every 60 days. In the interim, it us up to the RN to drive the POC to ensure goals are met

---

**RNs EMPOWERED**

With improved understanding of LTC DM management, RNs have control of the POC

- Need to do as few unnecessary procedures as possible which will
  - Improve patient care
  - Improve RN time management

---

**RNs EMPOWERED**

What do the providers need to know about the POC?

- Current meds that may be affecting glycemic control: cardiac drugs, anti-psychotics ...
- Do the providers need to know if the pt is on stool softeners? Or GERD medication?
- Important to relay pertinent information to the providers and ask the right questions.

---

**Case Study**
APPENDIX D: Diabetes Case Study

Sheza Gem is a 72 yr old female recently discharged from the hospital to your care following pneumonia requiring IV antibiotics and oxygen.

PMH: Diabetes x 10 years, previously on metformin 1,000mg BID, AFib, CHF, HTN

In the hospital they did a Hemoglobin A1C which was 11.4% and started her on Sliding Scale Insulin. When transferred Accuechecks were ordered QID with Sliding Scale Insulin

After 4 days her blood sugars are as follows

<table>
<thead>
<tr>
<th>TIME</th>
<th>TUE</th>
<th>WED</th>
<th>THUR</th>
<th>FRI</th>
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</thead>
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<tr>
<td>0600</td>
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<td>252</td>
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<td>123</td>
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<tr>
<td>1100</td>
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<td>304</td>
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<tr>
<td>2000</td>
<td>252</td>
<td>320</td>
<td>406</td>
<td>314</td>
</tr>
<tr>
<td>eAG</td>
<td>269</td>
<td>253</td>
<td>267</td>
<td>247</td>
</tr>
</tbody>
</table>

Sliding Scale
>150-199 = 6 units Novolin Regular
200-249 = 8 units
250-299 = 10 units
300-349 = 12 units
350-399 = 14 units
>400 – Call Provider

Discussion Questions:
- How would you handle this patient?
- Any thoughts about what is going on with the patient’s regimen?
- Are all the patient’s orders appropriate for her age and the LTC setting?
  - a. What would you d/c? Does anything need to be d/c’d?
  - b. What can be added to the regimen?
- Is the blood sugar optimally controlled?
- What is an appropriate A1c level for this patient?
PRE-/POST-EDUCATIONAL INTERVENTION NURSING STAFF SURVEY

1. I have received adequate education and training at Leahi Hospital to provide care to Type 2 diabetics in the LTC setting.
   Strongly Agree  Agree  Neutral  Disagree  Strongly Disagree

2. Medical providers are required to see their patients in the LTC setting on a monthly basis.
   Strongly Agree  Agree  Neutral  Disagree  Strongly Disagree

3. I feel competent discussing the elderly Type 2 diabetic resident’s plan of care with the medical providers.
   Strongly Agree  Agree  Neutral  Disagree  Strongly Disagree

4. I feel competent treating an elderly Type 2 diabetic who is hyperglycemic.
   Strongly Agree  Agree  Neutral  Disagree  Strongly Disagree

5. According to the American Diabetes Association (ADA), hypoglycemia is defined as blood glucose below 70mg/dL.
   Strongly Agree  Agree  Neutral  Disagree  Strongly Disagree

6. According to the American Diabetes Association (ADA), hyperglycemia is defined as blood glucose greater than 200mg/dL.
   Strongly Agree  Agree  Neutral  Disagree  Strongly Disagree

7. I feel competent treating an elderly Type 2 diabetic who is hypoglycemic.
   Strongly Agree  Agree  Neutral  Disagree  Strongly Disagree

8. The goal A1c level for the elderly Type 2 diabetic in LTC is \( \leq 7\% \).
   Strongly Agree  Agree  Neutral  Disagree  Strongly Disagree

9. Sliding Scale Insulin is a good way to maintain glycemic control in elderly LTC diabetics.
   Strongly Agree  Agree  Neutral  Disagree  Strongly Disagree

10. I feel confident in my abilities to provide best patient care to the elderly Type 2 diabetics at Leahi Hospital.
    Strongly Agree  Agree  Neutral  Disagree  Strongly Disagree

11. List three items for which additional training and education is needed so that you can confidently provide care to elderly Type 2 diabetics in LTC.
# Data Collection Procedures

## Variables

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>INSTRUMENTS</th>
<th>DATA COLLECTION POINT</th>
<th>DATA ANALYSIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>RN knowledge &amp; competency pre-intervention</td>
<td>Investigator-designed tool: Pre-Test Survey</td>
<td>Pre-Intervention</td>
<td>Descriptive Statistics</td>
</tr>
<tr>
<td>RN knowledge &amp; competency post-intervention</td>
<td>Investigator-designed tool: Post-Test Survey</td>
<td>Pre-Intervention</td>
<td>Descriptive Statistics</td>
</tr>
<tr>
<td>Appropriate T2DM Management</td>
<td>Investigator-designed tool: Baseline Chart Review</td>
<td>Pre-Intervention</td>
<td>Descriptive Statistics &amp; Trend Analyses</td>
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## Outcome Measures

<table>
<thead>
<tr>
<th>OUTCOME MEASURES</th>
<th>INSTRUMENTS</th>
<th>DATA COLLECTION POINT</th>
<th>DATA ANALYSIS</th>
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</thead>
<tbody>
<tr>
<td>Patients with appropriate or stable A1c levels</td>
<td>Investigator-designed tool: Chart Review</td>
<td>Post-Intervention</td>
<td>Descriptive Statistics &amp; Trend Analyses</td>
</tr>
<tr>
<td>Management of T2DM, including Hyper-/Hypoglycemia</td>
<td>Investigator-designed tool: Chart Review</td>
<td>Post-Intervention</td>
<td>Descriptive Statistics &amp; Trend Analyses</td>
</tr>
<tr>
<td>Nurses are confident, reporting to providers about patient's status; SBAR &amp; charting are appropriate</td>
<td>Investigator-designed tool: Chart Review &amp; Post-Intervention Survey</td>
<td>Post-Intervention</td>
<td>Descriptive Statistics &amp; Trend Analyses</td>
</tr>
<tr>
<td>Nursing staff with improved confidence providing care to elderly diabetics</td>
<td>Investigator-designed tool: Chart Review &amp; Post-Intervention Survey</td>
<td>Post-Intervention</td>
<td>Descriptive Statistics &amp; Trend Analyses</td>
</tr>
</tbody>
</table>
Symptoms or Signs of Hypoglycemia in a resident with Type 2 Diabetes diagnosis

- <70 mg/dL
- altered behavior & mental function
- altered LOC (e.g., drowsiness, lethargy)
- confusion or disorientation
- falls
- generalized weakness
- hallucinations
- hungry
- irritable
- pallor
- poor concentration & coordination
- seizures
- stroke
- diaphoresis

Is the patient responsive?

- YES
  - Is patient alert?
    - NO
    - Find out code status and transfer status. Notify the provider with the following: vitals and BS. **Prompt an order for IM glucagon.** Turn patient on their side after giving glucagon – they may awaken nauseous and vomit.

  - YES
    - Can they eat or drink?
      - YES
        - 1. BS < 70 in symptomatic pt: Give 4 oz orange juice (15g CHO)
        - 2. Re-check BS in 15 to 20 min. If < 70mg/dL Repeat #1: give 4 oz orange juice.
        - 3. For BS < 60 Give 4 oz orange juice with two packets of sugar
        - 4. Re-check BS in 15 to 20 min. If < 70, but over 60 mg/dL: give 4 oz orange juice.
        - 5. Once the pt is alert and able to talk, give a glass of milk or other regular food
        - 6. CALL THE PROVIDER for further instructions.
        - 7. Be prepared with
          - Previous BS records
          - recent intake
          - medications for diabetes and doses
          - ASK FOR FURTHER INSTRUCTIONS.

      - NO
        - When patient is responsive and able
          - Obtain a set of Vitals.
          - HAVE pt eat a meal if they are able.
          - Re-check patient’s BS.
          - Contact patient’s provider via SBAR for any BS < 70mg/dL or if pt is symptomatic
          - Have the following information ready for provider:
            - previous BS records
            - recent PO intake
            - medications for diabetes and doses
            - ASK FOR FURTHER INSTRUCTIONS.

Remember to write your SBAR
### A1C and Estimated Average Blood Glucose (eAG) Goals for the Elderly in LTC

<table>
<thead>
<tr>
<th>A1C %</th>
<th>eAG Mg/dL</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>126</td>
<td>Inappropriate for Elderly with cognitive impairment or limited life expectancy</td>
</tr>
<tr>
<td>7</td>
<td>154</td>
<td>Use Caution in Elderly with cognitive impairment</td>
</tr>
<tr>
<td>8</td>
<td>183</td>
<td>&lt;8% appropriate for most LTC residents</td>
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<tr>
<td>9</td>
<td>212</td>
<td>Up to 9% appropriate for life expectancy &lt; 5 years</td>
</tr>
<tr>
<td>10</td>
<td>240</td>
<td>Avoid &gt;9%, Symptoms likely</td>
</tr>
<tr>
<td>11</td>
<td>269</td>
<td></td>
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<tr>
<td>12</td>
<td>298</td>
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</tbody>
</table>

Ref: ADA guidelines 2015 & ADA & AGS, DM in Older Adults: Consensus Guidelines, JAGS 60:2342-2356 2012
Author: Saunders, V & Gandall Yamamoto, P 2015
Hyperglycemia in LTC

Notify the provider if the patient’s BS is >400 mg/dL

Be prepared with the following:

- Vital signs
- Previous BS Readings
- Symptoms
- Urinary Output
- Recent PO Intake
- Current DM RX and Doses

Ask for further instructions:

Rx that may cause Hyperglycemia:

- Antipsychotics
- Beta Adrenergic Agonists
- Calcium Channel Blockers
- Glucocorticoids
- Levodopa
- Megace
- Opiates
- Phenytion
- Thiazide Diuretics (HCTZ)

Ref: ADA guidelines 2015 & ADA & AGS, DM in Older Adults: Consensus Guidelines, JAGS 60:2342-2356 2012

Author: Saunders, V & Gandall Yamamoto, P 2015

Appendix I: Hyperglycemia in LTC
Hypoglycemia in LTC

Notify the provider if the patient's BS < 70mg/dL, if patient is SYMPTOMATIC

1. BS < 70mg/dL: Give 4 oz juice
2. Re-check BS in 15 to 20 min. if still < 70 mg/dL, but BS > 60mg/dl give 4 oz juice + 2 pkts sugar
3. BS < 60mg/dl: Give 4 oz juice
4. Re-check BS in 15 to 20 min. if still < 70mg/dL, but BS > 60mg/dL: give 4 oz juice
5. When pt is alert and able to talk, give a glass of milk or meal

If patient is SYMPTOMATIC

- Confusion, lethargy
- Tremors, sweating

SYMPTOM CHECK:
- Are they alert?
- Is the pt responsive?
- Assess the patient

Assess the patient:

- milk and/or a meal
- offer a glass of

Hypoglycemia in LTC

APPENDIX J: Hypoglycemia in LTC

Ref: ADA guidelines 2015 & ADA & AGS, DM in Older Adults: Consensus Guidelines, JAGS 60:2342-2356 2012

Author: Saunders, V & Gandall Yamamoto, P 2015
## Logic Model

### Resources
- Leahi and Maluhia Licensed Nursing Staff (RNs/LPNs)
- Nursing Managers
- DNP Student
- DNP External Advisor
- EB Diabetes Management Algorithms
- Diabetes Educational in-services / Curriculum
- Leahi and Maluhia Conference Rooms

### Activities
- Secure location for educational intervention
- Create flyer for event promotion
- Develop EB curriculum
- Create a pre-/post-test to measure knowledge changes
- Provide Educational intervention for the licensed nursing staff
- Conduct diabetic residents' chart reviews pre-/post-intervention
- Develop algorithm for communication and coordination of diabetic resident care
- Engage in follow-up interactions w/ licensed nursing staff to reinforce protocols/guidelines

### Outputs
- Target: 40 flyers distributed to licensed nursing staff, managers, & posted on all units at nursing stations
- Target: 78% of licensed nursing staff attend the educational intervention
- Target: Post-test scores increase by 10%

### Short Term
- Licensed nursing staff increase knowledge of diabetes management for LTC residents
- Licensed nursing staff utilize new knowledge to appropriately manage hyper- and hypo-glycemic episodes
- Development of program “champions” or leaders to teach in-services
- Licensed nursing staff able to utilize EB Diabetes Algorithms

### Intermediate
- Licensed nursing staff with improved confidence and comfort caring for diabetic residents
- Improvement & stabilization of diabetic residents’ A1c levels
- Consistent appropriate management of hyper- and hypo-glycemic episodes

### Long Term
- Improved patient outcomes and QOL
- Program sustainability

### Assumptions:
Short-term educational intervention will:
1. Improve diabetic residents' blood glucose and A1c levels.
2. Improve licensed nursing staff's knowledge and confidence in managing diabetes in a LTC setting.
## TIMELINE

<table>
<thead>
<tr>
<th>TASK</th>
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<tr>
<td>Successful Proposal Defenses</td>
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<tr>
<td>Submit IRB EXEMPT Status Application</td>
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<tr>
<td>Brief Key Stakeholders &amp; Staff</td>
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<tr>
<td>Develop Marketing Products</td>
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<tr>
<td>Prepare Instruments for Distribution</td>
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<tr>
<td>Begin Chair Review</td>
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<td>Educate Licensed Staff</td>
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<td>Implement Practice Change</td>
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<td>Collect Data</td>
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<td>Prepare &amp; Submit Dissemination Products</td>
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