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DNP Final Report: Vascular Access in Burn Patients: An Evidence-Based Practice Project

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VASCULAR ACCESS IN BURN PATIENTS: AN EVIDENCE-BASED PRACTICE PROJECT

by

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Dedication

This is dedicated to Ari Halldorsson, MD. Dr. Halldorsson devoted his life to healing surgical and trauma patients, including burn, even if the burn unit was just too hot for him. He inspired all who knew him to be better healthcare professionals. He made me proud to work where I do and always strive to be the best at what I do.

Table of Contents

Abstract

VASCULAR ACCESS IN BURN PATIENTS: AN EVIDENCE-BASED PRACTICE PROJECT

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Vascular access in burn patients is a challenging aspect of care that affects the healthcare team and patients daily. The goal in this evidence-based practice project at a southern United States burn center was to improve the quality of the vascular access process by reducing the use of Central Venous Lines (CVL) and unsuccessful venipuncture attempts. The following practice question was formed: In hospitalized burn patients (P), how does a vascular access team with ultrasound-guided peripheral IV capability (I) compared with no vascular access team and standard IV insertion (C) affect central line days (O1) or patient experience (O2) during patient hospitalization (T)? Based on systematic review of the literature and evidence appraisal, the recommendation was made to implement an early Vascular Access Team (VAT) consult for burn patients. A 45% reduction in CVL device days (DD) and a 35% improvement in patient experience were anticipated with implementation based on the evidence. The project was implemented in January through March 2022. The results included that there was a 12.8% reduction in CVL DD, an 89% reduction in the number of times more than two vascular access attempts was required, and a 138% improvement in patient experience. Although the CVL DD decreased, the evidence based anticipated outcome was not reached, most likely due to the specialized population of burn patients; however, the improvement in patient experiences far exceeded the evidence-based expectation. Early vascular access consult was successfully implemented in this burn center.

Chapter 1

Nature of the Problem

The elimination of suffering is a fundamental goal in the care of burn patients. Vascular access can be a significant source of suffering for burn patients. This chapter includes a discussion of the background of the problem of vascular access in burn patients, including a description of the issue, related factors, and interventions that have been tested to address the issue. The significance of the problem, including the magnitude and impact, are discussed using both external evidence and internal evidence. The target population and the organizational culture of a proposed project to address the problem are described. The practice problem leading to an answerable evidence-based practice question is presented.

Background

On admission, patients with large total body surface area (TBSA) burns are often in burn shock, causing capillary leakage and vascular collapse (American Burn Association [ABA], 2018). The lack of intravascular volume makes placing an intravenous catheter (IV) of any type difficult. The skin also may be burned over the most ideal areas for IV placement, so risk of infection is increased if the need arises to place an IV through the burn. Burn patients' length of stay is generally one day per one percent body surface area burned (Taylor et al., 2016), which is often longer than the length of stay of other types of patients. As a result, these patients will likely require many different IVs and venous access for drawing blood over an extended hospital stay, leading to the need to restart IVs that are difficult to place in some patients and potentially increasing patient suffering and requiring increased nursing time. IV access is necessary for both fluid maintenance during major operations and for volume replacement if there is blood loss (Miller & Myles, 2019). Patients with large TBSA burns may require multiple procedures, which often requires movement of the IV access to accommodate the location of the graft surgery. In an analysis of over 40 years of data from one verified burn center, Nickel et al.

(2020) found that although the number of required procedures had decreased, large TBSA burns still required an average of four operations.

The use of peripheral access for the initial IV fluid resuscitation is preferred at most burn centers (Al-Benna, 2011). In some critically ill burn patients, a central venous catheter (CVC) becomes necessary. In hemodynamically unstable or hypothermic burn patients, the CVC may be used to provide hemodynamic monitoring and intravascular warming (Prunet et al., 2012; Soussi et al., 2018). Burn patients sometimes experience renal failure, requiring a CVC for dialysis or continuous renal replacement therapy (Chen et al., 2020). Burn patients also at times require drugs that should only be administered through a CVC, including parenteral nutrition and vasoactive medications (Gorski et al., 2021). The CVC may be left in burn patients even after these other indications are not met because of difficulty obtaining peripheral IV access. After initial resuscitation, leaving the CVC in place may increase the risk for central line-associated bloodstream infection (CLABSI; Pepin et al., 2015). An estimated 28,000 patients die annually from CLABSI, making this infection dangerous and costly (Agency for Healthcare Research and Quality [AHRQ], 2020). The CLABSI rate in burn patients is estimated to be 20 infections per 1000 catheter days (Herndon, 2012, p. 437).

Establishing appropriate vascular access in patients known as "Difficult IV Access" (DIVA) is a problem in more than just the burn population. Patients with conditions such as chronic renal failure, altered fluid status, diabetes, IV drug use, tough skin, or limitation on limbs available for access have all been found to be DIVA patients (Ehrhardt et al., 2018). Besides the pain experienced by these patients from multiple IV attempts, there are clinical consequences for DIVA patients. Nurses spend more time with the multiple attempts for IVs and blood draws. There may be delays in diagnostic procedures for which IV contrast is required and surgical procedures for which IV access is needed before anesthesia can be induced. Infiltrations and extravasation can be serious consequences for DIVA patients (Armenteros et al., 2017; Dougherty, 2008). Difficulty with venipuncture or IV access can also be a significant source of a

negative patient experience. Decreased confidence in the clinician performing the vascular access procedure can cause patients and their family members to doubt the competence of the healthcare team (Plohal, 2021).

Vascular access teams (VATs) are comprised of healthcare professionals with specialized training in device choice, insertion technique, and maintenance of vascular access devices (Gorski et al., 2021). The team could include physicians, nurses, advanced practice providers, or other healthcare professionals. An important distinction of VATs is that the clinicians are not only skilled at inserting IVs, but they are also vascular access strategists. The name of these teams varies by organization, and they may be called IV teams, IV nurses, or vascular access nurses. For this project, the team consisted of registered nurse (RN) staff and was referred to as the VAT.

VATs insert a variety of vascular access catheters according to the organization's policy. Some VATs can insert CVCs, but the focus of this project is peripheral vascular access. Often VATs will use peripherally inserted central catheters as one of their vascular access tools, but this is also considered a central line because the line's tip terminates in the vena cava (Jerome, 2014). VATs often use ultrasound equipment to guide their insertion of peripheral IVs (Gorski et al., 2021). Using ultrasound equipment to guide peripheral IV insertion reduces the number of IV attempts. Improper training for ultrasound-guided peripheral IV (UGPIV) insertions may result in serious complications, including arterial placement, infiltrations, and extravasations (Nishizawa et al., 2020).

Gorski et al. (2021) defined three types of peripheral catheters:

- Short peripheral intravenous catheter (short PIVC): an over-the-needle catheter with a hollow metal stylet (needle) positioned inside the catheter, generally inserted in superficial veins.
- Long peripheral intravenous catheter (long PIVC): inserted in either superficial or deep peripheral veins and offers an option when a short PIVC is not long enough

to adequately cannulate the available vein. A long PIVC can be inserted via traditional over-the-needle technique or with more advanced procedures, such as Seldinger and accelerated Seldinger techniques.

- Midline catheter: inserted into a peripheral vein of the upper arm via the basilic, cephalic, or brachial vein with the terminal tip located at the level of the axilla in children and adults. (p. S74)

Multiple solutions for improving vascular access were found during a preliminary literature search, including using ultrasound-guided IV insertions and vein visualization devices to improve the first-time success rate. Feinsmith et al. (2018) tested the efficacy of using a training program for nurses about UGPIV placement. They found that successful IV insertion rates improved from 81% to 96%, IV attempts decreased overall by 2% ($p = 0.013$), and DIVA attempts decreased by 7% ($p = 0.003$). This evidence exemplifies the support for potential interventions for achieving vascular access placement.

Significance

External Evidence

As reported in the American Burn Association Annual Burn Injury Summary Report (ABA, 2020), an estimated 20,000 patients are hospitalized in United States burn centers annually with an average 9-day length of stay. Most patients sustaining severe burn injuries require vascular access throughout their hospital stay. Only 77% of IV insertions are successful in a general patient population (Jacobson & Winslow, 2005). Negative experiences from failed IV attempts can increase patients' anxiety and distress because they anticipate subsequent procedures (Chen et al., 2000). IV insertions requiring multiple attempts are costly. The median cost of an IV insertion is $41, with multiple attempts adding up to $125 for a successful insertion (Goff et al., 2013).

Internal Evidence

In the setting for the proposed change project, the Burn ICU, charge nurses complete a device days report, recording the number of patients with ventilators, urinary catheters, and central lines each night at midnight. The collected data are then reported to Infection Prevention and Control Department (IPCD) as catheter days. According to the Texas Healthcare Safety Network (n.d., Definitions of Common Terms), catheter days are defined as "The total number of days of exposure to the device (catheter) by all of the patients in the selected population during the selected time period." The reporting period for the organization is monthly. The organizational goal is to reduce the number of central line device days, and this is considered a process measure for reducing CLABSIs.

Data for central line device days in the Burn ICU (BICU) where the project was implemented are displayed in Table 1. The BICU data are benchmarked against data from other adult burn centers because there is no benchmark for mixed pediatric and adult burn units. The BICU outperformed the NDNQI in only four quarters, reflecting that the organizational goal of outperforming the NDNQI for more than four out of eight quarters was not met. There have been no specific interventions to reduce device days in each of these quarters, indicating either inconsistent practice or varying levels of acuity.

Table 1

Central Line Device Days for the Burn Unit

	2018 Q4	2019 Q1	2019 Q2	2019 Q3	2019 Q4	Annual average	2020 Q1	2020 Q2	2020 Q3	Average to Date	Unit Type Average
BICU	0.44	0.30	0.22	0.18	0.31	.2925	0.30	0.27	0.19	.253	0.19
NDNQI Mean	0.30	0.29	0.29	0.28	0.27	.2875	0.24	0.30	0.28	.273	

Note. Benchmarked data from NDNQI® database reported by Press Ganey Associates. BICU = Burn Intensive Care Unit; NDNQI = National Database of Nurse Quality Indicators; Q = quarter

To gain further insight into the impact on patients of the IV access problem in the burn center, during the project planning phase, the management team asked patients about their

experience with IV starts. Patients were interviewed during leadership rounds on weekdays from January 2021 through July 2021. The nurse leader spoke with any patient able to interact each day. If a patient had an IV attempt or blood draw in the previous day, the nurse leader asked that patient how many attempts it took and what the experience was. There were 91 total responses from 65 different patients. The same patients may have been asked the questions on multiple days because the answers could change daily. Out of the 91 responses, 53% required one attempt, 20% two attempts, and 27% three or more attempts. Most responses about patients' experiences with the IV procedures were neutral. There were 11 (12%) negative responses, and 21 times (23%) when nurses performing the procedure were praised for their skill.

The burn service coordinator in the operating room (OR) was also asked to report to the Burn Center Nursing Director about OR delays related to IV access issues. Out of the 32 inpatient burn cases in one month, there were six delays due to lack of adequate IV access for the case and two delays because the IV was in the same extremity as the surgery site.

Target Population Description

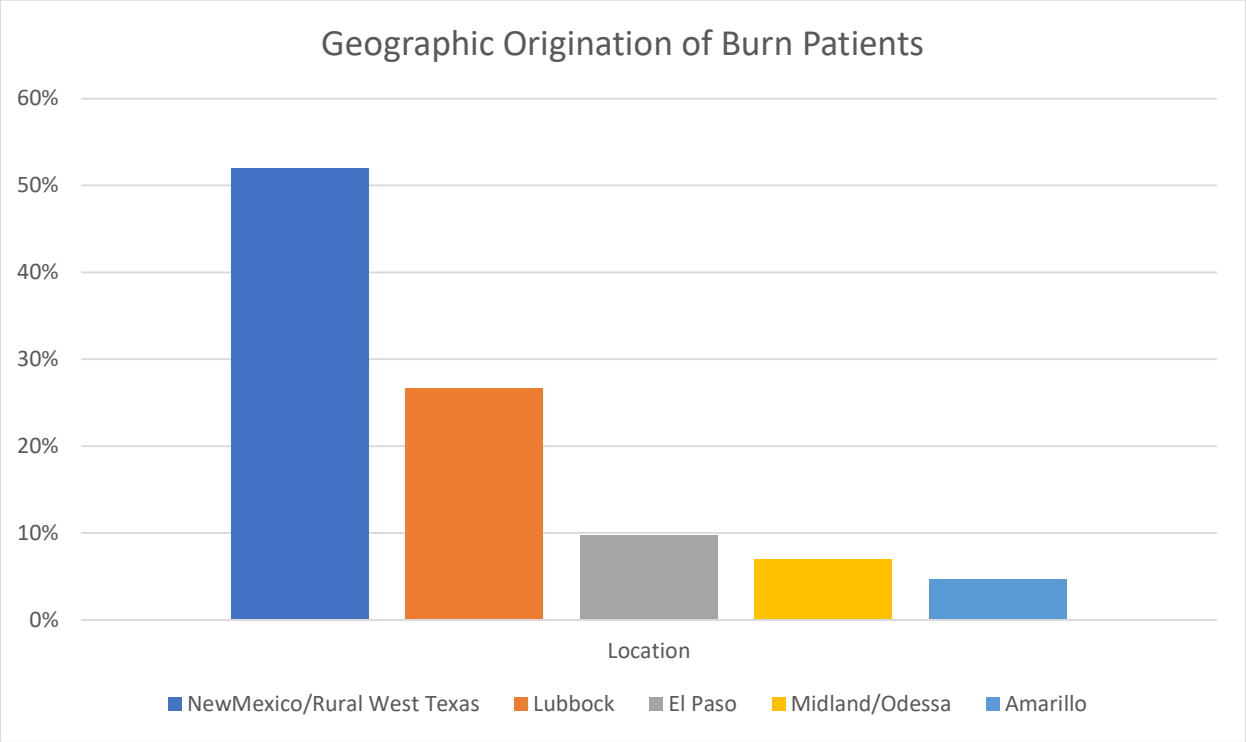
Demographic data were collected from 288 patients admitted to the burn center from January to June 2021. The population was 71% male. Patients ranged in age from 1 month to 89 years old, with 26% of the population being pediatric and 15.6% being geriatric (60 years or greater).

The burn center is unique because most patients admitted are from outside of Lubbock County. Figure 1 depicts the geographic origination of the burn patients. The distance patients travel is important for several reasons. Delayed treatment because of extended transport time results in patients sometimes being more ill on arrival and requiring more resuscitation than a patient arriving sooner after the burn injury. During the hospital stay, families incur travel expenses, and families are often separated, with caregivers trying to divide their time between a hospitalized family member and family members left behind at home. Discharge planning is

complicated in patients who were transported a long distance, often by plane, to reach the burn center, then requiring private transportation over a long distance to return home. Follow-up appointments are challenging because many patients do not have the means to travel the distance for appointments.

Figure 1

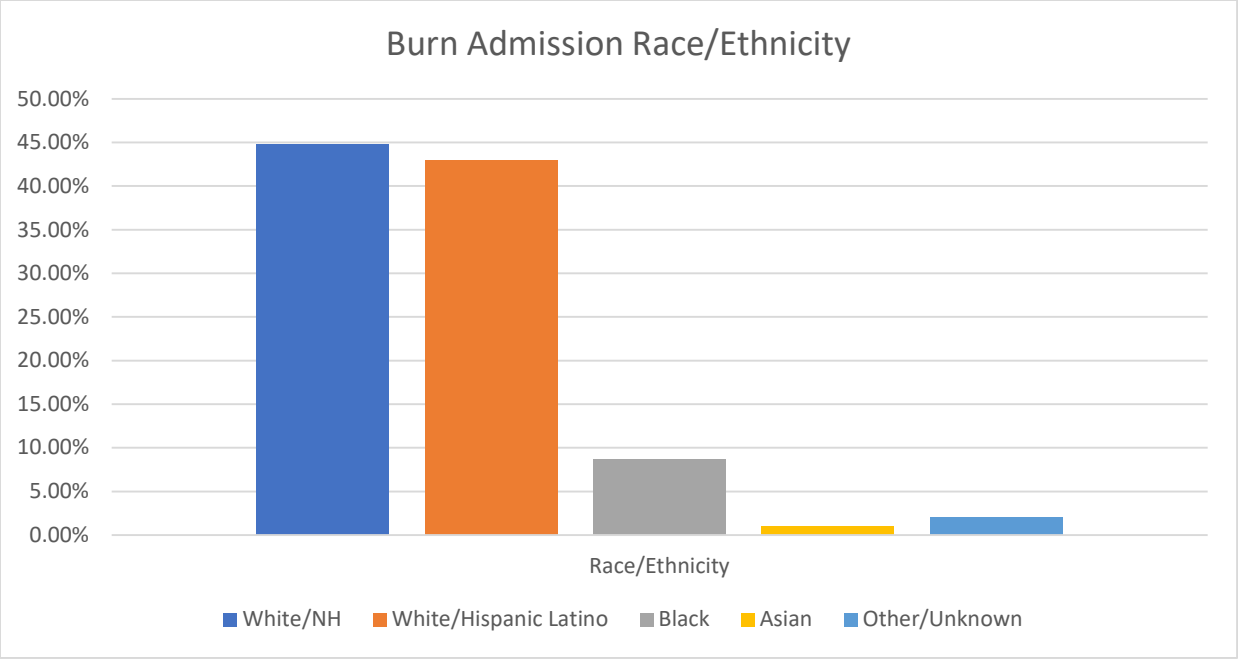
Geographic Origination of Burn Patients



The racial and ethnic distribution of patients in the burn center is depicted in Figure 2. Most patients admitted to the burn center are white, with an even distribution between Hispanic and non-Hispanic.

Figure 2

Burn Unit Admissions by Race/Ethnicity



Note: NH = Non-Hispanic

The mechanism of injury is an essential consideration in the burn population. In the burn patient population, 19% were injured due to causes related to poverty, assault, abuse, or neglect, and 1.7% were injured due to suicide attempts. Occupational accidents make up 19.8% of the injuries, and all other home or leisure accidents make up the remaining 22.6%.

Much of the burn patient population comes from rural areas or poverty, potentially increasing the likelihood that they have not previously received basic healthcare. Lack of prior healthcare can complicate patients' hospital stay, requiring the treatment of uncontrolled chronic illness or malnutrition to allow for healing of the burn wound. The large Hispanic population admitted to the burn unit brings patients and families who sometimes speak only Spanish. The language barrier brings communication challenges, particularly when assessing the source of patients' pain and suffering. Often the mechanism of injury requires attention to cultural considerations because there may be guilt or shame involved in the way patients were burned, particularly if the injury mechanism was because of neglect or abuse. There may also be guilt or

shame involved in occupational injuries. These behavioral considerations are important when measuring patients' pain and suffering.

Organization and Organizational Culture Description

The organization in which the project was completed is a 450-bed academic teaching hospital, Level 1 Trauma Center, and Verified Burn Center in the southern United States. It is the region's only burn center, serving greater than a 300-mile radius. The burn center serves patients of all ages with burn injuries, trauma involving soft tissue, and other soft tissue diseases. The burn center has a six-bed intensive care unit (ICU) and an eight-bed intermediate care unit.

A team of surgeons, including attending, fellow, chief, and second-year resident, is responsible for patients' medical care. There are also advanced practice providers available on the team. The multidisciplinary team includes an ICU pharmacist, nutritionist, respiratory therapist, physical therapist, occupational therapist, speech therapist, case manager, social worker, psychologist, and chaplain. Family-centered care is practiced in the unit, with one support person always included in each patient's care. The burn OR team includes RN coordinators, RN circulators, Certified Scrub Technicians, and the anesthesia team. This large group of people, along with the patient, are the major stakeholders in the project. A nursing management team is comprised of a director, assistant director, and two educators who will play a valuable role in implementing the project.

The Trauma and Burn Services department (TBSD) is responsible for the burn registry and coordinating performance improvement activities. The TBSD enters quality improvement and demographic data into the National Burn Registry, providing the Burn Center with valuable benchmarking data to compare the hospital with other verified burn centers. The IPCD collects quality improvement data related to infection control. The IPCD is also responsible for reporting these data to organizations with which the burn center has benchmarking agreements and to required state reporting agencies.

Prior to the project, the hospital used the Rapid Response Team (RRT) for assistance with vascular access throughout the hospital. The RRT includes one nurse focusing primarily on preventing clinical deterioration and one nurse focusing on the organization's vascular access needs. The nurses are trained for both roles and can assist each other as needed. The RRT nurses have been trained in vascular access techniques, vein selection, and catheter selection. Rapid responders use ultrasound guidance to place an appropriate catheter, including midlines and short peripheral IVs. Before becoming members of the RRT, the nurses received one day of classroom training and demonstrated five successful placements of each type of catheter they use. They maintain competency in vascular access by placing a high volume of ultrasound-guided catheters. Burn primary nurses and charge nurses use only standard insertion but do have an infrared vein visualizer available to use as a tool for vascular access. Practice prior to the project was to consult the RRT after the primary nurse and charge nurse had two failed IV attempts or if a PICC was ordered. The RRT nurse determined the type of catheter to use based on the vascular access algorithm included in the organization's vascular access policy. In this project, the RRT was referred to as VAT because of the vascular access focus of the project.

The primary barrier to vascular access practice change was the training required to implement a vascular access program. Multiple nurses needed to be trained to place IVs with the additional tools, and all nurses needed to be trained on the appropriate time to use other tools during IV insertion. VAT workload was a potential barrier. The VAT serves the entire hospital and had the capacity to assist the Burn Center more proactively, but that could have become more difficult if the workload of the RRT increased. Another factor identified as a potential barrier or facilitator for the project was the Burn Center Unit Based Council (UBC), a group of staff nurses chosen by peers to implement evidence-based practice at the bedside. This group was an essential group of stakeholders because they are responsible for making any

patient care-related changes and are well-respected nurses who could assist with project buy-in.

Development of Clinical Question

The problem of achieving and maintaining vascular access in various populations has been well-documented in the literature. Internal evidence has also been obtained to support the need for an evidence-based change project to improve the process for achieving vascular access in burn patients at UMC Health System. Preliminary evidence was found in the literature supporting interventions to achieve vascular access placement in various DIVA populations. The following practice question was derived based on review of the background literature: In hospitalized burn patients (P), how does a vascular access team with ultrasound-guided peripheral IV capability (I) compared with no vascular access team and standard IV insertion (C) affect central line days (O1) or patient experience (O2) during patient hospitalization (T)?

Conclusion

This chapter included a discussion of the background of the problem of vascular access in burn patients, including a description of the issue, related factors, and interventions that have been tested to address the issue. The significance of the problem, including the magnitude and impact, was discussed using both external evidence and internal evidence. The target population and the organization and culture of a proposed project to address the problem were described. The practice problem leading to an answerable evidence-based practice question was presented.

Chapter 2

Body of Evidence

This chapter includes a description of the process used to systematically search for an answer to the PICOT question along with a description of the process for appraising the articles found. A synthesis of the articles is reviewed, leading to a recommendation based on the evidence found for answering the PICOT question.

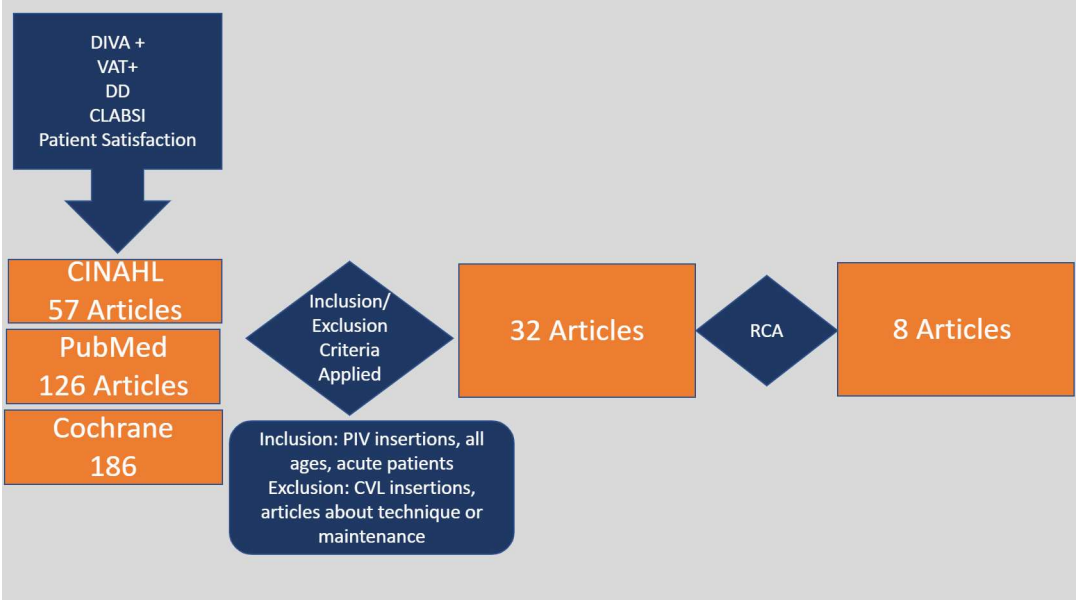
Systematic Search

A systematic search was conducted to answer the practice question. Keywords from the PICOT question used for the search across all databases were *DIVA, difficult IV access, vascular access team, IV team, ultrasound-guided peripheral IV, ultrasound-guided IV midline catheter, patient satisfaction or experience, device days, and central line days*. Even though it is the patient population in the practice question, *burn patients,* was not used as a keyword because the patient population is too narrow to capture adequate evidence. Keywords were systematically searched individually and then combined to yield the most relevant articles in each database.

Three databases were searched with this technique: CINAHL, PubMed, and Cochrane Library. In CINAHL, 57 hits were obtained using combined keyword searching. No additional articles were found when using the subject heading *patient experience*. In PubMed, 126 hits were obtained using combined keyword searching with the MESH heading of *patient experience.* In Cochrane Library, 89 hits were obtained using the same subject headings and combined keyword searching. Figure 3 is a flowchart showing the literature search process.

Figure 3

Literature Search



Note: DIVA= Difficult IV access, VAT = Vascular Access Team, DD = Device Days, CLABSI = Central Line Associated Blood Stream Infection, PIV = Peripheral IV, CVL = Central Venous Line, RCA = Rapid Critical Appraisal

Inclusion criteria for studies included peripheral IV insertions, all ages, and acute care patients with no limitation on the year of publication. Exclusion criteria included hemodialysis, port, central venous line, peripherally inserted central catheter insertions, or arterial insertions. Articles on the topics of line maintenance or insertion training techniques were also excluded. After all three database yields were reviewed, 32 studies were retained for critical appraisal.

Critical Appraisal

After the results were obtained from the literature search, the rapid critical appraisal (RCA) process outlined by Melnyk and Fineout-Overholt (2019) was used to examine reliability, validity, and applicability of the 32 studies. Eight studies contained information relevant to support the body of evidence (Aufricht et al., 2019; Bridey et al., 2018; Deutsch et al., 2014; Devries et al., 2019; Fujioka et al., 2020; Marsh et al., 2018; Pathak et al., 2018; Savage et al., 2019). Twenty-four studies were not included because they did not meet inclusion/exclusion criteria after further review, or they were useful only for background and significance data. After

critical appraisal of all eight studies, information from each study was entered into a summary table. The table included primary author of study, type of research performed, patient population, independent and dependent variables, statistical measurement, strength and quality of the evidence, and recommendations for use for each study, which allowed for the evidence in the studies to be compared. The summary table was used to organize the evidence in preparation for the synthesis phase of critical appraisal.

In two of the retained studies, patient experience improved with the use of a VAT. Fujioka et al. (2020) reported that patients had a better experience with IV insertion with a VAT (X^2 7.8, p = 0.005). They used a randomized controlled trial (RCT; level II evidence) with a sample of 255 acute care patients in their study. Marsh et al. (2018) compared outcomes with a VAT compared with a generalist insertion group consisting of both physicians and nurses. They used an RCT design in their pilot feasibility study to determine if a larger RCT could be done, so it was not powered adequately to give statistically significant answers to the clinical questions, although it did provide some valuable outcome information. The median patient experience with VAT IV insertion, measured using a 10-point scale, was 7 compared to 4.5 in the generalist group, representing a 25% improvement in patient experience with a VAT.

The outcome of successful IV placement was addressed in two of the studies. Marsh et al. (2018) found a 100% success rate using VAT compared to a 78% success rate by the generalists inserting IVs, representing an improvement of 22%. Deutsch et al. (2014) also found a high success rate for IV insertion of 96% when only surgical residents placed midline catheters in a surgical ICU setting in a small pilot cohort study (n = 31).

Decreasing central venous line (CVL) use and CLABSI rates were the most frequently studied outcomes found in the retained studies. In a large academic medical center, Savage et al. (2019) found a 45.2% reduction in device days and 80% CLABSI reduction with the use of a VAT compared with no VAT for IV insertion. The CLABSI rate was reduced from 0.385% to 0.047% (p = 0.003) and device days were significantly reduced (p = 0.001).

Bridey et al. (2018) found no difference in successful IV insertion by primary critical care nurses when USGIV was used compared with standard insertion without USGIV. The authors also reported concerns of potential complications such as infiltration when proper training is not done, supporting the importance of proper training for USGIV inserters.

Synthesis

The information from the eight keeper studies was next synthesized by level, outcomes, types of IV devices, and educational preparation of the VAT. Of the eight keeper studies, three were RCTs (level II; Bridey et al., 2018; Fujioka et al. 2020; Marsh et al., 2018), three were cohort studies (level IV; Deutsch et al., 2014; Savage et al., 2019; Pathak et al., 2018), and two were qualitative or descriptive (level VI; Aufricht et al., 2019; Devries et al., 2019).

The outcomes reported in each study are presented in Table 2. Decreased pain during IV insertion was found in one of the studies (Fujioka et al., 2020), and improved patient experience was reported in two studies (Fujioka et al., 2020; Marsh et al., 2018). The risk of CLABSI was reduced in three of the studies (Devries et al., 2019; Pathak et al., 2018; Savage et al., 2019), including two in which the number of device days for the central line was decreased (Pathak et al., 2018; Savage et al., 2019) and one in which the need for central line placement was decreased (Devries et al., 2019). The number of IV attempts was decreased and IV insertion success was increased in two studies.

The type of IV device used in the studies is presented in Table 3. Although ultrasound guidance was used to insert IVs in all studies, standard peripheral IVs were inserted in four studies, and midline peripheral IVs were inserted in four studies. IV type is an essential consideration for study duplication in the project because VATs use different modalities to insert IVs.

Table 2

Vascular Access Team Intervention Outcomes

OUTCOME	1	2	3	4	5	6	7	8
Mean Pain Score	↓[a]	NE	NE	NE	NE	NE	NE	NE
Patient Experience	↑[a]	__	↑	NE	NE	NE	NE	NE
CLABSI	NE	NE	NE	NE	↓	↓	↓[b]	NE
CVL DD	NE	NE	NE	NE	↓	NE	↓[b]	NE
Nonindicated CVL	NE	NE	NE	NE	NE	NE	NE	↓[b]
# Attempts	NE	----	↓	↓[c]	NE	NE	NE	NE
IV success	NE	NE	↑	↑[c]	NE	NE	NE	NE

Note. 1 = Fujioka et al. (2020); 2 = Bridey et al. (2018); 3 = Marsh et al. (2018); 4 = Deutsch et al. (2014); 5 = Savage et al. (2019); 6 = Devries et al. (2019); 7 = Pathak et al. (2018); 8 = Aufrich et al. (2019); CLABSI = Central Line associated blood stream infection; CVL= Central Venous Line; DD = Device Days; NE = Not Examined; [a] statistically significant findings; [b] no line placed, line necessity evaluated; [c] no comparison data

The educational background of the VAT teams using the UGIV insertion technique is presented in Table 4. Different educational backgrounds may mean different outcomes, so this is important to consider during implementation.

Table 3

Type of Device Placed

Device Type	1	2	3	4	5	6	7	8
USGIV standard	X	X	X		X			NE
USGIV midline				X	X	X	X	NE

Note: 1 = Fujioka et al. (2020); 2 = Bridey et al. (2018); 3 = Marsh et al. (2018); 4 = Deutsch et al. (2014); 5 = Savage et al. (2019); 6 = Devries et al. (2019); 7 = Pathak et al. (2018); 8 = Aufrich et al. (2019); USGIV = ultrasound guided intravenous; NE = Not Examined

Table 4

Educational Preparation of Vascular Access Team

Preparation	1	2	3	4	5	6	7	8
Vascular Specialty Nurse	X		X		X	X	X	X
Physician				X				
Bedside Nurse		X						

Note: 1 = Fujioka et al. (2020); 2 = Bridey et al. (2018); 3 = Marsh et al. (2018); 4 = Deutsch et al. (2014); 5 = Savage et al. (2019); 6 = Devries et al. (2019); 7 = Pathak et al. (2018); 8 = Aufrich et al. (2019)

Recommendation

The completion of a systematic search, then evidence appraisal, evaluation, and synthesis led to the recommendation to implement an automatic consult to the VAT for vascular access in burn patients instead of having the primary nurses attempt to insert an IV. The VAT would use ultrasound-guided technology to place the appropriate vascular access device according to hospital policy. Based on the evidence reviewed, a reduction of 45% in CVL DD (Savage et al., 2019) and a 35% improvement in patient experience (Fujioka et al., 2020) was anticipated with implementation.

Conclusion

This chapter included a description of the methods used to systematically search for an answer to the PICOT question, along with a description of the process for appraising the eight articles found. A synthesis of the eight articles was presented, which led to the recommendation of implementing an automatic VAT consult for vascular access in burn patients.

Chapter 3

Project Design and Methodology

This chapter includes a description of the models used to guide the project, including an evidence-based practice model and a change model. The action plan prerequisites, including practice-setting-specific recommendations and the fit, feasibility, and acceptability of recommendations to the organization, are discussed. The action plan for translation is presented, including the ethical review, project risk assessment and mitigation plan, communication plan, implementation plan, data collection plan, data analysis plan, proposed budget, sustainability plan, and dissemination plan.

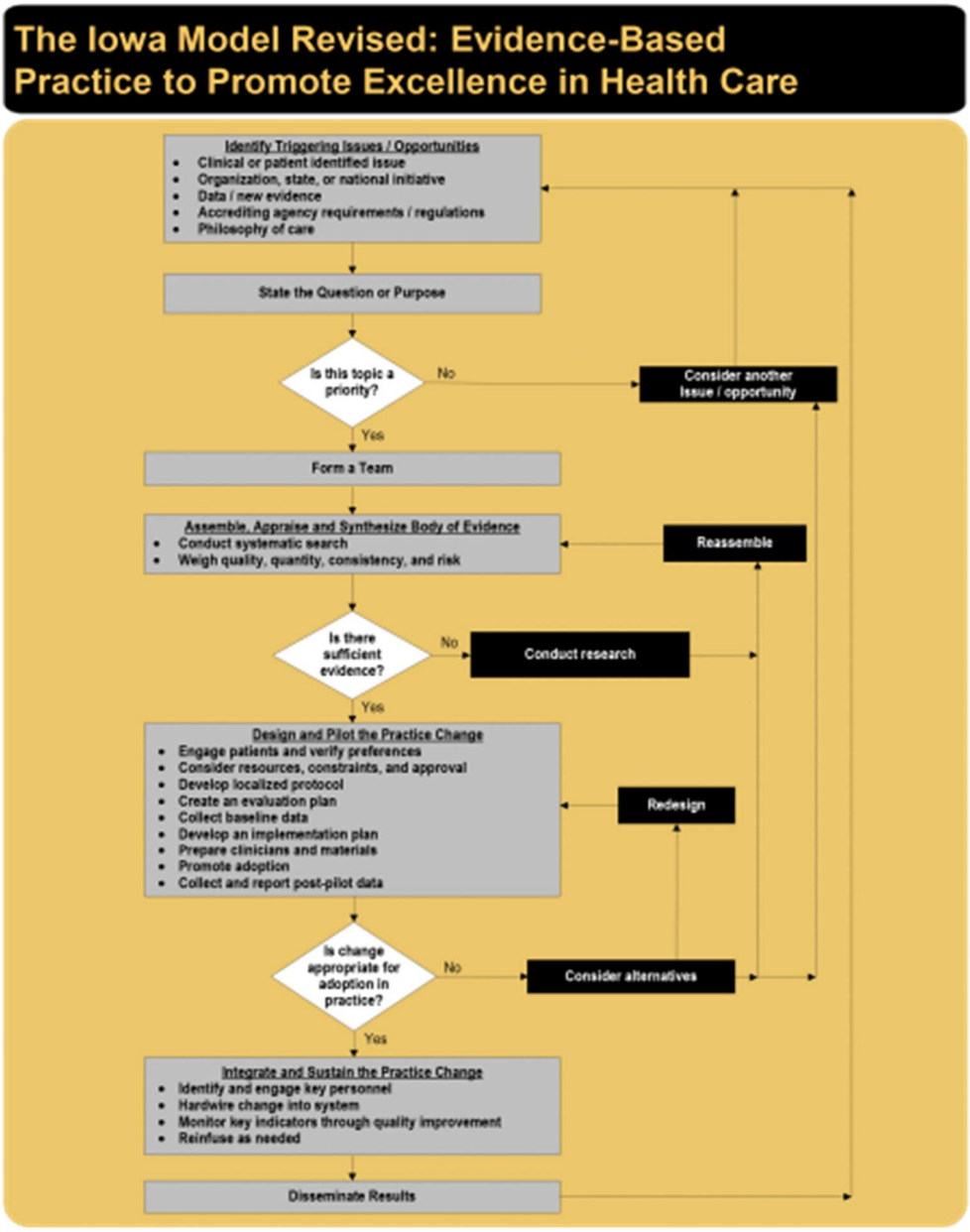
Project Models

Evidence-Based Practice Model

The Evidence-Based Practice (EBP) model chosen to guide the process for this project was the Iowa Model (Figure 3; Iowa Model Collaborative, 2017). The Iowa Model was a logical choice for the project because it is known for its ease of use. The model is also the designated EBP model for the hospital where the project was implemented. The model starts with the identification by clinicians or administrators of triggering factors which are practice issues needing improvement. This project started with concerns from patients and nursing staff about numerous IV attempts. A question was then formed using the PICOT format (step 2), and the topic's level of priority within the organization was analyzed to determine its level of support. The project leader consulted with nursing administration, stakeholders, the industry mentor, and the faculty mentor to determine vascular access in burn patients was a priority in the unit (step 3). A literature search was performed to find evidence to appraise and synthesize (step 4). If there is insufficient evidence to support a project, the topic should be referred to a research team specializing in the generation of new knowledge. There was sufficient evidence for this project, so the project design began.

Figure 3

The Iowa Model Revised



Note. From "The Iowa Model Revised: Evidence-Based Practice to Promote Excellence in Health Care©," by Iowa Model Collaborative, 2017, *Worldviews on Evidence-Based Nursing*, *14*(3), 175-182. (https://doi.org/10.1111.wvn.12223).Copyright 2021 by The University of Iowa.

The project then went through a series of steps in the design and piloting of the project (step 5), including planning for project implementation and evaluation. Baseline and post-pilot data were collected, then a decision was made about the appropriateness of adopting continued early vascular access consults in the unit. The unit adopted the project, but if not, the design process would have been repeated. The project was ready for adoption, and essential people and resources have been engaged to sustain using early VAT consult. The project results will be disseminated internally through a poster presentation and possibly externally through a regional conference presentation (step 6).

Change Model

Lewin's 3-step Change Model was appropriate for this project because the goal was to change an organizational process within the burn unit. The three steps in Lewin's Model (1951) include unfreezing, movement, and refreezing (Figure 4). The model has been used in many different types of organizations, including healthcare. Understanding the likelihood of resistance to change is an integral part of planning an EBP project (Hartzell, 2012). There was anticipation in this project that the burn nurses may resist the idea of another nurse placing lines in the patient. Preparation for resistance is where unfreezing becomes critical. Data must be gathered to determine any potential barriers to implementation and a strong argument made for the change before any attempt to implement the change. The preparation steps, including the literature search and meeting with stakeholders, were all part of the unfreezing phase of the project.

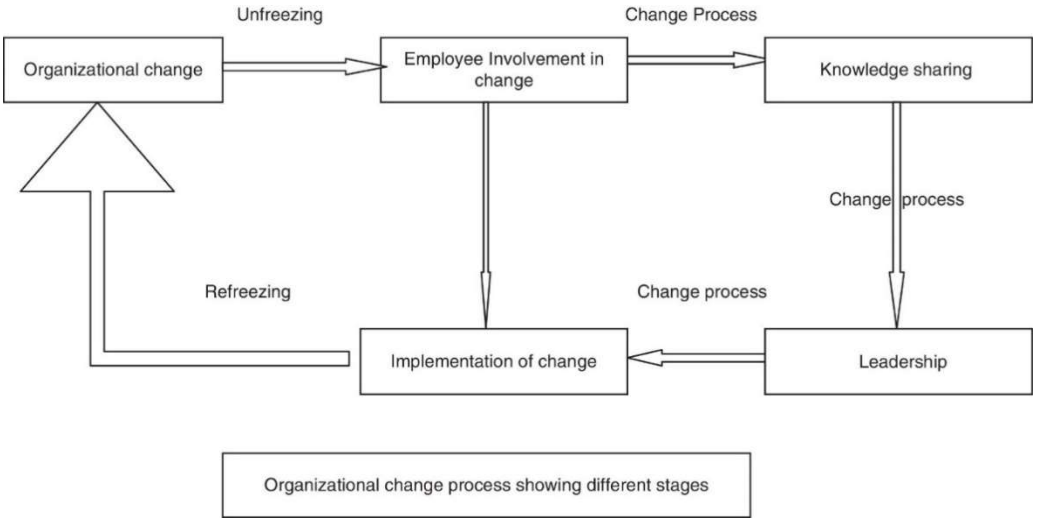
Movement is the implementation stage of the change. Careful planning and execution made this stage of the project successful. Stakeholders were frequently reminded of the benefit of the change. Nursing leaders shared positive patient comments with the nurses and the vascular access team, giving them real-time feedback on their successful efforts. Process monitors were essential during the movement stage (Hussain et al., 2018). The number of VAT consults and the cost of supply purchases were monitored during the implementation phase.

Successful implementation of the movement phase of this project relied on nurse leaders' frequent rounding with the vascular access team and burn nurses to ensure the plan was followed.

Refreezing is needed to sustain change and prevent those involved from reverting to the former process (Hartzell, 2012). To promote refreezing, leaders must provide positive reinforcement for the changed behavior and recognition of everyone involved in the change. Refreezing was initiated for this project with a "thank you party" where the stakeholders were recognized, and project results were revealed. Measuring progress, reporting outcomes, and disseminating results connect the Iowa model's final steps with the refreezing stage of Lewin's change process. These final steps of the Iowa model and refreezing are outlined in Chapter 5.

Figure 4

Kurt Lewin's 3-step Model



Note. From "Kurt Lewin's Change Model: A Critical Review of the Role of Leadership and Employee Involvement in Organizational Change," by S. T. Hussain, S. L. Tayyaba Akram, M. J. Haider, S. H. Hussain, and M. Ali, 2018, *Journal of Innovation & Knowledge,3*(3), 123-127. (https://doi.org/10.1016/j.jik.2016.07.002)

Action Plan Prerequisites

Practice-Setting Specific Recommendations

Based on recommendations from the evidence, the plan was to have the VAT insert IVs in all burn patients in this practice setting instead of having the primary nurses attempt to insert IVs. In this practice setting, when a burn patient needed vascular access for a peripheral IV or a lab draw, the VAT was to be messaged in the hospital's electronic medical system for a consult. The VAT would then examine the patient and insert the appropriate vascular access device according to hospital policy using ultrasound-guided placement. The plan included that the dayshift VAT nurse would also round with the charge nurse each shift to identify patients appropriate to transition from a CVL to peripheral lines. The VAT nurse and charge nurse would also plan for IV placement in patients requiring future surgical procedures.

Action Plan for Translation

Ethical Review

The procedures used in this evidence-based practice project were standard procedures for achieving vascular access and did not include any experimental procedures. This project did not pose a risk to patients' physical or emotional well-being that would exceed what is typically experienced by burn patients requiring IV access. The project also did not pose a risk to patients' right to privacy because all data collected was deidentified. Because this was not a research project, a review by the Institutional Review Board of the University of Texas at Tyler was not required. A quality improvement project request was submitted to the organization's Nursing QI project and research committee to confirm that no IRB review was required. Appendix A includes a copy of the approval document from the committee. The project plan also underwent ethical review and approval by the faculty mentor.

Project Risk Assessment and Mitigation Plan

A risk assessment was done as part of the project planning process. One low-level risk was identified concerning the VAT becoming too busy to round in the burn center. Mitigation for

this risk was the backup plan already in place for the VAT when there were high volumes of vascular access requests. Requests were prioritized according to the greatest need.

Two medium-level risks were identified. The first was the lack of product availability considering prior common product backorders. Mitigation included being aware of possible substitute products and keeping an adequate par level with several days of supply at the facility. The second medium-level risk was a change in patient acuity requiring more CVL use. This was a medium risk because it was not likely. However, it could affect the device day and CLABSI data if it occurred. This risk would be difficult to mitigate because the clinically appropriate line would need to be chosen.

Four high-level risks were identified. First, a decrease in the burn patient census could cause an influx of overflow patients, changing the patient population in the burn unit. This would weaken the specificity of the results to the burn patient population. Second, turnover in the VAT had already occurred. Mitigation of this included offering didactic and clinical training to new VAT members, and they had three months to gain experience before the project began. Third, the project leader could change employment positions, requiring a change in the project. This was an unlikely risk considering the project leader's 13-year tenure. The final high risk was resistance to change from the burn nurses if they wanted to continue to insert their own patients' IVs. This was mitigated through education about the benefits and including burn nurses in the implementation planning. Figure 5 displays the risk analysis matrix completed for the project.

Figure 5

Risk Analysis Matrix

Risk Analysis Matrix

***DNP Scholarly Project Name*:**	Vascular Access Consult in the Burn Center
Student:	Amanda Venable

#	Risk	Probability Score	Impact Score	Risk Score
1	Student changes positions during DNP program and has to change project as well	2	5	7
2	Product availability issues with midline catheters or other type of supplies needed by vascular access team	2	4	6
3	Vascular access team becomes too busy to round in burn every shift	2	3	5
4	Acuity of patients changes requiring mostly central line use causing skewing of the data	3	4	7
5	Burn census drops significantly causing overflow admissions and skewing the population	2	4	6
6	Turnover in vascular access team nurses impacting the skill and training of the team	3	4	7
7	Burn nurses resistant to change because they want to start their own IVs	3	4	7

Stakeholders

The primary stakeholders in the project were the burn patients and their families. Patients' feedback was invaluable in measuring the success of the project. Faculty and industry mentors were key to guiding and advising throughout the project. The burn and rapid response management team, including the director, assistant director, and educators, were responsible for sharing the project's vision with staff and for a portion of the data collection. Senior members of the VAT assisted with educating all VAT staff about the project plan and burn-specific vascular access considerations. Burn charge nurses, and unit-based council members were nursing leaders of the burn unit. Their support was necessary for sharing the project's vision, bringing attention to any issues that developed, and educating staff about the practice change of consulting the VAT for any vascular access needs. The burn unit assistant ensured an adequate supply of vascular access devices.

Communication Plan

Communication about the project occurred primarily through in-person meetings and the hospital messaging network. The initial communication was with VAT stakeholders, meeting to discuss the project and adjust the implementation according to the input received. The VAT assisted in creating the education materials used during communication with the burn nurses. The project was then communicated to the burn UBC, charge nurses, and burn staff in separate meetings, with adjustments to the plan made as concerns arose in the meetings. Progress of the project was reported in the burn unit Teams channel, the VAT Teams channel, and the burn administrative committee, which the majority of project stakeholders attended. The project leader met monthly with the industry and faculty mentors to provide project updates. The project leader was available by phone 24 hours a day if any issues required immediate attention.

Implementation Plan

The entire project plan is depicted in the Gantt chart in Appendix B. Implementation of the vascular access project was planned to begin on December 7, 2021. The project was

approved by the faculty and industry mentors, then an announcement was made to the stakeholders, including involved nurses, physicians, and members of the VAT, about the project. The announcement was intended to generate some anticipation for the project, as described in Lewin's change theory.

In December, education materials were prepared by expert members of the VAT for presentation to the burn unit-based council and the VAT and at the burn unit staff meeting. The OR and burn medical teams were also educated on the project in December.

Project execution began in January 2022. VAT members rounded each shift and inserted any lines needed. All patients admitted to the Burn Center were included in the project. Burn nurses consulted the VAT using the in-house communication device provided by the hospital. The project leader and other nurse leaders checked in daily with VAT and rapid response staff to ensure the implementation plan was working. The nurse leaders also began collecting the patient experience data during morning rounds.

Data were collected as the project continued from January through March 2022, and data were analyzed from April through June. Project results were reviewed with faculty and industry mentors in May 2022.

In July 2022, the project results were presented to the burn unit staff and VAT staff, along with a thank you party for everyone's participation. In August, the involved staff was surveyed to determine if anything about the project's operation should change as sustainability was considered.

Data Collection Plan

Patient experience data was collected during the daily rounds, which were part of the standard procedures in the unit. During these rounds, the burn unit nursing leadership team routinely asked patients a series of questions about their patient experience. The following questions were added to the standard questions during this project:

1. Did you have a new IV started, or were you stuck for a lab draw in the last day?

2. How many times did it take the nurse to be successful?

3. How would you describe your experience?

Answers were collected in the hospital's standard rounding app, password-protected, and used by all hospital leaders. The rounding app includes patient identifiers but is stored securely in accordance with the hospital IT security policy. Patient experience data for the project were reported in a deidentified manner. Data were reported monthly as the total number of patients interviewed, number of single attempts, number of double attempts, and number of times success required more than two attempts. Three categories of experience were reported: negative, positive, and neutral.

Central line device days were collected by the Burn Center charge nurse each night at midnight. The number of patients with a CVL and the total number of patients was recorded each night. The data were sent to the IPCD and then reported and benchmarked as described in Chapter 1. The data are all deidentified, and the benchmarked report is provided by Press Ganey Associates.

Process measure data were also collected to ensure proper implementation, assess VAT workload, and monitor for IV complications. The number of IVs inserted by the VAT was collected as part of RRT productivity reporting. Any IV complications were reported through the hospital's unusual occurrence system to the department director of the Burn Unit.

Data Analysis Plan

Baseline internal data about outcomes were compared to the proportions of post-intervention data to determine the percent of improvement in each outcome. The percentage improvement in outcomes during the project was compared to the expected improvement based on the evidence. Considering the number of reasons for central line necessity in the burn patient population, the 45% reduction in central line device days found in the evidence supporting this project was not expected. Still, a modest reduction resulting in no CLABSIs was the expected outcome for the project.

Proposed Budget

The cost to begin the project was funded mainly by in-kind donations of time from the industry mentor and the hospital allowing preparation work from nursing during hospital time. An existing vascular access nurse FTE was utilized for the project. The expectation was the VAT may spend an additional hour each shift dedicated to burn patients. A vascular access consult was expected to reduce burn nurse time spent on vascular access. The VAT was expected to spend one additional hour per day in the burn unit with an estimated cost of $2,520. The equipment required for ultrasound-guided IV placement was already available in the burn unit, so there was no increase in cost. There is a difference in the cost of other types of catheters used by vascular access nurses compared to standard short peripheral catheters. The estimated supply cost increase for the project was $6,237. The hospital was agreeable to this anticipated increase considering the likelihood the cost would be offset by other savings related to the project. The project budget is included in Appendix C.

Budget Justification and Return on Investment

There were increased labor and supply costs associated with the project. There was anticipation that decreased vascular access attempts would offset these labor and supply costs. However, this would need to be monitored during the project in consideration of the project's sustainability. The project may be cost-neutral, but if there were increases in cost related to higher usage of more expensive IV catheters, sterile supplies used with specialty IVs, and ultrasound probe covers, the cost could be justified by the financial results of decreased CLABSI rates and improved patient experience. The mean hospital cost of a CLABSI is $48,108 (AHRQ, 2020). Avoidance of one CLABSI would justify any increased cost from the project.

Sustainability Plan

A cost analysis was an important factor in consideration of sustainability. It was anticipated that if the project was effective and the cost was offset by the benefits, support for

the expansion of the program to other clinical areas with a large population of difficult IV access patients would be more likely.

The sustainability plan included monitoring several metrics. The activity of vascular access nurses is routinely reported monthly. Reported data include the number of total consults and the type of vascular access device inserted. Monitoring for potential complications, such as increased IV infiltrations, can be done through the hospital's standard reporting system. The project leader routinely received those reports and was immediately aware of potential safety issues. Monitoring the dwell time of each vascular access device inserted in the burn unit facilitated the determination of the cost of sustaining the program. This was accomplished through a query of deidentified data from patients admitted to the burn center and examining the average length of time vascular access catheters stay in patients. The average dwell time of vascular access devices before project implementation was compared with post-intervention dwell times.

Dissemination Plan

Findings were communicated to internal stakeholders through regular staff meeting and committee structures. There was a celebration event during which essential findings were displayed, but this was mostly a thank-you event. The organization's nursing department has an annual nursing poster contest where findings will be disseminated throughout the hospital.

The project findings were submitted in a manuscript to the Journal of Burn Care and Research (JBCR). There are also regional opportunities for dissemination, such as the annual regional trauma symposium that reaches West Texas and Eastern New Mexico healthcare providers. Another presentation option is the South Plains Organization for Nurse Leaders (SPONL), the regional American Organization of Nurse Leaders (AONL) chapter.

Conclusion

This chapter included a description of the models used to guide the project, including an evidence-based practice model and a change model. The action plan prerequisites, including

practice-setting-specific recommendations and the fit, feasibility, and acceptability of recommendations to the organization, were discussed. The action plan for translation was presented, including the ethical review, project risk assessment and mitigation plan, communication plan, implementation plan, data collection plan, data analysis plan, proposed budget, sustainability plan, and dissemination plan.

Chapter 4

Project Results

This chapter includes the results of the evidence-based project. Outcomes of the project are presented, including differences in central line device days, vascular access attempts, and patient experience with vascular access.

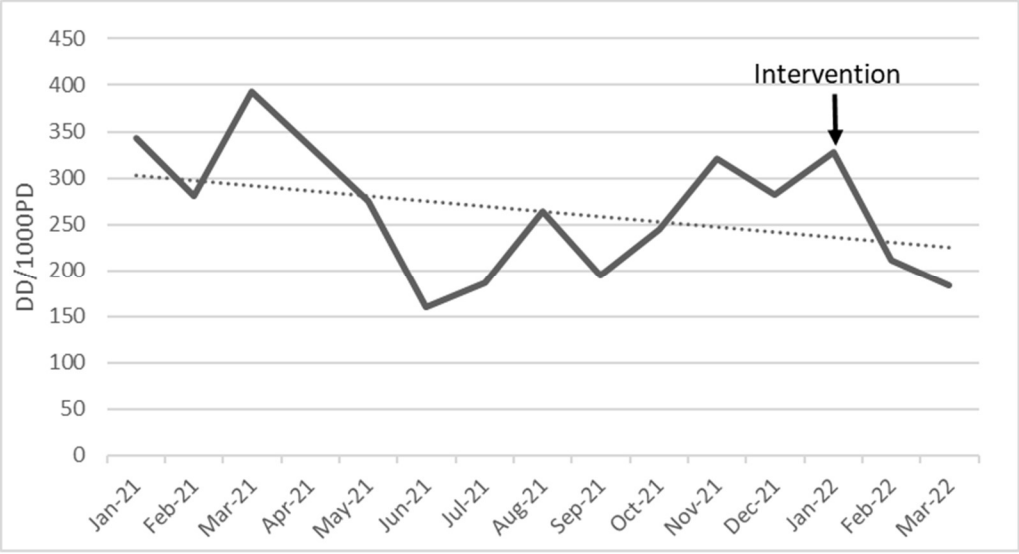
Results

Central Line Device Days Outcome Results

The mean CVL device days/1000 patient days pre-intervention was 275.74. The mean CVL device days post-intervention was 240.71, representing a 12.8% reduction. The central line device day ratio was tracked over time, and the mean device day ratio for the pre-intervention period was compared to the mean device day post-intervention. Figure 6 displays a run chart demonstrating the decrease in CVL device days over time.

Figure 6

CVL Device Days/1000 Patient Days



Note: DD = Device Days, PD = Patient Days

Vascular Access Attempt Outcome Results

In the pre-intervention period, there were 1,368 patient days, and nurse leaders documented answers for 170 patients with 383 responses. Of the 383 responses, 67 answered "yes" to having a venipuncture for a blood draw or IV start on the previous day. During the intervention period, there were 1,007 patient days, and there were 77 patients with 186 documented responses. Of the 186 responses, 43 answered "yes" to having a blood draw or IV start on the previous day. The percentage of responses reflecting that three or more attempts were required was reduced from 20.9% in the pre-intervention group to 2.3% in the intervention group. The results for the "number of attempts" question are listed in Table 5.

Table 5

Comparison of attempts pre- to post-intervention

	Total Number of Responses	1 Attempt Count (%)	2 Attempts Count (%)	> 2 Attempts Count (%)
Pre-Intervention	67	43 (64.2%)	10 (14.9%)	14 (20.9%)
Post-Intervention	43	37 (86%)	4 (9.3%)	1 (2.3%)
% Change		34% ↑	37.6% ↓	89% ↓

Note: > = greater than, ↑ = increased, ↓ = decreased

Patient Experience Outcome Results

The experience question was analyzed by first categorizing the quotes into positive, neutral, or negative categories. If there was anything positive in the wording, the quote was categorized as positive, and if there was any negative wording, the quote was considered negative. The remaining quotes were categorized as neutral. Each category's mean number of responses was compared for the pre-intervention and post-intervention groups. Table 6 displays the results of the patient experience of vascular access.

Table 6

Vascular Access Experience

	Positive Response Count (%)	Negative Response Count (%)	Neutral Response Count (%)
Pre-Intervention	12 (24.5%)	12(24.5%)	25 (51%)
Post-Intervention	28 (58.3%)	3 (6.3%)	17 (35.4%)
% Change in Mean	138% ↑	74.3% ↓	30.6% ↓

Note: ↑ = increased, ↓ = decreased

Conclusion

This chapter included the results of three outcomes measured in the project. The outcomes included central line device days, number of vascular access attempts, and patient experience with vascular access.

Chapter 5

Project Discussion

This chapter includes discussion of the evaluation of the process and outcomes of the project including the project limitations. The sustainability of the project is discussed, including both internal and external implications.

Discussion

Outcomes Evaluation

The most common outcome evaluation found in the literature for this project was CLABSI reduction. There were no CLABSIs during the intervention period; however, there was only one CLABSI in the burn center during the year preceding the intervention. A 45% reduction in central line device days was reported in the literature when a VAT was used (Savage et al., 2019). The same result was not expected in the burn-specific population of this project, considering the acuity of patients in the burn center, but a modest reduction of 12.8% was achieved.

A 35% improvement in patient experience and a 30% decrease in the number of attempts were reported in the literature when a VAT was used (Fujioka et al., 2020; Marsh et al., 2018). The outcomes in this project of 138% improvement in patient experience and 89% reduction in the number of times the vascular access required greater than two attempts were greater than anticipated based on the literature.

The utility of using trained vascular access nurses with skills such as USGIV in the organization's burn patient population was demonstrated in this project. Proactive use of the VAT in the burn center may have reduced CVL use, decreased the number of attempts at vascular access, and increased patients' reports of more positive experiences after the intervention of early VAT consult. These findings were not only consistent with but far exceeded the improvements reported in the body of evidence supporting this evidence-based practice project.

Although nursing time for IV insertions and venipunctures was not assessed in this project, the decreased number of IV insertion attempts could also reduce the nursing time required for vascular access. The patients experienced fewer attempts because of the VAT skill in insertion, and the inserted midlines were used for obtaining blood for laboratory analysis, decreasing the need for venipunctures. It is unknown how frequently the need for venipuncture was prevented because that was not measured in this project.

Process Evaluation

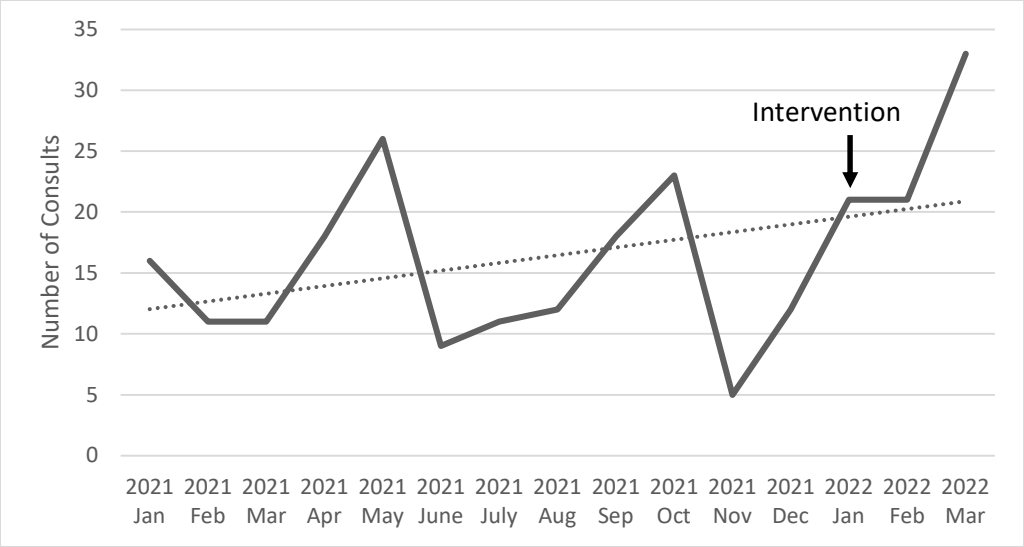
The project process was monitored closely by nursing leadership, asking the burn unit staff and RRT about any issues with the project. Leadership re-educated burn staff about the project as needed if the VAT had not been consulted for an IV insertion.

The number of VAT consults was monitored as a process measure. A potential threat to the project was the possibility that the number of VAT consults for burn patients could increase to surpass the capacity of the existing VAT. As shown in Figure 7, the number of VAT consults did increase during project implementation, particularly during the last month of the project, but it did not increase more than what is usually seen with acuity variability. The potential for further increase will need to be monitored.

One problem that arose during the project was the need to replace lines due to accidental displacement or clotting. This problem could potentially be prevented with increased knowledge about proper securing and flushing of the lines to maintain patency. This highlights the need to provide nursing staff education about line maintenance practices.

Figure 7

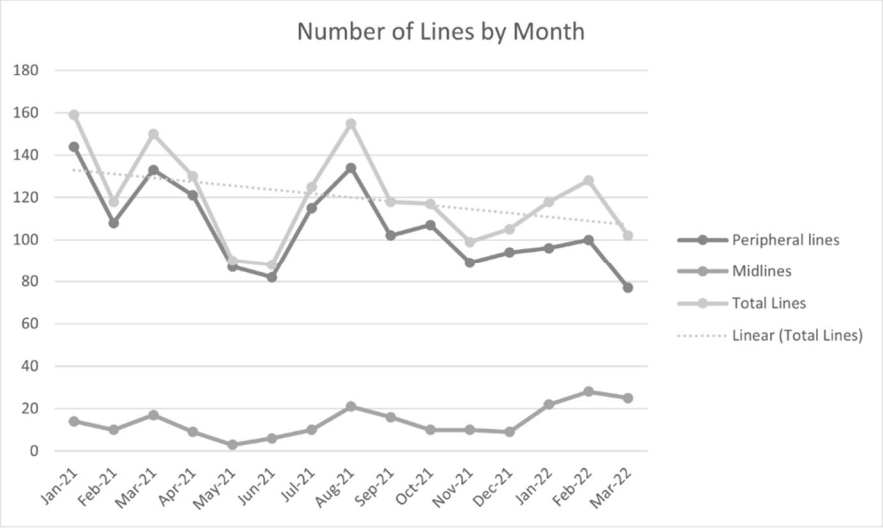
VAT Consults in Burn



The number of each type of line inserted was also monitored during the project. A decreased number of overall insertions could indicate that if the VAT made the correct line choice from the beginning, it could decrease the total number of lines used, potentially improving efficiency and cost. The total number of lines placed during the project did decrease as shown in Figure 8.

Figure 8

Lines inserted by month



Limitations

This project was limited to one unit in a large teaching hospital, limiting the patient population that benefited from the project. Nursing leadership rounds only occur Monday through Friday mornings; therefore, some patients with IVs may not have been included in the patient interviews during rounds. Patients not in the room at the time of rounds, unable to speak, or unavailable to speak were not interviewed. Although the questions asked during the interviews were not part of a validated questionnaire, they were based on evidence from previous vascular access literature.

This project worked well within the organizational structure with an already established VAT. VAT training can be lengthy, so starting a new VAT may not provide the same results. Interviewing the patients to determine attempts and experience worked well for this project, but it leaves some unanswered questions. It was not specified if the nurse attempting vascular access was from the emergency room, burn staff, or the VAT, so the improved number of attempts may not be attributed entirely to the VAT. Compliance with notifying the VAT was not closely monitored, so other staff besides VAT may have made the vascular access attempt at times. Other factors not considered for this project were the location of the burn or wound in relation to vascular access success.

Sustainability

Aarseth et al. (2017) found in their systematic review of the literature that the best predictor of successful sustainability was a successful project. The successful outcomes of this project are therefore the best predictor of its sustainability in this organization. Because of the positive outcomes from this project, the strategy of early consult of VAT for vascular access will be continued in the burn unit.

The burn unit in which the project was implemented is a small, specialized area with mostly DIVA patients. Examination of the needs in other units within the organization in which there are typically many DIVA patients may lend support to expanding the VAT strategy for

DIVA patients to these other units. In other clinical areas, a tool may be needed to determine which patients might require a VAT consult (Ehrhardt et al., 2018). Bridey et al. (2018) found that there was no benefit from the training of all critical care nurses in using USGIV, and there were some complications. Continued monitoring is required to determine if the addition of this task to the VAT is sustainable. Evaluation will be needed to determine whether increasing the number of personnel trained to perform VAT functions might be warranted if the benefits to patients are as remarkable as they were in this initial project.

There could be increased labor and supply costs associated with the project that may negatively impact its sustainability. The VAT team used for the project was already in place, so no additional personnel training was required. Although VAT activity did increase with this project, it did not exceed the capacity of the VAT to handle it and did not contribute to increased labor costs. The cost of the midline catheter used is $51 compared to the cost of a peripheral IV kit, $7. On average, during the project, there were 12 more midlines inserted a month, and four fewer peripheral IVs inserted a month. This led to an approximate cost increase of $556 per month. Further evaluation is needed to determine if these increased costs are offset by the decreased cost associated with decreasing number of failed attempts and venipuncture procedures. The benefits associated with improved patient satisfaction may justify the potential for an increased cost.

Conclusion

This chapter included discussions of the evaluation of the process and outcomes of the project including the project limitations. The sustainability of the project was discussed with both internal and external implications.

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Appendix A

UMC Nursing QI and Research Committee Project Approval

NA-171.1 Nursing Quality Improvement Process
Attachment 2

Nursing Quality Improvement Project Application

1. Project Leader: Name, Title, Department, and Contact Information: Amanda Venable MSN, RN, CCRN Department Director Burn, amanda.venable@umchealthsystem.com

2. Project Team: Name, Title, Department, Contact Information and Role on the project:
John Griswold, MD – Industry Mentor – TTUHSC, UMC Burn Medical Director
Lauri D. John PhD, RN, CNS – UT Tyler DNP program director, Faculty Mentor
ljohn@uttyler.edu

3.

4. Project Title:
Automatic Vascular Access Team (VAT) Consult for Burn Patients

5. Provide a brief (2-4 sentence) summary of your project:
The VAT (rapid response team) will automatically be consulted for burn patients to get appropriate vascular access from admission. VAT member will round daily with charge nurse to address line necessity.

6. State the project goal(s). Include information about who will benefit from the project. Please note that QI project goals are intended to bring about immediate improvements in a specific population. For example, "Our goal is to reduce the rate of CLABSIs for patients admitted to the Hematology/Oncology unit at UMC by 35% in 3 months."
Our goal is to outperform the NDNQI mean in CVL device days for eight quarters and to improve from 12% to less than five percent negative responses about vascular access experience in patient experience interview questions during daily rounds.

7. Provide background information and significance of the project. What is the problem your project addresses?
Burn patients fall in the category of difficult IV access (DIVA) patients. Often multiple IV sticks are required, decreasing patient satisfaction and increasing nursing time. Inability to find peripheral access can cause increased CVL dwell times, putting the patient at higher risk for CLABSI

8. Describe your plan of improvement intervention. What procedures will you follow?
When a burn patient requires vascular access, the VAT will be consulted initially to choose the right type of vascular access for the patient and so ultrasound guidance can be used right away. VAT will round each shift to proactively transition patients as they need to change vascular access, for example when a patient is ready to transition from CVL to peripheral IV

9. Where and how will you obtain data? Describe what will be collected and the source of the data. Do you routinely access these data (medical records, etc.) in your normal scope of work?

I will use NDNQI device day and CLABSI data (deidentified and used as part of my current job position). I will also use data from questions I ask during daily rounds. I will ask the patient if they had a blood draw or IV stick. If so how may tries and how would they describe their experience. The data will be entered in rounding app that is currently used as part of my regular job duties but will be reported as percentage answers, no patient data will be reported.

10. How will you analyze your data? How will you measure if the intervention was successful?

I am not planning to do any statistical analysis. I will look to see if we are outperforming the NDNQI benchmarks for CLABSI and device days. I will look to see if the is a reduction in the percent of negative vascular access experience responses.

11. What are your plans for dissemination of the project's results?

The final project paper will be available at UT Tyler library. I have thought of attempting to publish in a journal such as Journal of Burn Care and Research but I am still in the early planning stages.

Submit the completed application to the UMC Quality Improvement Committee. Additional information may be submitted as attachments. Questions may be directed to the UMC Quality Improvement Committee Chair at ann.purdom@umchealthsystem.com or by phone at 806.775.8585.

Please sign electronically and attach to an email—OR print, hand-sign, and then scan and send via email.

Project Leader signature: Amanda Kendall

Date:
10/7/21

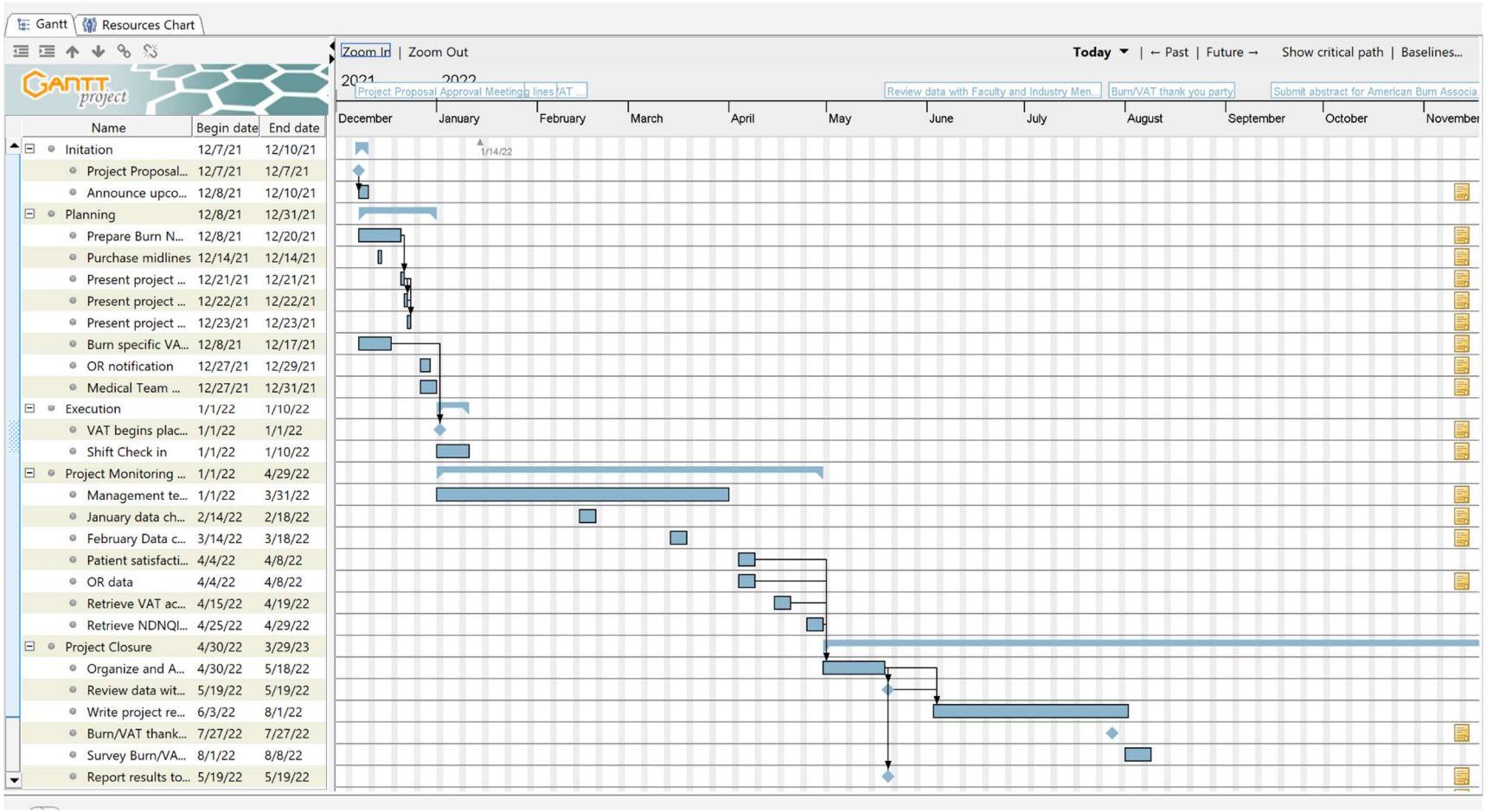
Project Approved on: 11/16/2021

Tammy Williams, DNP, RN, Executive Vice President and Chief Nursing Officer

Adonica Hall, DNP, RN, Nursing Research Committee Chair

Appendix B

Gantt Chart



Appendix C

Project Budget

DNP Project Name Early Vascular Access Consult in a Burn Center

Proposed Project Budget updated 10/3/2021

Project Lead:	**Amanda Venable MSN, RN, CCRN**						
Start Date:	**12/7/2021**						
Tasks	Description	Hrs/Units	Rate/Cost	Subtotal	In-Kind Donation	Budget	Comments
Initiation						**$0.00**	
Project Proposal Approval Meeting	**Dr. Griswold attendance at meeting**	1.00	$192.00	$192.00	$192.00	$0.00	**Donation of Dr. Griswold time for project proposal meeting**
Announce upcoming project	**Announcement of project through staff teams channel**	0.00	$0.00	$0.00		$0.00	
Planning							
Prepare Burn Nurse Educational Materials	**Electronic education to send out to burn nurses**	2.00	$30.00	$60.00	$60.00	$0.00	**Dianne and Trevor one hour each of work**
Purchase Midlines	**Buy extra midline kits anticipating increased volume caused by program**	75.00	$83.16	$6,237.00	$6,237.00	$0.00	**This will come from vascular access team budget. Hospital is agreeable to this increase and expectation is cost will be offset by decrease use of peripheral IV catheters.**
Present project to Burn UBC	**Will not require separate meeting time**	0.00		$0.00		$0.00	
Present project to Burn Charge Nurses	**Will not require separate meeting tim**	0.00		$0.00		$0.00	
Present project to Burn Staff	**Will not require separate meeting time**	0.00		$0.00		$0.00	
Burn Specific VAT fact sheet	**Electronic education to send out to vascular access nurses**	2.00	$30.00	$60.00	$60.00	$0.00	**Dianne and Trevor one hour each of work**
OR notification	**Will not require separate meeting time**	0.00		$0.00		$0.00	
Burn Medical Team Notification	**will not require separate meeting time**	0.00		$0.00		$0.00	
Execution							
VAT begins placing lines	**Vascular access nurse additional time in Burn Center**	84.00	$30.00	$2,520.00	$2,520.00	$0.00	**estimated at 1 additional hour per day X 12 weeks**
Shift check in	**Check in to make sure VAT/Burn nurse aware of project**	0.00		$0.00		$0.00	
Monitoring & Controlling							
Management team daily rounding	**No additional time required for this**	0.00		$0.00		$0.00	
January data check in	**confirm compliance and review 1st month outcome data**	4.00	$45.00	$180.00	$180.00	$0.00	
February data check in	**confirm compliance and review 1st month outcome data**	4.00	$45.00	$180.00	$180.00	$0.00	
Patient satisfaction data retrieval	**prepare this data for the project**	1.00	$45.00	$45.00	$45.00	$0.00	
OR data	**Time required for OR staff to collect data**	1.00	$30.00	$30.00	$30.00	$0.00	
Retrieve VAT activity report	**prepare this data for the project**	1.00	$45.00	$45.00	$45.00	$0.00	
Retrieve NDNQI device days report	**prepare this data for the project**	1.00	$45.00	$45.00	$45.00	$0.00	
Closing							
Organize and Analyze Data	**prepare data for analysis and presentation**	10.00	$45.00	$450.00	$450.00	$0.00	
Review data with industry mentor	**One hour meeting with Dr. Griswold**	1.00	$192.00	$192.00	$192.00	$0.00	
Write Project report	**prepare for dissemination of project**	30.00	$45.00	$1,350.00	$1,350.00	$0.00	
Burn/Vat Thank you Party	**Share results and thank team with food provided**	300.00	$1.00	$300.00	$300.00	$0.00	
Survey Burn/VAT	**send out survey to stakeholders**	2.00	$45.00	$90.00	$90.00	$0.00	
Report results to facility	**No additional time required for this**	0.00		$0.00		$0.00	**add to meeting agendas**
Present final project report	**One hour meeting with Dr. Griswold and faculty**	1.00	$192.00	$192.00	$192.00	$0.00	