

IMPLEMENTING QUICK REFERENCE MATERIALS FOR THE IMPROVEMENT
OF RARELY PERFORMED CLINICAL PROCEDURES:
A QUALITY IMPROVEMENT PROJECT

by

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ABSTRACT

This QI project sought to create and implement quick reference tools with the aim of enhancing compliance with clinical practice guidelines for rarely encountered clinical procedures. With collaboration from the Nurse Educator and Quality Improvement Officer on the medical floor at a southwest Montana hospital, the management of chest tubes and implanted ports were identified as inconsistently or infrequently performed procedures, and medical floor staff felt ill-prepared when executing these procedures.

The following steps for this project required reviewing and adapting information from the existing clinical guideline materials condensing pertinent information into easy-to-use quick reference information sheets. Next, transcripts were outlined for short 2-minute video tutorials corresponding with each procedure on the quick reference sheets. These quick reference materials were designed using the cognitive and multimedia learning theories, which utilize clear verbal and graphic information that optimize deeper learning and recall. Finally, the implementation phase of this project introduced the quick reference information sheets on the medical unit, covering the skills necessary to manage both chest tubes and implanted ports. Additionally, recording the short video tutorials occurred while implementing the quick reference sheets was underway. It is planned that the QR codes will be added later to the quick reference sheets, allowing stakeholders to access the videos tutorial that correlates to each procedure.

A survey of 10 medical floor nurses evaluated the utilization and helpfulness of the resources. The project's initial implementation results indicate a positive response from stakeholders to the quick-reference sheets. In addition, proxy outcomes show that nurses agreed on satisfaction, usefulness, and self-confidence survey questions regarding the use of the quick reference sheets. Future actions for this project are to add the video QR codes onto the quick reference sheets and implement these in the medical unit. It is predicted that a combined approach of using quick reference sheets and short videos will be an operative teaching method for advanced clinical skills of rarely encountered procedures, support clinical decision-making, and further enhance patient outcomes.

CHAPTER ONE

INTRODUCTION

Clinical Practice Problem

There is a wide range of clinical skills required from healthcare providers and nurses, and these can range greatly depending on their area of work. The inconsistency in a nurse's preparedness to appropriately perform inpatient bedside procedures and adhere to clinical practice guidelines can be impacted by many factors. Barriers to optimal and safe procedural practices include providers' insufficient knowledge, awareness, personal skills appraisal, lack of confidence, access to guideline recommendations, and low outcome expectations when adhering to clinical practice guidelines (Cochrane et al., 2007). For these reasons, rarely performed clinical procedures and infrequent exposure to specific patient cares, pose a risk to patient safety and healthcare outcomes.

This quality improvement project sought to implement educational reference materials in the form of quick reference information sheets and short evidence-based video tutorials on an inpatient medical floor in a hospital providing care to Southwest Montana. This project will allow for better consistency in performing infrequent bedside procedures, improving patient safety and quality of patient care.

Scope and Impact of the Clinical Problem

Through personal communication with the Nurse Manager, Nurse Educator, and Quality Improvement Officer on the medical floor at a southwest Montana hospital, two procedures were

identified as being inconsistently or infrequently performed. The procedures identified include the use of chest tubes and managing implantable ports. As a result, it is recognized that medical floor staff feel ill-prepared and less confident in caring for and managing patients requiring these specific procedures. Additionally, past documentation of safety events in the medical floors' incident reporting system indicates occurrences of inconsistent adherence to clinical practice guidelines when performing the identified procedures, resulting in compromises in standards of care and patient safety.

The scope of this clinical problem extends past the location of this project and is recognized as an area requiring further examination and improvement in many healthcare systems. A literature review and an exploratory, descriptive survey conducted by Lehwaldt & Timmins (2005) study showed a diversity of nurses' knowledge on various aspects of chest drain management. Observations of everyday practices suggest a lack of consensus on the principles of chest drain management, including aspects of suction levels, container changes, milking or clamping of chest tubes, pain relief, positioning of patients, air leaks, and breathing techniques for chest drain removal. Lehwaldt & Timmins (2005) determined that many nursing decisions and interventions are often based on personal factors than clinical evidence. Overall, the study findings showed that nurses felt uncertainty regarding key concepts of chest drain management, anatomy and physiology, and poor knowledge levels on dressing changes and requirements (Lehwaldt & Timmins, 2005).

In another study, researchers Lu et al. (2017) aimed to uncover self-reported practices of managing chest drains to understand the variations of nursing practice better and define the decision-makers for interventions required for chest tube management. The researchers surveyed

31 hospitals in Tianjin, China using a questionnaire on demographic information, self-reported management reflecting actual practices, and whom the primary decision-makers were regarding chest drain management. Results indicated considerable variation in nurses' self-reported clinical practice regarding the management of chest drains. Additionally, Lu et al. (2017) found gaps between nursing practice and nursing knowledge and concluded that nurses showed weaknesses in decision-making power regarding the management of chest drains.

The variability in nurses' preparedness to correctly perform bedside procedures and adhere to clinical practice guidelines also extends to the care and management of implantable ports and central lines. Alkan et al. (2017) conducted a cross-sectional study in four different cities in Turkey to explore nurses' knowledge about port-a-caths, their management and identify defining factors affecting their practice. The study concluded that work experience negatively correlated with knowledge of port-a-caths, finding no significant relationship between a nurses' practice and their years of nursing experience or age. Alkan et al. (2017) determined that nurses showed a more significant lack of knowledge and practice in knowing indications for the implantable ports, their period of use following implantation, the amount of normal saline used for flushing the port, and types of port needles. Additionally, the sample had poor knowledge of understanding complications of port-a-caths and managing them. This study emphasizes the importance of continual post-graduation education and the need to routinely update nurses who practice in settings where port-a-caths are used on the potential complications and protocols for their management (Alkan et al., 2017).

Significance of the Clinical Problem

Patient safety principles and clinical practice guidelines are evidence-based scientific methods used to achieve reliable healthcare outcomes and reduce the incidence and impact of adverse events (Vaismoradi et al., 2020). Unfortunately, there is an existing gap between the science of clinical practice guidelines and the implementation of these guidelines into clinical practice. Consequently, when these guidelines are not observed, patient safety is endangered. Therefore, hospital staff and nurses must be aware of the potential complications associated with chest tubes and implanted ports so that measures can be made to minimize the risk for the patients.

In analyzing the need for implementing this QI project, there were many considerable outcomes and adverse events to be aware of when managing and performing procedures for chest tubes and implantable ports. For example, managing a chest tube requires a thorough understanding of how it works and what potential complications can occur. Nurses need to assess the type and level of suction control, monitor, and classify air leaks, understand when it is and is not appropriate to clamp the catheter tube, evaluate the drainage, and look for clots in the tube (Huggins et al., 2021). Accurately managing and accessing an implanted central venous catheter reduces the risk of many adverse effects and complications, including bleeding, air embolism, pneumothorax, infection, venous thrombosis, catheter malfunction, and nerve injury (Heffner & Androes, 2021). Other complications when safeguards and practice guidelines are not followed include catheter breaking, mechanical failure, and the tearing of a port-a-cath (Samad & Ibrahim, 2015).

Implementing quick-use educational tools with compressed information relaying current evidence-based guidelines for performing these procedures will help to reduce the incidents and severity of these potential complications. Many factors influence compliance with clinical practice guidelines that impact patients, their family members, financial costs, and the healthcare systems. It is essential to understand the causes for inconsistencies in patient care and the limitation that can cause harm when providers are faced with performing procedures they do not routinely do (Vaismoradi et al., 2020).

An extensive systematic review by Cochrane et al. (2007) uncovered multiple elements that pose obstacles to optimal clinical practice and patient care. This research revealed a significant prevalence of behavioral and system barriers which influence the translation of knowledge into practice. Cognitive-behavioral barriers were identified as a lack of knowledge, awareness, professional skill, and skills appraisal. Professional attitude barriers were determined to be a lack of confidence, sense of authority, efficacy, accurate self-assessment, and lack of outcome expectancy when adhering to clinical practice guidelines. Furthermore, barriers embedded in clinical practice guidelines were identified as limited comprehension and practical access to recommendations (Cochrane et al., 2007).

Based on a systematic literature review by Vaismoradi et al. (2020), many individual and external elements impact adherence and compliance with clinical guidelines. Individual factors were determined to be prevalent in nurses providing direct patient care. Vaismoradi et al. (2020) summarized significant individual factors as a nurse's knowledge base, attitudes, perceptions, and ability to seek information and access materials and guidelines. The review results indicate that standardizing the care processes, providing appropriate education, equipment, and shared

information, can help enhance the consistency and compliance of following clinical practice guidelines and improve patient safety outcomes. These findings further support the need for implementing the improvement strategies of information cards and tutorial videos on the inpatient medical floor.

CHAPTER TWO

LITERATURE REVIEW

Research Synthesis

In 2001 the Institute of Medicine (IOM), now known as the National Academy of Medicine, identified a significant divide between the expected standard of care and what was known to be good health care and what people received. To enhance quality improvement of our health care system, the IOM identified six aims to address. These six aims stated that healthcare must be safe, effective, patient-centered, timely, efficient, and equitable (Institute for Healthcare Improvement, n.d.). Increasing nurses' knowledge and skills related to implanted ports and chest tubes are essential to enhancing compliance with practice guidelines, improving safety, reducing risks, and minimizing complications, all of which can be directly applied to the aims of the IOM.

Upholding quality and safety in health care is essential to optimizing care and enhancing patient outcomes. Hospital staff and nurses must be aware of the potential complications and necessary interventions required for managing ports and chest tubes and be provided with straightforward, useful tools to improve their adherence to practice guidelines. Ensuring high levels of competency in clinical skills can have impacts on reducing healthcare costs, risk of adverse events, patient morbidity and mortality rates, increase patient safety, and improve outcomes (Forbes et al., 2016).

As previously addressed in Chapter. 1, the scope and impact of nursing compliance to guidelines vary for many reasons and is a universal issue when managing chest tubes and implanted ports. Implementing video tutorials and quick reference information sheets will help

address any existing knowledge gaps and continually improve adherence to standards of care and practice guidelines on the medical floor.

Implementing quick reference cards and educational video materials resources for this quality improvement project are in line with DNP Essential IV (AACN, 2006). When integrating new resources into a workflow, it is necessary to ensure that they fit the users' needs and provides efficiencies to their practices instead of hindrances. Inpatient nurses working on a medical floor know how limited their time is when balancing ever-increasing patient loads and caring for patients with greater acuities. DNP Essential IV emphasizes the utilization of information and technologies into the healthcare setting to support clinical decision-making and professional practice. Essential IV also states that these systems are central to providing safe, efficient, patient-centered care, which supports nursing workflow and adherence to clinical guidelines (AACN, 2006).

Reference cards and videos that are designed and utilized to evaluate patient care, outcomes of care, care systems, and improve productivity and decision support all support the practices highlighted in DNP essential IV. In addition, a deep understanding of information and technology systems further allows for the translation of science and evidence-based research into practice, and work to improve the delivery of healthcare (AACN, 2006).

Evidence Strengths

Information Reference Cards

Evidence-based care sheets or reference cards provide quick and easy access to a condensed set of information or summary on the most current relevant clinical recommendations. Reference cards offer a concise way to organize evidence on specific diseases and conditions,

nursing interventions, the nursing process, management, and much more (Jameson, 2017; Malamed, 2021). Accessing pre-appraised care sheets and reference cards can greatly benefit nurses needing answers to critical clinical questions at the patient bedside and save valuable time in doing so. In addition, this resource serves as a cognitive aid in learning and refreshing clinical skills and effectively supports work performance (Jameson, 2017; Malamed, 2021).

A study conducted at Johns Hopkins Hospital focused on finding strategies to implement a hospital-wide glucose effort involving creating policies coupled with education and support resources for clinical decisions (Munoz et al., 2012). Pocket cards were developed and used as part of the clinical decision support infrastructure to assist providers in following the recommendations. The pocket cards summarized algorithms and protocols for glucose management. Their interventions showed that utilizing pocket cards improved overall patient hyperglycemia outcomes and physician adoption of practice guidelines (Munoz et al., 2012).

Pitimana-aree et al. (1998) conducted a study that introduced practice guidelines for stress ulcer prophylaxis by distributing information through pocket cards, seminars, and academic teachings. After introducing the clinical guidelines with the use of pocket cards, the result indicated an increase in the appropriateness of preventative measures and a decrease in overall medication costs. However, there were no differences in any clinical outcomes (Pitimana-aree et al., 1998).

In another study, researchers examined clinician use and preference for different types of educational tools to implement new practice recommendations (Jefferies & Shah, 2011). Educational tools examined included seminars, web-based tutorials, handouts, pocket cards, and web-based management algorithms. Results determined that clinicians preferred simple

educational tools that were readily accessible. The most frequently used and most helpful tools were pocket cards and seminars (Jefferies & Shah, 2011). The most remarkable finding in this study was that clinicians showed a significant lack of preference and use for electronic clinical learning tools (Jefferies & Shah, 2011). These study findings are consistent with previous literature, indicating the effectiveness of pocket cards as educational tools for executing clinical practices and their benefit in enhancing healthcare provider knowledge (Jameson, 2017; Malamed, 2021; Munoz, 2012; Pitimana-aree, 1998).

The use of reference cards has been shown to help clarify expectations and professional activities-based assessment requirements (Stoneham et al., 2019). The development of reference cards to use for learning in clinical settings is supported by cognitive load theory and multimedia learning theory. Cognitive load theory suggests that "learning happens best under conditions that are aligned with human cognitive architecture" (Soloman, 2018, para. 1). Richard Mayer, the originator of the cognitive theory of multimedia learning, based this theory on three main assumptions; separate auditory and visual channels process information; there is limited capacity in each of these channels; and learning is an active process which requires filtering, selecting, organizing, and incorporating knowledge based upon prior information (Mayer, 2005).

This theory infers that cognitive load needs to be kept at a minimum during the learning process for educational materials to be effective, suggesting that an extraneous load can be minimized by cognitively offloading a task to external resources and references (Soloman, 2018; Stoneham et al., 2019). For example, readily accessible reference cards can help decrease the unnecessary cognitive load created when providers need to recall extensive or specific professional activities.

The cognitive theory of multimedia learning hypothesizes that the brain does not interpret a multimedia design in a mutually exclusive fashion; instead, the presentation of text, image, and auditory information is selected and organized dynamically to produce logical mental constructs. Multimedia learning theory states that deeper learning occurs when information is presented together in graphics and text rather than just text (JSU., n.d.; Stoneham et al., 2019). Consequently, reference cards and information sheets designed with text and images ensure that both visual and verbal processing pathways are optimally leveraged, enhancing the learning experience (Stoneham et al., 2019).

Design principles for creating optimal educational material include using clear verbal and pictorial information. Therefore, quick reference sheets or pocket cards should help guide learners to select keywords and images and reduce the load for a single processing channel (Mayer, 2005). Mayer's theory underscores the importance of learning when new information is integrated with prior knowledge. Utilizing reference cards and information sheets will greatly benefit nurses learning new clinical skills or when refreshing their training on managing chest tubes and implanted ports (Mayer, 2005).

Video Education

Videos are considered a valid tool for student learning and work as a powerful instrument for education (Forbes et al., 2016; Salina et al., 2012). The increased use of videos and information technology for teaching clinical skills and refreshing nursing concepts offers a promising path for delivering education in healthcare settings (Forbes et al., 2016). The impact of video learning reduces the gap between theory and practice and is useful in teaching and achieving clinical competencies (Salina et al., 2012). Learning from videos is most beneficial

when course content is kept at less than 15 minutes in length. Further evidence demonstrates that 3-minute videos are even more optimal for retaining educational material (Berg et al., 2014; Salina et al., 2012).

In a randomized control trial, conducted on an undergraduate nursing course both in classroom lessons and in the laboratory, researchers determined that shorter videos, kept at 3-minutes, produced comparable or better performance results than when students watched a full-length American Heart Association (AHA) course. This study indicates that videos are a useful tool for refreshing and reinforcing concepts learned during nursing courses and are beneficial for continual training (Salina et al., 2012).

Like using reference information cards, teaching strategies that include videos allow learners to stimulate multiple visual and verbal processing pathways in the working memory. This supports the cognitive load theory and multimedia learning theory. Shorter videos allow the mind to process multimedia information from both the visual and verbal working memory pathways which in turn leads to enhanced learning (Forbes et al., 2016; Mayer, 2005).

The literature confirms that instructional videos are beneficial for learning nursing skills, as videos enable a visual demonstration of clinical skills that are like real-life situations but in a safe and controlled environment while still providing context to the skills (Forbes et al., 2016). Additionally, videos have been shown to be an equal and even more operative teaching method for advanced clinical skills compared to traditional in-person teaching (Cardoso et al., 2012; Forbes et al., 2016).

Research into video usage has underscored their effectiveness in nurses acquiring new clinical skills and in student satisfaction when learning. For example, in one study that taught

nursing students how to access and heparinize implantable ports and develop the knowledge to avoid adverse events, researchers used supplementary video materials with traditional clinical skills training (Cardoso et al., 2012). Study findings detailed that when supplementary teaching videos were used as a support tool for teachers, the nursing students had increased cognitive and procedural knowledge, higher student satisfaction rates, lower anxiety levels, and increased confidence when performing these procedures (Cardoso et al., 2012). These findings further support research demonstrating that a combined approach of in-person training and video materials, produces the greatest success when students perform the clinical procedures alone for the first time (Forbes et al., 2016).

Evidence Limitations

Many validated nursing resources, such as Lippincott, offer condensed evidence-based information in the form of quick-reference cards (Wolters Kluwer, 2019). Although these types of nursing pocket cards are not a new concept and are readily available, there appears to be a limited number of studies that directly support their use in adding providers in performing bedside procedures.

Additionally, it seems that there is no standardized template or specific format for their design. Instead, it seems that their practical and widespread use infers the benefits of reference cards. This appears to highlight a gap in research that specifically examines the impact of quick-reference cards and information sheets on nursing practices, skill acquisition, and adherence to clinical guidelines.

Many studies that investigate nurses' levels of knowledge about procedures, adherence to guidelines, or seek to interpret nurses' competence and confidence after learning a clinical skill,

often cite study limitations as having small sample sizes. Small sample sizes limit the applicability and generalization of their results to larger populations. Therefore, to further substantiate the data found in the supporting studies, additional evidence is needed apply the research findings (Alkan et al., 2017; Cardoso et al., 2011; Kiernan et al., 2018; Lu et al., 2017; Stoneham et al., 2019; Truebano et al., 2015).

Summary of Evidence

Implementing reference cards and short video tutorials supports the IOMs six aims and DNP Essential IV. These interventions will enhance quality improvement in our health care system by utilizing information and technologies to support clinical decision-making, enhance safety and professional practice (AACN, 2006; Institute for Healthcare Improvement, n.d.).

There are existing design principles for creating optimal educational materials, but the literature reviewed provides minimal clarification on how information cards should be optimally designed for use in standardizing clinical practices. Additionally, few studies directly research quick reference cards as a singular resource for improving adherence to clinical guidelines or performing bedside procedures. However, substantial evidence shows that using reference cards offers a benefit in being a quick and easily accessible resource for condensed evidence-based information and serves as an excellent cognitive aid in learning. Furthermore, reference cards or information sheets help clarify professional expectations and activities-based assessment requirements in healthcare environments (Jameson, 2017; Malamed, 2021; Stoneham et al., 2019).

Additionally, the literature confirms that short educational videos are beneficial for learning nursing skills and in demonstrating clinical skills with confirmed effectiveness in

increased cognitive and procedural knowledge. Moreover, educational videos are proven to lower student nurse anxiety levels, increase confidence when performing clinical procedures, and provide greater student learning satisfaction (Cardoso et al., 2012; Forbes et al., 2016).

Reference cards and short videos are both supported by the cognitive theory of multimedia. When these interventions are designed using clear verbal and graphic information, learners can better select and organize information in their working memory, allowing for deeper learning (Mayer, 2005). Utilizing reference cards and videos as an educational tool will greatly benefit nurses learning new skills or needing to recall information on managing chest tubes and implanted ports and improve patient outcomes through better adherence to clinical practice guidelines (Mayer, 2005).

CHAPTER THREE

OUTLINE FOR QUALITY IMPROVEMENT PROCESS

Conceptual Framework

Infrequent exposure to specific medical skills and procedures poses a risk to patient safety and healthcare outcomes. Implementing evidence-based video tutorials and quick reference information cards on an inpatient medical floor in a Southwest Montana hospital enhances the consistency and compliance of clinical practice guidelines when managing infrequently seen procedures and further improves patient safety and quality of care.

The conceptual framework selected for this quality improvement project was the Donabedian model. This model assesses and measures the structure, process, and outcomes related to the quality of medical care of performing infrequent procedures (Moran et al., 2020).

Donabedian defines structure as the physical and organizational characteristics of healthcare (Rahman, 2021). Structure measures are otherwise known as input measures and reflect the system's features that are attributed to the service provided, such as staffing ratios, materials available, and operating times of the service. Process measures assess the set of activities between providers and patients, including technical and interpersonal qualities, and focus on care delivery. The process measures should depict how the systems work to deliver the desired results (Rahman, 2021). Outcomes are seen as the impact of healthcare on the status of individual patients and populations, including clinical outcomes, patient satisfaction, and quality of life. In addition, outcome measures can demonstrate whether an improvement project's results and aims were achieved (Rahman, 2021).

In this quality improvement project, both the structure and process measures were used as a proxy for the project outcomes. The structure reflects the characteristics of the medical floor that contribute to nurses' workflow and how they access and use the implemented tools of information sheets and video tutorials. In addition, the structure includes the placement of the information sheets, where staff can view the video tutorials and the time needed to access these resources.

Process measures were the primary means for assessing the results of this project. These assessed whether the implementation of reference cards and video tutorials improved the process of providing and adhering to the standards of care required for managing chest tubes and implanted ports. The process measures evaluated how frequently the tools were used and if the tools improved the workflow and process of managing infrequently seen procedures. Additionally, to evaluate the practicality and sustainability of these tools, other clinical outcomes were considered for measurement, which included staff satisfaction with using the tool.

As a part of this project's long-term goals and measurements, outcome measures were recommended past the point of this project's deadline. These will assess the implemented tools' impact on how staff adhered to practice guidelines, the quality of patient care provided after the implementation period, and effects on staff adherence to standards of care. Additionally, the outcome measures will assess if these tools help reduce risks associated with managing chest tubes and implantable ports and decrease reported patient safety events.

Overall, utilizing the Donabedian Model helped achieve the goal of implementing the improvement strategies of information sheets and video tutorials on the inpatient medical floor

and increasing adherence to and knowledge of clinical guidelines, elevating the quality-of-care processes and improving patient outcomes.

Description of the Practice Site

The quality improvement project took place on the inpatient medical floor of a single hospital that primarily serves Southwest Montana. This facility is the only hospital in Gallatin County. According to the most recent U.S census data, the approximate local population is 119,938, with a growth rate of 2.35% in the past year. The county is currently the 4th largest in Montana and has experienced a growth of approximately 33.78% since 2010 (*Gallatin County, Montana Population 2021*, n.d.).

The hospital predominantly serves southwest Montana and is a 125-bed healthcare facility, certified Level III trauma center, DNV GL-accredited, and employs more than 200 physicians and health professionals (*Our Health System*, 2021). The medical floor of the hospital is a 38-bed unit typically staffing ten nurses during a 12hr shift, one charge nurse, four CNAs, and a unit clerk. Generally, during the day, the nurse-to-patient ratio is 1 to 5 and at night is 1 to 6.

Stakeholders

This project's input and output activities involved people from the facility, including the medical floor nurse manager, nurse educator, quality improvement officer, videographer and IT specialist, nurses, and nurse aids. In addition, key stakeholders that provided information for data collection were the healthcare providers who had patient care responsibilities during the

implementation period and any direct management of chest tubes and implanted ports; this included nurses, charge nurses, and nurse aids.

Reason for Quality Improvement Implementations

Through personal communication with the Nurse Manager, Nurse Educator, and Quality Improvement Officer on the medical floor at the hospital, the use of chest tubes and managing implantable ports were identified as being inconsistently or infrequently performed. Nursing practice on a medical floor requires varied competencies from nurses, including clinical proficiency involving skills acquired through learning and practice (Cardoso et al., 2012).

As discussed previously, many individual and external elements impact a nurse's skills, adherence, and compliance with clinical guidelines. Although the nurses at the hospital have a wide range of competencies, many may go long periods between learning or refreshing knowledge on how to manage chest tubes and implantable ports and perform these skills.

Additionally, patients requiring specialized skills may not be frequently seen at this facility or are otherwise more commonly placed on different hospital units. As a result, it is recognized that medical floor staff felt ill-prepared and less confident in caring for and managing patients requiring these specific and infrequently done procedures.

Project Inputs

The project's inputs reflect the resources needed to create, implement, sustain, and monitor this specific QI project. In working with the nurse educator and QI officer, two procedures were identified as infrequently done on the medical floor.

The following steps included reviewing and evaluating current research on evidence-based recommendations for managing chest tubes and implanted ports. Electronic material for this project included access to published Lippincott reference materials and Microsoft Word and color printing to design and create the reference cards for information on chest tubes and implanted ports. Educational materials used for the project included equipment to film a chest tube set up and dressing change. These materials were a single-use, disposable, sterile chest drainage collection unit; sterile water; gloves; suction regulator; suction connection tubing; wide tape (i.e., soft cotton tape), and sterile 4 x 4 gauze pads. Equipment needed to film a chest tube dressing change included gloves, cleaning solution (sterile normal saline), sterile 4 x 4 gauze pads, xeroform petrolatum gauze, sterile 4 X 4 pre-slit gauze pads, regular and sterile gloves, and wide tape (i.e., soft cotton tape).

A video recording device was used to create the short video tutorials, and access to the facility's QR code subscription service was required to link the short videos directly to the quick reference cards. However, the videos for the implanted ports were not completed prior to implementing this project due to barriers previously identified. In addition, printed survey questionnaires and Microsoft Office Excel was necessary to evaluate and monitor resources utilization and effect. Finally, access to the facility's incident reporting system will be necessary to evaluate the long-term measurements that seek to determine the QI tools' effect on reducing patient safety risks and events.

Project Outputs

Reference Tool Design

For this project, reference cards and short videos tutorial were designed and implemented based on current research confirming that these tools are beneficial for learning new clinical skills, continual training, and reinforcing concepts learned during nursing courses (Forbes, 2016; Salina, 2012). Additionally, creating the reference cards and the short videos utilized current evidence-based recommendations for the standards of care for chest tubes and implanted ports.

The reference sheets and short videos for this project were founded on research that states that these tools support the cognitive load theory and multimedia learning theory (Mayer, 2005). The design of these interventions used clear verbal and graphic information, which enables learners to better select and organize information in their working memory, allowing for deeper learning. Utilizing reference cards and video as an educational tool and practical clinical resource benefits nurses who need to recall information on managing chest tubes and implanted ports and improve patient outcomes through adherence to clinical practice guidelines.

Outputs Activities

In coordination with the nurse educator and the QI officer from the medical floor at the hospital, preliminary drafts and instructions using hospital materials for any visual references were made for the reference cards and the short video tutorial. The drafts were then edited to condense information further so that the reference cards were easily understood and could still be used as a quick reference resource. In addition, transcripts for the videos on chest tube set-up, assessment, and dressing change, were created based on the information from the reference

cards. Information for both the videos and references sheets were edited with the assistance of the QI officer and nurse educator.

A 4-point Likert type scale questionnaire was developed by the project leader. That was written and edited to collect information on the attitudes and beliefs of the stakeholders. The questionnaire looked to evaluate the usefulness, satisfaction, and confidence in using the reference tools as well as their projected frequency of future use.

Next, the videos were rehearsed by the DNP student and project leader, the QI officer, and the nurse educator to ensure that the video length was not longer than 3 minutes. The videos were then recorded by the facilities videographer and IT specialist. The processes of editing and finalization for these videos occurred while the initial implementation of the quick reference sheets was underway. The final video drafts produced three different videos that depict how to quickly set up, assess and manage, and change a dressing on a chest tube in what is expected from a real-life situation on the medical floor. These videos are to be linked to QR codes and will be implemented outside of the time frame for this QI project.

Following the finalization of the quick reference sheets, these were color printed on card stock with areas marked out for the upcoming QR codes so that stakeholders would know where they will access the short video links in the future. Finally, the quick reference sheets were placed in labeled folders on the wall of the medical equipment supply room of the medical floor so that they could be easily found and taken to the appropriate patient room when necessary. Then with the assistance of the nurse educator and QI officer, emails were sent to all key stakeholders. The information sheets will be switched out and reprinted once the final QR codes with the appropriate correlating video links to each clinical procedure have been finalized.

During staff shift change on the medical floor, in-person announcements were made by the project leader about implementing the resource tools, their locations, and how to utilize them. The stakeholders were informed that they would be surveyed after the implementation period.

Since evaluating measures for rarely performed procedures requires data collection over a long period of time. This QI project elected to assess proxy outcome measures to understand the potential effectiveness of the reference materials. For this reason, the project's resources tools were given to 10 medical floor nurses to review, and these stakeholders were surveyed to evaluate the process measures. The survey collected information on the attitudes and beliefs of these key stakeholders and the anticipated long-term effectiveness and outcome of the resources. The data collected will be used to present the results of the project. Additionally, the facility may utilize the data to determine the long-term benefits of the tools.

Project Proxy Outcome Measures

Process measures assessed whether the implementation of reference cards and video tutorials improved stakeholders' feelings of being ill-prepared and more confident in managing infrequently done procedures and improved the process of providing and adhering to the standards of care required for managing chest tubes and implanted ports. This project's goals are outlined as short, medium, and long-term goals and are further expanded upon as SMART goals in Appendix C.

Short-Term Goals

Short-term goals were measured after the initial implementation period. Information was collected through verbal communication, to measure whether key stakeholders on the medical

floor had been sent an email containing information on the implemented resources and instructions on how to access and utilize them to enhance the standards of care of chest tubes and implanted ports.

Medium-Term Goals

Medium-term goals were measured immediately after implementation. The project's resources tools were given to 10 randomly selected medical floor nurses and asked to review the quick reference guides. At this time, process measures evaluated the attitudes and beliefs of key stakeholders. These outcomes determined if the stakeholders were satisfied with the resources, if they felt they would be useful, easy to comprehend, quickly accessible, and if they would be more confident performing procedures associated with implanted ports and chest tubes after using the resources.

Long-Term Goals

The long-term project goals look beyond this project's scope, and it is recommended that the facility evaluate the process measure again using the projects questionnaire survey once the reference videos have been completed and their correlating QR codes have been added to the quick reference guides. This way the facility may better determine the benefits of the video education tools, in addition to the quick reference sheets.

Additionally, at six months post-implementation it is recommended that the facility measure continue to assess the project outcomes. At this time, process measures will be evaluated to determine how frequently the resources are used. Long-term goals seek to have stakeholders using the reference tools 100% of the time a patient requires the management of a

chest tube or implanted port. These goals anticipate a 90%-100% reduction in safety incident reports associated with the identified procedures and no occurrences of patient safety events associated with a lack of knowledge or adherence to standards of care. In addition, the long-term project goals will continue to evaluate the process measures, including the stakeholder satisfaction with the resources, if the resources have improved workflow and confidence in managing implanted ports and chest tubes.

Outcome measures are recommended as a part of this project's long-term goals and measurements. These will assess the outcome measures for the implemented tools impact how staff adhered to practice guidelines and the quality of patient care provided after the implementation period. Additionally, the outcome measures can assess if these tools help reduce risks associated with managing chest tubes and implantable ports and decrease reported patient safety events.

Barriers to Implementation

The main barrier to implementing this project was limited time. Coordinating a schedule with the QI officer to review and edit the resources tools in person was restricted. For this reason, planning activities for inputs and outputs for project implementation were mainly facilitated through telephone and email communication methods. Additionally, the facilities videographer and IT specialist had a limited schedule and were only available to film the short videos on 2/10/21, with a two-to-three-week turnaround time for the videos editing. Initially, the project leader had hoped to implement the quick reference sheets with the short videos simultaneously, but it became apparent after recording the short videos that this would not have

been possible in the timeframe outlined to complete the QI project. Overall, these factors shortened the project's timeline for its implementation and data collection.

Another obstacle included restrictions for videoing the information for the implanted port resources. The facility did not have a protocol to allow filming a patient for educational purposes. Due to these constraints and the necessary approval to film, accessing and de-accessing an implanted port on a patient is still in progress. For this reason, a short reference video was not made for the implanted port reference card.

When looking forward, attention should be paid to the fact that these resources are to be used for infrequently performed procedures, and long-term data collection may be limited due to the low incidences of chest-tube and implantable ports. Moreover, any staff rotation and turnover may affect the data collected that measure the long-term effectiveness of the resources.

CHAPTER FOUR

RESULTS

Data Collection and Evaluation

First, project outcomes evaluated the short-term goals after the initial implementation of the reference cards. Information was collected through verbal communication between the project leader and the QI officer. These results indicated that the facility's nurse educator and QI office had sent emails informing all medical floor staff about implementing the quick reference sheets and how to utilize them.

Medium-term goals were assessed after the first step of this project's implementation period. Ten nurses were randomly selected from the medical floor and provided with quick reference information sheets about dry suction water-seal chest tubes (Appendix C), chest tube set-up (Appendix D), chest tube assessment and monitoring (Appendix E), chest tube dressing change (Appendix F), and implanted port accessing and de-accessing (Appendix G). After the 10 nurses reviewed the information sheets, they were surveyed using a 4-point Likert type scale to indicate the level of agreement (Appendix B).

The data from the 4-point Likert type scale was evaluated on an ordinal and interval level. First, ordinal data were analyzed to gain a whole impression of the sample, and the most common scores were calculated for each question. Next, the questionnaire results were evaluated, and composite scores were made by finding the mean of each response on the questionnaire. To determine the minimum and the maximum length of the 4-point Likert type scale, the mean range was calculated by $(4 - 1 = 3)$ then divided by four as it is the greatest value

of the scale ($3 \div 4 = 0.75$). Afterward, the number one, which is the least value on the scale, was added to identify the maximum of this cell. This range gives weight to the participant's responses (see Table 1).

Table 1. Mean Score Range for 4-Point Likert Type Scale

	Value	Mean Score Range
Strongly Disagree	1	0.75-1.75
Disagree	2	1.76-2.5
Agree	3	2.6-3.25
Strongly Agree	4	3.26-4.00

Project Results

The stakeholder feedback on the quick reference cards' is depicted in Tables 2, 3, 4, and 5. These tables show the project outcomes and the participants' responses to items on the Likert-type scale questionnaire. Information in Table 2. represents results from the questionnaire that compares current clinical resource to the implemented reference sheets. Participants reported that the current resources were easily accessible but not easy to comprehend and that they were not satisfied with the existing standard clinical resources. In comparison, most participants agreed that the QI quick reference sheets were easy to comprehend and access quickly and that they were more satisfied with the QI resources than with the existing clinical resources (see Table 2).

Table 2. Current Clinical Resources Compared to QI Clinical Quick-Reference Sheets

	Current standard clinical resources	QI Clinical Quick Reference Sheets (perceived)
Resources are easy to quickly comprehend	Agree- 40% Disagree- 60%	Agree- 80% Strongly Agree- 20%
Resources are easy to quickly access	Agree- 60% Disagree- 40%	Agree- 90% Strongly Agree- 10%

Table 2. Continued

Satisfied with clinical resources	Agree- 30% Disagree- 70%	Agree- 80% Strongly Agree- 20%
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To further evaluate the new clinical quick reference sheets' perceived effectiveness for future practice, participants were asked to assess their usefulness and self-confidence in managing chest tubes and access ports following a review of the quick reference sheets. More than half of the participants reported that they found the QI tools useful, and all participants concurred that they felt more confident in managing chest tubes and implanted ports after using the clinical reference sheets (see Table 3).

Table 3. Usefulness and Perceived Self-Confidence

	QI Clinical Quick Reference Sheets (perceived)
Usefulness of the reference sheets.	Disagree 30% Agree 60% Strongly Agree 10%
Perceived self-confidence in managing chest tubes after using the clinical reference sheets.	Agree 90% Strongly Agree 10%
Perceived self-confidence in managing implanted ports after using the clinical reference sheets.	Agree 90% Strongly Agree 10%

The projected frequency of future use for the information sheets is shown in Table 4. This table depicts how many times the participants anticipate using the clinical quick reference cards, when necessary, in the future while working on the medical floor. Half of the participants reported that they anticipated using the clinical quick reference sheets at least once in their future practice (50%). In comparison, 30% predicted using them two times and 20% three or more times (see Table 4).

Table 4. Projected Frequency of Use

	QI Clinical Quick Reference Sheets (perceived)
Number of times nurses anticipate using the clinical quick reference sheets in their nursing practice on the medical floor.	One time 50% Two times 30% Three or more times 20%

To further evaluate the project outcomes and how the participants agree or disagree with the questionnaire statements, the result averages are represented in Table 5. The average response scores to the questions on the implemented material were between 2.8 and 3.1, indicating that predominantly, participants agreed with the questionnaire statements on satisfaction, usefulness, and self-confidence after using the quick reference sheets.

Table 5. Average Scores from 4-point Likert-Type Scale.

	Response Score Range	Mean
Existing clinical resources are easy to quickly comprehend.	Strongly Disagree- 0 Disagree- 12 Agree- 12 Strongly Agree- 0	2.4
Existing clinical resources are easy to quickly access.	Strongly Disagree- 0 Disagree- 8 Agree- 18 Strongly Agree- 0	2.6
Satisfied with existing clinical resources.	Strongly Disagree- 0 Disagree- 14 Agree- 9 Strongly Agree- 0	2.3
QI quick-reference cards are easy to quickly comprehend.	Strongly Disagree- 0 Disagree- 0 Agree- 24 Strongly Agree- 8	3.2

Table 5. Continued

QI quick-reference cards are easy to quickly access.	Strongly Disagree- 0 Disagree- 0 Agree- 27 Strongly Agree- 4	3.1
Satisfied with QI clinical resources.	Strongly Disagree- 0 Disagree- 0 Agree- 24 Strongly Agree-8	3.2
Usefulness of the QI reference cards.	Strongly Disagree- 0 Disagree- 6 Agree- 18 Strongly Agree-4	2.8
Perceived self-confidence in managing chest tubes after using the clinical reference cards.	Strongly Disagree- 0 Disagree- 0 Agree- 27 Strongly Agree- 4	3.1
Perceived self-confidence in managing implanted ports after using the clinical reference cards.	Strongly Disagree- 0 Disagree- 0 Agree- 27 Strongly Agree- 4	3.1

Discussion

Overall, the project's initial implementation results indicate a positive response from stakeholders to the clinical quick-reference sheets. After using the quick reference sheets, the outcomes show that nurses from the medical floor agreed on satisfaction, usefulness, and self-confidence with the questionnaire statements.

Based on the responses from the key stakeholders, it appears that there is a benefit in implementing the quick reference material in a hospital setting. The preliminary results from this QI project are consistent with that reported by similar studies, which depict the effectiveness of quick reference material as a part of educational strategies for standardizing the care processes, improving health care provider knowledge, enhancing the consistency and compliance of following clinical practice guidelines.

The next steps for this project are to implement the QR codes onto the quick reference sheets, which will allow stakeholders to access a link to the short information videos. It is predicted that a combined approach of using reference sheets and short videos will be an operative teaching method for advanced clinical skills of rarely encountered procedures, support clinical decision-making, and enhance patient safety. Although there are no long-term post-intervention data for this QI project, it is anticipated that there will be better consistency in performing infrequent bedside procedures, and patient safety and quality of patient care will improve with the use of both the quick reference sheets and the short information videos.

Limitations

The short implementation period and evaluation of short and medium-term goals restrict our ability to draw firm conclusions on the definitive role and benefits these resources play in improving adherence to practice guidelines and reducing patient risks. In addition, due to limited time constraints of the short implementation period, it was challenging to collect data from a larger population size, and the small sample size of 10 randomly selected nurses ($n=10$) was a limitation to this project.

Though the implementation of the quick reference materials shows promise in supporting the healthcare providers' clinical practice when performing rarely seen procedures, this project has yet to demonstrate a significant impact. Furthermore, this project has yet to investigate the long-term impacts these resources have on the perspective of medical floor staff and facility stakeholders, as well as improvement on nursing workflow, sustainability, and staff satisfaction of using these tools, and adherence to the standards of care required for managing chest tubes and implanted ports. Consequently, long-term data collection may be difficult to acquire since

the implemented resources will be utilized during rarely encountered procedures, which may further limit study results.

Recommendations for Future Practice

Key takeaways from implementing this project would include the importance of initially creating a timetable with predetermined deadlines for each step of the project. It is necessary to have all those involved with the project work together to create this timeline and agree on the deadlines. Instead of through third parties, the project leader should also communicate directly to all project stakeholders to limit the risk of delayed or missed communications.

As this project was developed, the design and editing of the reference materials was the most time-consuming task. For this reason, it would be prudent for future projects like this one to focus on creating only one reference material that would cover one clinical procedure. That resource can then be implemented early in the project's process, and more data can be collected over an extended period.

The additional insight gained from this project would be to work more closely with the facility stakeholders, including the videographer and IT specialist. Starting the short videos sooner in the project's timeline would have brought the filming and editing of the short videos to an earlier point in the project's process, allowing them to be completed by the initial implementation period.

Conclusion

The initial implementation of the quick reference sheets in the medical floor of a rural Southwest Montana hospital, indicated an interest in these materials by nurses, and on average,

participants agreed with statements on satisfaction, usefulness, and self-confidence after using the quick reference sheets. These proxy results suggest a positive impact on professional clinical nursing practices on the medical floor and could be successfully applied to cover different clinical procedures and incorporated into other units within the facility.

The quick reference sheets and short information videos were designed to enhance the compliance and consistency of clinical practice guidelines when managing infrequently seen procedures and further improve patient safety and quality of care. The cognitive load theory and multimedia learning theory supports the development of resources to aid in the practice of rarely encountered clinical procedures. Furthermore, quick reference sheets for this QI project were designed to stimulate visual and verbal processing channels using text and pictures, to facilitate better understanding, accuracy, and self-confidence in performing infrequent clinical procedures.

Further steps are needed to fully appreciate the results from this project, including implementing the short video tutorials, surveying a larger group of stakeholders, and completing the long-term measures. However, expected results from these measures hope to support further improvement in nursing practices of rarely encountered clinical procedures.

CHAPTER FIVE

DNP ESSENTIALS

The MSU DNP program has established the groundwork for the essential competencies for my future in advanced nursing practice and has allowed me to meet the DNP Essentials outlined by the American Association of Colleges of Nursing (AACN, 2006). The courses structured throughout the DNP program have integrated the eight DNP Essential through assignments and clinical rotations that have provided crucial practice-focused knowledge, skills, and education in evidence-based practice, quality improvement, research methodology, systems leadership, and organizational roles. The courses leading up to my final year in the DNP program have prepared me to develop and implement a Quality Improvement Project that reflects the knowledge I have generated in this program and addresses the DNP Essentials.

Reflection on DNP Essentials

The Scientific Underpinnings for Practice, Essential I, has been well integrated throughout the DNP program, allowing me to learn about different nursing science, concepts, and theories. This has been critical in bridging the gap from theory to practice and helping me apply research and knowledge to both my QI project and my professional clinical practice. Early in the program, during the course NRS603: Advanced Pharmacology I, the *Prescription Writing Assignments* helped me cultivate the building blocks for evaluating medication safety by utilizing appropriate pharmacology guidelines and research tools. This assignment reflects the underpinnings for practice in that safe pharmacological processes and recommendations are essential for best healthcare practices and optimal patient outcomes.

Implementing organizational and system leadership for quality improvement is evident throughout my QI project. Work done during the DNP program has allowed me to gain the ability to design evidence-based interventions to advance clinical practice guidelines in the healthcare system and evaluate those practice outcomes. All of which contribute to nursing science by assessing, interpreting, and disseminating research into practice, fulfilling Essential II, Organizational Leadership for Quality Improvement and Systems Thinking (AACN, 2006). In collaborative research and writing assignment for the course NRS 615: Translational Research, I employed organizational and system leadership abilities to research using a Translational Research Theoretical model to write a group paper called *Translational Plan of Action Paper*. This assignment helped me learn and practice translating research evidence into a current practice setting and how research could affect my future recommendations in practice. These skills were directly utilized in developing and implementing my QI project.

Clinical Scholarship and Analytical Methods for Evidence-Based Practices, Essential III, has been evident through my QI project by first examining existing healthcare systems and research recommendations and then facilitating meaningful changes in health care delivery to improve professional practices and patient outcomes. In addition, developing a research evidence table for group projects and papers has been necessary for multiple program assignments, including my QI project. For example, in the course NRS 615, creating an evidence table aided in researching and writing for two group papers, one titled, *Addressing Patient-Centered Education Recommendations for Patients Diagnosed Diabetes*, and the other titled *Translational Plan of Action Paper*. This process helped me develop the ability to effectively organize, analyze, and locate publications covering many relevant healthcare-related research topics.

Essential IV has been crucial in transforming health care practices by understanding technology and information systems. Using information technology has been important for performing thorough evidence-based research and when creating evidence tables, as described in exemplars for Essential III. Furthermore, utilizing technology has been necessary for efficient patient-centered care during my clinical rotation. Electronic technology is incredibly impactful to all healthcare professions, though information technology is still valid in other forms. For my QI project, a deep understanding of information and technology systems was necessary to translate science and evidence-based research into practice and work to improve the delivery of healthcare through implementing quick reference sheets which support the practices highlighted in DNP Essential IV (AACN, 2006).

Though I have not yet actively engaged in health care policy or legislation, I have developed the skills to critically analyze health policy and protocols and identify issues within care delivery systems (AACN, 2006). All of this highlights the importance of Essential V. These skills were executed in an advocacy letter to our state senator for an assignment in NR612, Ethics, Law, and Policy for Advocacy in Healthcare. In my letter, I expressed concerns regarding the Supreme Courts' decision to uphold the Trump administration's regulation to allow all employers exemptions from the ACA's mandated coverage of contraceptives based on religious and conscientious objections. I further communicated my concerns that this regulation reduced women's freedom by limiting the coverage of contraceptives and imposing unnecessary risks and burdens on an already vulnerable population. In addition, I feel that this course prepared me to advocate for significant cultural and social justice issues, safety regulations, and all healthcare professionals.

Throughout my QI project, interprofessional collaboration and communication, Essential VI, have been necessary to successfully develop and implement my project. From establishing approval to work with a healthcare facility to meeting with stakeholders, discussing goals, and evaluating the project, interprofessional collaboration has been a key process for creating a QI project that improves patient outcomes. Furthermore, during my time at each clinical rotation site for NRS 621, 622, 623, and 624, I found interprofessional communication essential in creating a hospitable, efficient, safe, and well-balanced work environment.

During each advanced clinical course, NRS 621, 622, 623, and 624, I worked to continuously develop my diagnostic reasoning skills by systematically forming healthcare strategies, patient treatment plans, health promotion, and preventive care. The most notable experience was being able to apply my didactic knowledge during my time at each different clinical rotation site. Essential VII, Clinical Prevention and Population Health for Improving the Nation's Health, have been reinforced continuously during the DNP program to promote patient health, utilize evidence-based recommendations, mitigate health determinants, and deliver diverse quality care (AACN, 2006). Additionally, completing the assignment, Complex Patient Case Presentation for NRS 622: Advanced Clinical II Primary Care for Midlife Families, helped me link the program's classroom learning to real-life experience by effectively working up a clinical diagnosis and patient plan, which greatly prepared me to do this in practice next.

As a DNP student, I have obtained an enriching learning experience in various courses through research assignments, required readings, group discussion threads, clinical rotations, and inter-cohort and inter-professional collaboration on projects. These assignments, and my time at clinical rotations, have taught me to understand and improve clinical care delivery systems,

evaluate clinical practice guidelines, direct patient outcomes, and effectively participate in health system leadership roles. I look forward to applying the many things this program has taught me and upholding the DNP Essentials in my practice as a DFNP.

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APPENDICES

APPENDIX A

SMART GOALS

SMART Goals

Specific

Management of chest tubes and implanted ports are identified as infrequently done clinical procedures on the medical floor. Rarely performed procedures pose a risk to patient safety and healthcare outcomes. Implementing quick reference cards and short video tutorials will improve access to useful clinical reference tools that support evidence-based clinical practices.

Measurable

Immediately after implementing the reference cards and short videos, stakeholders are very satisfied with the resources; they will be using the reference tools 90-100% of the time a patient requires a chest tube or implanted port management. The clinical reference tools will be reported as useful in practice and easy to quickly access and comprehend. Stakeholders will feel more confident in managing chest tubes and implanted ports after using the clinical reference cards.

In addition to these goals, at six months, it is anticipated that there will be a 90%-100% reduction in safety incident reports associated with the identified procedures, and there will be no occurrences of patient safety events associated with a lack of knowledge or adherence to standards of care. At this time, these goals will be beyond the project's reach and are to be carried out independently by the facility.

Achievable

Official approval from the healthcare facility to conduct research was approved after the project's proposal defense and IRB registration. Communication with the facilities has continued throughout the project's implementation. The facilities medical floor educator and QI officer has collaborated on this project and has assisted in the editing process for the reference cards and short videos.

Relevant

Stakeholders on the medical floor may go long periods between learning or refreshing knowledge on how to manage chest tubes and implantable ports and to perform these skills. Additionally, patients requiring these specialized skills may not be frequently seen at this facility or are otherwise more commonly placed on different hospital units. As a result, it is recognized that medical floor staff may feel ill-prepared and less confident in caring for and managing patients requiring these specific procedures when they are infrequently exposed to them. Utilizing reference cards and video as an educational tool will greatly benefit nurses learning new skills or needing to recall information on managing chest tubes and implanted ports and improve patient outcomes through better adherence to clinical practice guidelines.

Time-Bound

The final designs of the project's resource tools were made in collaboration with the facilities QI officer and were completed by 2/1/21. The resource tools were implemented by 2/24/22. The project's survey given to stakeholders after they had the implementation period to assess the project's mid-term goals. The data was analyzed and organized to determine the project's outcomes by 2/28/22. Next steps involved the videos being filmed on with the IT specialist, and final edits were completed on 2/30/21.

APPENDIX B

QI PROJECT QUESTIONNAIRE

Questionnaire: Evaluating Quality Improvement Tool

Instructions: This questionnaire contains statements about your attitudes about the implemented reference cards and videos. Each item represents a statement about your satisfaction, self-confidence in managing chest tubes and implanted ports when using the tools, how useful you find the tools, and how frequently you may use them. This is anonymous, with the results being compiled as a group, not individually. Information collected from this questionnaire will go towards the outcomes for this quality improvement project and may be used for future improvements in reference tool utilization.

Satisfaction with existing clinical resources (Lippincott):	STRONGLY DISAGREE	DISAGREE	AGREE	STRONGLY AGREE
Existing clinical resources are easy to quickly comprehend.				
Existing clinical resources are easy to quickly access.				
I am satisfied with existing clinical resources.				

Satisfaction with QI resource (Information/Reference Cards):	STRONGLY DISAGREE	DISAGREE	AGREE	STRONGLY AGREE
Clinical reference cards are easy to quickly comprehend.				
I would be satisfied with the implementation of clinical reference cards.				
The Usefulness of Tools:				
The reference cards would be useful in my practice.				
The reference cards are easy to quickly access (Placed at TL desk, utility room, with educator materials).				
Self-Confidence:				
I feel more confident in managing <u>chest tubes</u> after using the clinical reference cards.				
I feel more confident in managing <u>implanted ports</u> after using the clinical reference cards.				
Frequency of tool use:	0/ None	1 Time	2 Times	3+ Times
How many times do you anticipate using the clinical reference cards in your nursing practice?				

APPENDIX C

QUICK REFERENCE GUIDE: CHEST TUBES

CHEST TUBES: DRY SUCTION WATER SEAL

QUICK REFERENCE GUIDE

WATER-SEAL CHAMBER:

- Fill into blue suction port to the 2cm mark using pre-filled 45 ml sterile water squeeze bottle.

**Monitor for water evaporation and add additional NS if necessary.*

IN-LINE CONNECTOR:

Disconnect and attach/change out new chambers here.

COLLECTION CHAMBER:

- Fluid from patient is collected and measured here.

TO SUCTION:

- If ordered, connect the suction tubing to wall suction and set at least -80mmhg or higher to expand the bellows.

DRY SUCTION CONTROL:

- Suction regulator is per-set to -20mm H₂O.

**Turn the rotary dry-suction control dial to adjust to any suction setting that is ordered.*

BELLOWS:

- Bellows expand to triangle indicator, which confirms suction is operating.

**Since there is no bubbling in a dry suction system, the bellows are used as an indicator of suction.*



DRAINAGE SYSTEM AND TUBING:

- Place the drainage system at the bedside below the patient's chest tube in the upright position.

- Secure tubing to the patient's skin below the level of the dressing.

**Avoid creating dependent loops, kinks, and pressure in the tubing.*

PATIENT CONNECTOR AND TUBING CLAMP:

- Chest tube from patient attaches here with Zip Tie or tape.

**Clinical alert: Never clamp a chest tube when getting a patient out of bed or when transporting a patient.*

AIR LEAK MONITORING:

- Check for *fluctuation* in the water-seal chamber as the patient breathes.
 - This reflects pressure changes in the patient's pleural space during respiration.
- **Constant bubbling** in the water-seal chamber may indicate a persistent air leak and need further assessment.
- **Intermittent bubbling** in the water-seal chamber, with float ball oscillation, may confirm the presence of an intermittent air leak.
 - *Intermittent bubbling* may also occur when the chest tube drainage system is removing air from the patient's pleural cavity and intermittent bubbling is *normal*.
- **No bubbling** with minimal float ball oscillation at bottom of water seal will indicate *no air leak* is present or lung is fully expanded.

APPENDIX D

QUICK REFERENCE GUIDE: CHEST TUBE SET UP

CHEST TUBE QUICK GUIDE: SET UP

QUICK REFERENCE GUIDE

EQUIPMENT:

Single-use, disposable, sterile chest drainage collection unit
 Sterile water
 Gloves
 Suction regulator (wall mounted)

Suction regulator
 Suction connection tubing
 Tape
 Sterile dressing, sterile 4 x 4 gauze pads



SET UP (BASICS):

1. Fill water seal to 2cm line.
2. Connect the chest tube from the patient to the new chest tube drainage system.
3. Connect suction line from chest tube chamber to wall suction canister.
4. Turn on suction regulator to $> -80\text{mmHg}$.

STEP 1 – CHECK ORDERS

Verify the orders to determine the type of drainage system to be used.

- Note the *level of suction* prescribed, if ordered.

STEP 2 – PREPARE FOR PROCEDURE

Maintain sterile, no-touch technique whenever you make changes in the drainage system or alter any of the connections.

1. Open the sterile chest drainage collection unit.
 - o Set the unit on the floor or use the hangers to hang it level on the bed below the level of the patient's chest tube

STEP 3 – FOR DRY-SUCTION-WATER-SEAL SYSTEM

1. Use sterile water to fill the water-seal to the specified level, according to the manufacturer's instructions
 - o Fill to 2cm line with sterile water.



2. Connect the chest tube from the patient to the new chest tube drainage system at *In Line Connector*
 - o Do not disconnect the zip tie.



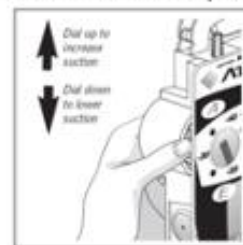
STEP 4 – TURN SUCTION SOURCE ON

1. Connect the suction tubing from the *wall suction canister* to the *drainage system* if there is an order for suction.
 - o Turn on wall suction regulator- *Increase wall suction to $> -80\text{ mmHg}$ or higher.*



STEP 4 –SUCTION CONTROL

1. Verify suction order. Ensure dry-suction control dial is set to correct amount (usually $-20\text{ cm H}_2\text{O}$)



APPENDIX E

QUICK REFERENCE GUIDE: CHEST TUBE ASSESS AND MONITOR

CHEST TUBE QUICK GUIDE: ASSESS & MONITOR

QUICK REFERENCE GUIDE



ASSESS AND MONITOR:

1. Assess and document patient's vital signs, respiratory status, pain level, and the integrity of the drainage system tubing every 2 to 4 hours.
 - Assess tubing, tidaling, oscillations, bubbling, and if it's suction or water seal.
 - Ensure that the drainage system is intact, with no air leaks or dependent loops or kinks in the tubing.
2. Monitor the color, character, consistency, and amount of drainage.
 - Mark the drainage level by writing the time and date at the drainage level on the drainage collection chamber every 8 hours.
3. Assess the dressing to ensure it is clean, dry, and occlusive.
 - Inspect skin for s/s of infection and palpate surrounding skin to identify subcutaneous emphysema.

*NURSING ALERT:

- Ensure that tubing is never kinked or looped.
- Keep chest drainage system *upright and below* the level of patient's chest.
- **Do not** clamp chest tube during transport, unless ordered by physician.
- **Never** clamp chest tube for more than one minute unless specifically ordered by physician (i.e. tPa).
- **Never** "strip/ milk" chest tube, which means squeezing length of tube without releasing it, unless ordered.
- Immediately notify the practitioner:
 - If chest tube is dislodged.
 - The patient has sudden or worsening respiratory distress.
 - Drainage suddenly increases (>100ml/h for 5 hrs or 1,000ml).
 - If previous drainages changes for serous/ serosanguinous to frank/ bloody drainage.
- Emergency supplies on hand; hemostats, xeroform gauze, sterile 4x4 gauze, silk tape.
 - **Always** have suction set up and ready to use even if the patient is to water-seal.
 - If the chest tube is completely dislodged, apply sterile 4x4 gauze over the exit wound and tape it down only on 3 sides. Then call the physician immediately while support staff stays with the patient.

WET VS. DRY SUCTION CONTROL SYSTEMS:

- Wet suction control systems regulate suction pressure by the height of the column of water in the suction control chamber. The amount of negative pressure that is transmitted to the patient's chest is determined by the height of water in this chamber, not the level of vacuum set on regulator.
- Dry suction control systems regulate suction pressure mechanically rather than with a column of water.

PATIENT PRESSURE MONITORING:

Changes in patient pressure can be observed by the level of the bluewater and small float ball in the water seal column.

- With suction operating, patient pressure will equal the suction control setting plus the calibrated water seal column level.
- For gravity drainage (*no suction*) patient pressure will equal the calibrated water seal column level only.

APPENDIX F

QUICK REFERENCE GUIDE: CHEST TUBE DRESSING CHANGE

CHEST TUBE QUICK GUIDE: DRESSING CHANGE

QUICK REFERENCE GUIDE



DRESSING CHANGE: USE STERILE, NO-TOUCH TECHNIQUE WHEN CHANGING THE DRESSING

EQUIPMENT:

PPE	Sterile 4 X 4 pre-slit gauze pads
Cleaning solution (sterile normal saline)	Regular and sterile gloves
Sterile 4 x 4 gauze pads	Wide tape (<u>i.e.</u> soft cotton tape)
Xeroform petrolatum gauze	

STEP 1 – ASSESS DRESSING & SKIN

- Inspect dressing for drainage saturation or if its poorly secured.
- Inspect skin around tube insertion site.
 - Check for redness, edema and signs of subcutaneous emphysema.

STEP 2 – REMOVE OLD DRESSING

- Be careful not to dislodge or place tension on chest tube.

STEP 3 – REMOVE GLOVES & WASH HANDS

- Set up materials on a sterile field. Put on sterile gloves and

STEP 4 – CLEANSE TUBE SITE

- Use *sterile normal saline* with a *sterile gauze pad*.

STEP 5 –SUCTION CONTROL

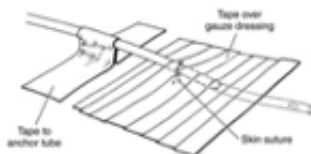
- Gently wrap sterile xeroform petrolatum gauze around chest tube insertion site.
- Then apply 4 x 4 pre-slit gauze pads in opposing direction, around chest tube.



- Finally apply 4 x 4 gauze pads on top.

STEP 6 –SECURE DRESSING

- Secure dressing using wide silk tape, ensuring chest tube is *not kinked*.
 - **NOTE:** Avoid using waterproof tape to secure dressing, as this leads to skin breakdown.



- Write the date, the time, and your initials on the dressing

STEP 7 –ASSESS CHEST TUBE

- Check drainage tube to eliminate any *kinks* or *dependent loops* that may impair drainage.

APPENDIX G

QUICK REFERENCE GUIDE: IMPLANTED PORTS

IMPLANTED PORTS

QUICK REFERENCE GUIDE



TYPES OF IMPLANTED PORTS:

- **Single lumen:** one access point, most common type.
- **Double lumen:** two access points.
- **Power-injectable:** Many single- and double-lumen ports are power-injectable. Made for imaging tests (CT, MRI), allows for high-speed injections of contrast.



EQUIPMENT:

- Inpatient Central Venous Access Kit
- Non-coring Huber Needle; PowerLoc needle *in Chemo Cart.*
 - 1 inch is most commonly used length
 - ¾ inch for a very thin-walled chest.
 - 1 ½ inch is for a large / deep chest wall

PREPARE FOR PROCEDURE:

1. Place the patient in seated or supine position with a mask on the patient and provider.
2. Palpate port prior to cleaning.
3. *Using a sterile technique* open central line kit, put on sterile gloves and set up sterile field:
 - including sterile saline flush, clave, needle, and a Biopatch.
4. *Cleanse the site with Chlora Prep* for 30 seconds using friction. Allow to air dry.
 - Then apply skin barrier solution
5. Prime the needle: Connect needle set to clave. Connect sterile flush to clave and prime the line and needle.
 - The flush should be left attached.
 - Set back onto sterile field.



ACCESSING PORT:

1. Palpate the port and hold it securely with non-dominant hand; tilt the port in correct direction if needed.
2. *Insert the Huber needle;* place needle perpendicular to the port, aim for the center, and push firmly through the skin in an arching motion, until needle contacts back of port.
3. *Aspirate* for blood return then flush with 10ml NS; *firm pulsing flush.*
4. Remove syringe then clamp.
5. Place Biopatch between skin and needle (2X2 sterile gauze if bleeding)
6. Cover with Tegaderm, label with date and initials.
7. Document in EMR



DE-ACCESSING:

1. *Flush port with 10 ml of NS then 500 units Heparin (5ml of 100units/ml):*
 - a. Flush 2nd port if present.
2. Take off syringe, close clamp.
3. *Stabilize* the port by securely holding the finger tabs down and firmly pull the wings up until you hear or feel a click.
 - a. Dispose in a sharps container.
4. Apply pressure if site bleeds; apply 2x2 or Band-Aid.
5. Document: De-access and Heparin and NS flush in MAR