Spring 5-19-2017

Increasing Sequential Compression Device Compliance to Decrease Venous Thromboembolisms and Improve Nursing Documentation

Shannon M. Muramoto
smmuramoto@gmail.com

A Quality Improvement Project:

Increasing Sequential Compression Device Compliance to Decrease Venous Thromboembolisms and Improve Nursing Documentation

Shannon Muramoto

University of San Francisco

Spring 2017

Abstract

Venous thromboembolisms (VTE) affect approximately 350,000 to 900,000 people in the United States annually and are the leading cause to preventable hospital death (Centers for Disease Control [CDC], 2017). Nearly 70% of these cases were preventable through the use of pharmacologic agents and/or mechanical compression devices, such as sequential compression devices (SCD). However, less than half of hospitalized patients receive VTE prophylaxis (CDC, 2017). At a large metropolitan hospital, compliance with VTE prophylaxis, specifically with SCDs, is an ongoing quality improvement project. Currently, SCD usage and nursing documentation compliance have been consistently below performance standards. Therefore, the aim of this quality improvement project is to increase SCD compliance in order to decrease the incidence of VTEs and improve nursing documentation. Based on previous data from a root cause analysis, one of the pivotal contributing factors to low SCD compliance was the lack of available SCD machines. In order to overcome this barrier, 180 SCD machines were place at the end of each patient bed across all medical-surgical units. Additionally, in-services were conducted to educate day and night shift medical-surgical nurses on the importance of VTE prevention, new SCD protocols, and were reminded to document SCDs. Audits were conducted to evaluate the effectiveness of these interventions. Results showed that having SCDs at the point of care did not increase SCD usage and nursing education did not improve SCD documentation compliance. These results led students to investigate other contributing factors, such as physicians. Future recommendations for this project are to conduct a six-month post audit to examine the location of SCD machines, work closely with physicians to study other contributing factors to low SCD compliance, and compose additional SCD procedures to close gaps in the current protocol.

Keywords: sequential compression device, venous thromboembolism, mechanical compression device, compliance

A Quality Improvement Project:

Increasing Sequential Compression Device Compliance to Decrease Venous Thromboembolisms and Improve Nursing Documentation

Venous thromboembolisms (VTE) are a preventable condition that is associated with high incidence rates. An ongoing quality improvement project at a large metropolitan hospital aims to improve VTE prophylaxis compliance, specifically with sequential compression device (SCD) usage, and increase SCD nursing documentation. Currently the hospital's compliance rates are below performance standards. The objective of this project is to increase SCD and nursing documentation compliance through implementing an environmental change, enhancing staff knowledge through in-services, and simplify cumbersome SCD protocols.

Background

In the United States, VTEs are the leading cause of preventable hospital death, leading to an estimated 60,000-100,000 deaths annually (Centers for Disease Control [CDC], 2017). Furthermore, approximately 350,000 to 900,000 people are affected by VTEs each year (CDC, 2017; Makic, 2014). According to the CDC (2017) VTEs are the fifth most common reason for readmissions and the third most frequent complication among patients that undergo total hip or knee replacement. Half of the nation's VTE events are attributed to recent surgical procedures or hospitalizations, with most events occurring after discharge (CDC, 2016). Additionally, nearly 70% of VTE cases were preventable through the use of pharmacologic agents and/or mechanical prophylaxis, however, less than half of hospitalized patients received these interventions. Nationwide, the annual total cost of VTEs is an estimated $10 billion, which causes a financial burden on both the patient and the facility (CDC, 2016).

The term VTE encompasses both deep vein thrombosis (DVT) and pulmonary embolism (PE), which are two types of blood clots. (American Heart Association [AHA], 2017). DVTs are blood clots that most commonly form in the deep veins of the legs, however, these clots can also be found in deep veins throughout the body. PEs occur when a DVT clot breaks free from the vessel wall and travels to the lungs where it impedes blood flow and oxygenation (AHA, 2017). Three factors that cause VTEs are vessel wall damage, venous stasis or abnormal blood flow, and hypercoagulability. These three elements are known as Virchow's triad (Makic, 2014). The most common risk factors for developing VTEs include: major surgery, multiple trauma, pelvis or hip fracture, previous VTE, family history, age, obesity, immobility, indwelling central venous catheter, heart disease, lung disease, malignancy, and inflammatory bowel disease (AHA, 2017; Makic, 2014). The signs and symptoms of VTEs depend on the location of the clot. DVTs may present with swelling, pain/tenderness, erythema, and warmth to touch in the affected area. On the other hand, PEs may present with chest pain, shortness of breath, and increased heart rate and respiratory rate (Makic, 2014).

Pharmacologic agents, mechanical compression devices, and early patient ambulation are effective evidenced-based interventions that are used to prevent VTEs. The most common prescribed VTE pharmacologic prophylactic agents are warfarin, low-molecular-weight heparin, and fondaparinux sodium (Makic, 2014). These anticoagulant medications specifically target the hypercoagulability component of Virchow's triad, which aids in decreasing VTE risk (Ho & Tan, 2013). The most common types of mechanical prophylaxis are graduated compression stockings and intermittent pneumatic compression devices (IPC), such as SCDs. In order to achieve maximum therapeutic benefits, SCD compression sleeves should be fitted to the patient and worn continuously except for cleaning, skin inspections, or during patient ambulation

(AACN, 2016; Makic, 2014). Mechanical compression devices work by creating intermittent sequential pressures on the legs to promote venous blood flow, which reduces venous stasis and activates the fibrinolytic pathway (Cowell et al., 2010). Mechanical compression devices also serve as an adjunct therapy to pharmacologic agents, further reducing VTE risk in high-risk patients (Ho & Tan, 2013). For patients that are able to do so, early ambulation is effective in lowering VTE risk, improves the patient's respiratory and cardiovascular status, and reduces muscle atrophy (Makic, 2014).

The Joint Commission is an independent, not-for-profit organization that evaluates and accredits hospitals in the United States that meet specific performance standards (Joint Commission, 2017). This organization worked with other key stakeholders to create the Top Performer on Key Measures Program, which consists of standardized processes and treatments, otherwise known as core measures, for common conditions that aid in reducing complications and lead to positive patient outcomes. These core measures are used to evaluate how often a hospital uses these standardized best practices and identify areas of improvement in the following: acute myocardial infarction, children's asthma care, emergency department, hospital outpatient department, hospital-based inpatient psychiatric services, immunization, perinatal care, stroke, substance use, tobacco treatment, and venous thromboembolism (Johns Hopkins University, n.d.; Joint Commission, 2017). Originally, there were six VTE core measures, however, the Joint Commission retired three of them due to consistent high performance results. The three core measures that are currently active examine VTE prophylaxis and the number of potentially preventable VTE cases (Joint Commission, 2017).

Statement of the problem

VTE prophylaxis is an evidence-based preventative therapy that reduces the risk of

VTEs. As one of the Joint Commission's core measures, compliance with VTE prophylaxis is evaluated for hospital accreditation (Joint Commission, 2017). Furthermore, the Centers for Medicare and Medicaid Services (CMS) no longer reimburses for hospital-acquired conditions, such as VTEs (Gidwani & Bhattacharya, 2015). The incidence of this preventable condition is remarkably high and the associated medical costs are causing an unwarranted financial burden to hospitals and patients.

At a large metropolitan hospital, compliance with VTE prophylaxis, specifically with SCDs, is an ongoing quality improvement project. Each month the quality improvement team conducts random audits to evaluate the compliance of SCD nursing documentation. In 2016, the highest compliance rate was 95%, however, compliance rates dropped as low as 69%. In 2017, compliance rates increased to approximately 80-85%, but this is still below the hospital's goal of 100% compliance. Previous nursing students spearheaded a SCD compliance project and identified barriers and possible causes to not only SCD documentation, but also to the compliance of SCD application. The next steps of this project are to implement a change and evaluate its effectiveness.

As the hospital's data illustrates, there is still an issue with SCD compliance rates. These percentages need to increase to not only prevent VTEs, but to also comply with the Joint Commission's core measures and receive reimbursement from CMS. Therefore, this quality improvement project aims to increase SCD compliance in order to decrease the incidence of VTEs and improve nursing documentation.

Rationale

Literature Review

Ibrahim, Ahmed, Mohamed, and Abduo (2015) conducted a systematic review to

examine the effectiveness of SCDs in preventing VTEs in trauma patients. PubMed, Cochrane Library, and CINHAL were used to search for research studies that met specific inclusion criteria. Among trauma patients, mechanical prophylaxis is the most common type of VTE prevention because pharmacological prophylaxis is contraindicated due to active bleeding, bleeding risk, or severe thrombocytopenia. Ibrahim et al. (2015) found that the incidence of DVTs was higher (8.8%) among trauma patients that did not receive VTE prophylaxis, compared to those who used SCDs (2.9%). Similar findings were also discovered among patients with hip and pelvic fractures. The incidence of DVTs for patients that did not receive VTE prophylaxis was higher (11.3%) compared to those that used SCDs (4%) (Ibrahim et al., 2015). These significant findings demonstrate that SCDs are effective in reducing DVTs when compared to no VTE prophylaxis.

A systematic review by Sadaghianloo and Dardik (2016) found similar results. Among hospitalized patients that used IPCs, there was a 57% decrease in DVT risk and a 52% decrease in PE risk, compared to no VTE prophylaxis. In addition, a 58% decrease in bleeding risk was noted with the use of IPCs. When IPC and pharmacologic prophylaxis were used simultaneously, DVT risk decreased another 46%, when compared to IPC use alone. Sadaghianloo and Dardik (2016) also examined recommendations and guidelines for IPC use among different patient populations. For neurosurgical patients, the American College of Clinical Pharmacy recommended IPC as a first-line VTE prophylaxis, with the addition of pharmacologic interventions once the risk of bleeding decreased. These recommendations are also the same for trauma patients. For medical patients, the National Institute of Health and Clinical Excellence recommend that VTE prophylaxis should be prescribed to all patients upon admission, and discontinued once ambulatory (Sadaghianloo & Dardik, 2016).

In a meta-analysis, Ho and Tan (2013) also evaluated the effectiveness of IPCs in reducing VTEs, and if combining IPCs with pharmacologic prophylactic agents would further reduce VTE risk. In total, 16,164 patients from 70 randomized controlled trails met the extensive inclusion criteria and were evaluated. Ho and Tan (2013) found that IPCs appeared to have the same efficacy as pharmacologic prophylaxis in reducing the incidence of PE (RR, 1.19; 95% CI. 0.62-2.29; P=0.59) and DVT (RR, 0.93; 95% CI, 0.69-1.26, P=0.66). IPCs were also associated with reducing the risk of bleeding. Additionally, combining pharmacologic prophylaxis and IPCs further reduced the risk of DVT (RR, 0.54; 95%CI, 0.32-0.91; P=0.02) but not PE (RR, 0.62; 95% CI; 0.32-3.02) compared to IPC alone. Therefore, it's recommended that high-risk patients, especially those with multiple risk factors, receive combined VTE therapy to prevent venous stasis and hypercoagulability (Ho & Tan, 2013). These findings are consistent with Ibrahim et al. (2015) and Sadghianloo and Dardik's (2016) systematic reviews.

Cowell et al. (2010) examined the efficacy and safety of compression devices compared to low-molecular-weight heparin in decreasing the risk of bleeding and VTEs after total hip arthroplasty. A total of 414 patients consented to the study and were randomly assigned to either the compression group or the low-molecular-weight heparin group. Patients in the compression group were allowed to receive 81mg of aspirin, per the surgeon's discretion. In the low-molecular-weight heparin group, major bleeding occurred in 11 cases (6%) and minor bleeding occurred in 78 cases (42%). In the compression group there were no cases of major bleeding, however, minor bleeding occurred in 74 cases (37%). The incidence of VTEs was the same between both groups (8 DVT, 2 PE). Based on the study findings, Cowell et al. (2010) concluded that compression devices decrease the risk of major bleeding events, and has been found to have the same effectiveness as low-molecular-weight heparin.

Compression devices have been proven to be effective at decreasing VTE risk, however poor SCD compliance rates are another issue. Ritsema, Watson, Stiteler, and Nguyen (2013) conducted a study to determine average SCD compliance through observations, and identify key factors leading to SCD non-compliance, through patient surveys. A total of 100 urologic post-operative patients were surveyed immediately prior to discharge regarding SCD availability, purpose, likes and dislikes, and suggestions for improvement. Furthermore, observations were made twice daily to determine SCD compliance. If non-compliance was discovered, researchers investigated the reasoning or cause. A total of 475 observations were conducted with 359 compliant observations and 98 non-compliant observations, which led to an overall compliance of 78.6%. On average, patients remained in the hospital for 1-9 days. The reasons for the 98 non-compliant observations were SCD sleeves were not replaced when patients got back into bed (50%), machine or cuffs were unavailable (22%), sleeves were bothersome or uncomfortable for patients (19%), SCD machine was not turned on/restarted (8%), or unknown reasons (1%) (Ritsema et al., 2013). Furthermore, some patients reported that SCDs were confining, while others enjoyed wearing the SCDs and compared it to a massage. Patient survey results also showed that the availability of SCD machines had the largest impact on compliance. These findings were consistent with the observational findings, which identified the lowest compliance due to the absence of SCD machines and the lack of sleeve reapplication in a timely manner. As a result of these findings the facility placed SCD machines at the bedside of each patient, in hopes that having the device readily available would increase compliance.

A meta-analysis by Craigie et al. (2015) found similar results. The average compression device compliance among post-operative patients was 75%. No difference in average compliance was found with shorter follow-ups ($\leq$3 days) and longer follow-ups (>3 days). The most common

reported reasons for patient non-compliance included: discomfort, sleep disturbances, too hot or noisy, and the device not being replaced or turned on by nursing staff (Craigie et al., 2015).

After examining the efficacy of mechanical VTE prophylaxis along with its associated low compliance rates and barriers, Bohnenkamp, Pelton, Rishel, and Kurtin (2014) used the Plan-Do-Study-Act (PDSA) model to improve SCD compliance on a 28-bed surgical gynecologic oncology and urology unit. In the first PDSA cycle, only 59% of patients were consistently wearing SCDs. Improvement strategies such as staff and patient education, standard order sets, and nurse rounding were implemented. These interventions led to 89% SCD compliance with the following identified barriers: lack of equipment, patient refusal, and limited knowledge for both staff and patients. These barriers were also seen in Ritsema et al. (2013) and Craigie et al. (2015). In the second PDSA cycle, Bohnenkamp et al. (2014) identified the lack of machines to be a vital area of improvement. The research team worked with an interprofessional team consisting of members from the purchasing department, infection prevention, legal, and house keeping, to purchase 28 extra SCD machines and establish new protocols. Each machine was labeled and dedicated to a patient room. Nursing staff was educated on the new SCD process through staff meetings, huddles, and one-on-one in-serves. A four-week random audit showed an increase in SCD compliance (96%), but did not reach the desired goal of 100%. These audits revealed that more nurse and patient education was needed. In the third PDSA cycle, nurses were further instructed on techniques to provide effective patient education regarding the benefits of SCDs and the risks associated with non-compliance. Furthermore, charge nurses and physicians reinforced patient education during rounds. Another round of audits were conducted and resulted in 100% SCD compliance (Bohnenkamp et al., 2014). This quality improvement project showed that the PDSA model is effective in testing and implementing a change in practice. Potential

causes to SCD non-compliance were brought to light and allowed the research team to continually make improvements and test further change strategies. This project also revealed that examining, planning, and implementing improvement strategies throughout multiple layers of the system achieved successful outcomes.

There has been extensive research on the effectiveness, compliance, and safety of mechanical VTE prophylaxis. When compared to pharmacological VTE prophylaxis or no VTE prophylaxis, studies have found that compression devices are effective in reducing the incidence of both DVT and PE, while also lowering the risk of bleeding and major bleeding events (Cowell et al., 2010; Ho & Tan, 2013; Ibrahim, et al., 2015; Sadaghianloo & Dardik, 2016). Mechanical prophylaxis has been found to be an effective alternative when pharmacologic VTE prophylaxis is contraindicated due to bleeding risk (Cowell et al., 2010; Ho & Tan, 2013; Sadaghianloo & Dardik, 2016). High-risk patients with multiple risk factors, should receive a combination of pharmacologic and mechanical VTE prophylaxis to further reduce VTE risk (Ho and Tan, 2013). Studies have also found that on average mechanical compression device compliance rates are approximately 75% and reasons for non-compliance were also identified and attributed to both the patients and the nursing staff (Craigie et al., 2015; Ritsema et al., 2013). In order to address low compliance rates, the PDSA model has been shown to be an effective tool to pilot change strategies and implement a change in practice (Bohnenkamp, 2014).

Financial analysis

In 2008, CMS stopped reimbursing hospitals for the cost of treating nine types of preventable hospital-acquired conditions, which includes DVT or PE after hip or knee replacement surgery (Gidwani & Bhattacharya, 2015). For patients that developed one of these preventable conditions, CMS would reimburse the hospital for the cost of treatment for the

admitting diagnosis, but exclude costs associated with hospital-acquired conditions. CMS implemented this hospital payment reform to lower costs, reduce the incidence of preventable conditions, and encourage the use of evidence-based prevention regimens (Gidwani & Bhattacharya, 2015).

VTEs are associated with an overwhelming annual cost of approximately $10 billion nationwide (CDC, 2016). The average total hospitalization cost for DVTs and PEs are approximately $9,400 and $11,000, respectively. Furthermore, ICU stays are associated with higher total hospitalization costs for both DVTs ($24,600) and PEs ($19,000) (Dasta et al., 2015). VTEs frequently reoccur after the first event and can lead to readmission that may cost up to 48% more than the initial event (Fernandez, Hogue, Preblick, Kwong, 2015). Since VTEs are a financial burden to patients and hospitals, it is crucial that healthcare providers implement cost effective, evidence-based preventative measures. Pharmacologic agents, such as injectable anticoagulants, are associated with an average daily cost of $60-$80 per patient. On the other hand, the only associated cost for mechanical compression devices are with the disposable sleeves. These sleeves cost approximately $180 and do not have to be changed daily (Ho and Tan, 2013). Associated medical costs are the main cost driver for VTE prevention. Both pharmacologic and mechanical prophylaxis are cost effective therapies that aid in lowering the incidence of VTEs, which results in lowering the overall total costs of VTE treatment.

Microsystem Assessment

This project took place in a large metropolitan acute care hospital that aims to provide safe, high quality, compassionate healthcare to all patient populations. According to data from the local public health department where this hospital is located, this 400-bed hospital serves approximately 106,000 patients annually and provides over 20% of all inpatient care for this

large metropolitan city. In order to meet a wide range of patient healthcare needs, this hospital provides the following services to adult and pediatric patients: emergency and trauma, obstetrics, surgical specialty services, geriatric care, general medicine, oncology, palliative care, primary care services, and psychiatric emergency services. This safety net hospital is committed to providing medical care to all community members, including those that are homeless, uninsured, or from diverse cultural backgrounds. Since this hospital caters to a diverse patient population, it is imperative that healthcare providers practice cultural sensitivity, compassion, and empathy, while also recognizing each patient's complex healthcare and personal needs.

This project was carried out on the hospital's medical-surgical units that consist of 180 beds and 389 nurses. Patients on these units are acutely ill adults with a wide variety of health issues or are recovering from surgery. An interdisciplinary team consisting of nurses, patient care assistants (PCA), physicians, nutritionists, occupational and physical therapists, respiratory therapists, and social workers, continuously work together to provide high quality, patient-centered care. Medical-surgical nurses are expert multitaskers that are responsible for managing multiple patients and provide individualized care throughout their shift. These nurses are responsible for carrying out a countless number of tasks such as: administering medications, admitting and/or discharging patients, educating patients and families, and assist patients with activities of daily life (American Academy of Medical-Surgical Nurses, 2017). Sometimes these tasks are spread out throughout the day, while other times nurses are asked to do multiple tasks at the same time. These front line healthcare professionals coordinate patient care to ensure that each patient is receiving high-quality, comprehensive care.

Timeline

This quality improvement project followed a four-month time line, as depicted in

Appendix A. The first action steps were dedicated to project preparation. This portion of the project consisted of meetings to onboard students, discuss implementation strategies, and create project materials. The project was implemented shortly there after. Project implementation took the longest as it included flyer posting and nurse education. Various meetings were also conducted to discuss project progress, barriers, accomplishments, and areas of improvement. PDSA cycles were written to identity new problems, record planned/completed tasks, summarize results, and adjust implementation strategies. In order to evaluate the effectiveness of this quality improvement project, audits were conducted to examine SCD and nurse documentation compliance. Audit data was then analyzed and compiled to create a data summary report to share with hospital administration.

Nursing Relevance

SCDs are one of the many patient care interventions that nurses frequently implement. As research shows, low compliance rates are a common theme and are attributed to both patients and nursing staff. This study will provide valuable insight into reasons for SCD non-compliance, specifically by nursing staff. This project could be delegated and managed by a clinical nurse leader (CNL) whose practice is dedicated to improving the quality and safety of patient care. As a mastered prepared clinician, the CNL works at the point of care to assess, coordinate, plan, and implement quality improvement strategies that are client centered, evidence-based, and cost effective (American Association of Colleges of Nursing, 2007). The CNL collaborates with interdisciplinary team members to identify areas of improvement and ensure consistency across specialties. Ultimately, this quality improvement project will aid the CNL and other hospital stakeholders in creating a user-friendly and practical standard workflow to increase SCD and nursing documentation compliance.

Project Overview

The aim of this quality improvement project is to increase SCD and nursing documentation compliance. Based on data from the previous semester, a root cause analysis revealed that low SCD compliance rates were attributed to the lack of availability of SCD machines. The next action steps for this ongoing project are to implement two interventions: a small environmental change and conduct staff education. PDSA cycles were created throughout the project to aid the team in planning and piloting these changes, identify barriers and methods to overcome them, summarize results, and adjust implementation strategies (see Appendix B). Various audits were conducted to evaluate the effectiveness of these interventions and provide meaningful insight into reasons for low compliance.

Implementation

Project Preparation

The first action steps of this project were dedicated to preparation. During this time, various meetings were held to familiarize students with the ongoing SCD project, implementation strategies, and finalize the project action plan. Furthermore, essential study materials including an education flyer and reminder signs were created, printed, and laminated. The educational flyer, as depicted in Appendix C, highlighted VTE risk factors and prevention regimens, new SCD protocol, and procedures on how to document SCDs in the electronic health record (EHR). Flyers were posted on each medical-surgical unit in staff break rooms, on education boards, and around the main reception desk. Two types of reminder signs were created regarding SCD location and nursing documentation. The SCD location reminders were placed on all medical-surgical units in dirty utility rooms, staff break rooms, and on the educational boards.

The nursing documentation reminders were placed on workstation computer screens in each patient room, as this is where most nurses do their charting.

Environmental Change

Previous data found that one of the primary causes to low SCD compliance was due to the lack of availability of SCDs and a cumbersome SCD ordering process. To overcome these barriers, the hospital ordered new SCD machines that were to remain at the point of care. In order to make this environmental change, a small team of hospital staff and students went to each medical-surgical unit to remove old SCD machines and replace them with new machines. Each new machine was placed at the end of each patient's bed and plugged into the wall. In addition, each SCD machine was labeled with the corresponding unit and room number to aid in easy identification and prevent misplacement. On each unit, all storage rooms, dirty and clean utility rooms, and patient closets were checked to ensure that all old SCD machines were removed. During this role out phase, a total of 180 new SCD machines were placed in patient rooms. In addition, approximately 5 extra machines were placed in each unit's storage room.

New SCD Protocol

Due to this environmental change, sections of the SCD protocol were adjusted accordingly. Each auxiliary department was notified about these changes and was instructed on how to perform their new responsibilities. The most crucial revision of the protocol was for SCD machines to remain at the patient's bedside - one machine per patient room. These new SCD machines should never leave the patient's room, unless the machine is broken. Environmental Services was informed that SCD machines are to be included in the room cleaning process, as it is now a piece of equipment that is apart of the patient's room. If patients are transferred in or out of the unit, the SCD machine does not go with the patient, rather it stays in the room. In the case

of a broken SCD machine, the protocol remains the same, and nurses should obtain a fully functional SCD machine from the unit's storage room. This new process only requires the Sterile Processing Department to pick up broken SCD machines that need to be fixed and cleaned.

Prior to the SCD role out, nurses had to order SCD machines from Central Processing and Distribution (CPD), who would then deliver the machine to the patient's room. Previous data found that this system was inefficient and required a considerable amount of time to operationalize. With this new environmental change, CPD no longer has to fulfill SCD requests or deliver SCD machines to medical-surgical units, as the machines are now at the point of care. Approximately 14 backup SCD machines were placed in CPD, to account for broken and/or missing machines. In this case, the previous ordering procedures would take place. In addition, each unit's clean utility room was stocked with SCD sleeves; therefore this item also does not have to be requested from CPD.

Educating Providers

Nursing education began shortly after the SCD role out. Upon entering each unit, students were required to notify the charge nurse of project tasks and receive authorization to conduct nursing education. Students were responsible for educating day and night shift medical-surgical nurses on the importance of VTE prevention and new SCD protocols. Nurses were also reminded to document SCDs in the shift assessment and practice effective communication with PCAs to improve SCD compliance. Nursing education was conducted through one-on-one in-services and unit huddles. The educational flyer was handed out to nurses and supplemented as a visual aid. Other staff members such as PCAs and unit clerks were also informed about the new SCD protocol. In order to monitor the progress of SCD education, staff members were required to signoff in the logbook. In order to educate as many nurses as possible in the allotted time

frame, students strategically created an education schedule based upon nurses' work schedules. The next phase of the project would take place once approximately 80% of all medical-surgical nurses were educated.

Auditing Process

Audits were conducted on all medical-surgical units to evaluate the effectiveness of this quality improvement project. A total of three audits were performed to examine SCD and nursing documentation compliance. On each audit day, students used the EHR to generate a master list of patients with SCD orders. Furthermore, a standardized auditing tool was created and utilized throughout the auditing process. Audits were conducted through patient observations, examining patient charts, and interviewing nursing staff. Audit data was analyzed and compiled into data summary reports.

Baseline Audit

A baseline audit was performed to give the students a quick glance at SCD application and compliance. This audit was also conducted to examine if SCD machines were still on the end of the patient's bed. In order to complete this audit, students went into each patient room to observe the location of SCD machines. If the machine was not on the end of the bed, students checked the patients' closets and surrounding areas. For patients that had an SCD order, compliance was also examined.

Primary SCD and Nursing Documentation Audit

After concluding the baseline audit, students had a better idea of where the SCD machines were located and a rough average of SCD compliance. An in-depth audit was conducted to investigate SCD compliance, SCD machine location, and nursing documentation. A standardized auditing tool was used to document observations and notes (see Appendix D).

Students were required to visit each patient room on all medical-surgical units and record SCD machine location, associated label, and utilization of SCDs, specifically for those with SCD orders. If there were multiple SCD machines in a patient room, students removed the machine, cleaned it, and placed it in the correct location. If SCD machines were missing from patient rooms, new machines were placed, based on available supply. When patients had SCD orders but were not compliant, students had to interview the patient's nurse to investigate reasons for non-compliance. In order to examine nursing documentation, students viewed the charts of patients who had SCD orders. Students inspected the safety/equipment section of the nursing shift assessment, as this is where SCDs are documented. Day and night shift SCD documentation was examined. If no documentation was noted, students interviewed the patient's nurse to investigate reasons for missing documentation.

Documentation Compliance Audit

This final audit specifically examined nursing documentation. To conduct this audit, students generated a master list of patients with SCD orders from the EHR. Day and night shift documentation was also observed. In the previous audit, students fixed the environment by placing SCD machines into rooms that did not have one and interviewed nurses to discover reasons of SCD and/or documentation non-compliance. Therefore, the purpose of this audit was to examine if the frequency of nursing documentation changed after the previous audit. Students did not interview nursing staff if SCD documentation was missing.

Expected Results

This quality improvement project implemented a small environmental change to medical-surgical units. Each patient room has its own designated SCD machine in order to overcome the barrier of unavailability. Additionally, sections of the current SCD protocol were edited to

remove inefficient procedures and simplify the overall process. Essential hospital staff was adequately educated on new SCD protocols and procedures. Furthermore, reminder signs were placed around the medical-surgical units to disseminate information regarding VTE prevention, new SCD protocol, and nursing documentation. Due to these changes, it is expected that SCD and nursing documentation compliance will significantly increase.

Results

Education Results

Out of a total of 389 medical-surgical nurses, 286 (74%) received SCD education. The goal of educating 80% of nurses was not met for a couple of reasons. First, the logbook that contained the comprehensive list of medical-surgical nurses was out of date. Students found that many of the nurses on the list transferred out of the medical-surgical department or left the hospital entirely. Secondly, several nurses were on leave and a few nurses only worked once or twice a month. Majority of the nurses were receptive to the SCD education and welcomed the new protocol changes. These nurses were happy to hear that the changes produced a straightforward and time efficient standardized system. A small number of nurses, on the hand, felt that this project did not hold much value and that a systematic change would not occur.

Baseline Audit Results

Results from the baseline audit yielded unfavorable outcomes. A total of 180 SCD machines were placed at the end of each patient's bed across all medical-surgical units. This audit revealed that a total of 37 SCD machines (21%) were missing from patient rooms and 10 SCD machines were no longer at the end of patient beds, rather the machines were found in patient closets. Additionally, 9 SCD machines were found in dirty utility rooms and/or clean

utility rooms. There were a total of 66 SCD orders across all medical-surgical units and only 19% were compliant.

Primary SCD and Nursing Documentation Audit Results

The primary SCD and nursing documentation audit examined SCD compliance, SCD machine location, and nursing documentation. There were a total of 57 SCD orders throughout all medical-surgical units. Out of the 57 orders, 32 (56%) were documented and only 11 patients (19%) were using SCDs. Of the 180 SCD machines that were originally placed during the role out, 49 machines were still on the end of the patient beds, while 102 were found in patient closets, and 17 were located in other areas of the room such as counter tops or under patient beds. There were 11 patient rooms that had 2 or more SCD machines. These extra machines were cleaned and placed into patient rooms that were missing a machine. This resulted in only 9 missing SCD machines, which is significantly lower than the baseline audit results.

Nurses were interviewed if SCDs were not documented and/or if SCD non-compliance was observed. When nurses were asked to provide reasons for no SCD documentation, the most common responses included: SCD is missing from the patient's room and cannot be located, have not finished charting shift assessment, and simply forgot to chart SCDs. During some of these interviews, some nurses edited their charting and immediately added in SCDs. The most common reasons for patient non-compliance included: patient refused SCD, patient is ambulatory, and SCD is missing from the patient's room and cannot be located. In some cases students were unable to interview nurses because they were on break or were too busy.

Documentation Compliance Audit Results

The results of this audit revealed an increase in nursing documentation. There were a total of 62 SCD orders and 41 (66%) were documented. This audit yielded the highest SCD

documentation compliance. With each audit, the frequency of documentation increased. Even though this outcome is still below the hospital and Joint Commission standards, the numbers are trending in the right direction.

Interdisciplinary Factors

Based on the above findings, having SCDs at the point of care did not improve compliance rates. These unexpected results encouraged students and their preceptor to explore other contributing factors to non-compliance. The only other discipline that manages SCDs is physicians, as they are responsible for ordering VTE prophylaxis for patients upon admission. Therefore, a final audit was conducted to evaluate interdisciplinary factors that may contribute to low SCD compliance.

This audit was conducted through patient observations, examining patient charts and medication administration records, interviewing nurses, and when necessary, calling physicians. Students created another standardized auditing tool for this evaluation (see Appendix E). Nursing documentation, SCD compliance, and type of prescribed VTE prophylaxis were examined. Students followed the same procedures as previous audits to study SCD and nursing documentation compliance. In cases where both pharmacologic and mechanical prophylaxis were ordered and the patient was refusing SCDs and/or ambulating, students asked the patient's nurse if the SCD order should be discontinued. If the nurse's consented, students would call the physicians. During this audit, nurses were also asked about barriers to SCD documentation and utilization.

Results of this audit revealed valuable information. A total of 20 randomly selected patients with SCDs orders were evaluated. Of these 20 patients, 1 patient (5%) was using SCDs, 11 orders (55%) were documented, and 7 patients (35%) were ambulatory and/or refusing SCDs.

There were 12 patients (55%) that had both forms of VTE prophylaxis, pharmacologic and mechanical. Of these 12 patients, 6 nurses (30%) did not want to discontinue the SCD order for the following reasons: nurses wanted to continue offering SCDs and sometimes patients would wear the SCD for a short period of time. Therefore, students called a total of 5 physicians: 4 from neurosurgery and 1 from trauma. From the neurosurgery team, 3 SCD orders were discontinued and 1 physician did not call back. Furthermore, this team does not re-evaluate SCD orders. The trauma team did not discontinue the SCD order because their protocol calls for both forms of VTE prophylaxis. Based on the audit results, additional contributing factors to low compliance rates were added to the root cause analysis (see Appendix F).

Nurses did not report any barriers to SCD documentation and utilization. Several nurses mentioned that SCDs are just not a high priority task and typically are forgotten about. A handful of nurses recommended changing the setup of the EHR by moving SCD documentation to the cardiology section of the shift assessment, having the ability to create personalized reminders, and adding more visual cues.

Implications

Audit results revealed low compliance rates for SCD usage and documentation. Several lessons were learned from this project. Having SCDs at the point of care and conducting nursing education in-services were not effective in increasing SCD and nursing documentation compliance. SCD machines did not remain in patient rooms, which attributed to machine misplacement and duplication. Furthermore, labeling SCD machines with corresponding unit and room number did not aid in easy identification or decrease the risk of misplacement. Having SCDs at the point of care did eliminate an inefficient step of the SCD protocol, but it was not the solution to low SCD compliance rates. Results from the final audit revealed that interdisciplinary

factors are contributing to SCD non-compliance. Physicians do not re-evaluate or discontinue SCD orders when SCDs are no longer necessary. Nurses also do not call physicians to discontinue these orders. Instead, nurses will occasionally make a note that the patient is ambulatory and/or refusing SCDs. Furthermore, when patients are continuously refusing SCDs, some nurses prefer to continue to offer SCDs, rather than discontinue the order. Based on the nurses' feedback, SCDs are a low priority and are frequently at the bottom of the list. Additionally, nurses recommended that changing the layout of the EHR might help to increase documentation compliance. Unfortunately, this hospital cannot make changes during this time, as a new system will be implemented in the near future.

The next steps of this project are to work with physicians and discover further contributing factors to SCD non-compliance. Multiple layers of the system need to be evaluated and changed, in order to achieve higher compliance rates. As the data shows, changing the environment by having SCDs continuously available at the point of are did not serve as a solution to low compliance. However, in order to maintain this change, it will be important to conduct six-month and twelve-months audits and remind staff about new the protocol. Furthermore, additional SCD procedures need to be composed in order to close gaps in the current protocol, and ultimately create standardized workflows. An interdisciplinary team of nurses, physicians, PCAs, and auxiliary staff should come together to create small improvement strategies that can be tested and implemented throughout multiple systems. In regards to the EHR system, nurses should be involved in editing the system layout to ensure it is uncomplicated, straightforward, seamless, and user-friendly.

Conclusion

Pharmacological and mechanical compression are two evidence-based preventative

therapies that reduce the risk of VTEs. The incidence of this preventable condition is unbelievably high and the associated costs place a financial strain on hospitals and patients. In order for hospitals to receive accreditation from the Joint Commission, specific performance standards need to be met. Furthermore, CMS does not reimburse for hospital-acquired conditions, such as VTEs, which leaves the hospital responsible to cover the associated costs. Therefore, it is imperative for this large metropolitan hospital to increase SCD and nursing documentation compliance rates.

The objective of this ongoing quality improvement project was to increase compliance rates through a small environmental change and staff education. New SCD machines were placed at the point of care and staff education was conducted regarding VTE prevention and new SCD protocols. Furthermore, nurses were reminded to document SCDs in the safety/equipment section of the shift assessment. Various audit results showed that these change strategies did not did not serve as a solution to low compliance rates. Additionally, these results led students to investigate interdisciplinary contributing factors, which provided valuable data for the next steps of this project. After presenting this data to hospital administration, the recommended next course of action is to work closely with physicians to discover contributing factors to SCD non-compliance, conduct post audits, and continue to update the SCD protocol.

References

American Academy of Medical-Surgical Nurses. (2017). *What is medical-surgical nursing?* Retrieved from https://www.amsn.org/practice-resources/what-medical-surgical-nursing

American Association of Colleges of Nursing (2007). *White paper on the education and role of the clinical nurse leader*. Retrieved from http://cnlassociation.org/pdf/ClinicalNurseLeader.pdf

American Heart Assoication. (2017). *What is venous thromboembolism?* Retrieved from http://www.heart.org/HEARTORG/Conditions/More/What-is-Venous-Thromboembolism-VTE_UCM_479052_Article.jsp#.WQE80lKZORs

Bohnenkamp, S., Pelton, N., Rishel, C. J., & Kurtin, S. (2014). Implementing evidence-based practice using an interprofessional team approach: Part two. *Oncology Nursing Forum, 41*(5), 548–550. https://doi.org/10.1188/14.ONF.548-550

Craigie, S., Tsui, J.F., Agarwal, A., Sandset, P.M., Guyatt, G.H., & Tikkinen, K.A. Adherence to mechanical thromboprophylaxis after surgery: A systematic review and meta-analysis. *Thrombosis Research, 136,* 723-26. Retrieved from http://0-www.sciencedirect.com.ignacio.usfca.edu/science/article/pii/S0049384815300359

Centers for Disease Control and Prevention. (2017). *Venous thromboembolism (blood clots).* Retrieved from https://www.cdc.gov/ncbddd/dvt/data.html

Centers for Disease Control and Preventin. (2016). *Venous thromboembolism (blood clots): Healthcare-associated venous thromboembolism.* Retrieved from https://www.cdc.gov/ncbddd/dvt/ha-vte.html

Colwell, C.W., Froimson, M.I., Mont, M.A., Ritter, M.A., Trousdale, R.T., Buehler, K.C., . . . Padgett, D.E. (2010). Thrombosis prevention after total hip arthoplasty. *The Journal of*

Bone and Joint Surgery, 92, 527-25. Retrieved from http://medicine.tums.ac.ir:803/Users/ramin_espandar/Journal%20Club%202,89/Thrombosis%20Prevention%20After%20Total%20Hip%20Arthroplasty.pdf

Gidwani, R., & Bhattacharya, J. (2015). CMS reimbursement reform and the incidence of hospital-acquired pulmonary embolism or deep vein thrombosis. *Journal of General Internal Medicine*, *30*(5), 588–596. https://doi.org/10.1007/s11606-014-3087-3

Ho, K.M., & Tan, J.A. (2013). Stratified meta-analysis of intermittent pneumatic compression of the lower limbs to prevent venous thromboembolism in hospitalized patients. *Circulation, 128*, 1003-1020. https://doi.org/10.1161/CIRCULATIONAHA.113.002690

Ibrahim, M., Ahmed, A., Mohamed, W.Y., & Abduo, S.E. (2015). Effect of compression devices on preventing deep vein thrombosis among adult trauma patients: a systematic review. *Dimensions of Critical Care Nursing, 34*(5), 290-300. doi:10.1097/DCC.0000000000000127

Johns Hopkins University. (n.d.) *Patient safety and quality: Core measures.* Retrieved from http://www.hopkinsmedicine.org/patient_safety/core_measures.html

Ritsema, D.F., Watson, J.M., Stiteler, A.P., & Nguyen, M.M. (2013). Sequential compression devices in postoperative urologic patients: *An observational trial and survey study on the influence of patient and hospital factors on compliance, 13*(20). Retrieved from http://0-go.galegroup.com.ignacio.usfca.edu/ps/i.do?v=2.1&u=usfca_gleeson&it=r&id=GALE%7CA329625301&p=GPS&sw=w&authCount=1

Sadaghianloo, N., & Dardik, A. (2016). The efficacy of intermittent pneumatic compression in the prevention of lower extremity deep venous thrombosis. *Journal of Vascular Surgery:*

Venous and Lymphatic Disorders, *4*(2), 248–256. https://doi.org/10.1016/j.jvsv.2015.07.006

The Joint Commission. (2017). *About the joint commission.* Retrieved from https://www.jointcommission.org/about_us/about_the_joint_commission_main.aspx

The Joint Commission. (2017). *Joint commission measures.* Retrieved from https://www.jointcommission.org/assets/1/18/TJC_Measures_2017.pdf

The Joint Commission. (2017). *Venous thromboembolism.* Retrieved from https://www.jointcommission.org/venous_thromboembolism/

Appendix A
VTE Project Timeline

Feb 2017 Tasks	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Meetings/Planning																												
SCD role out																												
Materials Preparation																												
Flyer posting																												
Nurse education																												
Write PDSA																												

March 2017 Tasks	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Meetings/Planning																															
Flyer posting																															
Nurse education																															
Labeling SCD machines																															
Baseline audit																															
Primary SCD and nurse documentation audit																															
Write PDSA																															
Literature review																															

April 2017 Tasks	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Meetings/Planning																														
Primary SCD and nurse documentation audit																														
Documentation audit																														
Interdisciplinary factors																														
Data analysis/Data summary																														
Write PDSA																														
Writing																														

May 2017 Tasks	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Reporting out (final meeting)																															
Writing																															

Appendix B
PDSA Problem Solving Tool

First PDSA Cycle

Date: 2/27/2017

P L A N

- Problem:
  - SCDs not applied to patient within 2 hrs of order.
- Potential Root cause(s):
  - *Nursing staff*: believe SCDs are soft orders; SCD's not on all beds; duplicate nursing notes from previous shift; unaware of SCD order
  - *Patient education:* does not effectively convey importance of wearing SCDs; does not stress risk factors of DVTs
  - *Patient:* refuse SCDs; find SCDs uncomfortable, itchy or unnecessary; do not understand how to self-apply SCDs
  - *PCAs:* believe SCDs are soft orders; do not re-apply SCDs after ambulating or toileting
  - *Auxiliary staff*: do not re-apply SCDs after ambulating
  - *Miscommunication:* nurses non compliant with standardized charting for SCD usage; hospital staff unaware of SCD protocols; unclear SCD protocols and parameters
- Improvement idea to test:
  - SCDs will be placed on all beds in all med-surg units and all medical-surgical nurses will receive SCD education and resource
- Predicted result(s) of this test:
  - SDC compliance will increase due to availability of SCD machines and increased awareness of SCD protocols and importance
- Measurable targets to determine success or failure:
  - Evaluation/audits of patient beds and interviews with nursing staff and patients

D O

What tasks are planned/completed to test your idea?

Tasks (Include population/setting)	Person Responsible	Due Date	Date Completed
1. Collect old SCD machines from all med-surg units	Students	2/23/17	2/23/17
2. Place new SCD machines on all med-surg beds	Students	2/23/17	2/23/17
3. Education of RN's and PCA's on all med-surg units via revised flier	Students	3/6/17	
4. Conduct SCD audits 2-3 weeks post implementation	Students	3/13-4/13	

	Document what actually happened:

S T U D Y	• Summarize measurable results of test:
	  ○ All med-surg units (4th-7th floor) have an SCD on every patient bed and all old SCD machines were taken off the unit.
	  ○ We want to evaluate nurses knowledge of SCD use and analyze whether nurses are using SCD more frequently.
	• What did you learn?
	  ○ In order to overcome some of the resistance when implementing a new system, it is important to educate staff on the importance of this new intervention.
	• Unintended consequences:
	  ○ Conflicting ideas about where SCDs should be kept if SCDs are not in use
	  ○ Need plan of action for when SCDs are transferred between units (ie from PACU to med-surg)
	• Barriers/Root Causes:
	  ○ Nurses: some resistant to having the new SCDs on patient beds
	  ○ Nurse managers: argued that if the patient does not have an order for SCDs then it should go in the patient's closest until needed.

A C T	• Further implementation:
	  ○ Create small laminated reminder cards for nurses and post them on each COW in each patient room.
	• Next tests or adjustments:
	  ○ Post-audits will be necessary in order to evaluate nurses' knowledge and see if SCD machines are where they need to be i.e. bed and not placed in closet.
	  ○ Checking if patients have SCD orders and seeing if nurses are implementing them.
	  ○ Determining if nurses are using standardized documentation on SCD orders/usage
	• Unresolved barriers: Continued resistance from nursing management and staff.

Second PDSA Cycle **Date: 3/12/2017**	

P L A N	• Problem:
	  ○ SCDs are missing from patient rooms
	• Potential Root cause(s):
	  ○ *Location:* SCDs are sometimes stored in patient closet rather than staying on the end of the bed; patient belongings or extra bedding is placed on top of the SCDs in the closets;
	  ○ *Nursing staff*: Nurses are not checking patient closet for SCDs, rather they will just order another one which can lead to duplicate SCDs in one room.
	• Improvement idea to test:
	  ○ Label each SCD with corresponding zone and room number

<table>
<tr><td></td><td>

- Predicted result(s) of this test:
  - SCDs will not go missing and if SCDs are removed from the room for whatever reason they can be easily returned; each SCD will be accounted for
- Measurable targets to determine success or failure:
  - Evaluation/audits of patient beds and interviews with nursing staff and patients
  - All patient rooms will have a labeled SCD machine

</td></tr>
<tr><td>D
O</td><td>

What tasks are planned/completed to test your idea?

<table>
<tr><th>Tasks
(Include population/setting)</th><th>Person Responsible</th><th>Due Date</th><th>Date Completed</th></tr>
<tr><td>1. Print labels for all med-surg rooms (5-7th floor)</td><td>Students</td><td>3/9/17</td><td>3/9/17</td></tr>
<tr><td>2. Place labels on SCD machines (5th-7th floor)</td><td>Students</td><td></td><td></td></tr>
<tr><td>3. Place extra machines in storage room on each med-surg unit</td><td>Joel (rep)</td><td></td><td></td></tr>
<tr><td>4. Education of RN’s and PCA’s on all med-surg units via revised flier</td><td>Students</td><td>3/17/17</td><td></td></tr>
<tr><td>5. Conduct SCD audits 2-3 weeks post implementation</td><td>Students</td><td>3/20-4/13</td><td></td></tr>
</table>

Document what actually happened:

</td></tr>
<tr><td>S
T
U
D
Y</td><td>

- Summarize measurable results of test:
  - SCDs in med-surg units were labeled
  - Rooms with missing machines: 5411, 5416, 5420, 5428-1, 5601-1, 5602-2, 5604, 5609, 5611, 6203-2, 6205-2, 6210, 6422, 6425, 6426-2, 6427, 6428, 6431, 6438-2
  - All dirty and clean utility rooms and storage rooms were checked for SCDs - none were found
  - SPD has 14 extra machines as of 2/10/17
  - CPD has 1 broken machine as of 2/10/17
- What did you learn?
  - Potential unintended consequences should be further analyzed before future implementations, as identifying them and taking steps to minimize them (ie labeling all machines pre-roll out) can save time
- Unintended consequences:
  - Conflicting ideas about where SCDs should be kept if SCDs are not in use
- Barriers/Root Causes:
  - Nurses: some resistant to having the new SCDs on patient beds

</td></tr>
</table>

	○ Nurse managers: argued that if the patient does not have an order for SCDs then it should go in the patient's closest until needed.
A C T	• Further implementation: ○ Label storage SCD machines to ensure there are four extra machines per floor • Next tests or adjustments: ○ Post-audits will be necessary in order to evaluate if labeling SCDs prevents misplacement ○ Checking if patients have SCD orders and seeing if nurses are implementing them. ○ Determining if nurses are using standardized documentation on SCD orders/usage • Unresolved barriers: Continued resistance from nursing management and staff; continued misplacement of SCDs

Third PDSA Cycle **Date: 4/10/2017**	
P L A N	• Problem: ○ SCD machines are missing ○ SCD machines are labeled, but continue to be misplaced/transferred between units ○ SCDs are not being applied to patients with order ○ Nurses are not documenting patient compliance or refusal of SCDs in the shift assessment • Potential Root cause(s): ○ *Staff:* Protocol variation; no uniformity throughout floors; not recalling education/in-service; copying shift assessment from previous shift; higher priorities ○ *SCD Location:* SCDs are sometimes stored in patient closets rather than staying on the end of the bed; patient belongings or extra bedding is placed on top of the SCDs in the closets; multiple SCD machines in patient rooms ○ *SCDs Missing:* Extra SCD machines were pulled from storage so no extra machines exist on many units; nurses do not know who to inform if they are unable to find a machine • Improvement idea to test: ○ Place one SCD labeled with corresponding zone and room number on each patient bed across all med-surg units ○ Educate nursing staff regarding new SCD procedure along with a reminder to document SCD usage. ○ Share results with nurse managers and nurses and remind them to continue to document in their shift assessment • Predicted result(s) of this test: ○ SCD compliance rates for documentation and usage will increase; SCD machines will not go missing and will be contained on the intended unit ○ Nurses will aim for higher documentation compliance and documentation will increase • Measurable targets to determine success or failure: ○ Audits of each patient room and interviews with nursing staff ○ All patient rooms will have a labeled SCD machine

<table>
<tr><td></td><td>
Correct documentation of SCD orders/usage in the shift assessment
</td></tr>
<tr><td>D
O</td><td>
What tasks are planned/completed to test your idea?
<table>
<tr><th>Tasks
(Include population/setting)</th><th>Person Responsible</th><th>Due Date</th><th>Date Completed</th></tr>
<tr><td>1. Baseline audit on all med-surg floors</td><td>Students</td><td>4/10/17</td><td>3/27/17</td></tr>
<tr><td>2. Room audit on all med-surg floors (locate SCD machines)</td><td>Students</td><td>4/10/17</td><td>4/3/17</td></tr>
<tr><td>3. SCD orders audit on all med-surg floors</td><td>Students</td><td>4/10/17</td><td>4/3/17</td></tr>
<tr><td>4. Compile and analyze baseline and audit data</td><td>Students</td><td>4/10/17</td><td>4/5/2017</td></tr>
<tr><td>5. Share data with nurse managers and nursing staff</td><td>Students</td><td>4/23/17</td><td></td></tr>
</table>
Document what actually happened:
</td></tr>
<tr><td>S
T
U
D
Y</td><td>

<u>Summarize measurable results of test</u>:

Total nurses educated: 286/389 (74%)
Total SCD orders: 57

Average documentation: 32/57 (56%)
Average SCD usage: 11/57 (19%)

9 missing SCD machines (6203-2, 5425, 5426-1, 5428-2, 5434, 5601-1, 4410-1, 4410-2, 4411)

<u>What did you learn</u>?

SCDs are not used if the patient is ambulatory
Nurses are not calling physician to d/c SCD orders when necessary, thus SCD orders are not d/c’d
Nurses are not documenting SCD use due to numerous reasons including if patient is ambulatory, refuses, is agitated, or because they are unaware of SCD order or need to document
It is unclear as to whether labeling all SCD machines was effective and useful for staff
SCDs are not always reapplied after the patient uses the restroom or works with other specialties (physical therapy)

<u>Unintended consequences</u>:

Worse documentation compliance post-education than pre-education

<u>Barriers/Root Causes</u>:

SCD documentation or compliance is not a primary task for nurses
Patients frequently refuse SCDs
SCD machines, labeled or unlabeled, continue to go missing and nurses cannot always access a machine when needed

</td></tr>
</table>

A C T	• Further implementation:
	  ○ Conduct secondary audit on all med-surg floors, with an emphasis on units that had the lowest compliance
	  ○ Remind nurses how to correctly document SCD orders/usage in shift assessment
	• Next tests or adjustments:
	  ○ Perform secondary SCD orders audit with a focus on documentation
	  ○ Ask nurses:
	  ▪ Why SCD was not charted or not in use
	  ▪ Barriers and challenges to documenting and utilizing SCDs
	  ▪ Ask if they remember the education/in-service
	  ▪ Ask if they have any suggestions to help increase SCD documentation
	  ○ Ask approximately 10 patients with SCD orders:
	  ▪ Do you know what an SCD is?
	  ▪ Do you know why you need to use the SCD?
	  ▪ Did your nurse educate you on the SCD process?
	  ○ Attend 62/64 and 54/56 huddle to remind staff about documenting SCDs in shift assessment
	• Unresolved barriers:
	  ○ Continued resistance from nursing management and staff
	  ○ Continued misplacement of SCDs in patient rooms and on the unit

Appendix C
Educational Flyer

PREVENTING VTE

Venous thromboembolism is the leading cause of preventable hospital death in the US

DID YOU KNOW?

Venous thromboembolism (VTE) refers collectively to deep vein thrombosis (DVT), a blood clot that occurs in a deep vein usually in the leg, and pulmonary embolism (PE), a clot that breaks loose and travels to the lung.

SCDs can significantly reduce patients' risk of developing a VTE and when SCDs are combined with pharmacological prophylaxis, patients' risks are even lower.

Reducing hospital acquired VTE aligns with the hospital's strategic plan to achieve zero patient harm and ensure financial stewardship.

In the United States, hospital acquired VTEs can costs up to $10 billion annually.

Let's aim for greater than 100% SCD compliance!

RISK FACTORS FOR VTE INCLUDE:

- Age (70+)
- Immobility for more than 72 hours a day
- History of VTE
- Malignancy
- Major surgery or trauma
- Serious infection
- Heart Failure, MI, Lung disease
- CNS injury
- Obesity
- Hypercoagulable state
- Pregnancy
- Inflammatory bowel disease
- General anesthesia time more than 30 minutes

WHAT CAN WE DO TO PREVENT VTE?

- Assess each patient's risk of developing VTE (the Provider does this on admission).
- Provide pharmacologic prophylaxis (for example Enoxaparin or Heparin) as ordered by the patient's Provider.
- Provide mechanical prophylaxis (for example SCD) as ordered by the Provider.
- **When ordered "except while walking", use SCDs every time the patient is in bed until the order is discontinued or the patient is discharged.**
- Encourage early and frequent ambulation.
- Teach our patients about VTE and how to prevent it (for example, teach your patients what SCDs are, why they are important, and how to apply them).

Nurses' feedback was heard and the new SCD process will eliminate steps and stress-saving more time for patient care!

NEW SCD PROCESS

- ONE SCD Machine should be on EVERY BED/ROOM
- Keep SCD machine on end of the bed for EVS to clean
- SCD sleeves are stocked in clean utility room in each unit
- Utilize SCD machine on patients at least 18 hrs/day
- Remove old sleeves from machine when patient is discharged
- Do not store extra SCD machines in room
- If patient is transferred in or out with SCD, keep SCD in original room

PROVIDER ORDERS/TRANSCRIPTION

- Pharmacologic VTE prophylaxis (Enoxaparin or Heparin SQ)
- Mechanical VTE prophylaxis (SCD – calf or foot sleeves)
- If patient is not at risk for VTE or prophylaxis contraindicated, Provider documents why not (built into the CPOE order set)
- If high risk, can order both pharmacologic and mechanical VTE prophylaxis

NURSING DOCUMENTATION

- Pharmacologic: document in MAR
- **Mechanical: In LCR – shift assessment – safety equipment – under equipment check box SCD**
- NOTE: **If patient refuses to wear the SCD, document the patient refused in the comment section. If the patient is consistently refusing to wear SCD despite of education, notify the Provider to discontinue SCD.**

COMMUNICATION/EDUCATION

- SCD order verified into eKardex are an active Provider order
- CPOE order reads "SCD except while walking", patients should have SCDs ON while in bed, even if they can ambulate, in order to follow this order.
- SCD sleeves will be stored in clean utility room
- Communicate upon shift/hand off report
- Communicate with PCA/CAN
- Educate patients/care givers on the importance of SCDs and VTE risk

Thank you all for your hard work and assistance with improving patient care!

Appendix D
Primary SCD and Nursing Documentation Auditing Tool

SCD Machine Audit

Room #	# SCDs in room	Location	Notes

Nursing Documentation Audit

Room #	SCD Documented in LCR?	If not, why?	SCD location (bed or closet)	SCD connected to patient?	If not, why?

Appendix E
Interdisciplinary Auditing Tool

Room #	Team	Primary Dx	SCD Order?	Pharm Order?	RN Documented?	Patient wearing SCD?	Call Provider?	Notes

Appendix F
Root Cause Analysis