Spring 5-14-2020

Wound Care Education for Primary Care Providers at a Regional Medical Center

Zaira Torres
ztorres1234@yahoo.com

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Zaira Torres, DNP, FNP-C

University San Francisco

Chair:

Karen A. Van Leuven, PhD, FNP-C

Committee Member:

Jodie P. Sandhu DNP, FNP-C

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Abstract

Problem. Due to the aging population and the high prevalence of chronic diseases such as diabetes and cardiovascular disease, in the US, millions of people suffer from chronic wounds secondary to these chronic conditions. Wound care treatment is very expensive, costing the US health care system approximately $10 billion annually. San Mateo Medical Center treats many patients with wounds. However, the treatment is suboptimal as most primary care providers (PCPs) are not trained to perform wound care according to best practice. This creates several problems such as a large number of referrals to the Vascular Clinic, visits to the emergency room for dressing changes, and admissions to the hospital due to preventable wound infections.

Intervention. Wound care education targeted at PCPs was identified as an intervention to improve health outcomes through the delivery of evidence-based, cost-effective wound care. This project consisted of a class on assessment and management of vascular wounds, diabetic wounds, pressure injuries, and surgical wounds in the primary care setting. The class was implemented at San Mateo Medical Center on May 1st, 2019.

Measures. A pre- and post-class assessment was used to measure change of practice and practice improvement in the delivery of wound care in the outpatient clinics.

Results. Data analysis indicated that after the class, the PCPs felt knowledgeable regarding assessment and treatment of vascular wounds, diabetic wounds, surgical wounds and pressure injuries. The PCPs' practice also improved as a result of the wound care class indicated by a mean value of 3.5 in the Likert Scale. Referrals to the Vascular Clinic decreased by 77.8%.

Conclusion. The provision of real-time, evidence-based, cost-effective wound care ensures the safety of patients by improving their health outcomes and increasing their satisfaction. Improving wound care knowledge by PCPs has long term implication that will benefit all parties in our organization.

Keywords: wound care treatment, chronic wounds, evidence-based, outpatient wound care, and best practice.

Section II: Introduction

Problem Description

San Mateo Medical Center is a 448-bed public hospital and clinic system located in San Mateo County. In addition to the hospital's main campus, the medical center operates 12 outpatient clinics throughout the county. These clinics are located in Redwood City, South San Francisco, Daly City, and Half Moon Bay (County of San Mateo Performance, 2019).

The hospital serves low-income patients who frequently present with complex chronic conditions (Spicer, Delmo, & Agdipa, 2017). Many of these patients suffer from chronic wounds, especially diabetic foot ulcers and vascular ulcers, secondary to their chronic conditions. The hospital provides care to 2,200 patients each year accounting for 13,700 inpatient days. In the outpatient clinics, 53,000 patients are seen for a total of 236,000 clinic visits each year (County of San Mateo Performance, 2019). The wound care nurse (this DNP candidate) treats patients with diabetic wounds, vascular wounds, pressure injuries, and surgical wounds in the Surgical Specialty Clinic. These patients have been referred upon discharge from the hospital or from all the outpatient clinics. The Vascular Clinic, which operates in the Surgical Specialty Clinic, provides care to 650 patients each year, of which, approximately 100 have wounds. The types of wounds seen in the Vascular Clinic are mostly diabetic wounds, arterial wounds, venous stasis ulcers, surgical wounds, and pressure injuries. Approximately 70 % of these wounds are venous stasis ulcers and diabetic wounds. Patients with wounds are seen for initial assessment by a vascular surgeon and a nurse practitioner, who have experience with different types of wounds. Referrals are also received from general surgeons, the neurosurgeon, the dermatologist, and the plastic surgeon.

The Vascular Clinic only operates on Thursday afternoons, and between 12 to 15 patients are seen each week. The surgeon or the NP will see patients with wounds initially to assess the

wound, order tests, and recommend treatment. The subsequent visits are handled by the wound care nurse until patients are healed. The wound care nurse is a resource nurse and works in the Surgical Specialty Clinic 12 hours per week. She sees patients on Tuesday, Wednesday, and Thursday afternoons. Each patient is seen once a week, and the wound care nurse can modify the treatment as needed and can perform minor debridement. If the wounds are not healing, patients are scheduled back with the surgeon for further assessment and testing. Approximately, 10 wound care patients are referred every week to be seen by the wound care nurse but only two or three can be seen in a timely manner (See Appendix A, Table 1 for the number of referrals sent to the Vascular Clinic). The wound care nurse treats between 12 and 18 wound care patients each week. Because each patient takes approximately two to three months to heal, the nurse can only accept new patients once patients are discharged. Usually, between one and three patients are discharged each week (see Appendix A, Table 2 for the number of discharges form the Vascular Clinic). Patients that are not seen by the wound care nurse, go to the ER instead which is costly. Many of these patients could be treated in the primary care setting if PCPs were trained in wound care according to best practice. Per discussion with the Medical Director of the Surgical Specialty Clinics, expansion of Vascular Clinic and wound care nurse hours is not possible because the physical space is shared with other specialties such as orthopedics, urology, dermatology, general surgery, otorhinolaryngology, neurosurgery, plastic surgery, musculoskeletal, ophthalmology, and dentistry who rotate in other times.

Available Knowledge

Chronic wounds including venous stasis ulcers, diabetic foot ulcers, arterial ulcers, and pressure ulcers are primarily associated with conditions more prevalent in older patients including vascular disease, unrelieved pressure, and diabetes (Gould et al., 2015). Wounds that are not healing become chronic, delaying the healing process even more (Munro, 2017). The role

of clinicians is to utilize their clinical judgment, patient preference, and evidence to make decisions that will result in a healed wound through the provision of high-quality and cost-effective care (Munro, 2017). The following is a review of the literature regarding best practice for the assessment and management of chronic wounds.

Arterial Wounds. Arterial or ischemic wounds result from poor arterial circulation, most commonly this occurs in the lower extremities (Palombo & Kozakova, 2016). Smoking, hyperlipidemia, hypertension, and diabetes mellitus are risk factors for the development of arterial wounds (Ganguly & Alam, 2015). One of the main symptoms of arterial disease is pain in the legs when walking or during exercise. Other signs of chronic tissue ischemia are: weak or absent pulses, poor hair growth in the legs, poor growth of toenails, thin shiny skin, decreased temperature of the lower leg, elevational pallor, and dependent rubor (American Heart Association, 2016; Federman et al., 2016; Ferri, 2019). An ankle brachial index (ABI) is a reliable (90% sensitivity and 98% specificity) and cost-effective test that can be used in primary care to assess and diagnose peripheral arterial disease (Park, 2016).

Ischemic ulcers are usually located distally, especially in the toes and forefoot, and present with a “punched-out” appearance. The base of the ulcer is usually pale with little drainage and with minimal or absent granulation tissue. Infection is common but the ulcer may not show signs of infection such as periwound erythema, swelling, warmth, and purulent drainage since the compromised blood flow affects the immune response. These wounds are usually small and deep, and necrosis is common (Singer, Tassiopoulos, & Kirsner, 2017).

In ischemic ulcers, the goal is to improve tissue perfusion via revascularization, medications (antiplatelet, lipid-lowering, and antithrombotic therapy), and a progressive walking program. The patient should stop smoking as it causes vasoconstriction and should avoid

constrictive garments. Adequate hydration is important to decrease the viscosity of the blood. Patients affected by arterial disease should avoid falls or other accidents to prevent wounds since their healing will be delayed due to their ischemic condition (Federman et al., 2016).Wound care should be performed to heal wounds with adequate perfusion (Singer et al., 2017).

Venous Ulcers. Causes of venous ulceration are not well understood, but it is hypothesized that ulceration develops in response to venous hypertension, which causes extravasation of molecules, such as fibrinogen and red blood cells, into the surrounding tissue causing tissue damage and increasing susceptibility to minor trauma (Sundaresan, Migden, & Silapunt, 2017). Damage to the valves, or deep venous system congestion, causes valvular incompetence which results in venous hypertension, backflow of blood, and transmission of high pressures from the deep venous system to the superficial venous system (Dhillon, 2014). Deep vein thrombosis, obesity, pregnancy, prolonged standing, aging, sedentary life style, loss of calf muscle due to paralysis, thrombophlebitis, and thrombophilic conditions are risk factors that cause venous stasis and ulceration (Medeiros et al., 2014).

Patients may present with edema of lower extremities and venous dermatitis characterized by scaly, itchy skin, and hemosiderosis. Other findings include ankle flare, lipodermatosclerosis, and pain that is worse at the end of the day and relieved by leg elevation. In contrast to arterial disease, feet are generally warm and pulses are palpable (Dhillon, 2014; Vasudevan, 2014). Venous ulcers are the most common types of ulcers, accounting for 80-90% of all leg ulcers (Cleveland Clinic, 2019). Most patients present with ulcers located around the medial malleolus. These ulcers are shallow and have irregular edges but with well-defined margins. The wound base is red and is usually highly exudative with drainage that is yellow-white in color. Crusting is common and a yellow, thin fibrinous tissue may be present on the wound base (Dhillon, 2014; Ferri, 2019; Vasudevan, 2014).

Treatment for venous stasis ulcers is aimed at improving venous return with surgical obliteration of damaged veins, elevation of legs, and compression therapy (Chi & Raffetto, 2015). Optimal level of compression is at least 30mmHg at the ankle (Alavi et al., 2016). Wounds are treated with topical wound therapies, pain management, absorption of excess drainage, and protection of the periwound skin from maceration. Venous ulcers have a recurrence rate of 70%; therefore, patients need to use ongoing compression therapy and elevation of legs (Widener, 2015).

Neuropathic (diabetic) Ulcers. Neuropathy is a condition of nerve damage with unknown pathophysiology. It has been suggested that glucose control may be an important factor in neuropathy prevention because edema caused by hyperglycemia interferes with nerve conduction (Mayo Clinic, 2019). Another factor is microangiopathy which damages small blood vessels supplying the nerves (Emory University Wound, Ostomy, and Continence Nursing Education Center [Emory University WOCNEC], 2017). Almost 50% of patients with diabetes have neuropathy (The Foundation for Peripheral Neuropathy, 2016). Neuropathy coexisting with peripheral arterial disease can lead to foot ulceration and infection (Markakis, Bowling, & Boulton, 2016). Patients with sensory neuropathies are at high risk for painless trauma resulting from improperly fitting shoes, burns, and trauma. Trauma is the principal trigger for the formation of neuropathic ulcers (Jeffcoate, Vileikyte, Boyko, Armstrong, & Boulton, 2018). Patients need to be screened for signs of neuropathy with the use of Semmes-Weinstein monofilaments. Failure to respond to the 5.07 monofilament indicates loss of protective sensation and failure to respond to the 6.10 monofilament is indicative of total loss of sensation. Furthermore the feet of diabetic patients can become dry and cracked with fissure formation. Fissures are an entry point for bacterial penetration and recurrent infection leading to wounds (Bryant & Nix, 2016).

Prevention of ulcers is the key in patients with neuropathies. Patients should be encouraged to use properly fitted shoes, avoid heels as it increases pressure over metatarsal heads, always wear protective foot wear to prevent trauma, shake out shoes before donning, check water temperature with the elbow before stepping into the tub or shower, put on clean socks daily, wear socks that are not tight and with the seams toward the outside, and check feet every day for lesions of any kind (Bryant & Nix, 2016; Iraj, Khorvash, Ebneshahidi, & Askari, 2013). The reduction or elimination of pressure and trauma is vital for the management of neuropathic ulcers. Fasting glucose levels should ideally be between 100 and 140 g/dL (Bryant & Nix, 2016). Patients should not use the shoes that caused the ulceration since in 45% of foot ulcers, sharp injury and ill fitted shoes were the direct cause (Yosuf, Mahadi, Mahmoud, Widatalla, & Ahmed, 2015).

Pressure Injuries. In April, 2016, the National Pressure Ulcer Advisory Panel (NPUAP) announced a change in terminology from pressure ulcer to pressure injury and updated the pressure injury stages. According to NPUAP (2016), a pressure injury is localized damage to the skin and underlying tissues usually over a bony prominence or associated to a medical or other device, and occurs as a result of prolonged pressure or pressure in combination with shear. Table 1 illustrates the different pressure injury stages as defined by the NPUAP (Appendix B).

Since pressure injuries result from hypoperfusion to soft tissues caused by prolonged pressure, the gold standard for pressure injury prevention and treatment is pressure relief (Gould et al., 2016). Patients should be repositioned frequently to avoid pressure over bony prominences. The ideal turning frequency is not known but a 2-hour turning frequency has been set empirically. The head of the bed should be maintained at the lowest degree of elevation as allowed by the medical condition the patient has. The knees should be raised to reduce shearing forces. A nutritional assessment should be performed and vitamins and minerals should be given

if deficiencies are confirmed. Wound dressings should be applied to promote healing (Gould et al., 2016).

Surgical Wounds. Surgical wounds are wounds created by the rupturing of approximated or sutured skin margins after a surgical procedure (Sandy-Hodgetts, Carville, & Leslie, 2017). The major goal of surgical wound care is preventing complications such as surgical site infections which are among the top three hospital-acquired conditions. Obesity is an independent predictor of increased risk for surgical site infections (Bryant & Nix, 2016). Signs of infection can be: dull wound tissue, slough, failure of the wound to decrease in size, hypergranulation, increased exudate, erythema, increased pain or unexplained pain, malodor, confirmed presence of infection through a culture, and increased temperature of periwound tissue. Uncontrolled patient comorbidities such as high BMI and diabetes are risk factors for wound dehiscence. Blister development around the incision has been identified as a potential risk factor for surgical site infection (Ousey, Zarghooni, & Overschelde, 2017).

Incisions should be kept dry without prolonged exposure to moisture (including topical antibiotics). Postoperative dressings should be kept in place for 48 to 72 hours. After 48 to 72 hours the patient may shower if suture line is closed with no drainage. Timing of suture or staple removal depends on incision location: Face: 3-5 days; scalp, chest, fingers, hand, and lower extremity: 7-10 days; and back: 10-14 days (Bryant & Nix, 2016).

Best Practice Principles of Wound Healing. Despite the advancement of wound care technology, fundamental principles still apply. Wound healing is multifactorial and involves the management of the patient's comorbidities and wound etiology. Regardless of the types of wounds, appropriate treatment involves wound bed optimization by removing necrotic tissue and maintaining a moist wound environment, infection control, treatment of rolled-in and calloused wound edges, and off-loading measures (Garwood & Steinberg, 2016).

Removal of devitalized wound tissue through debridement is paramount for wound healing. Necrotic tissue is a medium for bacterial growth and its removal helps to move the wound from the inflammatory phase into the proliferative phase of repair. Debridement should be performed during each treatment visit until the wound is clean with healthy granulation tissue (Schultz et al., 2017). In the primary care setting, there are different options for debridement such as conservative sharp wound debridement with the use of scissors, scalpel, or curette under topical anesthesia; autolytic debridement with the use of medical honey dressings (e.g. Therahoney and Medihoney), enzymatic debridement using collagenase (e.g. Santyl), and mechanical debridement using gauze to gently remove devitalized tissue (Powers et al., 2016).

Maintaining a moist wound surface is also important as it promotes cell migration and wound healing. Appropriate dressings should be selected to absorb exudate while maintaining a moist wound bed. There are five basic types of moisture-retentive dressings; these are: films (e.g. Tegaderm), foams (e.g. Optifoam, Mepilex), hydrocolloids (e.g. Duoderm), calcium alginates (e.g. Maxorb, Kaltostat, Algiderm), and hydrogels (e.g. Elastogel, DermaGel). Alginates and foams absorb moderate to large amounts of drainage while hydrocolloids are used in minimally draining wounds. Hydrogels provide moisture to dry wounds (Powers et al., 2016).

Rolled-in or closed wound edges, also called epibole and calloused wound edges prevent epithelial cell migration and therefore wound healing. Epibole, commonly occurs in wounds with undermining which is the separation between periwound skin and wound base. Closed wound edges have to be treated for healing to occur. They can be cauterized with silver nitrate sticks or excised with scissors or scalpel. Callous commonly occur in diabetic foot ulcers. Callous also needs to be excised with scissors or scalpel for the wound to heal (Wound Care Advisor, 2019).

Wound healing can be impaired with critical colonization and infection and requires treatment (Bryant & Nix, 2016). Infection can spread to adjacent tissues which can result in deep

infection and even systemic infection. Local wound infection can be treated using cleansing agents and topical antimicrobials; for deep and systemic infection, systemic therapy is needed. Signs and symptoms of infection are: erythema, warmth, increased pain, increased exudate or purulent drainage, friable tissue, increased wound size, and new areas of slough (Powers et al., 2016). Dressings with antibacterial properties such as medical honey and dressings containing silver are used with good results. Medical honey is available in a sheet presentation and gel. Silvers dressings are available in different forms such as gels, alginates, foams, hydrocolloids, etc. Topical antibiotics such as Polysporin/Neosporin, silver sulfadiazine, bactroban (effective against MRSA), and gentamicin are used for wounds with surface infection and when the causative agent has been identified (Powers et al., 2016).

PICO Question. The following is the PICO question developed to direct the search for wound care evidence and its relevance in the primary care setting: In patients with diabetic wounds, vascular wounds, and pressure injuries, how does the provision of current wound care practice compared to care provided after the implementation of a wound care education program affect PCPs' practice to improve patient health outcomes at San Mateo Medical Center?

A literature search from 2013 to 2019 was conducted using Google Scholar, PubMed, and CINHAL with key terms: wound care treatment, chronic wounds, evidence-based, outpatient wound care, and best practice. Eight articles were included in this literature review. The evidence was reviewed and synthesized using the John Hopkins Nursing Evidence-Based Practice Appraisal Tool (John Hopkins School of Medicine, 2012). This tool helped evaluate the usefulness and validity of the articles selected. An evidence table (Appendix C) was developed to document and organize the information used in this literature review.

According to the literature, medical students receive minimal wound care training which prevents them from properly treating chronic wounds (White-Chu, Le, & Cordrey, 2019;

Delaplain & Joe, 2018), and only seven medical schools in the US provide a formal wound healing elective (Kamath, Agarwal, Salgado, & Kirsner, 2019). PCPs educated on wound care will make better clinical decisions that will benefit the patients and the organization.

More than six million people in the US are affected by chronic wounds (Powers, Higham, Broussard, & Phillips, 2016). Vascular ulcers, diabetic foot ulcers, and pressure ulcers are chronic wounds that affect older individuals primarily and cause considerable morbidity and mortality (Gould et al., 2015). The cost to treat chronic wounds can be as high as $9.4 billion per year, making it the largest direct medical cost of all skin conditions (Powers et al., 2016). According to Chan et al. (2017), chronic wounds will continue to be problematic because of their high prevalence and the significant amount of health care resources needed to treat them.

According to Munro (2017), lack of wound care knowledge prevents clinicians from providing care that is evidence-based and cost-effective. Early management of wounds can decrease complications and reduce associated costs. However, primary care providers are not adequately trained or are underprepared to treat even the most common types of wounds. Moreover, clinicians don't feel confident regarding their wound management skills (Kulikov, Sandhu, & Van Leuven, 2019).

Rational: Theoretical Framework

The theoretical framework used for the development of the project is the Imogene King's theory of goal attainment. Introduced in the 1960s, this theory states that nurse and patient communicate information, set goals, and take action to attain those goals. Being a social individual, the patient has three fundamental needs: a) the need for health information, b) the need for care to prevent illness, and c) the need for care when the individual cannot take care of himself or herself (Petiprin, 2016). In her theory, King states that an important component of health is the ability of the patient to adjust to the internal and external environment using

available resources. The internal environment transforms energy so that patients can adjust to the external environment which includes informal and formal organizations. The goal of the nurse is to help patients function in their individual roles by maintaining health. The nurse uses her knowledge to assess the patient and formulate a diagnosis, to create an intervention plan, and to implement actions to achieve the patient's goals (Petiprin, 2016).

The wound care education project was based on this theory. The goal of the project is to improve the health of patients with wounds at San Mateo Medical Center through the provision of evidence-based and cost-effective care. The need for wound care education targeted at PCPs was diagnosed. Moreover, the PCPs have recognized this need and had been requesting a wound care education class from the Continuing Medical Education Department (CMED) for the past two years.

Aim Statement

The aim of this DNP Project is to develop, implement, and evaluate a wound care assessment and treatment education class for all PCPs at San Mateo Medical Center and satellite outpatient clinics with the goal of improving patient outcomes by providing care according to best practice, by facilitating change of practice and practice improvement, and by decreasing the number of referrals to the Vascular Clinic by 30%. This project was completed on August, 2019.

Section III: Methods

Context

San Mateo Medical Center has only one wound care nurse who acts as a consultant and provides wound care treatment to patients in the hospital and the wound care clinic. Of the approximately 10 patients referred each week to the Vascular Clinic for wound care treatment, a mere two or three can be seen in a timely manner (see Appendix A, Tables 1 and 2). This causes delayed care, potentially resulting in costly ER visits or admissions to the hospital due to a

wound infection. This affects health outcomes and the economy of the organization. The development of an evidence-based wound care education class directed at PCPs will ensure high-quality, timely, and cost-effective patient care.

Stakeholders

The stakeholders for the development of the project are the wound care nurse, the nurse practitioner working at the Vascular Clinic, the nurse informaticist, the PCPs from the outpatient clinics, the hospitalists, the providers in the emergency department, the manager of the medical surgical and intensive care units, the manager of the CMED, and the patients. This DNP candidate was in charge of developing and delivering the wound care educational material. PCPs provided their feedback throughout the development of the project to create educational material that best fits their needs.

Intervention

The intervention was the development of a wound care education class based on best practices. The intervention was chosen by this DNP candidate to improve the PCPs' skills regarding assessment and treatment of wounds and to decrease the number of wound care referrals to the Vascular Clinic. This education class included written material, PowerPoint slides, and a presentation that took place on May 1st, 2019 at San Mateo Medical Center during the PCPs' weekly continuing medical education (CME) classes.

The class included wound assessment including clinical manifestations to guide the clinician in the differentiation of the type of wounds. The class also included evidence based information regarding principles of moist wound environment to achieve wound healing. Pictures of different types of wounds were provided along with pictures of dressings that are used to treat these wounds. The wound care supplies available at the hospital were also brought to the class for the PCPs to see. The PowerPoint slides were reviewed by the nurse practitioner

from the Vascular Clinic who has wound care experience. The slides were also reviewed by the manager of the CMED to ensure that the education needs of the PCPs were met and to evaluate the length of the class (see Appendix D for the Wound Care Class PowerPoint Slides).

Gap Analysis

Wound care referrals are sent to the Vascular Clinic from all the outpatient clinics. Because of the large number of referrals, many patients are not seen in a timely manner and go to the ER for dressing changes or are admitted to the hospital due to a wound infection. The PCPs expressed need for a wound care class to improve their delivery of care, and the manager of the CMED sent a request to the Vascular Clinic for a wound care class directed at PCPs (see Appendix E for the Gap Analysis Tool, Appendix F for the invitation letter from the manager of the CMED, and Appendix G for the Continuing Education Units/Hours Application Form).

GANTT

A GANTT chart was developed to help with the planning and scheduling of the project. This chart was helpful to determine the length of the project, the resources needed, and to see whether deadlines were met (see Appendix H for the Project GANTT Chart). The project started with the topic selection and literature review in August 2017 and continued until August 2018. Throughout this time, the statement of determination, GAP analysis, aim statement, and determination of stakeholders was developed by this DNP candidate. The project was presented to the stakeholders on September, 2018. In October 2018, the manager of the CMED formally invited this DNP candidate to present the class. From November to December of the same year, the PowerPoint presentation was developed. The class was presented to the PCPs on May 1st, 2019, and a questionnaire to evaluate the PCPs' quality improvement of care was sent to them by the CMED on August 15, 2019.

SWOT Analysis

A SWOT analysis was developed to evaluate and address barriers for the development of this project (See the SWOT Analysis Table in Appendix I).

Strengths. A major strength was the extensive wound care experience of this DNP candidate. Another strength was the support from PCPs for the development of the program since it will benefit our patients and the hospital through the provision of real-time, best-quality wound care. The CMED fully supported the development of the project and requested the class.

Weaknesses. A major weakness during the development of the project was the lack of support from some outpatient clinic managers who didn't express interest in the project. Underestimation of the time needed to complete the project was another weakness and so was the potential inability of PCPs to attend the class due to time constraints.

Opportunities. Efficient and timely wound care provided by PCPs will reduce patient risk, wound care referrals, and the high costs of ER visits and hospitalization. Wound care will be provided to patients that live in underserved geographic areas as several PCPs also work in the mobile clinic. The provision of best practice wound care will improve patient safety and satisfaction.

Threats. Potential lay-offs happening in the hospital due to budget constraints could affect the development of the project. A for-profit wound care company approached the hospital's authorities to offer improved patient outcomes at a lower cost but was rejected by the medical director of the Specialty Clinic due to lack of physical space to undertake such project.

Work Breakdown Structure

The following is a work breakdown structure (WBS) created to facilitate the accomplishment of the project objectives (see the WBS Hierarchy Chart in Appendix J).

Initiation. The GAP analysis demonstrated the need for a wound care class directed at PCPs from all the outpatient clinics. To address this need, a wound care education project charter

was created. The first deliverable of the project was the submission of the project to the sponsor, the manager of the CMED. The project sponsor reviewed and accepted the project.

Planning. During the planning phase of the project, the preliminary scope statement was created by this DNP candidate. The development of the project needed the help of a small team which was composed of the nurse practitioner from the surgical clinic, who also sees patients with wounds and who has great wound care experience, and the hospital's nurse informaticist. The project team kickoff meeting took place to determine the goal of the project, to encourage communication, to set expectations, and to get started. The project plan was reviewed and approved by the team members.

Execution. The first deliverable was the creation of a written wound care material that included evidence-based assessment and treatment of pressure injuries, vascular wounds, diabetic foot ulcers, and surgical wounds. A second deliverable was the development of PowerPoint slides for a wound care class that focused on evidence-based wound assessment and treatment principles. The project was implemented in May, 2019.

Control. During the control phase there were a series of project management sessions and project status evaluation meetings. This DNP candidate led these meetings. Project updates were continuously provided to ensure that team members and stakeholders were well informed regarding the progress of the project, and changes were implemented based on the feedback of the PCPs.

Closeout. Outcomes were measured and evaluated to determine if the project objectives were achieved.

Proposed Budget

This DNP candidate developed the education material. The number of hours needed to accomplish this task was 40. The material was disseminated to PCPs on May 1st, 2019 during

their weekly CME classes. The class was also recorded and made available as a webinar to PCPs who could not attend the class. The class took 1 hour. Time spent in the development of assessments, data collection, and analysis was 10 hours. Meetings with team members totaled another 10 hours. The project manager's time (this DNP candidate) totaled 62 hours. At $78 per hour, the total expense was $4,836. The nurse practitioner worked approximately10 hours at a rate of $90 per hour, resulting in a total of $900. The nurse informaticist also worked 10 hours at a rate of $80 per hour, resulting in a total of $800. The total amount spent was $6,536 (see budget in Appendix K).

Return on Investment

The return on investment was difficult to calculate. It is assumed that the provision of evidence-based wound care by the PCPs will decrease the number of referrals to the Vascular Clinic; patients referred will be seen by their PCP in a timely manner and will not end up going to the ER or admitted to the hospital due to preventable infections. This will save money to the hospital as evidenced by the literature. Chronic wounds are a burden to the healthcare system and a physical and mental burden for the patients and their families (Olson et al., 2019). In the US, 5.7 million people suffer from chronic wounds. Estimates for the cost of this care range from $20 billion (Järbrink et al., 2017) to $96.8 billion annually based on CMS reimbursement (Landsman, Masturzo, & Barbul, 2019).

This wound care education class was targeted at physicians, physician assistants, and nurse practitioners working at San Mateo Medical Center. Regarding nurse practitioners in particular, there is evidence that wound care educated nurse practitioners can effectively manage chronic wounds improving patient outcomes and decreasing wound care costs. This is due to their vast medical knowledge, patient centered care, and their ability to work with the interdisciplinary health team (Irving, Sedlak, Walton, Collier, & Bernhofer, 2017).

The wound care education class will increase the PCPs wound care knowledge. As a result, they will feel comfortable treating wounds and will not refer all wounds to the Vascular Clinic. Referring patients to the Vascular Clinic for wounds that can be treated in the primary care setting increases costs and often results in delays in care due to the limited availability of the clinic. Even one less referral to the Vascular Clinic or one less visit to the ER will save costs to the patient and the health care facility.

Communication Plan/Matrix

A responsibility matrix was created to summarize and delineate the tasks to be accomplished, and to clearly determine the team members and their responsibilities. This responsibility matrix also specifies the type of authority of each team member (see Appendix L for the Communication Plan/Matrix Chart). This DNP candidate was the project manager and was in charge of developing the class. The class was reviewed by the nurse practitioner from the Vascular Clinic. The Nurse informaticist helped with the data collection regarding the number of wound care referrals and discharges from the Vascular Clinic. The manager from the CMED reviewed the content and length of the class. The class was presented by this DNP student. Reports regarding the development and implementation of the project were communicated to Dr. Karen Van Leuven, the project's advisor.

Study of the Intervention

Implementation. This DNP student collaborated with the manager of the CMED for the development of the wound care class. PCPs had communicated their need for the class and the specific topics they wanted to be covered: pathophysiology, assessment, and management of vascular wounds, diabetic foot ulcers, pressure injuries, and surgical wounds. They also wanted information on wound care dressings available at San Mateo Medical Center and how to use them. Specifically, they requested pictures of different types of wounds with the corresponding

dressings. The wound care class and Power Point slides were developed according to these requirements. The class was presented on May 1st, 2019 to the PCPs during their weekly CME class. The PCPs that attended the class included physicians, nurse practitioners, and physician assistants. The class lasted one hour; 45 minutes were dedicated to the presentation, and 15 minutes were allocated to answer questions. To assess the effectiveness of the class, the CMED sent a survey to the PCPs three months after the class to effectively assess quality improvement.

Proposed Outcome Measures. Upon implementation of the wound care education class:

1. Primary care providers will be able to assess, diagnose, and treat minor vascular wounds, diabetic wounds, and pressure injuries.
2. Primary care providers will be able to correctly utilize the supplies needed to treat vascular wounds, diabetic wounds, surgical wounds, and pressure injuries.
3. Primary care providers will be comfortable performing minor wound care in their clinical setting.
4. Primary care providers will be competent in referring patients with wounds appropriately to the Vascular Clinic.
5. There will be a 30% decrease in wound care referrals to the Vascular Clinic.

To measure the outcomes, a pre- and post-survey evaluation tool was developed based on the educational objectives outlined in the Application for Continuing Medical Education (CME) Credits and Continuing Education Units/Hours (CEU/CEH) document (see Appendix G). The survey was composed of questions with responses using the Likert Scale. The agreement scale type was used which had the following responses: a) strongly agree, b) agree, c) undecided, d) disagree, and e) strongly disagree (Iowa State University Extension, 2010). The survey was sent to PCPs by the CMED three months after the class was presented (August 15, 2019) to evaluate

knowledge and change of practice (see Appendix M for the Pre and Post Survey Evaluation Tool).

The survey tool used by the CMED at San Mateo Medical Center is SurveyMonkey. Web surveys such as SurveyMonkey are evolving, and new tools are constantly being developed. These tools have the advantage of rapid distribution and cost effectiveness. Moreover, data can be readily analyzed and stored, and proactive follow up procedures can be implemented (Hayslett & Wildemuth, 2004).

Analysis

Although wounds can be prevalent, expensive, and even lethal, wound care is challenging for most PCPs since, traditionally, they are not trained in wound care (Fox, Baquerizo, Berriman, & Kirsner, 2016). The intended outcome of the project was to educate PCPs at San Mateo Medical Center regarding evidence-based wound care. The implementation of the wound class will allow the PCPs to perform wound care according to best practice. This will ensure quality improvement in the provision of wound care, and will result in the decrease of wound care referrals to the impacted Vascular Clinic. The class was implemented and pre- and post-assessments using SurveyMonkey were performed to assess the effectiveness of the class. The data from the results of the assessment were exported to Excel for statistical analysis.

Ethical Considerations

The privacy of patients was not affected as the quality improvement project was targeted at PCPs; therefore, it did not require Institutional Review Board (IRB) approval for the protection of human subjects (see appendix N for the DNP Statement of Non-Research Determination Form). The project was approved by the USF School of Nursing and Health Professions DNP committee. According to the Provision 2.3 of the Code of Ethics for Nurses (American Nurses Association, 2015), because of its complexity, the provision of care requires

strong collaboration and support from all health professions. Nurses are at the center of this collaborative effort and foster multidisciplinary care that is safe, high-quality, and patient centered. Through the implementation of this project, this DNP candidate will collaborate with PCPs to ensure the delivery of safe, best practice wound care.

By teaching best practice wound care to PCPs with the goal of improving the health of our patients, the project fulfills an important Jesuit core value which is "the belief in and a commitment to advancing social responsibility in fulfilling the University's mission to create, communicate and apply knowledge to a world shared by all people and held in trust for future generations (University of San Francisco, n.d.)."

Section IV: Results

Qualitative Findings

Initially, the plan was to develop the class and present it to PCPs in their respective clinics. However, charge nurses of the outpatient clinics were not supportive expressing lack of time for a wound care class. Fortunately, a few months later and based on the PCPs' request for a wound care class, the manager of the CMED requested the class and was fully supportive of the project. The class was also recorded to be available as a webinar for the PCPs that could not attend the class. Fifteen minutes allocated for questions was insufficient as several PCPs left the classroom at the end of the class without having the opportunity to be heard. This DNP candidate provided her email so that PCPs could email their questions.

At the end of the class, several physicians approached this DNP candidate requesting a pictorial list of wound care dressings available in the hospital so they can request supplies from the Distribution Department to use it in their clinics. The list was soon created and sent to them (see Appendix O for the list of wound care supplies available at San Mateo Medical Center). In addition to the PowerPoint presentation, a wound care demonstration was going to be provided

using a mannequin and wound care supplies, but as the class unfolded, it was becoming evident that there was not going to be enough time for the wound care demonstration.

Quantitative Findings

Fifteen PCPs including physicians, nurse practitioners, and physician assistants from the different outpatient clinics attended the class and completed a pre- and post-class survey (see Appendix P for the pre- and post-class survey results). There were four questions that evaluated how comfortable the PCPs felt assessing and treating wounds, selecting appropriate dressings, and referring patients appropriately to the Vascular Clinic (see results of the pre-training survey on Table 1 below).

Table 1

Pre-Training Survey

Question	Mean Value	ST DEV
1. Before the class, I felt knowledgeable regarding assessment and treatment of vascular wounds, diabetic wounds, surgical wounds, and pressure injuries.	2.17	0.98
2. Before the class, I felt comfortable performing wound care.	2.17	0.98
3. Before the class I felt comfortable selecting the appropriate dressing according to different wound characteristics.	2.00	0.63
4. Before the class, I felt comfortable referring the appropriate patients to the wound care clinic.	2.33	0.52

The PCPs' mean scores were less than 3 for all the questions, which indicated that they did not feel comfortable assessing and treating wounds, and they did not know what types of wounds to refer to the Vascular Clinic.

The post-training survey shows an improvement in the PCPs responses for questions 1 and 4. The mean value for question 1 was 3.33 and for question 4 was 3.5 (see table 2 below) indicating that after the class, the PCPs felt more knowledgeable regarding assessment and

treatment of vascular wounds, diabetic wounds, surgical wounds and pressure injuries, and they also felt more comfortable referring their patients appropriately to the Vascular Clinic.

Table 2

Post-Training Survey

Question	Mean Value	ST DEV
1. After the class, I feel knowledgeable regarding assessment and treatment of vascular wounds, diabetic wounds, surgical wounds, and pressure injuries.	3.33	0.82
2. After the class, I feel comfortable performing wound care.	2.83	0.98
3. After the class I feel comfortable selecting the appropriate dressing according to different wound characteristics.	2.83	0.98
4. After the class, I feel comfortable referring the appropriate patients to the wound care clinic.	3.50	0.84

A T-test was performed to compare the scores obtained before and after the class to evaluate if the PCPs' improvement was due to the class and not due to chance. The *p*- value provided by the T-test indicated that the results obtained after comparing the pre and post test scores were statistically significant for question 4 and marginal for questions 1, 2, and 3.

Table 3

Statistical Significance Pre-post Test

Participant Number	Question 1 Pre	Question 1 Post	Question 2 Pre	Question 2 Post	Question 3 Pre	Question 3 Post	Question 4 Pre	Question 4 Post
1	2	4	2	3	3	2	2	4
2	2	4	2	4	2	2	2	2
3	2	3	2	2	2	3	2	4
4	2	4	4	4	1	2	3	4
5	4	3	2	2	2	4	2	3
6	1	2	1	2	2	4	3	4
Mean	2.17	3.33	2.17	2.83	2.00	2.83	2.33	3.50
STDEV	0.98	0.82	0.98	0.98	0.63	0.98	0.52	0.84
T-test, p-value	0.06		0.10		0.14		0.01	

The CMED added two questions to the survey to measure the overall improvement of the PCPs after the class. These questions assessed whether the class improved the PCPs' wound care knowledge, and if their practices improved after the wound care class (see table 4 below).

Table 4

Post Class Survey Overall Improvement

Question	Mean Value	ST DEV
1. The wound care class improved my wound care knowledge	3.50	0.84
2. My practice has improved after the wound care class	3.50	0.84

The mean score for both questions was 3.5 indicating that the PCPs' wound care knowledge and their practice has improved as a result of the wound care class. The standard deviation was <1 indicating a normal distribution, with the variance in the results being close to the mean.

The amount of wound care referrals to the Vascular Clinic also decreased after the class, going down from nine to two per week, indicating a decrease of 77.8% (see table 5 below). The percentage decrease surpassed the goal of 30%. One explanation could be that, in addition to the class, the number of referrals decreased due to a fall in the hospital's general census. In 2019, from the end of July until December, the census decreased by 50% in the impatient setting, and the outpatient clinics were experiencing a similar setback. One assumption for the low census, according to the hospital's administrators, was the policy changes implemented by the current White House administration. These policy changes directly affected the immigrant population which accounts for a large percentage of the patients at San Mateo Medical Center.

Table 5

2019 3th Quarter No. of Wound Care Referrals to the Vascular Clinic

	July	August	September
Week 1	2	2	3
Week 2	3	2	3
Week 3	2	2	1
Week 4	1	2	1
Mean referral/ week	2	2	2

Data collected by Wound Care Nurse and Nurse Informaticist based on number of wound care referrals received each week in the Vascular Clinic at San Mateo Medical Center during the third quarter of 2019.

An unexpected problem was the number of PCPs that completed the post-class survey. Out of 15 PCPs, only 6 completed the survey despite repeated requests sent to them via email. This could have been prevented if the surveys were completed right after the class, but the CMED was very specific about sending the survey three to six months after the class to truly measure quality and practice improvement.

Tracking Change Over Time

To track change in wound care practice over time and with the support of the CMED, another survey will be sent to the PCPs in the following months. Also, a class discussing dressing selection, application and wound debridement is being planned.

Section V: Discussion

Summary

The goal of this DNP project was to create and disseminate a wound care education class targeted at PCPs at San Mateo Medical Center to deliver best practice wound care resulting in improved patient outcomes and facilitation of change of practice and practice improvement. Several PCPs including two nurse practitioners and a physician, had previously expressed their interest in learning more about wound car. From these interactions, this DNP candidate learned

that PCPs are not formally trained to provide wound care in their medical programs; however, they experience first-hand how important this skill is to provide appropriate care.

During the development of the project, five outcomes were identified:

a) Primary care providers will be able to assess, diagnose, and treat minor vascular wounds, diabetic wounds, and pressure injuries.

b) Primary care providers will be able to correctly utilize the supplies needed to treat vascular wounds, diabetic wounds, surgical wounds, and pressure injuries.

c) Primary care providers will be comfortable performing minor wound care in their clinical setting.

d) Primary care providers will be competent in referring patients with wounds appropriately to the Vascular Clinic.

e) There will be a 30% decrease in wound care referrals to the Vascular Clinic.

The project aims were achieved. PCPs reported that as a result of the class, they feel comfortable assessing and treating vascular wounds, surgical wounds, diabetic wounds, and pressure injuries. They also feel more comfortable referring only complex wounds to the Vascular Clinic. The PCPs reported that their wound care knowledge improved after the class and that their practice has also improved. The PCPs were also exposed to the different wound dressings available in the hospital, and a list of these supplies, with their pictures for easy identification, was provided to them. Wound care referrals to the Vascular Clinic decreased by 77.8%. The large reduction in wound referrals could be due to the wound care class but also due to a decrease in the hospital's patient census. One objective that was not achieved due to inadequate time, was a demonstration of a wound dressing change and debridement.

The implication for advanced nursing practice is that this wound care class was beneficial to the nurse practitioners in our hospital. Similar to PCPs who lack formal wound care training in

their programs, nurse practitioners also face the same issue (Schallmo et al., 2019). Formal wound care training is neglected in medical and advanced nursing programs, yet wound care is a prevalent problem that is a burden to the healthcare system and impairs the quality of life of those that suffer from them (Chandan, 2019). As the population in the US keeps aging, the number of chronic wounds is likely to increase and inevitably, nurse practitioners will have to treat these patients and deliver care that is evidence-based.

Interpretation

Chronic wounds are a burden to the healthcare system and affect the lives of sufferers; however, most medical and nurse practitioner programs don not have formal wound care education as part of their curricula (Yim, Sinha, Diaz, Kirsner, & Salgado 2014). Because no specific medical specialty is responsible for the treatment of chronic wounds, their cost and morbidity have been ignored from a public policy stance in the US (Nassbaum et al., 2018). This problem is experienced at San Mateo Medical Center where the PCPs felt the need for a wound education class.

The provision of wound care that is not evidenced based affects the health outcomes of our patients. The implementation of the wound care class ensures that PCPs are trained in wound care according to best practice. Hence, the PCPs will feel comfortable assessing and treating wounds and referring only complex wound care cases to the Vascular Clinic. Evidence-based wound care will be provided without delay by our PCPs benefiting their practice and our patients.

Limitations

There were limitations encountered in the implementation of this quality improvement project. Due to budget constraints, the CMED only schedules one-hour classes for the PCPs. This amount of time turned out to be insufficient and did not allow for a wound dressing change

and debridement demonstration as originally planned. Also, the questions of several PCPs were not answered at the end of the class due to insufficient time.

Another problem was the number of participants that answered the survey after the class. Of 15 participants, only six answered it. Several emails were sent to the PCPs to answer the survey but only six responded. The manager of the CMED stated that the response rate for this project was what they usually get for all their classes. The low response rate could have been caused by the three month time period that elapsed amount of time elapsed from when the class was provided to when the survey was sent.

Conclusion

Chronic wounds disproportionally affect millions of Americans and negatively impact their quality of life. In addition to imposing a burden to the life of chronic wound sufferers, chronic wounds are also a burden to the US health care system as their treatment costs several million dollars annually. The development of an evidence-based wound care education program directed at PCPs will improve the outcomes at San Mateo Medical Center**.**

The implementation of the wound care education project created short and long-term implications. The provision of evidence-based, cost-effective wound care is the most important implication that materialized after the implementation of the project. This continues to ensure the safety of our patients by improving their health outcomes and increasing their satisfaction. Improving wound care knowledge of PCPs will likely benefit all parties in our organization. More wound care education needs to be provided; especially hands-on wound care training to reinforce and improve the PCPs' wound care skills.

Section VI: Other Information

Funding

No funding was received for the development of this project. This DNP candidate volunteered her time for the development of the class. Because the class was requested by the CMED, the nurse statistician and the nurse practitioner worked on this project during their regular working hours. This DNP candidate presented the one hour-class during her working time. This was approved by her manager.

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Section VIII: Appendices

Appendix A

Table 1. 2018 4th Quarter No. of Wound Care Referral Patients Vascular Clinic			
	October	**November**	**December**
Week # 1	8	10	10
Week # 2	10	8	10
Week # 3	9	8	9
Week # 4	12	9	7
Patient Average per Week	9.75	8.75	9

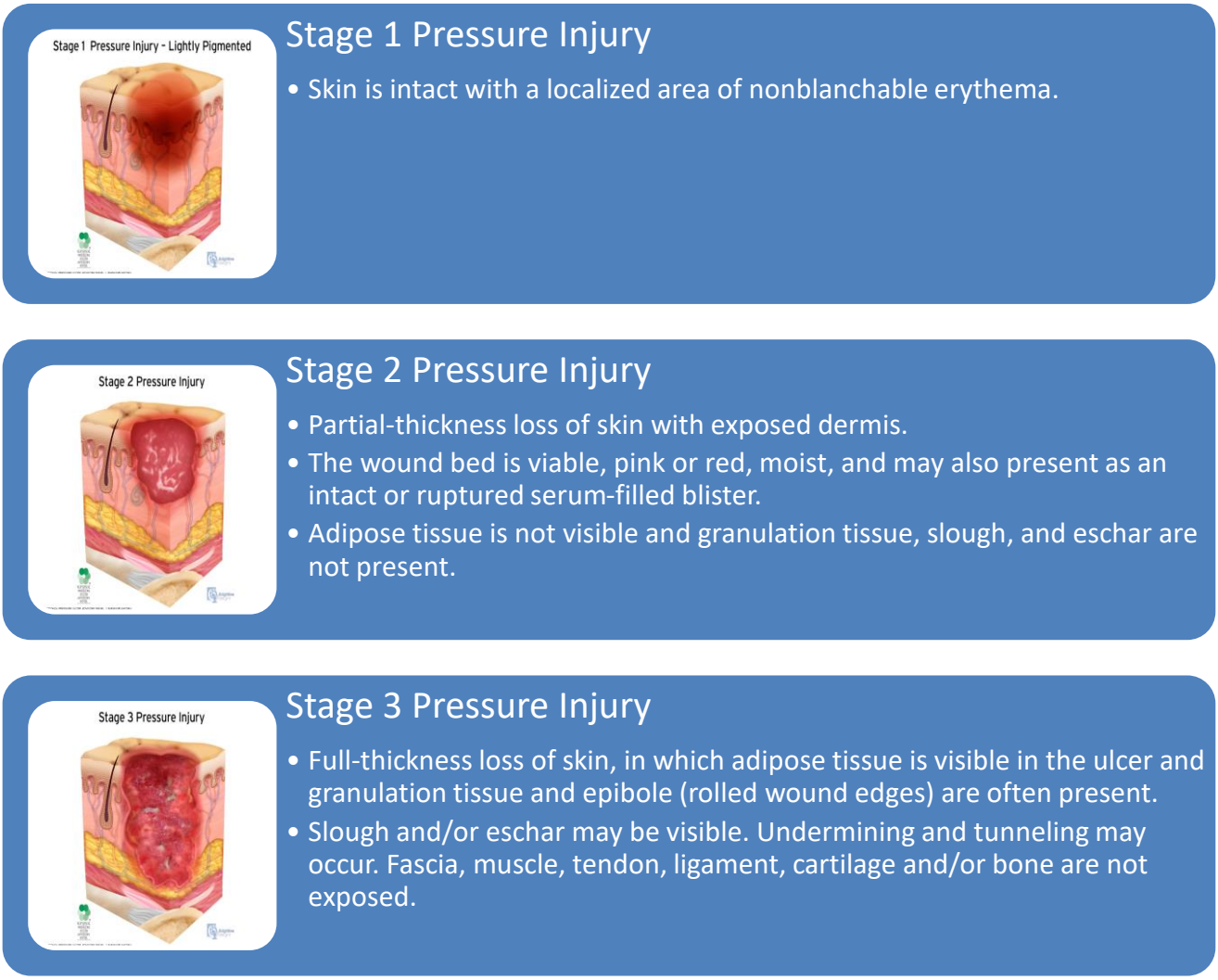
Data collected by Wound Care Nurse and the Nurse Informaticist based on number of wound care referrals received each week in the Vascular Clinic at San Mateo Medical Center during the last quarter of 2018.

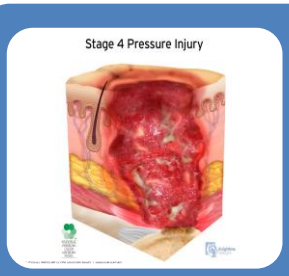
Table 2. 2018 4th Quarter No. of Wound Care Patients Seen and Discharged-Vascular Clinic						
	October		**November**		**December**	
	Pts. Seen	**Pts. D/C**	**Pts. Seen**	**Pts. D/C**	**Pts. Seen**	**Pts. D/C**
Week # 1	18	1	18	2	15	2
Week # 2	18	1	16	2	18	3
Week # 3	16	2	17	3	16	2
Week # 4	18	3	17	3	18	1
Patient Average per Week	17.5	1.75	17	2.5	16.75	2

Data collected by Wound Care Nurse and the Nurse Informaticist based on number of wound care patients treated and discharged each week from the Vascular Clinic at San Mateo Medical Center during the last quarter of 2018.

Appendix B

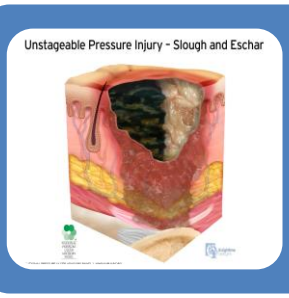
Table 1: Pressure Injury Stages





Stage 4 Pressure Injury

- Full-thickness skin and tissue loss with exposed or directly palpable fascia, muscle, tendon, ligament, cartilage or bone in the ulcer.
- Slough and/or eschar may be visible. Epibole, undermining, and/or tunneling often occur.



Unstageable Pressure Injury

- Full-thickness skin and tissue loss in which the extent of tissue damage within the ulcer cannot be confirmed because it is obscured by slough or eschar.
- If slough or eschar is removed, a stage 3 or stage 4 pressure injury will be revealed.

Deep Tissue Pressure Injury

- Intact or non-intact skin with localized area of persistent non-blanchable deep red, maroon, or purple discoloration or epidermal separation revealing a dark wound bed or blood filled blister.
- This injury results from intense and/or prolonged pressure and shear forces at the bone-muscle interface. The wound may evolve rapidly to reveal the actual extent of tissue injury, or may resolve without tissue loss

NPUAP, 2016.

Appendix C

Literature Review Evidence Table

Citation	Statistical Tools	Data (Statistics) Collected	Quality of Evidence	Highlights from Article
Chan et al., (2017). Cost-of illness studies in chronic ulcers: A systematic review.	Cohen's kappa coefficient for inter-rater agreement=0.88. Several electronic databases were searched.	Chronic ulcers cost between $1000 for patient out of pocket per year and almost $35,000 per episode form the health-care public payer perspective.	Good quality of evidence.	Chronic wounds will continue to be problematic because of their high prevalence and the significant amount of health care resources needed to treat them.
Delaplain & Joe (2018). Problems and costs that could be addressed by improved burn and wound care training in health professions education.	N/A this is a review of the literature regarding the lack of wound care education in most medical schools in the U.S.	N/A	Good quality of evidence.	Most medical schools do not have a dedicated wound care curriculum. This means that most students graduating from medical school lack competency in practical wound care.
Gould et al., (2015). Chronic wound repair and healing in older adults: Current status and future Research	N/A this is a workshop with an intradisciplinary group of experts in the field.	N/A	High quality of evidence.	Vascular ulcers, diabetic foot ulcers, and pressure ulcers are chronic wounds that affect older individuals primarily and cause considerable morbidity and mortality to millions of these older Americans.
Kamath, Agarwal, Salgado, & Kirsner (2019). Wound healing elective: An opportunity to improve medical education curriculum to	N/A this is a review of the literature regarding the lack of wound care education in medical schools in the US.	N/A	Good quality of evidence.	In the USonly seven medical schools in the US provide a formal wound healing elective.

better manage the increasing burden of chronic wounds.				
Munro, (2017). Causes and consideration with chronic wounds: A narrative review of the evidence	N/A. Several electronic databases were searched.	N/A	Good quality of evidence.	Lack of wound care knowledge prevents clinicians from utilizing clinical knowledge to provide care that is evidence-based and cost-effective.
Powers, Higham, Broussard, & Phillips, (2016). Wound healing and treating Wounds: Chronic wound care and management	N/A. Review of wound care evidence based principles.	N/A	High quality of evidence.	-More than six million people in the US are affected by chronic wounds. -Quality of life of these patients is greatly impacted by chronic wounds; the mortality for some of them equals that of patients with cancer. – The cost to treat chronic wounds is $9.4 billion per year, making it the largest direct medical cost of all skin conditions .
Kulikov, Sandhu, & Van Leuven, (2019). Can a smartphone app help manage wounds in primary care?	N/A Review of the literature.	N/A	High quality of evidence.	Diabetes and obesity could lead to complications including chronic wounds, and patients will present with these complications to primary care providers. Primary care providers are ineffectively prepared to provide optimal wound care to the aging population based on the lack of

				rigorous curriculum and training.
White-Chu, Le, & Cordrey (2019) Implementing a chronic wound care workshop for internal medicine residents.	N/A this is a review of the literature regarding the state of US medical schools and their lack of wound care curricula.	N/A	Good quality of evidence.	Medical students receive minimal wound care training which prevents them from properly treating chronic wounds.

Appendix D

Wound Care Class PowerPoint Slides

DNP PROJECT: WOUND CARE EDUCATION FOR PRIMARY CARE PROVIDERS

ZAIRA TORRES, RN BSN CWON

CONFLICT OF INTEREST DISCLOSURE

No financial relationship and/or commercial interest with the makers of the products showed in this presentation.

OBJECTIVES

- Primary care providers will utilize assessment data to determine probable etiologic factors for chronic wounds.
- Primary care providers will be able to assess, diagnose, and treat minor vascular wounds, diabetic wounds, and pressure injuries.
- Primary care providers will learn the equipment and supplies needed to treat vascular and diabetic wounds and pressure injuries.
- Primary care providers will be comfortable performing minor wound care in their clinical setting.
- Primary care providers will be competent in referring patients with wounds appropriately to wound care clinics.

WOUND ASSESSMENT AND DOCUMENTATION

- Assessment goals are identification of etiologic factors, assessment of systemic factors affecting repair, and assessment of wound status as basis for topical therapy.
- Document:
  - Location of the wound
  - Wound size: length, width, depth, undermining, tunneling
  - Wound bed tissue appearance: beefy red, slough, eschar
  - Exudate/drainage: color, amount
  - Peri-wound condition: maceration, erythema, induration, callous
  - Stage pressure injuries.

WOUND ASSESSMENT AND DOCUMENTATION

- Document infection:
  - Slough: new, increased
  - Drainage: excess, change in color/consistency
  - Poor granulation tissue
  - Redness, warmth, induration around injury, pain or tenderness, unusual odor
- Take picture and document:
  - Identification shall be within the picture and include:
    - Measuring gauge
    - MR#
    - DOB
    - Location on body of the wound
    - Date and time photo taken
    - Initials of person who took picture.

PRESSURE INJURIES

- NPUAP change nomenclature form pressure ulcer to pressure injury in 2016.
- **A pressure injury is localized damage to the skin and/or underlying soft tissue usually over a bony prominence or related to a medical or other device**. The injury can present as intact skin or an open ulcer and may be painful. The injury occurs as a result of intense and/or prolonged pressure or pressure in combination with shear. The tolerance of soft tissue for pressure and shear may also be affected by microclimate, nutrition, perfusion, co-morbidities and condition of the soft tissue.

PRESSURE INJURY STAGE 1

- Non-blanchable erythema of intact skin
- May appear differently in darkly pigmented skin.
- Color changes do not include purple or maroon discoloration; these may indicate deep tissue pressure injury.

PRESSURE INJURY STAGE 2

- Partial-thickness loss of skin with exposed dermis.
- The wound bed is viable, pink or red, moist, may also present as an intact or ruptured serum-filled blister.
- Commonly result from adverse microclimate and shear in the skin over the pelvis and shear in the heel.
- Should not be used to describe moisture associated skin damage (MASD) including incontinence associated dermatitis (IAD), intertriginous dermatitis (ITD), medical adhesive related skin injury (MARSI), or traumatic wounds (skin tears, burns, abrasions).

PRESSURE INJURY STAGE 3

- Full-thickness loss of skin, in which adipose tissue (fat) is visible in the ulcer and granulation tissue and epibole (rolled wound edges) are often present.
- Slough and/or eschar may be visible. The depth of tissue damage varies by anatomical location; areas of significant adiposity can develop deep wounds.
- Undermining and tunneling may occur. Fascia, muscle, tendon, ligament, cartilage and/or bone are not exposed.

PRESSURE INJURY STAGE 4

- Full-thickness skin and tissue loss with exposed or directly palpable fascia, muscle, tendon, ligament, cartilage or bone in the ulcer.
- Slough and/or eschar may be visible. Epibole (rolled edges), undermining and/or tunneling often occur.
- Depth varies by anatomical location.

UNSTAGEABLE PRESSURE INJURY

- Full-thickness skin and tissue loss in which the extent of tissue damage within the ulcer cannot be confirmed because it is obscured by slough or eschar.
- If slough or eschar is removed, a Stage 3 or Stage 4 pressure injury will be revealed.
- Stable eschar (i.e. dry, adherent, intact without erythema or fluctuance) on an ischemic limb or the heel(s) should not be removed.

DEEP TISSUE PRESSURE INJURY

- Intact or non-intact skin with localized area of persistent non-blanchable deep red, maroon, purple discoloration or epidermal separation revealing a dark wound bed or blood filled blister.
- This injury results from intense and/or prolonged pressure and shear forces at the bone-muscle interface. The wound may evolve rapidly to reveal the actual extent of tissue injury, or may resolve without tissue loss.
- If necrotic tissue, subcutaneous tissue, granulation tissue, fascia, muscle or other underlying structures are visible, this indicates a full thickness pressure injury (Unstageable, Stage 3 or Stage 4).

ADDITIONAL PRESSURE INJURY DEFINITIONS

Medical Device Related Pressure Injury:

- This describes an etiology of the injury.
- Use the staging system to stage .
- Medical device related pressure injuries result from the use of devices designed and applied for diagnostic or therapeutic purposes. The resultant pressure injury generally conforms to the pattern or shape of the device.

Mucosal Membrane Pressure Injury:

- Found on mucous membranes with a history of a medical device in use at the location of the injury.
- Due to the anatomy of the tissue these injuries cannot be staged.

DIABETIC FOOT ULCER/NEUROPATHIC ULCER

- A serious complication that diabetics may encounter are diabetic wounds also know as neuropathic wounds.
- Neuropathy is a state of nerve damage.
- 50% of diabetic patients have neuropathy.

DIABETIC FOOT ULCER/NEUROPATHIC ULCER

TYPES OF NEUROPATHY

Motor Neuropathy:

- Damage to the nerves that control the muscles of the foot.
- Associated with muscle atrophy, foot and toe deformities, and altered weight-bearing, causing callous formation and plantar surface ulcers.

Autonomic Neuropathy:

- Damage to the nerves that control the sweat glands and dilation of arterioles.
- Loss of sweating causes dry and cracked feet with fissures that can get infected.
- Increased blood flow results in osteopenia placing the patient at high risk for fracture with minor stress and trauma.
- Patient continues to walk on foot which eventually causes ulceration.

DIABETIC FOOT ULCER/NEUROPATHIC ULCER

PATHOLOGY

- Breakdown most commonly occurs in areas exposed to painless, repetitive trauma from friction or pressure resulting in inflammatory changes in tissues getting additional trauma and damage eventually causing ulceration.
- Can also get unrecognized direct penetration of skin by sharp object.

DIABETIC FOOT ULCER/NEUROPATHIC ULCER

RISK FACTORS:

- High levels of blood glucose for extended periods affects e immune system. Reduced blood flow and damaged nerves puts patients at high risk of developing ulcers.
- The risk is higher for diabetic patients with comorbidities such as atherosclerosis, high cholesterol levels, obesity, or AIDS.
- Unhealthy diet, smoking, and lack of exercise are risk factors.
- Any diabetic patient who has a hazardous occupation (operating heavy machinery, using sharp tools for building and construction, or violent sports) is at greater risk.

MANAGEMENT OF DIABETIC FOOT ULCER/NEUROPATHIC ULCER

Reduce or eliminate Pressure and trauma: Offloading

- Pressure relief for heel ulcers.
- Modification of footwear to avoid pressure/friction to toe ulcers.
- "Offloading" for plantar surface ulcers until healed.

Evaluate perfusion and initiate vascular consult if indicated

- If wound is ischemic and covered with dry eschar and there are no signs of infection: **Do not debride**.

Control glucose levels

- Keep blood sugar ideally between 100 and 140.

Initiate appropriate topical therapy

- Apply principles of moist wound healing.

DIABETIC FOOT ULCER/NEUROPATHIC ULCER

PREVENTION

- Assure correctly fitting shoes.
- Avoid heels: > 2" heels increases pressure over metatarsal heads by 57%.
- Consider shoes with rigid soles which keep shoe from bending at ball of foot.
- Check feet at end of every day for presence of lesions.
- Avoid barefoot walking
- Always shake out shoes before donning.
- Always check water temperature before stepping into tub or shower.

VENOUS STASIS ULCERS

Definition

An open skin lesion of the leg or foot that occurs in an area affected by venous hypertension.

Pathophysiology

- Prolonged venous hypertension results in vein wall damage.
- This increases capillary permeability and allows the extravasation of micromolecules and macromolecules into the surrounding tissue.
- Damage to these tissues leads to venous ulcer development.

VENOUS STASIS ULCERS

Risk Factors for Lower Extremity Venous Disease (LEVD):

- Family history
- Older age
- Obesity
- History of venous disease or thromboembolism
- Trauma to the legs
- Female
- Pregnancy
- Occupation that involves standing for a long period

VENOUS STASIS ULCERS

Location:

- Lower calf and ankle (the gaiter area)
- Pretibial and medial supra-malleolar area of the ankle near perforator veins

Diagram 5

VENOUS STASIS ULCERS

Associated Skin Assessment:

- Hyperpigmentation of lower calf and ankle skin from hemosiderin staining (leakage of red blood cells into the tissue)
- Lipodermatosclerosis – thickening and fibrosis of skin and subcutaneous tissue from chronic inflammation
- Edema that may worsen with prolonged standing
- Dry scaly skin that may be itchy
- Weepy skin
- Evidence of healed venous ulcers

VENOUS STASIS ULCERS

Wound Characteristics

- Typically shallow in depth
- Irregular in shape
- Moderate to large amount of drainage is common
- Often has a yellow fibrous film covering the surface
- Variable pain (mild to severe)

ARTERIAL ULCERS

Definition

- A wound caused by impaired arterial blood flow to the lower leg and foot.
- The impairment in blood flow results in tissue ischemia, necrosis, and loss.

Causes

- Most commonly – Atherosclerosis
- Arteriosclerosis
- History of arterial insufficiency to lower extremities:
  - Peripheral Arterial Disease (PAD)
  - Lower Extremity Arterial Disease (LEAD)

ARTERIAL ULCERS

Risk Factors for Atherosclerosis/Arteriosclerosis

- Age
- Smoking
- Diabetes Mellitus
- Hypertension
- Dyslipidemia
- Obesity
- Family history of cardiovascular disease

Location

- Toes, dorsum of the foot, lateral malleolus, distal lower leg

ARTERIAL ULCERS

Associated Skin Assessment

- Cooler skin temperature
- Thin, shiny skin
- Decreased or absent skin hair
- Decreased pulse strength in affected extremity
- Skin pallor on foot elevation; dusky rubor on dependency
- Dystrophic toenails
- Low Ankle-Brachial Index (ABI)

ARTERIAL ULCERS

Wound Characteristics

- Round and regular in shape
- Pale wound bed
- Can be shallow in depth or relatively deep
- Smooth, well defined wound edges
- Gangrenous/necrotic tissue may cover the wound
- Minimal drainage
- Severe pain

GUIDELINES FOR DIFFERENTIAL ASSESSMENT

Venous

- Location Around medial malleolus
- Ulcer bed dark red or red with thin layer adherent slough
- Large volume exudate
- Pain that improves with elevation and worsens with dependency

Arterial

- Location distal foot/toes or area of trauma that is not healing
- Ulcer bed necrotic or viable but pale
- Minimal exudate
- Pain that worsens with activity or elevation and improves with rest and dependency

MANAGEMENT OF VASCULAR ULCERS

Venous

- Protect surrounding skin
- Absorptive dressing
- Monitor for infection
- Manage venous dermatitis (if indicated)
- Compression therapy and/or elevation unless contraindicated

MANAGEMENT OF VASCULAR ULCERS

Arterial

- Vascular consult if appropriate
- Measures to enhance perfusion (avoid cold, constrictive garment, nicotine and caffeine, adequate hydration)
- Dependent or neutral position
- Non-adherent non-occlusive dressing if open lesion
- Necrotic and non-infected-no intervention
- Necrotic and infected-prompt MD consult
- Maintain high index of suspicion for wound infection

SURGICAL WOUND CLOSURE

- Surgical wounds are closed primarily or are left open for either delayed primary closure or healing by secondary intentions.
- Incisions are approximated with sutures, staples, adhesive tapes, and skin adhesives to provided support and stability to tissues until healing has progressed and an acceptable degree of wound tensile tissue strength is reestablished.
- Sutures should be removed within 1 to 2 weeks. Left too long can cause suture marks, local tissue reaction, and scarring. Removed to soon can cause wound dehiscence.

SURGICAL WOUND INFECTION

- Deep incision infection involves the deep tissues including muscle and fascia.

- Prevention of hyperglycemia: helps minimize SSI.
- Obesity is an independent predictor of SSI.

PRINCIPLES OF TOPICAL WOUND THERAPY

Infection:

- Wound healing is impaired with critical colonization (local wound infection) and infection and requires treatment.
- Signs and symptoms of infection: erythema, warmth, increased pain, increased exudate or purulent drainage, friable tissue, increase on wound size, and new areas of slough.

SURGICAL WOUNDS

- Surgical wounds that heal within an expected time frame and without complications are considered acute wounds.
- The major goal of surgical wound care is preventing complications such as surgical site infection.

SURGICAL WOUND INFECTION

- Surgical site infection (SSI) is among the top three hospital-acquired conditions.
- SSI occur within 30 days of surgery or within 1 year if an implant has been inserted.
- Superficial incision infection involves only skin and subcutaneous tissue at the incision.

TOPICAL INCISION CARE

- Keep incisions dry without prolonged exposure to moisture (including topical antibiotics).
- Maintain original postoperative dressing for 48 to 72 hours (use antiseptic technique and sterile saline for changing dressings if needed in first 48 hours).
- After 48 to 72 hours, patient may shower if suture line is closed with no drainage.
- Timing of suture or staple removal depends on wound location:
  - Face: 3-5 days
  - Scalp, chest, fingers, hand, lower extremity:7-10 days
  - Back: 10-14 days
- Protect surgical wound incision from exposure to sun to prevent permanent hyperpigmentation.

PRINCIPLES OF TOPICAL WOUND THERAPY

Debridement:

- Removal of devitalized tissue is paramount for wound healing.
- Necrotic tissue is a medium for bacterial growth and its removal helps to move the wound from the inflammatory phase into the proliferative phase of repair.
- Types of debridement: surgical, autolytic, enzymatic, biological, chemical, and mechanical debridement.
- Contraindicated in ischemic wound non-infected and covered by dry eschar.

PRINCIPLES OF TOPICAL WOUND THERAPY

Moist Wound Surface:

- A moist wound surface promotes cell migration and wound healing.
- Appropriate dressings should be selected to absorb exudate while maintaining a moist wound bed.
- There are five basic types of moisture-retentive dressings: films, foams, hydrocolloids, alginates, and hydrogels

DRESSING SELECTION GUIDELINES

Deep wet wounds:≥0.25cm

Need absorptive filler +cover dsg

Filler:

- calcium alginate (Maxorb)
- Gauze & specialty gauze (nonwoven preferred, loosely packed)

Cover dressing:

- Gauze /tape (use transparent adhesive such as Suresite Window instead of tape if exposed to contaminants)
- Waterproof foam dressing(Optifoam: good choice when bacterial barrier needed)

Deep dry wounds:≥0.25cm

Need Hydrating filler+cover dsg

Filler:

- Wound gel(Hydrogel) +lightly fluffed damp saline gauze

Cover dressing:

- Gauze +Tegaderm
- Waterproof foam dressing (Optifoam)
- Both options prevent wound contamination.

RECALCITRANT WOUNDS

- If wounds do not show measurable improvement in two weeks, they are said to be refractory or recalcitrant wounds.
- These are wounds that do not heal despite appropriate treatment. The causes for healing failure are not well-understood making the treatment of these wounds empiric.
- The treatment plan should be reassessed, the patient systemic status should be evaluated, the wound should be assessed for evidence of heavy bioburden, and active wound therapy should be initiated.
- Active wound products: matrix metalloproteases inactivators (collagen), exogenous growth factors, extracellular matrix products (collagen) negative pressure wound therapy, human skin equivalents, and hyperbaric oxygen therapy.

ACTIVE DRESSINGS: COLLAGEN DRESSINGS

PRINCIPLES OF TOPICAL WOUND THERAPY

Open Closed Wound Edges:

- Closed wound edges prevent epithelial cell migration and therefore wound healing.
- Commonly occurs in wounds with undermining which is the separation between periwound skin and wound base.
- Closed wound edges have to be treated for healing to occur.
- They can be cauterized with silver nitrate sticks or surgically excised.
- Silver nitrate is also used to treat hypergranular tissue which impairs healing.

DRESSING SELECTION GUIDELINES

Shallow Wet Wounds:≤0.25cm

Options:

- Foam dressing with adhesive borders (Optifoam)
- Alginate (Maxorb)+adhesive foam or gauze and tape

Shallow Dry Wounds:≤0.25cm

Options:

- Wound gel (Hydrogel) +foam dressing (Optifoam)
- Hydrocolloid (Tegaderm Hydrocolloid)
- Transparent dressing (Suresite window)
- Non-adhering contact layer (Curad oil emulsion, Curad Xeroform)+gauze cover or foam dressing(Optifoam)

DEBRIDERS: COLLAGENASE, MEDICAL HONEY, CADEXOMER IODINE

DRESSING SELECTION BY TYPE OF WOUND

Deep wet wound

Alternatives:

-Wound VAC

-Loosely packing the wound with gauze moistened with saline, or packing strip, or calcium alginate, cover with gauze and tape or foam with adhesive borders

DRESSING SELECTION BY TYPE OF WOUND

Deep dry wound

Alternatives:

-Hydrogel, pack loosely with gauze moistened with saline, cover with foam with adhesive borders or gauze and tape

DRESSING SELECTION BY TYPE OF WOUND

Arterial ulcer with stable eschar

Paint it with Povidone Iodine and leave open to air or cover with gauze.

DRESSING SELECTION BY TYPE OF WOUND

Yellow slough/necrotic tissue

Needs debridement: surgical, enzymatic, autolytic, chemical

DRESSING SELECTION BY TYPE OF WOUND

Yellow slough/necrotic tissue

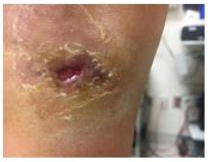
Needs debridement: surgical, enzymatic, autolytic, chemical

DRESSING SELECTION BY TYPE OF WOUND

Thin Yellow slough:

Needs debridement: medical honey

DRESSING SELECTION BY TYPE OF WOUND



Clean wound bed non-granular, non-healing

Needs active dressing

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Appendix E

Gap Analysis Tool

Best practice	Best practice strategy	How your practices differ from best practice	Barriers to best practice implementation	Will implement best practice? Yes/no; why not
Moist wound environment for wound healing.	Wound too dry delays wound healing due to dehydrated cells. Wound too moist delays wound healing because overhydrated cells swell and burst.	Still performing wet-to-dry dressings.	Many of the providers have not had wound care training and don't feel comfortable performing wound care.	Yes. Promotes wound healing by performing a best practice, well accepted wound care principle.
Arterial brachial index (ABI) test prior to compression dressings for treatment of venous stasis ulcers.	ABI test indicates if there is good arterial circulation. Arterial compromise is a contraindication for compression therapy.	Performing compression dressings without ABI test putting patients at risk. Providers are not aware of importance f ABI test to prevent cutting circulation during compression therapy.	Not enough time to perform an additional task.	Yes. Failure to implement this best practice principle can put at risk patients' limbs.
Wound bed preparation through the debridement of necrotic tissue.	Necrotic tissue delays wound healing and promotes infection if wound not infected already.	PCPs do not debride the wound and do not know what wound care products to use; this lack of wound care knowledge causes wound deterioration; treatment becomes lengthy and very expensive. Patients got to the ER for dressing changes, get admitted due to wound infection, large amounts of referrals are sent to the wound care clinic	Many of the providers have not had wound care training and don't feel comfortable performing wound care.	Yes. Appropriate best practice, real time wound care is more efficient, cost effective, and improves outcomes.

Appendix F

Letter of Invitation for a Wound Care Class from the Continuing Medical Education Department

February 26, 2019
Hello Zaira and Yuwen:

Thank you for agreeing to speak to our staff/faculty and participate in our CME activities.
This event is scheduled for:

Title: Wound Care in the Primary Care Setting
Date: May 1, 2019
Time: 1:30-2:30 PM
Location: Classroom 1, 2nd floor, San Mateo Medical Center, 222 39th Avenue, San Mateo

Please complete the highlighted portions of the attached CME application. I am happy to help you with the practice gaps and learning objectives for your talk. Please ensure that your presentation is aligned with the learning objectives identified.

Instructions for slides: Please include the following: 1) A slide showing your disclosures and 2) a slide outlining the learning objectives identified with the CME Committee planner. Also, please ensure that your presentation and slides are free of any commercial bias or promotion of any commercial interest.

Handouts: Our audience greatly appreciates receiving handouts. If you have printed materials to be distributed, please email them to Dina Gibbs at dgibbs@smcgov.org at least 1 week prior to the event. If you would like some of your slides to be provided as a handout, please identify which ones should be included in the handout and we will provide that to the participants. Please note that it is your responsibility to not include any materials which may cause a copyright infringement.

Questions: In the CME Application, we show the questions that we will ask in a follow up survey of attendees. Feel free to add additional questions if you think they will provide valuable information about changes in attendees' practice habits.

Audiovisual Needs: Please let us (dgibbs@smcgov.org) know in advance if you need any audiovisual equipment.

Cultural Requirement: As you are aware, our patient population is highly diverse in San Mateo County and our audience will greatly appreciate any comments relating your presentation topic to the diverse needs of our population. Also of note, the California Legislature passed Assembly Bill 1195 stating that all continuing medical education courses shall contain curriculum that includes cultural and linguistic competency in the practice of medicine (http://www.imq.org/imqdoc.cfm/120#ab1195). Thank you in advance for addressing this at some point in your presentation.

HIPAA Regulations: The Health Insurance Portability and Accountability Act of 1996 (HIPAA) may have provisions relevant to CME activities. Please note that it is your responsibility to not include any information which may cause a HIPAA violation.

Pharmaceutical and Medical Device Products: If applicable, speakers are asked to identify

pharmaceutical and medical device products by their generic names, announce if described uses are unlabeled by the FDA or treatments are not approved by the FDA, and note if described research studies were industry funded or practices are still considered experimental.

Please email the following no later than one month prior to presentation:

□ CME /CEU Application* (CME Committee member can help with filling out this form)
□ Curriculum vitae*
□ An electronic copy of your slides
□ An electronic copy of your handout (if applicable)

*The Accreditation Council for Continuing Medical Education **requires** that we obtain the goals and objectives**,** CME Activity Disclosure of Relevant Financial Relationships & Participation Declaration, and your curriculum vitae, *prior* to your lecture.

Many thanks for contributing your expertise to our continuing education program.

Sincerely,
Josh Schechtel
Manager, CME Program

Appendix G

APPLICATION FOR CONTINUING MEDICAL EDUCATION (CME) CREDITS AND CONTINUING EDUCATION UNITS/HOURS (CEU/CEH)

SAN MATEO COUNTY HEALTH SYSTEM

This section to be completed for ALL Continuing Education types:			
Proposed Activity Title	**Wound Care in the Primary Care Setting**		
Proposed Date(s)	**May 1, 2019**	**Time:**	**1:30 to 2:30 PM**
Speaker(s)' Name(s)	**Zaira Torres, Yuwen Liao**	**Email:**	**ztorres@smcgov.org yliao@smcgov.org**
Number of Credit Hours	**1**	Credit hours based on hour-for-hour participation, excluding breaks and meals.	

To meet the California Medical Association's requirements for CME accreditation, an educational event must strive to maintain, develop, or increase the clinical knowledge, skills and performance that practitioners use to provide service to patients, the public, and the profession. The ultimate goal is optimum patient care.

PLEASE INDICATE YOUR TARGET AUDIENCE (For which license(s) do you seek credits?)

☒ MD	☐ Clinical Psych/PsyD	☒ RN	☐ LMFT	☐ LCSW	☐ LPCC	☐ CAADE	☐ CCAPP

Speaker and planner to complete the section below:

Learners' Needs

This section helps identify what your audience needs to learn

1. CURRENT SITUATION:

What about the current situation is preventing desired patient outcomes? What are clinicians currently doing or not doing? *(e.g Providers are not taking a medical history in a culturally sensitive way; Providers are not screening children for lead levels; Providers are not talking about smoking cessation with their patients)*

Describe current situation:

Many of our primary care providers are not comfortable doing minor wound care in the clinic setting.

2. DESIRED PRACTICE:

What is the desired patient care or patient outcome? *(e.g. Providers use culturally appropriate language when taking a medical history; All children at risk are screened for lead levels; Smoking cessation is addressed with all patients who smoke)*

Describe desired practice:

Primary care providers should be competent in caring for a variety of wounds in the primary care clinic, and should be competent in referring appropriately to the wound care clinic.

3. GAP:

Why does a gap exist between the current situation and desired practice? What are the learning needs of your audience? *(e.g. Providers need to learn how to take a culturally sensitive medical history; Providers need to know the guidelines for lead level screening and follow up; Providers need to practice talking about smoking cessation with their patients)*

Describe learning needs:

Our providers have not had training in treating various wound types, and they need to know what equipment and supplies are needed so that these can be ordered by their clinic managers.

4. UP TO THREE EDUCATIONAL OBJECTIVES: Pick 3 specific tasks the learner will be able to do after the Continuing Education activity; start each with a concrete-action verb (*e.g. Providers **will take** a medical history in a culturally sensitive manner; Providers **will order** lead screening on all at-risk children; Providers **will talk** about smoking cessation with all patients who smoke*)

1**. Primary care providers will be able to assess, diagnose, and treat minor vascular wounds, diabetic wounds, and pressure injuries.**

2. Primary care providers will learn the equipment and supplies needed to treat vascular and diabetic wounds and pressure injuries.

3. Primary care providers will be comfortable performing minor wound care in their clinical setting.

4. Primary care providers will be competent in referring patients with wounds appropriately to wound care clinics.

5. CULTURAL AND LINGUISTIC COMPETENCY OR HEALTH DISPARITIES THAT WILL BE ADDRESSED IN THIS ACTIVITY INCLUDE: (see examples below)

The aftercare of wounds depends on the patient understanding the instructions from the provider. It is important that instructions are in the patient's primary language.

Examples of cultural, linguistic and disparity factors that play a role in suboptimal health outcomes:

- *Disparities among different patient groups in care or outcomes*
  - *(e.g. language barriers, metrics that show disparities by race, age or gender, etc.)*
- *Incidence and/or prevalence of a disease/problem varies with different ethnic, racial or cultural groups. A disease presents differently in different ethnic, racial or cultural groups*
  - *Example: Asthma is more common in Puerto Rican children than non-Hispanics*
  - *Example: Lupus is more common in African-Americans than non-African-Americans*
- *Prognosis/outcome of the disease/problem varies with different ethnic, racial or cultural groups*
  - *Example: Outcomes in hypertension are worse in African-Americans than non-African-Americans*
- *Compliance with therapy of this disease/problem varies with different ethnic, racial or cultural groups*

- *Explanation/patient instructions are affected by cultural/language differences*

(California Assembly Bill 1195 AB-1195.pdf requires continuing medical education activities with patient care components to include curriculum in the subjects of cultural and linguistic competency.)

6. **FOLLOW UP QUESTIONS: Several months after your talk, we will ask attendees the following questions. Please add other questions that you think will provide valuable information about changes in our providers' practice habits.**

1. Since hearing this presentation, have you made any changes in your clinical practice based on what you learned? If so, can you give an example?

2. Have you experienced any difficulty or barriers to making the changes mentioned in question 1?

PLEASE SUBMIT YOUR APPLICTION WITH REQUIRED DOCUMENTATION ELECTRONICALLY TO THE CME OFFICE AT LEAST 30 DAYS PRIOR TO YOUR EVENT. Email: jschechtel@smcgov.org

IF YOU HAVE ANY QUESTIONS PLEASE CALL Josh Schechtel, Manager of Medical Education at: (650) 578-7196.

FOR CME OFFICE USE ONLY

A. Disclosure Declaration – Are disclosure form(s) completed and logged for all individuals with control of content?

Speaker(s) ☐ Yes ☐ No Planning Committee Members and CME activity monitor ☐ Yes ☐ No

Conflict of Interest – Does any individual with control of content have a potential conflict of interest with this CME activity?

☐ Yes ☐ No If "Yes", contact Josh Schechtel, CME Director – Email: jschechtel@smcgov.org

B. **This activity addresses the following desirable physician/provider attributes** (at least one required):

☐ Professionalism	☐ Quality improvement	☐ Provide patient centered care
☐ Patient care and procedural skills	☐ Evidence-based practice	☐ Values/Ethics for Interprofessional practice
☐ System-based practice	☐ Medical knowledge	☐ Interprofessional communication
☐ Practice-based learning and improvement	☐ Utilization of informatics	☐ Roles/responsibilities
☐ Interpersonal & communication skills	☐ Interdisciplinary teams/teamwork	

C. This activity is designed to change:

☐ Competence ☐ Performance ☐ Patient Outcomes

D. CME Committee Member, please identify the source of information or data used to identify the professional practice gap(s).

☐ CME Committee (with or without presenter input)
☐ Survey Results
☐ Requests/needs identified on CME evaluation forms
☐ Requests/needs identified in departmental meetings
☐ Quality Team
☐ CDC Primary Indicators, in which our county performed "Worse" than peer counties
☐ Other (please describe) _____

☐ LIVE CME ACTIVITY (grand rounds, training, etc.)

☐ ENDURING MATERIALS/INTERNET ENDURING MATERIALS

☐ **APPROVED FOR CME BY:**

CME Committee Member — **Date received by CME office**

☐ **APPROVED FOR CEU/CEH BY:**

Workforce Education and Training Coordinator/ CEU Coordinator — **Date received by ODE**

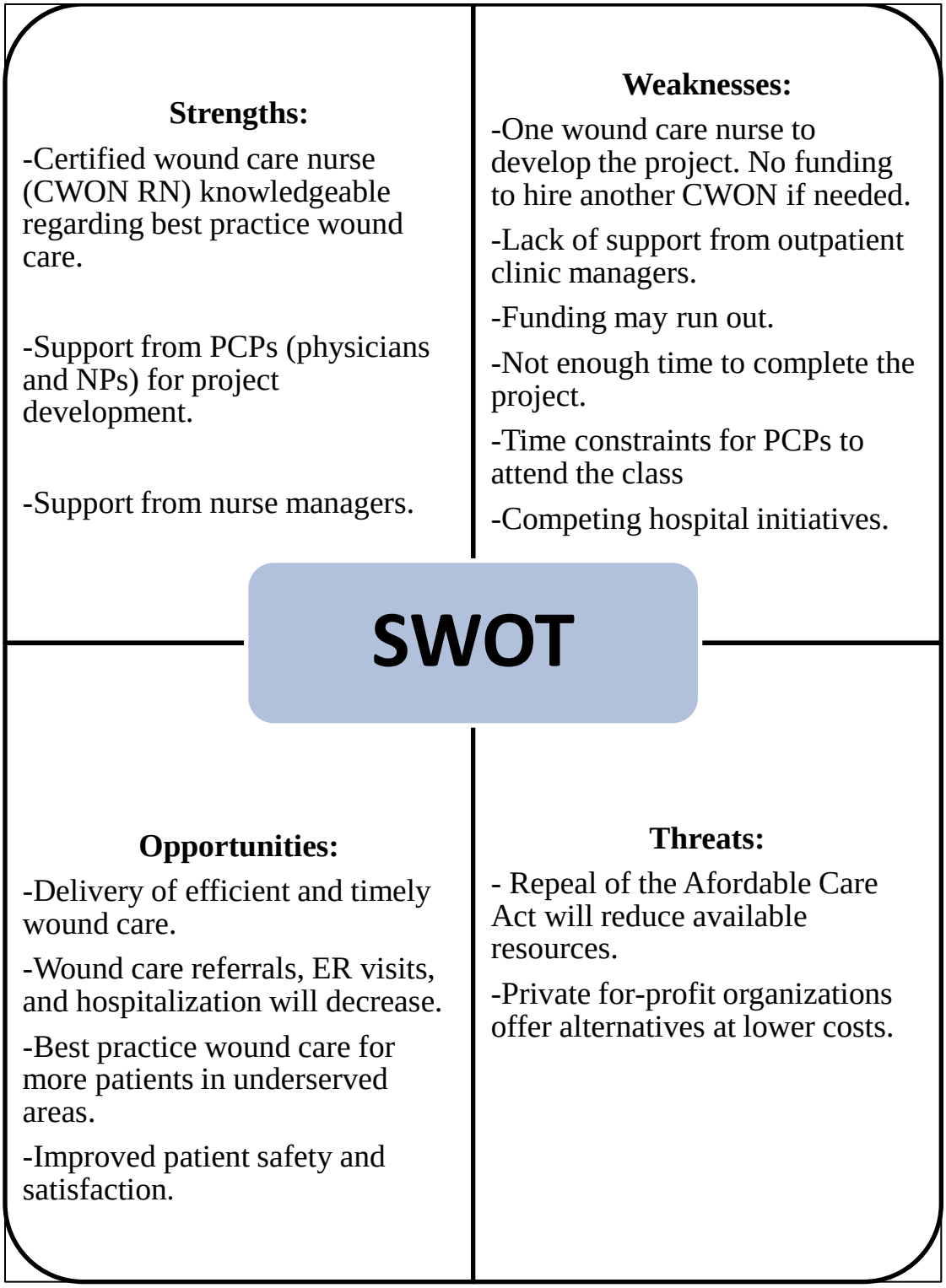
Appendix H

Project GANTT Chart

Wound Care Education for Primary Care Providers Project GANTT Chart										
Task Date	**Name**	**Fall 17**	**Spring 18**	**Summer 18**	**Fall 18**	**Spring 19**	**Summer 19**	**Fall 19**	**Spring 20**	**Completed**
8/28/2017	DNP Topic Selection- Wound Care Education for PCPs-**Problem identification**	x								Yes
10/7/2017	Literature review - Project idea paper	x								Yes
11/4/2017	**Statement of determination**	x								Yes
1/18-5/18	Detailed **analysis of issue/Gap analysis**		x							Yes
6/18-8/18	**Determination of stakeholders** and roles related to the issue			x						Yes
6/20-8/18	Development of **AIM statement** for the issue			x						Yes
8/18-12/18	Working on **theoretical framework** for the project				x					Yes
9/20/2018	Presentation of project to stakeholders				x					Yes
10/1/2018	Invitation from Continuing Medical Education Program (CMEP) to present the class				x					Yes
11/18-12/18	Development of PowerPoint presentation				x					Yes
1/19-5/19	Qualifying Project: **Manuscript Development** N749A					x				Yes
2/19/2019	PowerPoint presentation reviewed by NP and CMEP					x				Yes
5/1/2019	Class presented to PCPs					x				Yes
8/15/2019	Questionnaire sent to PCPs by CMEP to assess quality improvement						x			Yes
6/19-8/19	Qualifying Project:**Prospectus Development** N749B						x			Yes
8/19-12/19	DNP Residency NURS 795							x		Yes
1/20-5/20	**DNP Project** NURS 789								x	Yes

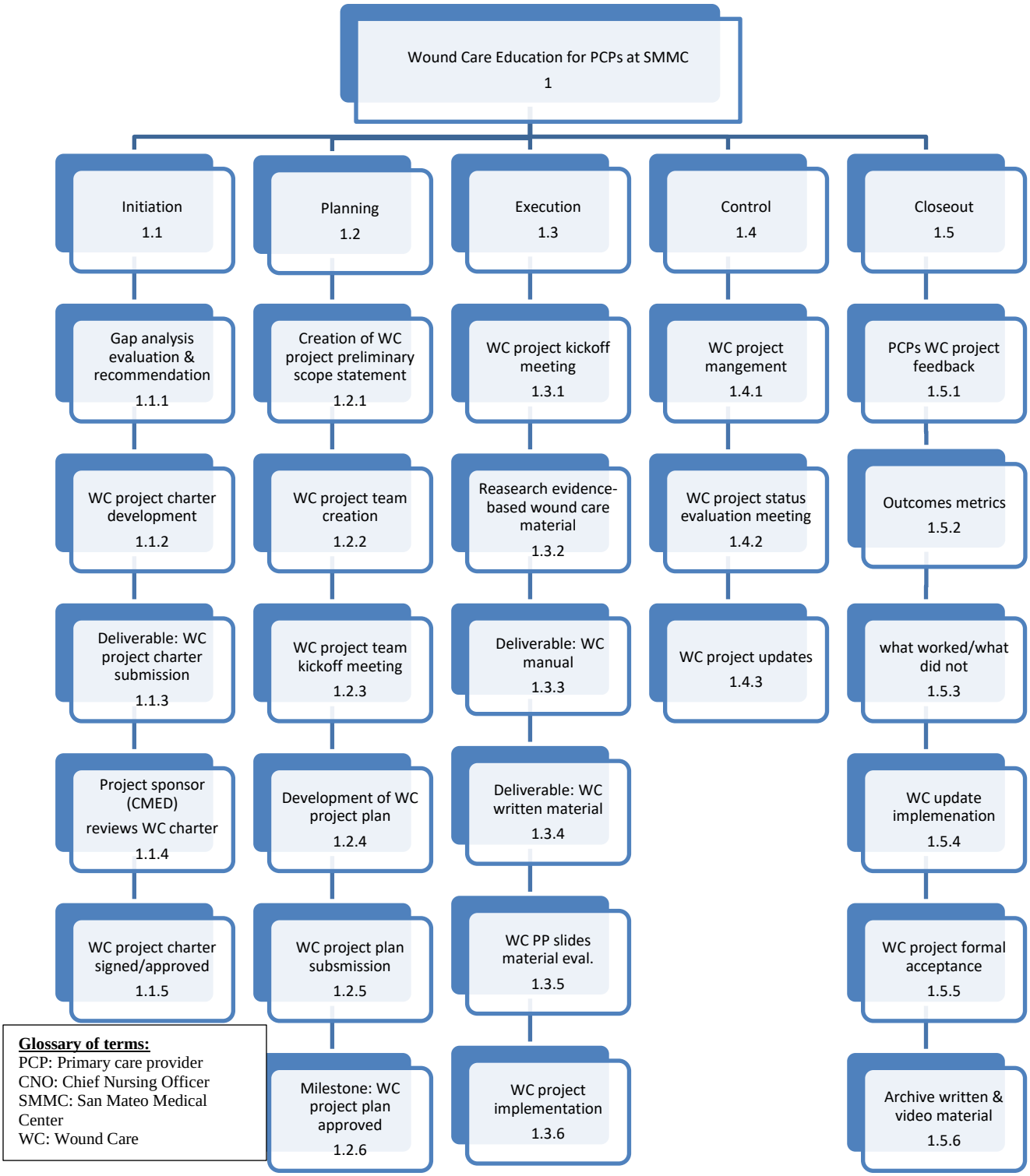
Appendix I

SWOT Analysis



Appendix J

WBS Hierarchy Chart



Appendix K

Wound Care Education Project Proposed Budget

Project Team	Edu. Material (hours worked)	Pre/Post Assessment (hours worked)	Teaching (hours worked)	Data Collection & Analysis (hours worked)	Total Hrs. Worked	Cost/Hr.	Total Cost
Woudn Care Nurse	40	10	2	10	62	$78.00	$4,836.00
Nurse Practitioner	5			5	10	$90.00	$900.00
Nurse Informaticist				10	10	$80.00	$800.00
Total							$6,536.00

Appendix L

Communication Plan/Matrix Chart

	Project Team			
Task	Project Manager	Nurse Practitioner-Surgical Clinic	Nurse Informaticist	Manager of the CMED
Gap analysis development	R			
Project charter development and submission	R			
Project scope statement	R			
Project team creation	R			
Project plan and submission	R	S	S	
Research wound care education material	R	S		
Deliverable: wound care manual	R	S		
Deliverable: wound care PowerPoint slides	R	S		
Project implementation-presentation	R			R
Project status evaluation	R	S	S	R
Project updates	R	S	S	R
Outcome metrics	R	S	R	R
What work/what did not	R	S	S	

R = Responsible
S = Supports/Assists

Appendix M

Pre and Post Survey Evaluation Tool

Pre Test

1. Before the class, I felt knowledgeable regarding assessment and treatment of vascular wounds, diabetic wounds, surgical wounds, and pressure injuries.
   5: strongly agree ( ) 4: Agree ( ) 3: Undecided ( ) 2: Disagree ( ) 1:Strongly disagree ( )

2. Before the class, I felt comfortable performing wound care.
   5: strongly agree ( ) 4: Agree ( ) 3: Undecided ( ) 2: Disagree ( ) 1:Strongly disagree ( )

3. Before the class, I felt comfortable selecting the appropriate dressing according to different wound characteristics.
   5: strongly agree ( ) 4: Agree ( ) 3: Undecided ( ) 2: Disagree ( ) 1:Strongly disagree ( )

4. Before the class, I felt comfortable referring the appropriate patients to the wound care clinic.
   5: strongly agree ( ) 4: Agree ( ) 3: Undecided ( ) 2: Disagree ( ) 1:Strongly disagree ( )

Pot Test

1. After the class, I feel knowledgeable regarding assessment and treatment of vascular wounds, diabetic wounds, surgical wounds, and pressure injuries.
   5: strongly agree ( ) 4: Agree ( ) 3: Undecided ( ) 2: Disagree ( ) 1:Strongly disagree ( )

2. After the class, I feel comfortable performing wound care.
   5: strongly agree ( ) 4: Agree ( ) 3: Undecided ( ) 2: Disagree ( ) 1:Strongly disagree ( )

3. After the class, I feel comfortable selecting the appropriate dressing according to different wound characteristics.
   5: strongly agree ( ) 4: Agree ( ) 3: Undecided ( ) 2: Disagree ( ) 1:Strongly disagree ( )

4. After the class, I feel comfortable referring the appropriate patients to the wound care clinic.
   5: strongly agree ( ) 4: Agree ( ) 3: Undecided ( ) 2: Disagree ( ) 1:Strongly disagree ( )

Post Test Overall Improvement

1. The wound care class improved my wound care knowledge.
   5: strongly agree ( ) 4: Agree ( ) 3: Undecided ( ) 2: Disagree ( ) 1:Strongly disagree ( )

2. My practice has improved after the wound care class.
   5: strongly agree ( ) 4: Agree ( ) 3: Undecided ( ) 2: Disagree ( ) 1:Strongly disagree ( )

Appendix N

DNP Statement of Non-Research Determination Form

Student Name: Zaira Torres

Title of Project:

Wound Care Education for Primary Care Providers at a Regional Medical Center.

Brief Description of Project:

Development of a wound care education program directed at primary care providers (PCPs) to ensure the provision of high-quality and cost-effective care. Currently, PCPs at San Mateo Medical Center refer all wound care patients to the Vascular Clinic. Many of these wounds could be treated by the PCPs if they knew how to treat wounds according to best practice. Due to the large number of referrals, many patients are not seen in a timely manner and go to the emergency room for treatment. Some patients are admitted to the hospital due to preventable wound infection and sepsis.

A) Aim Statement:

The aim of this DNP Project is to develop, implement, and evaluate a wound care assessment and treatment education class for all PCPs at San Mateo Medical Center and satellite outpatient clinics with the goal of improving patient outcomes by providing care according to best practice, by facilitating change of practice and practice improvement, and by decreasing the number of referrals to the Vascular Clinic by 30%. This project was completed on August, 2019.

B) Description of Intervention:

Development of an evidence-based wound care education program for PCPs. The program will include assessment and treatment of vascular wounds, pressure injuries, neuropathic wounds, and surgical wounds.

B) **How will this intervention change practice?**

Wound care knowledge will allow PCPs to utilize clinical knowledge to provide care that is evidence-based and cost-effective. This will improve our outcomes by decreasing the number of referrals to the Vascular Clinic and the number of admissions to the

hospital due to wound infection. C) **Outcome measurements:** PCPs will feel competent to assess and treat vascular wounds, neuropathic wounds, surgical wounds, and pressure injuries. The PCPs' practice will improve as a result of the wound care class. The number of referrals to the Vascular Clinic will be measured. The goal is to decrease them by 30%.

To qualify as an Evidence-based Change in Practice Project, rather than a Research Project, the criteria outlined in federal guidelines will be used: (http://answers.hhs.gov/ohrp/categories/1569)

X This project meets the guidelines for an Evidence-based Change in Practice Project as outlined in the Project Checklist (attached). Student may proceed with implementation.

___ This project involves research with human subjects and must be submitted for IRB approval before project activity can commence.

Comments:

EVIDENCE-BASED CHANGE OF PRACTICE PROJECT CHECKLIST *

Instructions: Answer YES or NO to each of the following statements:

Project Title:	**YES**	**NO**
The aim of the project is to improve the process or delivery of care with established/ accepted standards, or to implement evidence-based change. There is no intention of using the data for research purposes.	**X**	
The specific aim is to improve performance on a specific service or program and **is a part of usual care**. ALL participants will receive standard of care.	**X**	
The project is **NOT** designed to follow a research design, e.g., hypothesis testing	**X**	

or group comparison, randomization, control groups, prospective comparison groups, cross-sectional, case control). The project does **NOT** follow a protocol that overrides clinical decision-making.		
The project involves implementation of established and tested quality standards and/or systematic monitoring, assessment or evaluation of the organization to ensure that existing quality standards are being met. The project does **NOT** develop paradigms or untested methods or new untested standards.	**X**	
The project involves implementation of care practices and interventions that are consensus-based or evidence-based. The project does **NOT** seek to test an intervention that is beyond current science and experience.	**X**	
The project is conducted by staff where the project will take place and involves staff who are working at an agency that has an agreement with USF SONHP.	**X**	
The project has **NO** funding from federal agencies or research-focused organizations and is not receiving funding for implementation research.	**X**	
The agency or clinical practice unit agrees that this is a project that will be implemented to improve the process or delivery of care, i.e., **not** a personal research project that is dependent upon the voluntary participation of colleagues, students and/ or patients.	**X**	
If there is an intent to, or possibility of publishing your work, you and supervising faculty and the agency oversight committee are comfortable with the following statement in your methods section: *"This project was undertaken as an Evidence-based change of practice project at X hospital or agency and as such was not formally supervised by the Institutional Review Board."*	**X**	

ANSWER KEY: If the answer to **ALL** of these items is yes, the project can be considered an Evidence-based activity that does NOT meet the definition of research. **IRB review is not required. Keep a copy of this checklist in your files.** If the answer to ANY of these questions is **NO**, you must submit for IRB approval.

*Adapted with permission of Elizabeth L. Hohmann, MD, Director and Chair, Partners Human Research Committee, Partners Health System, Boston, MA.

STUDENT NAME (Please print):

__Zaira Torres_____

Signature of Student: _____DATE____11-04-18_

SUPERVISING FACULTY MEMBER (CHAIR) NAME (Please print):

_Dr. Karen Van Leuven_____

Signature of Supervising Faculty Member (Chair):

_____DATE____11-04-18__

Appendix O

San Mateo Medical Center Wound Care Products List

Therahoney gel: Debrider for slough but can be used in any wound, specially good for small wounds and dry wounds since the gel will keep the wound moist.

Therahoney sheet: Debrider for slough. Use in bigger wounds since gel in big wounds can become messy to apply.

Hydrogel: For clean (no slough) dry wounds.

Collagen Ag: To expedite wound healing in clean wounds. Not to be applied on necrotic tissue.

Silvadene: Good for burns. Apply Silvadene, then cover with Xeroform and then secure with dry dressing (gauze 4x4, BAD pad, gauze roll, etc., depending on size and location of wound)

Triamcinolone: For itchy, scaly skin in venous dermatitis.

Packing strip: Iodoform (with iodine) and plain, ¼, ½ inch. To pack small abscesses, small healing surgical wounds. There is also plain packing strip, but if you can only get one, get Iodoform.

Moisture barrier-zinc oxide: Good for moisture associated dermatitis. Also good to apply on stage 2 pressure injuries: apply a thin layer of paste and then cover it with foam dressing, area to be offloaded. It works better that antibiotic ointment because antibiotic ointment keeps the wound too moist.

Calcium alginate 4x4in, 6x6in and rope: Get 4x4 if can only get one. Good for highly draining wounds. Can go directly on top of clean wound bed or on top of honey, collagen, etc.

Optifoam with adhesive borders 4x4 and 6x6 in: to cover dressings and also for wet wounds since it absorbs moderate to large amounts of drainage.

Xeroform: Non-adhesive dressing. Good for skin tears, abrasions, open blisters, incisions, burns.

Gauze 4x4

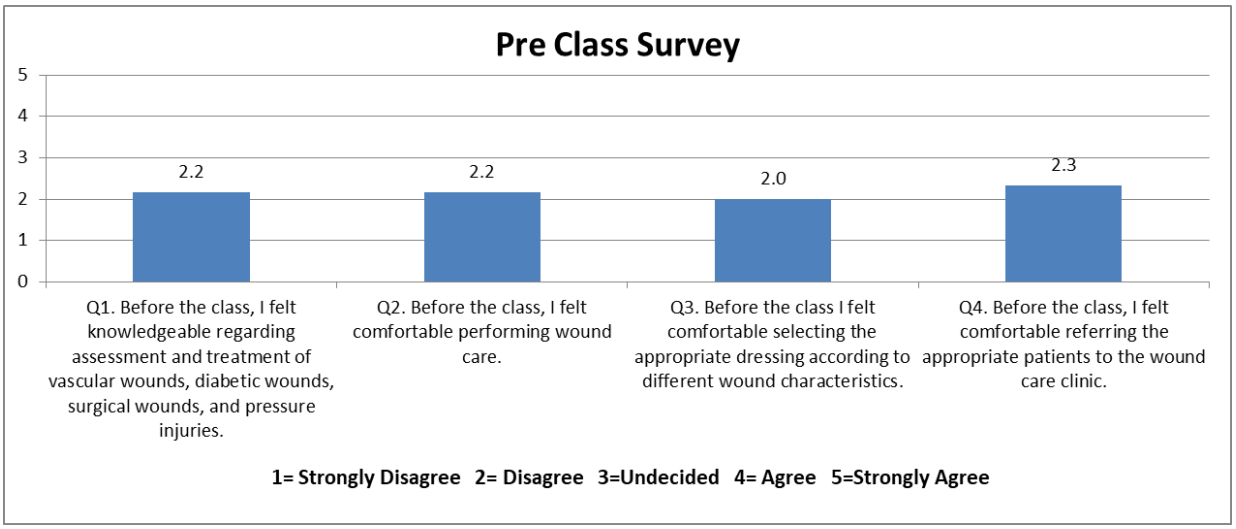
ABD pad: For extra-absorption or to cover big wounds.

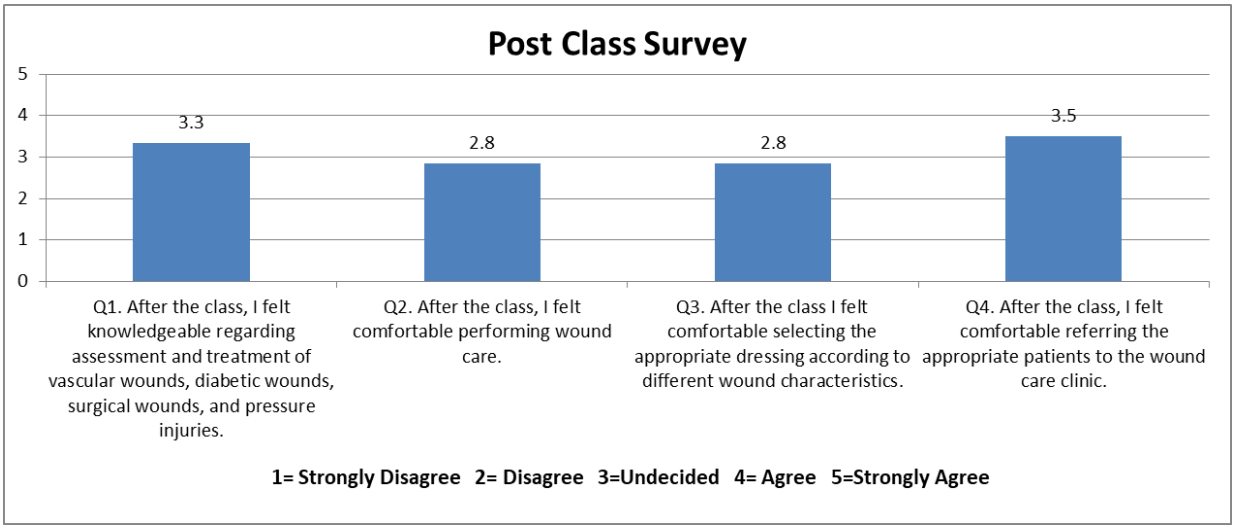
Gauze roll-bandage and conforming stretch gauze bandage: use bigger or smaller depending on the size of the wound and anatomical location.

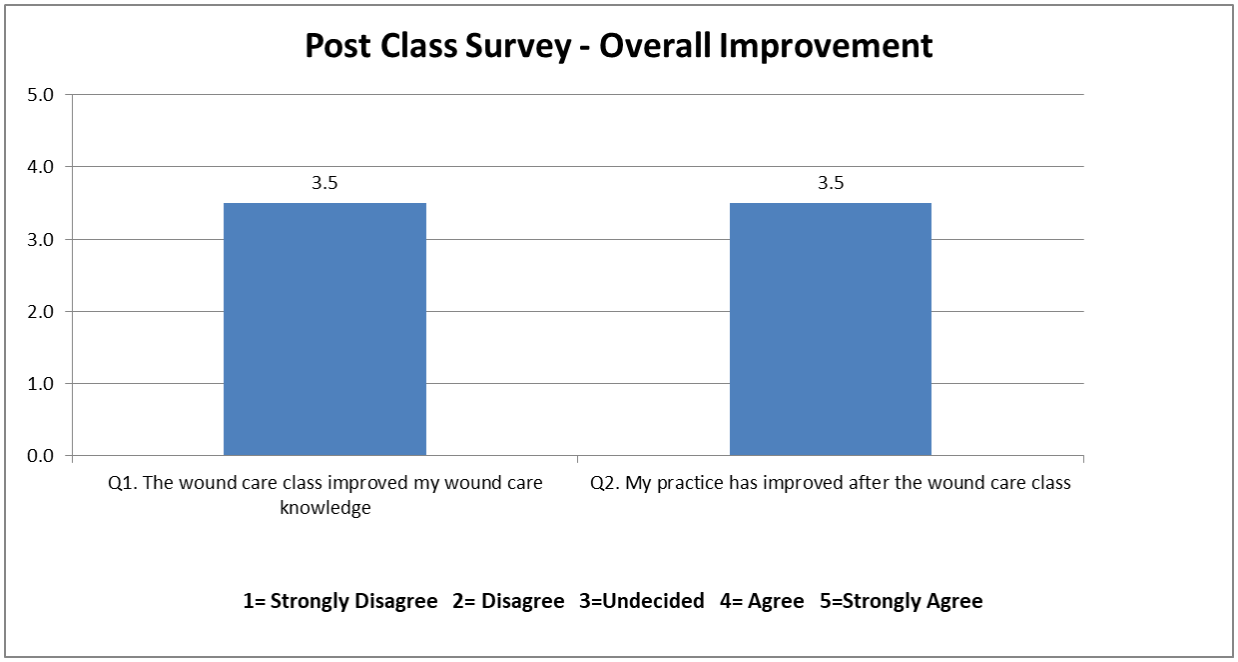
Suture removal kit: Also to help with debridement, can use the pick-ups to help with slough removal.

Appendinx P

Pre and Post Class Survey Results






Post Class Survey - Overall Improvement
5.0
4.0
3.0
2.0
1.0
0.0
3.5
3.5
Q1. The wound care class improved my wound care knowledge
Q2. My practice has improved after the wound care class
1= Strongly Disagree 2= Disagree 3=Undecided 4= Agree 5=Strongly Agree