Using Simulation for Oncology Nursing Competency Evaluation in Hospitals

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Using Simulation for Oncology Nursing Competency Evaluation in Hospitals

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Acknowledgments

I want to thank my family, USF professors, and KP for the honor. I began my nursing education with USF in 1993. It is so fitting that I conclude my terminal degree at my Alma Mater.
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Section I: Abstract

Problem: Oncologic patients requiring acute nursing care are usually admitted to designated oncologic medical surgical nursing unit, these care settings often have low admission volumes of oncologic patients that require chemotherapy and or post-therapy care (Muehlbauer, Parr, & Perkins, 2013). Nurses in these environments have reported decreased professional confidence and not feeling safe enough to administer chemotherapy, monitor and care for cancer patients (Muehlbauer, Parr, & Perkins, 2013).

Context: The current education structure for many hospitals in an integrated healthcare system, does not consistently provide all the components needed for an onsite oncologic nursing competency validation program. Developing a facility driven oncologic nursing competency program that incorporates both web-based learning and simulation may mitigate many of these issues. The aim of this project was to the increase the number of competent oncologic registered nurses for an acute care facility, using web-based education and simulation educational modalities.

Intervention: Education and hands-on training needed to demonstrate oncologic competency using web-based oncologic modules and simulated skills review and competency validation was provided to medical surgical registered nurses that needed initial certification and competency or annual renewal.

Measures: Pre-and post-evaluation survey tools measured the impact of the project.

Results: 7 registered nurses enrolled. Staffed perceived knowledge rating of Oncologic Nursing Care had an improved post-survey rating by 46.4%. Staffed perceived knowledge rating of Chemotherapy Administration had an improved post-survey rating by 58.3%. Staffed perceived confidence rating for caring for an oncologic patient had an improved post-survey rating by 78%.
Staffed perceived confidence rating for general nursing assessments had an improved post-survey rating by 40.9%. Statistically, the results are mixed.

**Conclusion:** The project supports the evidence about use of simulation educational methods for nursing skills and competency validation. The project is still in active status and the framework is being explored for use in other nursing care areas. Further study is needed with a larger sample size to understand the statistical effects. Additionally, there is need to study the implications on patient care outcomes as well.

**Keywords:** Oncologic nursing competency, computer-based education, simulation-based education, simulation competency validation
Section II: Introduction

In the United States, the cost of oncologic care was about $125 billion in 2010. Today this care is roughly $160 billion with projections of future cost increases (Mariotto, Yabroff, & Sha, 2020). The American Cancer Society estimates that 1.8 million people will be diagnosed with cancer, and over 600,000 people will possibly die in the United States (Siegel, Miller, & Jemel, 2019). About 67% of those diagnosed with cancer will live for about five years and will require oncologic care (Siegel, Miller, & Jemel, 2019). Oncologic care delivery occurs across various healthcare settings (Muehlbauer, Parr, & Perkins, 2013). This care encompass initial cancer diagnosis, induction of chemotherapy, maintenance therapy, recovery, remission, palliative care or hospice and will require nursing interventions along the continuum of the disease process (Linnard-Palmer, 2012).

Problem Description

Oncologic patients requiring acute nursing care are usually admitted to designated oncologic medical surgical nursing units. The literature reflects that, these care settings often have low admission volumes of oncologic patients that require chemotherapy and or post-therapy care (Muehlbauer, Parr, & Perkins, 2013). This does not allow for nurses to have a consistent opportunities of oncologic nursing expertise and causes possible degradation of the associated competencies (Muehlbauer, Parr, & Perkins, 2013). Nurses in these environments have reported decreased professional confidence and not feeling safe enough to administer chemotherapy, monitor and care for cancer patients (Muehlbauer, Parr, & Perkins, 2013).

Nursing education, both at the undergraduate and graduate level, traditionally does not delve into oncologic nursing care; thus, newer nurses and advanced nurses are often not adequately prepared to care for cancer patients along the healthcare continuum (Simmers, 2014).
The competent oncologic nurse can effectively manage the complex cancer patient, their disease process, modalities of cancer treatment, multidisciplinary care teams, the patient's psychosocial and symptom management (Gaguski, et al., 2017). Delivering high-quality oncologic care recognizes the requisite nursing knowledge and required roles in providing this care across the continuum of cancer care. The National Academy of Medicine (formerly Institute of Medicine) holds that educating and assessing nursing competency is integral to high-quality care (National Academy of Medicine, 2011). Training programs that increase and build competency develop and grow the nursing workforce that will possess the capacity and capability to deliver high-quality care to cancer patients (National Academy of Medicine, 2011).

In an integrated healthcare organization, 43% of 21 hospitals report challenges with low admission volumes of acute oncologic patients with chemotherapy requirements. The implications of waning nursing competency and the requirement to deliver safe care have led to the investigation of simulation education modalities to assist nurses in knowledge acquisition and maintenance of oncologic competencies (Simmers, 2014).

Available Knowledge

PICOT Question

In an integrated health care organization's acute care medical-surgical setting, how does an education program with internet-based education modules and simulation-based oncologic nursing competency validation affect the registered nurse's professional confidence and the number of competency validations in chemotherapy-biotherapy administration.
Search Strategy

A focused search strategy included the following electronic databases: PubMed, CINAHL, Google Scholar, Embase, CENTRAL, MEDLINE. The duration of the search included timeframes from 2000 to 2020, using peer-reviewed journals. The search strategy key terms and inclusionary terms included simulation and nursing education, simulation and nursing competency, simulation, and patient safety, nursing education, simulation and health professions, and simulation and acute care nursing. Simulation studies outside of healthcare were excluded.

Search Outcomes

The search on CINAHL yielded 52 articles and on PubMed 76 articles. Eight articles were selected for inclusion into this project. Out of all the articles, these articles represented the strongest evidence-based ratings for simulation use in nursing education and competency. These ratings were supported by the John Hopkins’ Nursing Evidence-Based Practice Research Evidence Appraisal Tools (Dang & Dearholt, 2018; see Appendix A).

Literature Review

**Acute Oncologic Nursing Competency**

Managing oncologic patients challenges nurses because of the disease process and the complexity of the treatment plan (Sharour, 2019). Chemotherapy administration can be a complex process because of the narrow safety margin of the cytotoxic medications used in the therapeutic regimen (Sharour, 2019). The medications are classified as high alert medications due to the potential harm if an error occurs (Crannell, 2012). The Oncology Nursing Society contends that the provision of quality cancer care to patients is contingent on registered nurses being competent in the essentials of Oncologic Nursing Care (Crannell, 2012). These competencies include the initial and ongoing education of oncology therapy with the foundation
of the knowledge pulling from current research and evidence-based practice (Crannell, 2012). The National League for Nursing (NLN) defines competency as "a principle of professional practice that identifies the expectations required for the safe and effective performance of a task or implementation of a role" (NLN, 2009, as cited in NLN, 2017, p. 10). Self-learning, return demonstration, and skills fairs do not provide the same efficacy of learning and competency assessment as simulating via a human patient simulation (Crannell, 2012).

Coyne et al. (2019) completed an integrative review for chemotherapy administration that included 17 studies. In this review, Coyne et al. found five themes associated with patient and nurse safety during the administration of chemotherapy: (a) governance, (b) process safeguards, (c) communication, (d) interdisciplinary collaboration, and (e) education. Additionally, critical approaches to increase patient and nurse safety included physician computer order entry of chemotherapy, barcode usage, medications safety procedures, education, and simulated learning (Coyne et al., 2019).

Keddinton et al. (2019) reviewed 13 RCTs from the years from 2012 to 2017 and found that evaluation of competency by the utilization of simulation is more realistic and can be employed for high-risk care processes, thereby promoting patient safety and developing critical thinking skills. Integrating simulation in competency evaluation allows for a more precise assessment of nurses' skills and competence; these efforts will potentially improve patient safety care outcomes (Keddinton et al., 2019).

Simulation

In the past 25 years, simulation has become assimilated into health professionals' education, yet full integration of skill development remains a challenge for practicing nurses (Aebersold & Tschannen, 2013). Using human patient simulation in staff education fosters

Simulation is often used in healthcare organizations for new employee orientation, continuing education, professional development, high and low-volume vignettes, and training on new equipment and the hospital-built environment (Rutherford-Hemming & Alfes, 2017). Despite the high use in hospital environments, there were 65 research studies within this setting published between January 2011 and September 2016. These studies were mixed in positive and negative reviews due to the diversity in topics and methods of research. Despite these outcomes, students reported higher confidence levels and satisfaction with the simulation mode of education. However, there is a need to understand the effects of simulation on patient outcomes (Rutherford-Hemming & Alfes, 2017).

The NLN and the National Council of State Boards of Nursing support simulation training as an essential nursing education tool (Kiernan, 2018). Simulation provides an optimal clinical experience, where situations allow the learner to grasp concepts and to develop and practice skills without exposing patients to harm (Simmers, 2014). Simulation offers real-life, student-centered learning opportunities that foster the space for deliberate practice and psychomotor learning with immediate feedback on performance (Kiernan, 2018). The deliberate practice goal is to ensure the learner's application and practice of consistent nursing interventions and skills maintenance (Kiernan, 2018). Clinical skills taught but not practiced beyond the initial instruction and assessment resulted in a skill deficit over time (Oermann et al., 2015).
The utilization of high-fidelity simulations in nursing increased learner knowledge, self-confidence, satisfaction, and self-efficacy in managing critical oncologic infusion emergencies (Sharour, 2019). Simulation exercises can improve nurses' recognition of and the use of appropriate interventions to safely rescue patients in an acute care environment (Askew et al., 2012). Simulation exercises can identify the nurses' opportunity to improve their clinical performance and heighten their clinical confidence in caring for the acute oncologic patient (Askew et al., 2012).

Ness et al. (2016) completed a pilot study to assess the feasibility of using simulation to improve oncologic nursing confidence, knowledge, and skills. The areas of chemotherapy-biotherapy administration, chemotherapy-biotherapy sensitization, extravasation management, and management of chemotherapy medication spills were topics covered (Ness et al., 2016). The study included 40 oncology nurses who completed a baseline survey and received 12 modules of online education. They attended a 3-hour class covering the key areas using interactive mannequins. Sixty days later, this group of nurses completed simulation-based competencies covering three of the four required core areas within 90 minutes. The simulation did not validate the management of chemotherapy spills (Ness et al., 2016). The 40 oncology nurses completed the interactive simulation-based competency and as a result, their confidence baseline in the four core areas was 57.6% compared to the three-month post-survey rating of 97.06%. For the chemotherapy extravasations knowledge area, the baseline confidence rating was 26.19% compared to the 3-month confidence post-survey rating of 94.12%. In the oncologic nursing skills area, the confidence rating improved from a baseline of 65.12% to 95.83% at 8 months post-intervention. Interactive skill based simulated education using mannequins improved the confidence, knowledge, and skills of the oncology nurses (Ness et al., 2016).
Confidence

Nursing is a service profession, and confidence and self-confidence are critical practice requirements (Perry, 2011). When care is delivered by a nurse who displays low self-confidence, the patient's perception may be discomfort, fear, and concern about the nurse's competence and ability to safely render care (Holland et al., 2012). Confidence informs self-efficacy, which influences learning, which further impacts confidence, learning, and affective domains, cycling on to an individual's knowledge base (Perry, 2011). An increased competence level in the clinical setting is often attributed to participation in simulation exercises. These exercises allow participants to practice assessment and communication techniques in a stress-free learning environment. Simulation scenarios provide students the opportunity to develop their confidence as they learn to control their fear and panic when faced with clinical emergencies (Perry, 2011).

In an integrative review, Linn et al. (2019) selected 29 articles to analyze the publications on clinical simulation practices for intensive care nursing education. Articles published from 2008 to 2017 were reviewed and included those that discussed the use of simulation in nursing professionals' continuing education or in student education. The findings show that 34% of the studies review the use of simulation in education on intensive care nursing care techniques like delirium, mechanical ventilation and airway management and pneumonia prevention activities. 76% of the articles examined in this review, covered the use of simulation in continuing education of nursing professionals. The identified variables in this review are confidence, communication skills, efficiency in determining patients' clinical decompensation, technical skill development, teamwork, and clinical decision-making (Linn et al., 2019).

Labrague et al. (2019) completed a systematic review of the impact of utilizing high-fidelity simulations on nursing students' anxiety and self-confidence during undergraduate
nursing education. Thirty-five articles were selected for review. The results revealed that about 65% of the articles had strong support for the efficacy of high-fidelity simulation in self rated areas of anxiety reduction, boosted self-confidence among nursing students during the performance of nursing care. About 9% of the articles showed no significant impact of high-fidelity simulation modalities on the same areas rated. This review also underscored the need for more research that studies the impact of high-fidelity simulation on students' anxiety (Labrague et al., 2019).

Summary of the Evidence

The evidence supports simulation use in nursing education. It appears that adopting simulation-based education may mitigate the negative impacts of novice training introduced during validation of nursing care practices and competency maintenance. Simulation-based education helps in learning exercises that closely mimic real-life nursing, medical education, and hospital practice (Muehlbauer et al., 2013). Simulation may reduce anxiety associated with the complexity of care and potentially improve the nurses' professional confidence. More importantly, many healthcare organizations have integrated this educational approach for many nursing genres like perioperative nursing, emergency nursing, and obstetrical nursing (Muehlbauer et al., 2013).

Rationale

Conceptual Framework

The theories selected for this project coalesced around the adult learner and the use of simulation education to improve oncologic nursing skill sets and competency (Kenner & Weinerman, 2011). Adult learning theory comes from the organizational development area where the focus on learning theory is considered a means of providing employees with the knowledge
and tools needed for successful workplace performance (Kenner & Weinerman, 2011). Adult learners are usually self-directed and task or goal oriented (Kenner & Weinerman, 2011). This theory has been historically sufficient as a learning framework, however for this project more support is needed to address the simulation modality of learning and the specialization of oncologic nursing knowledge. To that end, the NLN/Jeffries' simulation framework and the deliberate practice framework provides design support of this project and bolsters the context of the adult learning theory.

**Knowles' Adult Learning Theory**

Integrating simulation-based education into nursing education requires the adoption of a framework to help guide the practice. Naturally, the traditional approach to teaching and learning in this population is grounded in Knowles' adult learning theory. The adult learning theory works from the premise of the self-concept, adult learner experience, readiness to learn, orientation to learn, and motivation to learn (Lippit & Knowles, 1984). The design of the curriculum and class content supports this theory as the lecture or didactic approaches to knowledge exchange provides evidence of this. However, the context of using simulation-based education requires consideration of constructs that embrace it as a teaching methodology, in addition to the traditional education platform. The NLN/Jeffries simulation framework and deliberate practice are training constructs that complement the adult learning theory.

**NLN/Jeffries' Simulation Theory**

Jeffries (2005) stated that simulations are delineated activities that mimic a clinical environment's reality and create a space to demonstrate the nursing practice and critical thinking through structured role-playing, interactive videos, and with the use of mannequins. The
NLN/Jeffries' simulation theory has six key elements: context, background, design, educational practices, simulation experience, and outcomes (Jeffries et al., 2016). The elements include:

1. Context is defined as the purpose, physical location, and evaluation criteria of the learning experience, providing the needed framework for each developed simulation.

2. The background is entrenched in the context, uses students' expectations and principal goals, as well as resources for the simulation support.

3. Simulation design comprises learning objectives, desired fidelity, student role assignments, simulation flow, and pre-briefing/debriefing strategies, commencing from an environment of trust on the parts of both the facilitator and learners.

4. The simulation experience is interactive, student-centric, experiential, and collaborative. It merges on the interaction between facilitator and participants through pre-briefing, simulation progression, cues, and debriefing (Jeffries et al., 2016).

Deliberate Practice

Deliberate practice has been a central concept in effective simulation learning (Chee, 2013). Deliberate practice was born from Ericsson's theory of expertise, which theorizes that expert performance results from an individual's prolonged efforts to improve performance by employing purposeful actions created to optimize improvement (Chee, 2013). Chee (2013) identified the essential elements of deliberate practice as including being highly motivated learners with a strong concentration that focuses on clear learning objectives or tasks at an appropriate level of difficulty, which centers on repetitious practice that delivers feedback from educational inputs that facilitate monitoring and corrective action. Through this process, knowledge acquisition is precise and allows for progression to the next educational level (Chee,
2013). The development of motor skills and the ability to perform procedures in the clinical setting are critical nursing education outcomes (Oermann et al., 2015).

The frameworks described create a conceptual anchor and can guide the clinical project with the educators to craft nursing education that will address the diverse learning needs by addressing not only the learner but the contextual aspects of learning. Though the NLN/Jeffries simulation theory is sufficient to address the simulation aspects of the project, it is not inclusive of a theoretical educational underpinning (Shepard & Burton, 2018). Combining the theories and framework support design and thrust of the project.

**Specific Aim**

By December 2020, the project would increase the number of competent oncologic registered nurses for an acute care facility, using web-based education and simulation educational modalities. Key performance indicators will be the number of nurses that complete the competency and the pre- and post-survey measuring the nurses' perception of their knowledge level and confidence.
Section III: Methods

Context

Some hospitals in an integrated healthcare system, did not provide all the components needed for an onsite oncologic nursing competency validation program. There was need to create a sustainable educational program that could foster consistent avenues of access to ensure initial and ongoing oncologic nursing competencies and expected patient care outcomes. Facilities with low-volume oncologic cases may have challenges in maintaining staff nurses' competencies to administer and deliver care to oncologic patients safely (Askew, Trotter, Vacchiano, Garvey, & Overcash, 2012). Developing a facility driven oncologic nursing competency program that incorporates both web-based learning and simulation may mitigate many of these issues.

This project took place in an urban medium sized hospital within a large integrated healthcare organization in the San Francisco Bay Area. The nursing department of focus was the 48-bed medical-surgical- telemetry-oncology unit. This facility has about 65 acute care oncology admissions annually or about 5-6 admissions per month.

The key stakeholders were hospitals within the Northern California Region, cancer patient and their families, medical surgical oncologic nursing staff, physicians, clinical educators, simulation vendors, and hospital leadership. The staffing office, environmental services, and information technology departments also became critical stakeholders in this project.

It is also important to insert the overt influence that COVID-19 had on the contextual aspects of this project. The initial scope of the project was to develop this intervention among all 21 facilities, unfortunately, this was not actualized due to the COVID-19 mandated quarantine and social distancing. Significant resources that were relied upon for this project were diverted to
either care for patients affected by COVID-19 or support other necessary functions of hospital operations.

**Gap Analysis**

A gap analysis assesses the organization's infrastructure, processes, policies, education program, and information technology against the desired state and calls out common themes, and variations (Golden, Hager, Gould, Mathiodakis, & Pronovost, 2017) (see Appendix B). To understand the current oncologic competency structures that hospitals in an integrated health system has, in spring of 2018 a survey was completed by 18 of the clinical directors to determine the current state of their facility. The survey findings showed that out of 21 facilities, 85% of an integrated healthcare organization did not have an inpatient oncologic program. It was also revealed that 64% of the hospitals had low oncologic admission volume (under 10 per month) and that 29% had mid to high volumes (above 10 admissions per month). In this healthcare system, there are only four Northern California hospitals with an inpatient oncology program with dedicated oncology units, teams, leadership (clinical nurse specialists/educator), support, and training. In addition, only 42% reported only using the web-based education (ONS) Certification program and 16% of the facilities had a robust program (which includes, web-based education platform by the Oncologic Society of Nursing (ONS) Certification program, Clinical Nurse Specialist, competency validation process). None of the facilities were using any form of simulation for education or competency validation.

The major themes that emerged through the gap analysis revealed an opportunity to leverage internal facility resources to create a standardized oncologic nursing education program that meets the consistent oncologic educational needs at the facility level.
Gantt Chart

The Gantt chart shows that the curriculum was developed and vetted by the nursing education departments in the local facility during January and February of 2020 (see Appendix C). The clinical educator and the support team learned the course content to ensure adherence to the project. The clinical educators tested the curriculum content with frontline staff to determine effectiveness. The education was to commence in March 2020 but due to the mandatory COVID-19 state-mandated shutdown, all clinical education classes were suspended, and resources were moved to patient care areas for clinical support. Because of social distancing, permission to conduct classes was revoked. Work with the Laerdal Simulation Representatives was completed remotely due to the pandemic and visitor restrictions.

In August 2020, a business case was presented to the facilities Nursing Executive Team (Chief Nurse Executive, Nursing Directors for Administration, and Clinical Education) about the current state of the Oncologic competent staff, the impact of transferring patients to other facilities without the competency, both in terms of patient satisfaction and financial realities. The class was approved, contingent on demonstration of plans for social distancing and infection prevention. The plan was approved, and the first Oncologic Clinical Education Cohort began the online component during the last week of August 2020. The class' simulation activity was postponed until September 2020 due to COVID-19 quarantine mandates of clinical educators and staff due to exposure or infection.

Work Breakdown Structure

Critical areas of work were identified in the Work Breakdown Structure and are described below (see Appendix D). The team created a project charter and A3 (see Appendix E) and project plan that helped maintain the scope and guide the project activities. The project plan
incorporated the Plan, Do, Study, and Act (PDCA) performance improvement model (see Appendix F). It was used to socialize the project's needs and impact with staff. A marketing and communication plan was created to ensure an effective connection with key stakeholders. Clinical education and frontline staff nurses were integral partners in project progress and curriculum development. Lastly, logistic planning involved coordination of class schedules, staffing, and class materials for successful training and simulation. All the elements of the work-break down structure were satisfied by March 2020. Because of social distancing, permission to conduct in-person classes were revoked. This delayed completion of the simulated education components and the competency validation aspects of the project.

**Communication Plan**

The clinical director was responsible and accountable for the communication plan for the project (see Appendix G). Team bi-weekly check-ins were scheduled via Microsoft Teams with the chemo education team, which consisted of the clinical manager, clinical director, clinical educator, and a staff registered nurse who supports the simulation classes. The bi-weekly meeting goal was to review the project's status, review deliverables, and address any barriers. The executive sponsor was updated monthly through an email or weekly meetings scheduled with the clinical director (project owner). At the beginning of the month, the chemo education team had an online team meeting to review the class schedule, curriculum, staff enrolled, and class logistics to ensure class success.

The team created fliers and distributed them in email, huddles, and on department communication boards to communicate the class offering. Lastly, to understand and learn from the classes, a post-class review (that included the clinical director, the frontline staff assistant, the clinical educator, and the administrative support) was scheduled virtually to debrief and learn
about the effectiveness of the classes or challenges before the next level. Moreover, the project charter, plan, and key milestones were updated and shared as part of the communication plan.

**SWOT Analysis**

An organizational self-assessment was completed by the clinical director to appreciate our bright spots and opportunities. SWOT (strengths, weaknesses, opportunities, and threats) analysis was completed and used to bolster the project (see Appendix H). The integrated healthcare organization had significant resources to support the use of web-based training and simulated learning. The weaknesses demonstrated the opportunity to standardize oncologic nursing education and training approaches across the region. Opportunities existed in using simulation technology to offer education and training for healthcare staff. Industry trends readily embrace the high use of technology for information delivery and the use of simulated education experiences and multi-modal educational offerings (Aebersold & Tschannen, 2013). The COVID-19 pandemic presented a major threat and disrupted social norms and has reframed the way we provide education and validate competency due to the required social distancing and utilization of personal protective equipment.

**Budget**

A preliminary budget was created for this project, focusing on personnel, simulation lab, other expenses, and assumptions (see Appendix I). The total cost of the project was $96,000. Each area will be briefly discussed with the hours and/or the financial impact appreciated for this project.

**Personnel**

The assumption that the current nursing education budget annually plans for chemotherapy/oncologic nursing competency was leveraged in this project. Staff were scheduled
to participate in the computer-based education, simulation training, and validation class on their regular workdays. This prevented any labor-related budgetary variance.

This project was predicated on the enrollment of 24 staff nurses (12 new and 12 seasoned registered nurses). A total of 396 hours were provided for education, totaling $63,380. The project activities of the clinical director, clinical educator, administrative support, frontline staff assistance, and the executive sponsor were completed during regularly scheduled business periods. This team utilized approximately 1,090 hours ($28,958) to plan and execute this project.

It is important to note, that the COVID-19 pandemic and response efforts of the organization, prevented the actualization of the projected enrollment number of nurses for this intervention.

Simulation Lab

The simulation lab is located on the second floor and consists of fully equipped, unlicensed inpatient rooms. There was no cost utilizing the facilities to accommodate the in-person classes. The facility had previously purchased the high-fidelity simulation mannequins before this project's onset. There were no other additional charges with technology use.

Other Expenses

Each participant had ONS education vouchers purchased for them for $120, so the total cost for this project was $2,880 (24 nurses x $120). Other expenses incurred for training materials and meals were $4,040.

Assumptions

The project was predicated on there being five oncology acute care (non-ICU) admissions per month. In a hospital finance journal, the cost per medical-surgical admission in a non-profit hospital is about $3,833 per day (Ayala, 2019). The average length of stay (LOS) for a patient
admitted for acute oncologic care is about three days, about $11,499 per visit. Patient care delays may increase the length of stay. In an integrated health care system, one hospital reported six instances in one year, where a patient had to stay an additional day in the medical surgical oncology unit due to delays in chemotherapy administration. If there were available nurses with oncologic competencies during these delays, it may have prevented the prolonged visit and the cost avoidance could have been about $22,998 ($3,833x 6 days).

The cost of a high alert medication error could cost the organization up to about $250,000 in litigation costs (Goguen, 2021). Medication errors can occur at several points during the administration of chemotherapy, which is why it is critical that nurses be competent in the processes needed to ensure safe administration (Coyne, Northfield, Ash, & Brown-West, 2019)

Assuming that this program were successfully implemented, about $185,722 could be the cost avoidance (Appendix I) of having a facility-based clinical education oncologic nursing competency program that ensures that nurses are prepared to safely deliver patient care when needed. This could prevent extended length of stays, ensure safer chemotherapy administration and oncologic care that could prevent patient harm.

**Intervention**

The purpose of this project was to create a process that would ensure that both new and seasoned acute care nurses have access to the education and hands-on training needed to demonstrate oncologic competency using computer-based modules and simulated skills competency validation. The educators that provide the education and competency validation were masters prepared nurses who have current oncologic competencies (ONS certification and competency validations and who have been teaching this content for greater than 5 years) and are considered regional subject matter experts. The facility's nursing leaders identified the
participants, enrolled them into the required ONS online classes, and scheduled them for the two-day, hands-on simulation training and competency evaluation. Each participant completed the electronic pre-education survey to gather baseline data on oncologic nursing experience before completing the computer-based online training. The online education included the 45-minute Oral Chemotherapy for Registered Nurses course through HealthStream and the 16-hour ONS Chemotherapy Biotherapy Certificate course. The educator or the nurse printed the biotherapy certificate to validate course completion, as this is required foundational coursework. Within two weeks, two 8-hour days are scheduled consecutively to complete the hands-on simulation training and testing. During the first day, all competency components were demonstrated for the nurses during the early four hours using simulation mannequins.

The last four hours included a return demonstration of the concepts and time for participant questions and practice. On the final day, the nurses again review and demonstrate the skills previously covered and ensure that all skills have been validated. The last four hours of the day entails the full simulation activity for competency validation. The simulation includes a pre-briefing, the actual simulation, and a debriefing (Muehlbauer et al., 2013). The simulation was based on standardized oncology nursing care. The intention of the simulation activity was to incorporate knowledge and the necessary skills in chemotherapy-biotherapy administration, chemotherapy-biotherapy sensitization, extravasation management, and chemotherapy medication administration. Each participant completed the entire simulation activity.

The clinical educator evaluated the participant's performance and knowledge base and completed the oncologic nursing competency validation tool. A debriefing of the event was conducted with the educator and the staff nurse. After the simulation event, each participant
completed an electronic post-education questionnaire to assess the learning impact. The nurses received a certificate of completion and four continuing education units (CEUs).

**Study of the Intervention**

Each participant completed the pre-intervention questionnaire (see Appendix J) to gather baseline data on their oncologic nursing experiences, perceptions of their competence, and current confidence level. They also completed a post-education questionnaire to assess the impact of the learning and an evaluation of the simulation-based learning experience. Both the pre- and post-intervention survey asked the same 14 questions to understand better the learner's current knowledge base and confidence in caring for oncologic patients before the pre and post-intervention. The questions initially asked to assess the nurse's tenure as a nurse, education level, assigned department, and facility identification. The remaining survey questions used a Likert scale to identify the professional time spent delivering oncologic nursing care, the rating of current oncologic nursing care, rating of knowledge of chemotherapy administration, rating of the confidence of caring for an oncologic patient, and the confidence for assessing and rating of therapeutic communication skills.

The surveys were created in the Microsoft Forms Survey Application (MS Forms) to ensure accuracy and completeness. The link to the survey was included in the initial HealthStream module that the nurses completed. The staff was sent an electronic link to their organizational emails or given the option to use a QR code to link automatically to the post-evaluation assessment. The data for each survey was collected, collated, and analyzed by only the Clinical Director. There are no identifying aspects of data collected or utilized in this project.
Measures

The aim of this project was to increase the number of competent oncologic registered nurses for an acute care facility, using web-based education and simulation educational modalities. The selected performance measures were the number of nurses that completed the competency and the pre- and post-intervention survey results measuring the nurses' perception of their knowledge level, assessment and confidence. The method selected for evaluating this project's impact was to assess the participants perception of their skill level and confidence in caring for oncologic patients using a survey. An electronic survey was built (MS Forms) to gather the learner's self-assessment of skill and confidence. These measures were selected because many of the research appraised indicated that an outcome to simulated learning was increased confidence as well as improved skill level both show a direct impact of the intervention (Kiernan, 2018).

The number of oncologic competent nurses produced from this project, the oncologic competency tool for each of the nurses was collected, counted, reviewed for accuracy and completeness, and then electronically stored. To assess the effect of the intervention on the nurse's competency, assessment skills and confidence, before and after intervention surveys were administered by means of an electronic survey created in MS Forms.

Surveys

Each participant completed the pre-education questionnaire (see Appendix J) to gather baseline data on oncologic nursing experience, competence, and current confidence level. Each participant completed a post-education questionnaire to assess the impact of the learning and an evaluation of the simulation-based learning experience. Both the pre- and post-evaluation survey asked the same 14 questions to better understand the learner's current knowledge base and
Using Simulation for Oncologic Nurse Competency

Confidence in caring for oncologic patients before and post-intervention. The first two survey questions had no bearing on the data as it was asking for the date and years of nursing. Questions 4-9 assessed the nurse's tenure as a nurse, education level, assigned department, and facility identification. The remaining five survey questions used a Likert scale to identify the professional time spent delivering oncologic nursing care, the rating of current oncologic nursing care, the rating of knowledge of chemotherapy administration, the rating of the confidence of caring for an oncologic patient, and the confidence for assessing and rating of therapeutic communication skills.

The surveys were created in Microsoft Forms to ensure accuracy and completeness. The link to the survey was included in the initial HealthStream module the nurses completed. Staff were sent an electronic link to their organizational emails to complete the post-evaluation assessment. The data for each survey were collected, collated, and analyzed by this application—only the clinical director has access to the raw data. There were no personal identifying aspects of data collected or utilized in this project.

**Evaluation Tool or Nursing Competency**

The competency evaluation tool was developed into the skills checklist for each clinical topic covered in training. On the day of the simulation, the existing oncologic nursing competency validation tool was used as a document to validate skills and competency. The oncologic nursing competency validation tool was placed into the staff's employee record after the session (see Appendix K).

**Analysis**

The data was collected electronically using Microsoft Forms and was later converted into an excel spreadsheet for further appreciation of the data. Each question and response were
grouped and tabulated for evaluation and comparison. The answers received came from nurses with diverse practice history, education level, and years of services and account for the differences and variation of responses noted. All 14 questions were evaluated and only 12 were compared, and calculations for difference and percent change were used. Bar graphs were used to express the data collected, as the design of this project was descriptive and aimed to distinguish and identify the link between the participant's pre-intervention (baseline) assessment survey and the post-intervention survey. This approach allows the opportunity to focus on the effect of the intervention on the nurses enrolled in the education program by appreciating the patterns that emerged from the data. The graphs and charts' analysis was subjective, and the authors used the data to appreciate the qualitative differences and characteristics.

**Ethical Considerations**

Patients in the nursing care setting have expressed concern about being "practiced on" by nursing students or nurses on orientation (Simmers, 2014). Using simulation-based education decreases the disconnect and reduces the likelihood of harm resulting from any novice error. Though learning sometimes causes anxiety and stress for the learner, the simulation education opportunity should be a positive experience. Clear expectations of performance were set with all participants, and opportunities to practice new skills, ask questions, and have fun was encouraged. There were concerns about the impact that a negative outcome such as the death of the mannequin would have on the nurse acquiring knowledge, skills, and techniques to build self-confidence. Though the learning environment simulated real-life situations, and we appreciate that death is a part of that subset. However, death-based oncologic scenarios were not part of the care situations considered in this project.
Institutional Review Board

The project was evaluated and approved as a quality improvement initiative through the University of San Francisco School of Nursing and Health Professionals (see Appendix L). Additionally, to ensure organizational approval, the chief nursing officer and the regional clinical adult service director approved the project (see Appendix M). Lastly, to ensure institutional support, the research determinant official for the organization reviewed the project and indicated that it did not meet the regulatory definition of research involving human subjects (see Appendix N).

American Nurses Association

Demonstrating ethics in healthcare is critical as challenges with care delivery arise and require the nurse and healthcare team to make sound and just decisions. Nurses have the ethical duty to practice with integrity, causing no harm and in the spirit of patient advocacy. This project was completed within the provisions of the American Nurses Association Code of Ethics (Haddad & Geiger, 2020).

Jesuit Values

Spirituality influences learning, feelings, and behavior, positively impacting individual growth and community at large (Streetman, 2015). Six Jesuit values are embodied in this project: Cara Personalis, Magis, Men and Women for and with Others, Contemplatives in Action, Unity of Heart and Mind, and Finding God in All Things (Streetman, 2015). The concepts of Cura Personalis (care for the person), Men and Women for and with Others, and Magis (the greater good) are a reflection in this project through the use of resources to create a program. The design of this program is to teach our nurses the knowledge needed to safeguard the successful care of oncologic patients and their families. This principle is further demonstrated through the advocacy
of nursing leadership and the total caring aspect of nursing service for our patients, their families, and the community.

This project was centered on ensuring the delivery of care to those patients who are at the most vulnerable point in their lives. It embodies the Jesuit value of Unity of Heart and Mind (those who act out of love of God in morality and ethicality (Streetman, 2015). To deliver nursing care to our patients allows one to find God in one or many of the myriad of care experiences that we are given. Nursing leadership must advocate constructing healing environments that care for the entire person in a manner that demonstrates dignity, both for our patients and our employees. Additionally, this speaks to this project's thrust of building pathways for staff to seamlessly acquire knowledge that validates their clinical aptitude and is evidenced by expected patient care outcomes.
Section IV: Results

Years of Service

All the staff nurses enrolled were employed at the same facility and on the same medical-telemetry unit designated for oncologic care. The sample size was seven. Most nurses (86%) were in the profession for greater than six years and hold a bachelor's degree (86%). Fifty-seven percent of the nurses reported caring for oncologic patients for more than four years (see Appendix O).

Pre-Intervention Survey Findings

The pre-intervention survey was provided to the staff before the computer-based education and simulation training (see Appendix P: Pre- and Post-Intervention Survey). When asked to rate their perception of knowledge of oncologic nursing care on a Likert scale from 1 to 10 (with 10 being the strongest), the average response was 3.71 (see Appendix P: Nurse Knowledge Graph). The average response for rating knowledge of chemotherapy administration was 3.44 (see Appendix P). When assessing the perception their confidence level of caring for an oncologic patient receiving chemotherapy, the average response was 3.29. The nurses reported average confidence levels with nursing assessment and therapeutic communication with patients of 6.29, and 6.57, respectfully.

Post-Intervention Survey Findings

The post-intervention survey was provided to the staff after the computer-based education and simulation training. When asked to rate their perception of knowledge of oncologic nursing care on a Likert scale from 1 to 10 (with 10 being the strongest), the average response was 46.4% (see Appendix P). The average response for rating knowledge of chemotherapy administration was also 58.3%. When assessing the confidence level of caring for an oncologic patient receiving
chemotherapy, the average response was 78.1%. The nurses reported average confidence levels with nursing assessment and therapeutic communication with patients as 40.9% and 32.6%, respectfully.

**Quantitative**

A one-way within subjects' ANOVA was conducted to compare the effect of the web-based education and simulation skills review and competency program (intervention) on the perception of knowledge of oncologic care and of chemotherapy. The sample size is seven and the alpha is 0.05 for all tests. There was a significant effect on the nurse’s perception of knowledge, for oncologic care (question 10) $F(1,12) = 2.86, p = .08$. The post-hoc t-test results were also significant $t(6) = 2.04, p = 0.08$. The knowledge rating for chemotherapy (question 11) results were not significant $F(1,12) = 3.54, p = .08$. The t-test indicates there was a significant effect on the nurse's perception $t(6) = 2.00, p = 0.09$.

The ANOVA was also done to compare the effect of the intervention on the nurses' perceived confidence with caring for patients and with general assessments. The results indicate that there was significant effect on the nurses’ perception of confidence in caring for oncologic patients (question 12) $F(1,12) = 6.27, p = 0.02$. The post-hoc t-test supports this with $t(6) = 2.19, p = 0.07$. The confidence rating for nursing assessment (question 13) had a significant effect on the nurses’ perception of confidence with general assessments $F(1,12) = 5.52, p = 0.03$. The post-hoc t-test results show that there is not significant effect with this measure $t(6) = 2.27, p = 0.06$. To determine the effect that the intervention had on the nurses' perception of therapeutic communication (question 14), an ANOVA was conducted and revealed that there was no significant effect on therapeutic communication $F(1,12) = 5.82, p = 0.03$. The post-hoc t-test indicated there was a significant effect on therapeutic communication.
Section V: Discussion

After the students completed the computer based ONS education, they completed a skills emersion class that reviewed core competencies and then tested their knowledge and performance in a simulated care scenario. The findings of this project connect to the rationale and framework described earlier. The NLN/Jeffries Simulation Theory bolstered this project's foundational development. It posits that context, background, design, educational practices, simulation experiences, and outcomes are key components to developing, implementing, and evaluating simulation-based education (Jeffries, Rodgers, & Adamson, 2016).

The Deliberate Practice framework was also appreciated in this project due to the learners practicing and skillful performance, which results in enhanced skill sets and optimized care improvement demonstrated during the simulation (Chee, 2013). Lastly, Knowles' Adult Learning Theory underpinned the educational theory needed to develop the curriculum, class design and class evaluation as it helped frame the context of the adult learning and self-concept (Lippitt & Knowles, 1984).

All the enrolled participants completed the Oncologic Nursing Competency (see Appendix J) validations and are competent to care for this patient population. Additionally, the confidence level of the staff showed marked improvement. The pre-intervention average was 3.29, and the post-intervention average for staff perceived confidence was 8.86 (Appendix P), which is a 62% improvement. This speaks to the nurses' self-efficacy in completing the tasks, assessment, and needed communication to deliver oncologic nursing care (Coyne, Northfield, Ash, & Brown-West, 2019). Moreover, it reveals an increased competence level in the clinical setting being attributed to participation in simulation exercises.
Strengths of the Project

Chemotherapy administration is a high-risk, complex process due to the high-alert medications and the high margin for potential patient harm (Pirschel, 2017). Allowing staff nurses to learn and practice in a safe simulated environment was one of the project's strengths. Another added strength was the clinical education department's support and partnership with the nursing unit's leadership. Developing the infrastructure to rely on existing resources within each institution is significant because it provides a pathway to ensure clinical education can support demands for oncologic care and other nursing fields in the future.

Interpretation

The post-intervention surveys completed by the nurses enrolled in the program, indicated that the oncologic education program had a significant effect on their knowledge of oncologic nursing, chemotherapy administration, confidence, and assessment skills. The average oncologic and chemotherapy administration nursing perception of knowledge rating was initially 3.71 and 3.43 the post-intervention survey rating was 5.43 for both categories which is a 50% change over the pre-intervention survey. This outcome supports that the web based ONS education and the simulation learning increased the nurse's perception of knowledge in this area.

The nurse's perception of confidence (see Appendix L) in the areas of caring for an oncologic patient and patient assessments (see Appendix M) also showed improvement by 78% and 40.9% respectfully. These findings support Labrague et al. (2019) position on simulation-based education reducing anxiety and enhancing self-confidence during care delivery also supports Ness et al. (2016) stance that using simulation as a feasible education strategy to improve oncologic nursing knowledge, skill and confidence.
Though this project's sample size was relatively small (N=7), the findings are encouraging and support further efforts to move forward with the program for this subset of nurses. The project's impact on people and systems seems favorable as new processes and structures for clinical education were created to ensure a method that staff nurses can regularly complete and maintain their oncologic competencies. This project's results align with those results found in Ness & Johnson et al. (2016) pilot study that showed improvement in oncologic nursing confidence, knowledge, and skill. As we continue to educate nurses, efforts to assess the effect of the education on patient care is required as a future outcome measures of this program.

**Limitations**

The initial scope of the project was to be inclusive of multiple hospitals in a integrated healthcare system over 10-months. However, public health restrictions and organizational mandates related to COVID-19, required that this work be postponed during the first and second quarters of this year. These restrictions changed the expected design of the project and the expected sample size. COVID-19 infections, restrictions on gathering, need for quarantine, and social distancing requirements prevented the simulation activities needed for oncologic key concept review and competency validation.

The survey instrument used to measure program outcomes also presented limitations. For instance, the survey instrument was limited in its ability to control for the impact of confounding factors (like the use of other study materials, the working in other organizations with a stronger oncologic competency program) on participant outcomes. Additionally, the instrument did not provide additional data that allowed for exploration of alternative explanations of positive and negative variations in outcomes. Finally, on average, participants responses to survey instrument items showed a mean increase in respondent perception. However, the results significance tests
(i.e., analysis of variance & t-test) were mixed. As a result, a greater sample size and possibly additional outcome measures should be considered for full appreciation of the impact of the project. This suggests that future projects can explore the use of the survey instruments with larger samples to assess the efficacy the intervention with respect to the project goals.

**Conclusions**

Facilities with low-volume oncologic cases may have challenges in maintaining staff nurses’ competencies to administer and deliver care to oncologic patients safely (Askew, Trotter, Vacchiano, Garvey, & Overcash, 2012). A facility driven oncologic nursing competency program that incorporates both web-based learning and simulation may mitigate many of these issues. Oncologic educational offerings and competency evaluations are necessary for nurses at every level and must encompass the continuum of cancer care to reduce the potential of complications and errors related to treatment (Linnard-Palmer, 2012). Today the burning platform is oncologic care, and tomorrow it may be another high impact nursing area or concept. The opportunity lies in creating clinical education infrastructures that allow nurses to be exposed to new and existing knowledge, digest concepts and tools, and apply the knowledge in a safe environment that allows for knowledge application.

The ever-changing social context that influenced the work environment due to the pandemic created opportunities to leverage technology to assist with educational delivery. It also required a review and engagement of additional stakeholders that impacted the educational resource and environment.

This project's sustainability plan has been created through joint efforts between the facility's local leadership and clinical education. Future participants have been enrolled in online classes and scheduled for classes through December 2020. The oncologic nursing competency
validation process has become part of the overall education plan and is built into the annual budget. Work has recently commenced around standardizing the approaches to oncologic competencies for Northern California. There is excitement around identifying other practices that will support and grow this project. The scalability of this work is feasible in other nursing care education genres like, obstetrics, intensive care units, perioperative nursing and neonatal intensive care (Aebersold & Tschannen, 2013) (Rutherford-Hemming & Alfes, 2017).
Section VI: Other Information

Funding

No external sources of funding were provided for this intervention. All time supplied for the entire project was allocated from the organization's current staffing and agreed-upon pay programs and practices.
Section VII: References


source/professional-development-programs/program-outcomes-and-competencies2.pdf?sfvrsn=2


https://doi.org/10.1016/j.nedt.2014.11.007


https://doi.org/10.1111/j.1744-6198.2011.00230.x


https://doi.org/10.3332/ecancer.2019.961


https://doi.org/10.1016/j.ecns.2016.12.007


https://doi.org/10.3233/THC-181543


Section VIII: Appendices
## Appendix A

### Evidence Evaluation Table

<table>
<thead>
<tr>
<th>Study</th>
<th>Author and Date</th>
<th>Study Title</th>
<th>Study Design</th>
<th>Sample Size</th>
<th>Findings</th>
<th>Limitations</th>
<th>Evidence Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aebersold, M., Tschanen, D., (May 31, 2013)</td>
<td>Simulation in Nursing Practice: The Impact on Patient Care</td>
<td>Article with an overview of simulation techniques and uses and review of selected simulation research</td>
<td>n/a</td>
<td>Simulation shown effectiveness as a nursing training method for new procedures, communication processes, and skill-based and non-skill-based techniques</td>
<td>Lack empirical evidence of its impact on patient outcomes</td>
<td>III</td>
</tr>
<tr>
<td>2</td>
<td>Coyne, E., Northfield, S., Ash, K., Brown-West, L., Miles, C., Manton, K., &amp; Barratt, C. (2017)</td>
<td>The minimum education and safety requirements for the nursing administration of cytotoxic drugs: an integrative review protocol</td>
<td>Integrative review</td>
<td>17 studies</td>
<td>Established a protocol for minimum standards for nurses administering chemotherapy in Australia</td>
<td>The practice had an international focus, Nomenclature standards are needed</td>
<td>II</td>
</tr>
</tbody>
</table>

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<tr>
<th>Study</th>
<th>Author and Date</th>
<th>Study Title</th>
<th>Study Design</th>
<th>Sample Size</th>
<th>Findings</th>
<th>Limitations</th>
<th>Level</th>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Hegland PA, Aasle H, Stremme H, Jamtvedt G (2017)</td>
<td>Simulation-based training for nurses: Systematic review and meta-analysis. Nurse Educ Today. 2017 Jul;54:6-20. doi: 10.1016/j.nedt.2017.04.004. Epub 2017 Apr 19. PMID: 28456053.</td>
<td>Systematic review and meta-analysis.</td>
<td>15 RCT studies</td>
<td>Fifteen RCTs met the inclusion criteria. Comparing simulation-based training to other learning strategies on nurses' skills, six studies in the meta-analysis showed a significant but small effect in favor of simulation (-1.09, CI -1.72 to -0.47). There was significant heterogeneity (I² 85%).</td>
<td>Large between-study variation in results. The quality of evidence for all comparisons was graded as low.</td>
<td>II</td>
<td>good</td>
</tr>
</tbody>
</table>

4 | Kedington AS, Moore J (2019) | Simulation as a Method of Competency Assessment Among Health Care Providers: A Systematic Review. Nurs Educ Perspect. 2019 Mar/Apr;40(2):91-94. doi: 10.1097/01.NEP.0000000000000433. PMID: 30601272. | Systematic Review | 13 RCT studies | Simulation may be a safe and effective method of competency assessment in health care professionals. | Current literature is limited. There have been few inpatient studies performed, and attrition was high in many studies, preventing accurate results in some instances. | II | good |
<table>
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<tr>
<th>Study</th>
<th>Author and Date</th>
<th>Study Title</th>
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<th>Findings</th>
<th>Limitations</th>
<th>Level</th>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Kieman LC. (2018)</td>
<td>Evaluating competence and confidence using simulation technology. Nursing Oct;48(10):45-52. doi: 10.1097/01.NURSE.000045022.36908.F3. PMID: 3021760; PMCID: PMC6155363</td>
<td>Research article</td>
<td>30 students</td>
<td>8-week implementation phase. The posttest measurement increased by 37.26% compared with the pretest measurement</td>
<td>CCC instrument self-assessment tool, which measures perceived clinical competence and not the student's actual performance</td>
<td>□</td>
<td>good</td>
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<tr>
<th>Study</th>
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<th>Limitations</th>
<th>Level</th>
<th>Quality</th>
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<tbody>
<tr>
<td>7</td>
<td>Lavoie, P., Michaud, C., Belisle, M., Boyer, L., Gosselin, E., Gondin, M., Larue, C., Lavoie, S., &amp; Pepin, J. (2018).</td>
<td>Learning theories and tools for the assessment of core nursing competencies in simulation: A theoretical review. Journal of advanced nursing, 74(2), 239–250. <a href="https://doi.org/10.1111/jan.13416">https://doi.org/10.1111/jan.13416</a></td>
<td>182 studies published between 1999–2015 describing simulation in nursing education</td>
<td>43% of the articles did not provide an explicit theory. The remaining papers 57% identified one or more learning or teaching theories, The National League for Nursing/Lefhines Simulation Framework, Kolb’s theory of experiential learning, and Bandura’s social cognitive theory and concept of self-efficacy were the most frequently used. Students' perceptions of simulation, knowledge, and self-confidence were the most commonly assessed, mainly via scales designed for the study where they were used. Core competencies were mainly assessed with an observational approach.</td>
<td>few studies examined the use of simulation in nursing education through learning theories and via assessment of core competencies</td>
<td>II</td>
<td>good</td>
</tr>
<tr>
<td>Study</td>
<td>Author and Date</td>
<td>Study Title</td>
<td>Study Design</td>
<td>Sample Size</td>
<td>Findings</td>
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<tr>
<td>S</td>
<td>Linn, Amanda Chialup, Caregnato, Rita Catalina Aquino, &amp; Souza, Emiliane Nogueira de. (2019).</td>
<td>Clinical simulation in nursing education in intensive therapy: an integrative review. Revista Brasileira de Enfermagem, 72(4), 1061-1070. Epub August 19, 2019. <a href="https://dx.doi.org/10.1590/0004-7167-2018-0217">https://dx.doi.org/10.1590/0004-7167-2018-0217</a></td>
<td>Integrative review</td>
<td>29 articles</td>
<td>76% of the articles review the use of simulation in nursing continuing education, while articles describe the use for student education. There is a higher prevalence of studies with a level of evidence 6 (17), with 28 international publications. There was an increase in scientific production, with 16 articles published in the last three years</td>
<td>technological and resource limitations for clinical simulation practices</td>
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<tr>
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<th>Quality</th>
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<tbody>
<tr>
<td>9</td>
<td>Ness, W., Holland, M., Johnston, D., Giordana, M., &amp; Kroon, S. (2016).</td>
<td>From novice to expert: Simulation-based learning raises the confidence and competency levels of oncology nurses in chemotherapy-biotherapy administration. Oncology Nursing Society Annual Congress. San Antonio, TX. [<a href="https://congress.ons.org/wp-content/uploads/2016/05/Accepted">https://congress.ons.org/wp-content/uploads/2016/05/Accepted</a> Abstracts-2016.pdf](<a href="https://congress.ons.org/wp-content/uploads/2016/05/Accepted">https://congress.ons.org/wp-content/uploads/2016/05/Accepted</a> Abstracts-2016.pdf)</td>
<td>pilot study</td>
<td>40 nurses</td>
<td>Their confidence baseline in the four core areas was 57.6% compared to the three-month post-survey rating of 97.06%. For the chemotherapy extravasations knowledge area, the baseline confidence rating was 26.19% compared to the 3-month confidence post-survey rating of 94.12%. In the oncologic nursing skills area, the confidence rating improved from a baseline of 65.12% to 95.85% at 3 months post-intervention.</td>
<td>All data points not published due to the need for one-year post-evaluation survey requirements.</td>
<td>II</td>
<td>good</td>
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<tr>
<td>Study</td>
<td>Author and Date</td>
<td>Study Title</td>
<td>Study Design</td>
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<td>10</td>
<td>Rutherford-Hemming, T., &amp; Alves, C. M. (2017).</td>
<td>The Use of Hospital-Based Simulation in Nursing Education—A Systematic Review of Clinical Simulation in Nursing, 13(2), 78–89. <a href="https://doi.org/10.1016/j.ecns.2016.12.007">https://doi.org/10.1016/j.ecns.2016.12.007</a></td>
<td>Systematic Review</td>
<td>65 studies</td>
<td>More randomized controlled trials and studies with power analyses and validated measurement instruments must fully assess the impact of simulation on acute care nurses the practicing nurses at the bedside.</td>
<td>a need to investigate the effects of simulation education on patient outcomes</td>
<td>II</td>
<td>Good</td>
</tr>
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</table>

## Appendix B

### Gap Analysis

<table>
<thead>
<tr>
<th>Business Requirement</th>
<th>Current State</th>
<th>Gap between existing state and requirement</th>
<th>New structure to reduce or eliminate gap</th>
<th>Issues &amp; Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>RN to administer chemotherapy medications and provide care based on standard</td>
<td>Low volume of oncologic patients Patients transferred out to facility that can provide care $780 per pt day lost $1200-1500 ambulance charged</td>
<td>We may not be able increase the volume</td>
<td>Creation of a standard education plan for inpatient chemo certified nurses to receive and maintain competency</td>
<td>It costs $120 for initial and $40 for renewal of ONS chemotherapy certification Negatively impacts patient care experiences</td>
</tr>
<tr>
<td>Oncologic competent registered nurses</td>
<td>Expired chemo competency for RN</td>
<td>Using simulation to provide initial and renewal of chemo competency</td>
<td>Structured notification process and scheduling to ensure attendance</td>
<td>Staffing challenges that pull staff from scheduled classes</td>
</tr>
<tr>
<td>Budgeted education hours</td>
<td>Inconsistent educational approaches to maintain competency</td>
<td>Using facility resources, space and simulation assets to offer frequent exposure to oncologic nursing care practice environments</td>
<td>Creating classes and skills play on site</td>
<td>Staff refusing to complete the training</td>
</tr>
<tr>
<td>Inconsistent clinical education resources</td>
<td>Coordinating class time with dept manager and staffing office</td>
<td></td>
<td></td>
<td>Turn over in leadership will hamper the support of the structure</td>
</tr>
<tr>
<td>RNs lack confidence in current chemo competency due to low volume of chemo patients</td>
<td></td>
<td></td>
<td></td>
<td>No reward and recognition</td>
</tr>
</tbody>
</table>
Appendix C

Gantt Chart
Appendix D

Work Breakdown Structure

Oncologic Nursing Simulation Education WBS
# Appendix E

## Project Charter

**Project Name:** Oncologic Nursing Simulation Competency  
**Improvement Advisor:** Berlina E. Leonor  
**Charter Date:** May 2020  
**Facility:** San Leandro Medical Center  
**USF Chair:** K. T. Warrman

**Project SMART Goal:** The aim of the project is to increase the oncologic competency by 15% (compared to baseline) and increase confidence of the registered nurses (compared to the pre-simulation survey) in an acute care setting that has low-volume oncologic patients, using simulation-based learning and evaluation approaches over 4 months.

### Problem Statement and Business Case

<table>
<thead>
<tr>
<th>Problem Statement</th>
<th>Project Team</th>
</tr>
</thead>
</table>
| Registered nurses in the acute care setting struggle with maintaining oncologic competencies in their facilities due to low oncologic case volume and inconsistent exposure to the activities associated with administering chemotherapy. Adopting simulation-based education may mitigate the negative impacts that this may have on patient care delivery, nursing practice, and maintenance of competency. | - Sponsors: R. Loften  
- Champions: Linda Daniel DECEPH  
- Project Co-Leads: Glory Asqua RN Educator  
- Front-Line: Inesina Villar  
- Project Oversight: Quality Council |

<table>
<thead>
<tr>
<th>Customer Benefit</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase the number of oncologic competent nurses, improve the nurse's confidence, reduce and prevent patient care delays or transfers, improve patient satisfaction</td>
<td></td>
</tr>
</tbody>
</table>

### Expected Financial Impact

- Reduced cost from patient transfers
- Reduction in length of stay
- Reduction in patient harm related to high-risk medication administration

### Other Business Benefit

Establish a new modality for nursing education in the face of the COVID-19 pandemic

### Project Timeline and Key Milestones

- **Assess:**
  - Baseline Data Obtained: December 2019  
  - Project Kick-Off: July 2020  
  - Project Charter Completed: June 2020  
  - Process Map: Completed: October 2019  
  - Voice of the Customer: Obtained: December 2019

- **Identify Changes:**
  - Cause and Effect: Developed: October 2019  
  - Start PDSA Action Plans: May 2020

- **Test:**
  - PDSA Action Plans: Completed: August 2020

- **Implement:**
  - Sustainability Plan: Complete pending  
  - Training and Communication Plan: Ongoing  
  - Financial Impact: Validated by Finance  
  - Project Storyboard: Complete and Submitted: December 2020  
  - Spread Plan: Spread key learning to KNICAL

### Project Measures

- Outcome Measures: Number of competent staff compared to baseline, percent of staff reporting higher confidence in survey
- Process Measures: Number of courses completed by RN, number of pre & post simulation survey completed staff
- Balancing Measures: Number of medication errors and number of near misses and number of transfers to other facilities due to inability to provide the nursing care

### Project Scope

- In Scope: All MS Tele nurses hired to the 5th floor
- Out of Scope: Med Surg and ICU
Appendix F

Project Plan A3

Oncologic Nursing Competency A3

Problem Statement

Registered nurses in the acute care setting struggle with maintaining oncologic competencies in their facilities due to low oncologic case volume and consistent exposure to the activities associated with administering chemotherapy. Adopting simulation-based education may mitigate the negative impacts that this may have on patient care delivery, nursing practice and maintenance of competency.

SMART Goal

The aim of the project is to increase the oncologic competency by 15% (compared to baseline) and increase confidence of the registered nurses (compared to the pre-simulation survey) in an acute care setting that has low volume oncologic patients, using simulation-based learning and evaluation approaches over 4 months.

Current State: Identify Target / Actual / Gap

Target - Sustainable educational structure that will ensure annual are provided competencies are validated
Actual - We provided the online education and rely on external sister facilities to provide the oncologic competency validation
Gap - is not using internal facility resources to create a standardized nursing education opportunity, that would meet the consistent oncologic educational need at each facility.

Analysis

Low volume oncologic cases impact the nursing staff because of the inability to maintain the competence to safely administer and deliver care to oncologic patients. Covid 19 County and organizational mandates have made it difficult to cohort staff in close confines to complete online education as well as face-to-face classes. In addition, the hospital census, the number of staff out on medical leave and our inability to procure temporary nursing labor has made it infeasible to pull critical staff away from the bedside.

Barriers

<table>
<thead>
<tr>
<th>Barrier Description</th>
<th>Est. Close Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>COVID-19 Pandemic Social distancing</td>
<td>ongoing</td>
</tr>
<tr>
<td>Unable to have more than 10 in a room</td>
<td>ongoing</td>
</tr>
<tr>
<td>Staffing shortages and constraints</td>
<td>ongoing</td>
</tr>
</tbody>
</table>

Test of Change (Countermeasures) and Next Steps [Plan Do Study Act]

<table>
<thead>
<tr>
<th>Action</th>
<th>Who</th>
<th>By When</th>
<th>Status</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schedule the online education for the staff</td>
<td>D Littlepage</td>
<td>July 23</td>
<td></td>
<td>Staffing crisis only allowed for 1 day of training of 4 RNs</td>
</tr>
<tr>
<td>Order the ONS vouchers</td>
<td>Glory Asuao</td>
<td>JUN 20</td>
<td></td>
<td>ONS vouchers ordered</td>
</tr>
<tr>
<td>Build the curriculum</td>
<td>D Littlepage, Glory Asuao</td>
<td>MAY 20</td>
<td></td>
<td>Curriculum created</td>
</tr>
<tr>
<td>Build and Test the Simulation Scenario</td>
<td>D Littlepage, Glory Asuao</td>
<td>MAY 20</td>
<td></td>
<td>Scenarios tested during test run class, staff response was favorable</td>
</tr>
<tr>
<td>Record the 4 Chemotherapy –Biotherapy Management modules</td>
<td>D Littlepage, Glory Asuao</td>
<td>AUG 20</td>
<td></td>
<td>Educator out of 14 county mandated COVID 19 Stay Home order</td>
</tr>
<tr>
<td>Schedule the simulation</td>
<td>D Littlepage, Glory Asuao, Berlin Leonor</td>
<td>AUG 20</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Accomplishments

<table>
<thead>
<tr>
<th>Accomplishment Title</th>
<th>What's Working</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>VOUCHERS ORDERED</td>
<td>ONLINE CLASSES PROVIDED</td>
<td>JUN 2020</td>
</tr>
<tr>
<td>SIMULATION SCENARIOS BUILT</td>
<td>12 SCENARIOS</td>
<td>MAY 2020</td>
</tr>
</tbody>
</table>

Appendix G
### Communication Plan

#### Project Communication Plan

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Message Type</th>
<th>Goal</th>
<th>Media Format</th>
<th>Frequency</th>
<th>Owner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemo Education Team, Clinical Manager, Clinical Director, Clinical Educator, Director of Education, Staff RN</td>
<td>Team Check-in Charter review A3 updates</td>
<td>Review Status Remove barriers Milestone review Review deliverables</td>
<td>Teams meeting In person meetings</td>
<td>Every other week</td>
<td>DNP Project Owner</td>
</tr>
<tr>
<td>Executive Sponsor: CNE</td>
<td>Status Report A3 updates</td>
<td>Share current status of project</td>
<td>Email Update during 1:1</td>
<td>monthly</td>
<td>DNP Project Owner</td>
</tr>
<tr>
<td>Clinical Manager, Clinical Director, Clinical Educator, Director of Education, Staff RNs, Staffing office, Admins Support</td>
<td>CBE &amp; Simulation Class schedule and plan and structure</td>
<td>Share the class time Review curriculum Roster Class logistics Ensure vouchers are purchased</td>
<td>Teams meeting Email update Class flier</td>
<td>Every month to ensure that communication is disseminated</td>
<td>DNP Project Owner</td>
</tr>
<tr>
<td>Clinical Manager, Assistant Nurse Managers Staff RNs, Staffing office, Admins Support</td>
<td>Class Go live</td>
<td>Conduct Classes CBE Simulation</td>
<td>Class flier Emails huddle</td>
<td>2 Week before every class</td>
<td>DNP Project Owner Clinical manager ANMs</td>
</tr>
<tr>
<td>Clinical Manager, Clinical Director, Clinical Educator, Director of education, Staff RNs, Staffing office, Admins Support</td>
<td>Lessons post project review</td>
<td>Review learnings from the project implementation</td>
<td>Teams meeting Plus, deltas format</td>
<td>After every class</td>
<td>DNP Project Owner</td>
</tr>
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</table>
Appendix H

SWOT Analysis
Appendix I

Project Budget

<table>
<thead>
<tr>
<th>Category of costs</th>
<th>Quantity</th>
<th>Labor Hours</th>
<th>Total Labor Hours</th>
<th>Costs</th>
<th>Other Costs</th>
<th>Total Costs</th>
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<tbody>
<tr>
<td><strong>Personnel</strong></td>
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<td></td>
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<tr>
<td>New RN</td>
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<td>33</td>
<td>396</td>
<td>$73.00/hr</td>
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<td>Renewal RN</td>
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<td>33</td>
<td>396</td>
<td>$87.00/hr</td>
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<td>In-person meetings, virtual meetings and emails</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Clinical Educator</td>
<td>1</td>
<td>84</td>
<td>84</td>
<td>$85.00/hr</td>
<td>$0</td>
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<tr>
<td>Clinical Director</td>
<td>1</td>
<td>196</td>
<td>196</td>
<td>$103.00/hr</td>
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<td>$20,188.00</td>
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<tr>
<td>Admin Asst</td>
<td>1</td>
<td>8</td>
<td>8</td>
<td>$36.00/hr</td>
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<td>$288.00</td>
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<tr>
<td>Executive Sponsor</td>
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<td>4</td>
<td>4</td>
<td>$205.00/hr</td>
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<td>$820.00</td>
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<td><strong>S&amp;W Subtotal</strong></td>
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<td></td>
<td>1090</td>
<td>$676.00</td>
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<tr>
<td>Supplies</td>
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<td>$0</td>
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<tr>
<td>ONS Vouchers</td>
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<td>$120.00</td>
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<td>Training Materials</td>
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<td>$800</td>
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<td>Meals &amp; Refreshments</td>
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<td>$15.00</td>
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<td><strong>Expense Subtotal</strong></td>
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<td><strong>Equipment</strong></td>
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<td>Simulation Equipment</td>
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<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
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<td>Purchased Services</td>
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<td>$0</td>
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<td>$0</td>
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<td><strong>Equipment Subtotal</strong></td>
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<td></td>
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<td>$0</td>
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<td>$0</td>
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<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$96,358.00</td>
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<tr>
<td>less salaries and benefits in existing operating budgets</td>
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<td>Total</td>
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<td></td>
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<td></td>
<td>$4,040.00</td>
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</tbody>
</table>
Cost Avoidance

**Cost Avoidance**

<table>
<thead>
<tr>
<th>Cost Avoidance Category</th>
<th>Cost Avoidance Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Alert Medication Error</td>
<td>The average cost of malpractice suit</td>
</tr>
<tr>
<td>Increased length of stay LOS</td>
<td>The average cost per patient day</td>
</tr>
<tr>
<td>High Alert Medication error litigation</td>
<td>Cost of litigation and remedy</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NAME</th>
<th>Increased LOS</th>
<th>Pt. Sat</th>
<th>Transport Costs</th>
<th>Staff satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>RN</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cost Avoidance Measure</th>
<th>Cost of investment</th>
<th>Cost annually</th>
<th>New Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual cost of Oncology RN training</td>
<td>$96,000</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>High Alert Medication Error</td>
<td>$250,000</td>
<td>$161,722</td>
<td></td>
</tr>
<tr>
<td>Length of stay</td>
<td>$24,000</td>
<td>$185,722</td>
<td></td>
</tr>
</tbody>
</table>
Appendix J

Survey Tool

Pre-Evaluation of Current Chemotherapy and Biotherapy Knowledge (2)

to be given to Acute Care RN beginning the Chemotherapy & Biotherapy Training Course

1. Today's Date *

Please input date in format of M/d/yyyy

2. How many years have you been a RN? *

- 0-5 years of RN experience
- 6-10 years of RN experience
- 11-15 years of RN experience
- 15 years or more of RN experience

3. What is your highest nursing education level? *

- ADN
- BSN
- MSN
- DNP/PHD

4. What Facility do you work for? *

Enter your answer
5. What Nursing Department do you currently work in? *
   - Med-Surgical Nursing Unit with oncologic patients
   - Med- Tele Nursing Unit with oncologic patients

6. Please identify the number of years that you have provided care for chemo/oncologic patients *
   - 1 2 3 4 5 6 7 8 9 10

7. Please rate your knowledge of Oncologic Nursing Care *
   - 1 2 3 4 5 6 7 8 9 10

8. Please rate your knowledge of Chemotherapy Administration *
   - 1 2 3 4 5 6 7 8 9 10

9. Please rate your confidence in caring for an oncologic patient receiving chemotherapy *
   - 1 2 3 4 5 6 7 8 9 10

10. Please rate your level of confidence with general nursing assessment (focused assessments neuro, cardiac, resp, GI, GU...) *
    - 1 2 3 4 5 6 7 8 9 10
Appendix K

Project Oncologic Nursing Competency

<table>
<thead>
<tr>
<th>Date</th>
<th>RN Evaluators</th>
<th>Evaluator Initials</th>
<th>Drugs Administered</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>/</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>/</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>/</td>
<td></td>
</tr>
</tbody>
</table>

Verification Method Codes:  RD=Return Demonstration  V=Verbalized

PRIOR TO ADMINISTRATION  
Evaluator Initials: ____ / ____

1. Coordinates time of administration with pharmacy and others as needed.
2. Verifies consent obtained by MD for treatment.
3. Verifies laboratory values are within acceptable parameters and reports results to provider as needed.
4. Performs independent double check of original orders with a second RN for accuracy of:
   - Protocol or regimen
   - Agents
   - Recalculated body surface area
   - Patient dose
   - Schedule
   - Route
5. Verifies that patient education, premedication, prehydration, and other preparations are completed

ADMINISTRATION  
Evaluator Initials: ____ / ____ / ____

1. Compares original order to dispensed drug label at the bedside or chairside with another RN
2. Verifies patient identification
3. Applies gloves and gown and uses safe handling precautions
4. Verifies adequacy of venous access and appropriate IV site selection
5. Checks IV patency and flushes line with 5-10 ml normal saline
6. Demonstrates safe administration:
   - Pushes through side arm or at hub closest to patient; checks patency every 2-5 ml (every 2-3 ml for pediatric patients)
   - Verifies appropriate rate of administration
7. Demonstrates appropriate monitoring/observation for specific acute drug affects
8. Verbalizes appropriate action in the event of extravasation
9. Verbalizes appropriate action in the event of hypersensitivity reaction

AFTER ADMINISTRATION  
Evaluator Initials: ____ / ____ / ____

1. Flushes line with enough fluid to clear IV tubing of drug.
2. Removes peripheral IV device or flushes/maintains vascular access device
3. Disposes of chemotherapy waste according to policy
<table>
<thead>
<tr>
<th>Verification Method Codes</th>
<th>Verification Method</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>RD=Return Demonstration V=Verbalize E=Exemplar CS=Case Study</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Participates in interdisciplinary care planning with physicians, nurses and other healthcare professionals (e.g., home care or dietary workers).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Anticipates complications of chemotherapy and takes action to prevent or minimize the complications.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Involves patients and caregivers in care planning and provides interventions specific to individual patient needs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Instructs patients about hair, scalp and skin care and takes measures to preserve body image.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Reviews laboratory values and provides patients with information about myelosuppression, prevention of infection, fatigue, and prevention of bleeding according to ONS Putting Evidence Into Practice (PEP) evidence.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Identifies patients at risk for oral mucositis and provides education regarding oral hygiene according to ONS PEP evidence.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Demonstrates knowledge of interventions (drug therapy and nonpharmacologic) for prevention and management of nausea and vomiting according to the ONS PEP evidence.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Instructs patients about the prevention and management of gastrointestinal complications (e.g. constipation, diarrhea, anorexia) according to the ONS PEP evidence.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Identifies and takes nursing action to prevent or manage potential or actual hypersensitivity and anaphylactic reactions.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Uses appropriate safe handling precautions in the preparation, handling and disposal of hazardous drugs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Demonstrates knowledge and skill in the assessment, management and follow up care of extravasations.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Assesses patients for the most appropriate type of venous access device (peripheral or central) based on type and duration of intended therapy.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Demonstrates accessing an implanted port utilizing Lippincott's procedure guidelines: &quot;Implanted port access.&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix L

Signed Statement of Non-Research Determination Form

DNP Statement of Non-Research Determination Form

Student Name: Dana N Littlepage RN

Title of Project:
Using Simulation to Increase Rates of Nursing Competency in Hospitals with Low Volume Oncology Cases

Brief Description of Project:

A) Aim Statement:
The aim of the project is to increase the oncologic competency and confidence of the registered nurses in an acute care setting that has low volume oncologic patients, using simulation-based learning and evaluation approaches over one year.

B) Description of Intervention:
1. The facility selected will identify the participants and enroll them into the required online classes and schedule them for the two-day hands on training and simulation.
2. Each participant will be required to complete the pre-education questionnaire to gather demographic data and baseline data on oncologic nursing experience prior to completing the online training.
3. The online education includes the 45-minute Oral Chemotherapy for Registered Nurses Course through HealthStream, and the 16-hour Oncology Nursing Society Chemotherapy Biotherapy Certificate course.
4. The following week, 2 eight-hour days will be scheduled consecutively to complete the hands-on simulation training. The first day, all components of the competency will be demonstrated for the nurses during the first four hours. The last four hours will be return demonstration of the concepts and time for participant questions. The final day will require the nurses to again demonstrate the skills reviewed previously and ensure that all skills have been validated off. The last four hours of the day will entail the full simulation for competency validation.
5. The Simulation will include a pre-briefing, the actual simulation, and a debriefing. The simulation is based on oncology nursing care and will incorporate chemotherapy medication administration, general care of the acute care oncologic (using the nursing process), communication and an emergent oncologic event. Each participant must complete the entire simulation activity.
C) How will this intervention change practice?

1. The simulation will provide the clinical educator knowledge needed to complete the oncologic nursing competency validation tool
2. Anchor and guide the clinical educators to craft nursing education that will address the diverse needs of the nurse acquiring the knowledge and will eventually, optimize the care outcomes delivered to the patient.

C) Outcome measurements:

1. The immediate outcome of the interventions proposed in this project, is the effect of the simulation learning approach on the nurse’s confidence and competence in chemotherapy administration and oncologic nursing care.
2. Increase in the number of Registered Nurse with validated oncologic nursing competencies

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)

☐ 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:

<table>
<thead>
<tr>
<th>Project Title:</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>The aim of the project is to improve the process or delivery of care with</td>
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<td></td>
</tr>
<tr>
<td>established/ accepted standards, or to implement evidence-based change. There</td>
<td></td>
<td></td>
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<tr>
<td>is no intention of using the data for research purposes.</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>The specific aim is to improve performance on a specific service or program and</td>
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<tr>
<td>is a part of usual care. ALL participants will receive standard of care.</td>
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<tr>
<td>The project is NOT designed to follow a research design, e.g., hypothesis testing 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.</td>
<td>x</td>
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<tr>
<td>The project involves implementation of established and tested quality standards and/or systematic monitoring, assessment or evaluation of the organization to</td>
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Using Simulation for OncoLogic Nurse Competency

UNIVERSITY OF SAN FRANCISCO | School of Nursing and Health Professions

Ensure that existing quality standards are being met. The project does NOT develop paradigms or untested methods or new untested standards.

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 Kaiser Permanente 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): Dana N. Littlepage

Signature of Student:

DATE 9/8/2019

SUPERVISING FACULTY MEMBER (CHAIR) NAME (Please print): K.T. Waxman

Signature of Supervising Faculty Member (Chair):

DATE

DNP Department Approval 5/8/14
Appendix M

Research Determination Outcome Letter

January 11, 2020

Subject: RDO KPNC 19 - 191
Title: Using Simulation to Increase Rates of Nursing Competency in Hospitals

Dear Ms. Littlepage:

As a Research Determination Official (RDO) for the Kaiser Permanente Northern California region, I have reviewed the documents submitted for the above referenced project. The project does not meet the regulatory definition of research involving human subjects as noted here:

[X] Not Human Subject

The activity does not meet the regulatory definition of human subjects at 45 CFR 46.102(f):

Human subject means a living individual about whom an investigator conducting research obtains (1) data through intervention or interaction with the individual, or (2) identifiable private information.

Therefore, the project is not required to be reviewed by a KP Institutional Review Board (IRB). This determination is based on the information provided. If the scope or nature of the project changes in a manner that could impact this review, please resubmit for a new determination. Also, you are responsible for keeping a copy of this determination letter in your project files as it may be necessary to demonstrate that your project was properly reviewed.

Provide this approval letter to the Physician in Charge (PIC), your Area Manager, and Chief of Service, to determine whether additional approvals are needed.

Sincerely,

David C. Matesanz

Director
Research Compliance and IRB Administration
Financial Conflict of Interest Officer
Kaiser Permanente
NCAL Regional Compliance, Ethics, & Integrity Office
1800 Harrison St., 10th Floor, Oakland, CA 94612
Appendix N

Organization Letter of Support

To: USF Nursing Department Chair for Executive Leadership DNP Program
From: Kaiser Permanente San Leandro
Date: Friday, October 18, 2019
Subject: Letter of Support for Dana Littlepage's DNP Project

I understand that Dana Littlepage is completing a project that will focus on creating an Oncologic Simulation Training Program for initial and renewing competencies. This project aims to increase the number of oncologic competent nurses in facilities that have low-level oncologic patients requiring chemotherapy administration.

The project consists of these elements:

1. Gap analysis of the current state of the oncologic competency program both locally and for region.
2. Partner with the organizations Regional Adult Services Director, IT team, Quality team, and other key stakeholders to assist with build, deployment and support of the simulation-based competency program
3. Complete research that will facilitate the development on the development of simulation training and evaluation process.
4. Participate in the design the education curriculum and simulation scenarios
5. Data gathering on key program performance metrics and updates.

The organizations local leadership and regional sponsor are in support of this project.

Thank you,

Amy Bearden
Chief Nursing Executive
Kaiser Permanente
San Leandro Medical Center

Shirley Paulson
Regional Adult Services Director
Kaiser Permanente
Regional Offices
Appendix O

Nursing Years of Service

Nursing years of experience

Ages of Nurses Enrolled

- 15 years or more of RN experience
- 11-15 years of RN experience
- 6-10 years of RN experience
- 0-5 years or more of RN experience

57% of the nurses enrolled had greater than 15 years of experience.

14% of the nurses enrolled had less than five years of experience.
## Analysis of Pre and Post Questionnaire Responses

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Appendix P

Pre- and Post-Survey Results

Survey Question Averages

PRE  POST  DIFFERENCE  % CHANGE
Appendix Q

Knowledge Rating of Oncologic Care and Chemotherapy

Knowledge Rating

-pre
-post

CHEMOTHERAPY ADMINISTRATION KNOWLEDGE

-pre
-post
Appendix Q

Knowledge Rating of Oncologic Care and Chemotherapy (continued)

10. Rate your knowledge of Oncologic Nursing Care

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11. Please rate your knowledge of Chemotherapy Administration

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Appendix R

Confidence Rating

**Confidence in caring**

**confidence with general nursing assessment**

- **PRE**: Please rate your level of confidence with general nursing assessment (focused assessments neuro, cardiac, resp, GI, GU...)
- **POST**: Please rate your level of confidence with general nursing assessment (focused assessments neuro, cardiac, resp, GI, GU...)
Appendix R

Confidence Rating

12. Please rate your confidence in caring for an oncologic patient receiving chemotherapy

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Please rate your level of confidence with general nursing assessment (focused assessments neuro, cardiac, resp, GI, GU…)

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Source of Variation | SS | df | MS | F | P-value | F crit |
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Appendix S

Therapeutic Communication

14. Please rate your therapeutic communication skills (with family and patients)

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Please rate your therapeutic communication skills (with family and patients) PRE
Please rate your therapeutic communication skills (with family and patients) POST