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A Performance Improvement Nursing Fellowship to Enhance Timely Access to Care

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Abstract

This scholarly report describes a Doctorate of Nursing Practice (DNP) project that advanced the performance improvement (PI) knowledge of frontline nurses to improve timely access to acute care during a 6-month PI/Lean management nursing fellowship. Patient flow issues delay access to care and result in negative patient quality outcomes and safety failures. Patient experience, confidence, and satisfaction in healthcare organizations erode when timeliness and efficiency are deficient. The project site is a 443-bed, two-campus, not for profit community hospital in Northern California. This project included the implementation of a PI/Lean nursing fellowship program as an evidence-based intervention to address patient flow issues. During the project, the nurse fellows were expected to learn through didactic education in addition to engaging, integrating, and leading PI/Lean activities within the organization. Patient flow measurements occurred six months before and during the fellowship. PI/Lean knowledge and skills acquisition were measured using a pre- and post-knowledge assessment tool. A program effectiveness survey was administered to team members. A qualitative survey gauged the fellowship's impact. The timeliness of access to care indicated a degradation of 5 minutes or 2% during the entire 6-month fellowship though a 3-minute improvement occurred in the final three months. The fellows' pre- and post-assessment indicated a 60% improvement. The fellowship effectiveness survey indicated an 83% satisfaction rate. The qualitative survey revealed a positive tone. The nursing fellowship provided a methodology to advance the frontline nurses' knowledge and skills in improvement science while assisting the organization in achieving a priority strategic initiative.

Keywords: performance improvement, Lean, nursing fellowship, patient flow

Section II: Introduction

Problem Description

Timely access to emergency and acute medical care is a problem greatly affecting many Americans, resulting in poor quality of care. According to Sprivulis, Da Silva, Jacobs, Frazer, and Jelinek (2006), there is a 20% to 30% increase in mortality for patients with prolonged emergency department (ED) length of stay (LOS). Hospitals describe the process of placing the patient at the right level of care at the right time as throughput or patient flow (AHA Solutions, 2012). Since the implementation of the Affordable Care Act in 2010 and the Centers for Medicare & Medicaid (CMS) Star Rating systems, hospitals have begun to put more effort into improving operational systems, such as patient flow. Ultimately, patient flow has an effect on the financial bottom line of the hospital through the pay-for-performance penalties, in addition to adversely impacting a health system's reputation for quality, safety, and service (AHA Solutions, 2012). Timely and efficient care, however, is not dependent only on ED efficiency. Patient flow is dependent on many complex factors throughout the entire system. The focus for improvement should be to reduce wait times or delays for patient intake and inpatient admissions from ED and to achieve timely and efficient transfer and discharge of patients throughout the healthcare organization (Institute for Healthcare Improvement [IHI], 2003).

Nurses working in healthcare settings have a keen awareness of the challenges associated with timeliness of care and the resulting quality of care problems. Therefore, nurses are well-suited to address these problems and seeking solutions to improve patient flow through complex healthcare systems. Derived from the manufacturing industry, healthcare systems have adopted Lean principles to improve care and to eliminate waste in our complex healthcare systems. Cohen (2018) noted that Lean methods engage those closest to the work, such as nurses, to

improve safety, quality, and service. Combining nurses' knowledge of operational problems associated with patient throughput and equipping them with the powerful problem-solving techniques offered by Lean concepts allows nurses to positively influence patient access to efficient, exceptional service, and high-quality care.

The setting for the DNP project was a licensed 443-bed, not for profit, two-campus community hospital experiencing patient flow concerns. The hospital has employed varied methodologies over the past five years to improve patient flow. However, none of the methodologies used in the past have created sustained improvement. During the 2018 fiscal year, the median patient flow from patient arrival in the ED to inpatient unit was 319 minutes (5.31 hours). The community hospital viewed this lengthy amount of time in the ED for its patients as a concern for patient quality, experience, and access to care and treatment.

The community hospital has recently become a 5-Star CMS rated hospital. The CMS hospital rating measures Medicare beneficiaries' experiences with their health plan and healthcare system, as well as specific quality indicators. The overall hospital rating ranges from one to five stars. The more stars a hospital earns, the better it performs on the required quality measures. The most common overall hospital rating is three stars. The area measured by CMS that is performing the poorest at the hospital is the patient flow measurement. Hospitals performing in the top decile in the nation report patient arrival in ED to inpatient unit to be 180 minutes (CMS, 2019).

Patient satisfaction in the ED and beyond is greatly affected by the efficient and timeliness of care. For the 12-month fiscal year 2018, the overall ED satisfaction percentile ranking from patient satisfaction surveys conducted by Press Ganey was just below the 50th percentile ranking nationally. The hospital's organizational goal for the fiscal year 2019 is to

improve to > 55th percentile nationally. While many patient experience initiatives have been implemented in the community hospital's ED, efficiency and timeliness of care are known to be key drivers of satisfaction. In fact, revising high impact workflows, such as streamlining registration and provider triage, can have real, impactful results on ED wait times, percent of patients left without being seen and patient experience (www.healthcatalyst.com). Thus, patient flow improvements impacted by the work of the fellows had a secondary and measurable impact on patient experience outcomes.

Available Knowledge

PICOT Question

The PICOT question for this paper and supported by the literature is: In patients admitted from the emergency department, how does extensive performance improvement/Lean management training for frontline nurses focusing on patient flow using a nursing fellowship program approach in the acute care environment, compared to current practice, affect patient flow over the six-month nursing fellowship period?

Literature Review

A comprehensive and systematic literature review of relevant articles was conducted using several databases, including CINAHL, Pub Med, and Cochran Library, using keywords *Lean principles in ED throughput, nurses involved in performance improvement, nurses' problem solving,* and *nursing performance improvement/Lean fellowships*. The literature review included articles no more than 10 years old, quantitative and qualitative, as well as the United States and internationally published. Over 100 articles originally met the criteria; 10 articles meeting the inclusion criteria were critically evaluated for this paper. The reason the 10 articles were selected was due to their subject matter relevance and level of evidence (see Appendix A).

The Johns Hopkins critical appraisal tool was used to evaluate the articles for the level of evidence and quality (Dearholt & Dang,2018). The articles either related to Lean PI, ED throughput, or nurses identifying and solving operational and clinical problems, as well as performance or quality improvement fellowships for nurses—all of which were relevant to the PICOT question. However, not all articles were of high quality, but are featured because they offered a degree of relevance and strengthened overall context for the DNP project. The first four articles cover the importance of Lean PI as a technique in improving throughput and the use of frontline nurses to achieve the improvement (see Appendix A).

In a study that spanned a three-year period, Ng, Vail, Thomas, and Schmidt (2010) demonstrated improvements. Using Lean management techniques and Lean frontline staff to improve hospital throughput, Ng et al. were able to note key improvements, such as a reduction in mean registration to physician time from 111 minutes to 78 minutes. The number of patients who left without being seen decreased from 7.1% to 4.3%. The LOS for discharged patients decreased from 3.6 hours to 2.8 hours. There was also an increase in patient satisfaction scores, from 79.8% to 82.0% (Ng et al., 2010).

In a Lean management project, DeAnda (2018) examined throughput techniques that involved a nurse flow coordinator as an empowered nurse who was specifically assigned to improve patient flow out of the ED at a busy Texas hospital. Not only did the throughput measure of transport times improve from 104 minutes to 80 minutes, but the frontline nurses involved in the project were 92% satisfied with the intervention of the flow nurse coordinator role.

Holden (2011) conducted a systematic review of the literature, critically reviewing 18 articles describing the implementation of Lean principles related to ED throughput in the United

States, Australia, and Canada. Six study questions were developed that provided guidance for the literature review. Holden indicated that Lean appears to offer significant improvement opportunities in the ED. In this systematic review, the EDs that implemented Lean generally had favorable effects. However, Holden concluded that more work should be completed to assess Lean management's effects on patient safety and quality outcomes.

A systematic review of the literature was completed by Walker, Kappus, and Hall (2016). The authors identified and synthesized the literature regarding patient throughput and strategies for improving throughput in acute care settings. The purpose of the review was to synthesize the strategies to improve throughput that resulted in improved outcomes. Fourteen articles met the established criteria for review. The articles were synthesized and presented for the reader by best practice categories. Walker et al. noted a gap in evidence related to best practice strategies with correlational metrics or outcomes for safe quality care. The researchers found that one of the major best practices was the use of Lean methodologies to improve patient throughput, along with nine other best practices.

Using the Institute of Medicine's (IOM) quality domains (safe, effective, patient-centered, efficient, timely, and equitable), Stang, Crotts, Johnson, Hartling, and Guttman (2015) performed a systematic review, with the objective to identify existing measures of ED crowding that have been linked to the quality of care. Stang et al. reviewed literature from 1980 to 2012 within major databases from several countries around the world. Observational studies, including cross-sectional, cohort, and case-control, were included in the review, as well as quality improvement, quasi-experimental, and before/after studies. The authors identified 7,413 articles, with 32 of those articles included in the review.

Stang et al. (2015) found there were 15 ED crowding measures linked to quality of care outcomes. Data were provided on the link between ED crowding and the IOM domains of timely, effective, safe, and patient-centered care, none related to the IOM domains of efficient and equitable. The measures most frequently related to care quality included total ED volume, number of patients in the waiting room, ED occupancy, ED LOS, total patient care hours, number of admitted patients in the ED awaiting an inpatient bed, and the LOS for admitted patients. Two of the publications showed no link between crowding and quality, as measured by delays in time to percutaneous coronary intervention or time to computed tomography (CT) for stroke patients with < 3 hours from symptom onset. Some of the quality measures affected by the 15 ED crowding measures included clinical outcomes, such as time to antibiotic for pneumonia patients, time to analgesia, door-to-needle time, time to asthma treatment, adverse cardiovascular outcomes, time to CT order, and in-hospital mortality at 10 days (Stang et al., 2015). All the areas had statistically significant findings that indicated quality was compromised based on well-established standards. Stang et al. believed this was the first study exploring ED crowding measures and providing linkages directly to quality of care outcomes. The outcome of the study assists hospital leaders and staff in directing interventions, as well as provides valuable information to policymakers. Limitations of the study were the variability of the study design and the methodology of the articles included in the systematic review. There were no randomized controlled trials that met the inclusion criteria, which would have strengthened the evidence level.

The following two articles describe nurses' ability to identify problems within the healthcare system. Stevens et al. (2017) described nurses' encounters with operational failures (OFs) in the healthcare system that hinder the timeliness of care and erode quality and patient

safety. Stevens et al. conducted a multi-site study to describe the rate and categories of OFs detected by nurses as they provide care and work within a healthcare system. Data were collected from 774 nurses working in 23 hospitals. OFs were found in six categories, including equipment/ supplies, information/communication, medication, staffing/training, and physical unit layout. On average, registered nurses (RNs) reported a rate of 6.07 (*SD* = 7.10) OFs per shift. The most common OF was related to equipment and supplies. Stevens et al. asserted that their findings illustrated that RNs commonly encounter OFs in delivering patient care. The frontline RNs' intimate knowledge of OFs can greatly inform operational improvements that not only improve quality care but also reduce wasted RN time.

While nurses are effective at identifying OFs, they are ill-equipped to complete deeper system-level problem-solving. Instead, due to the nature of the work environments, nurses are forced to create workflow alternatives (e.g., work arounds). Unfortunately, direct care nurses have little time to learn and employ second-order problem-solving techniques offered through Lean techniques. Tucker, Edmondson, and Spear's (2001) qualitative study examined the daily problem-solving skills of nurses. Using observations of 22 nurses on all three shifts, the researchers collected data related to actual situations and responses to develop theoretical concepts about the phenomenon of problem-solving behavior. The outcome of this qualitative study demonstrated that nurses do whatever it takes at the moment to take care of their patients, use trial and error to find a solution, and only involve other closest work friends in problem-solving rather than reporting to the resource that could solve the problem. Rarely is second-order problem-solving utilized by direct care nurses (Tucker et al., 2001).

The final three articles describe that, when equipped with knowledge, tools, and techniques for improvement, nurses are an untapped resource to identify and solve clinical and

organizational problems and improve patient outcomes. Sharpe (2015) described a grant-funded project of 37 hospitals, spanning 12 years that empowered frontline nurses as leaders implementing evidence-based practices to improve quality and safety. The nurses involved in leading the efforts received extensive training in improvement concepts. The improvements measured were falls with injury, sepsis mortality, central-line bloodstream infections, hospital-acquired ulcers, ventilator-acquired pneumonia, medication errors, and acute myocardial infarction mortality. Forty-three percent of the hospitals reduced falls with injury, 100% of the hospitals reduced medication administration errors, 77.1% of the hospitals improved sepsis mortality, 82.9% of the hospitals improved central-line bloodstream infections, 69.7% of the hospitals improved ventilator-associated pneumonia, and 100% of the hospitals reduced acute myocardial infarction mortality (Sharpe, 2015).

Bramley, Manning, and Cooper (2018) described the Chief Nurse Excellence in Care Junior Fellowship initiative, which provided a small cohort of nurses an opportunity to advance their skills in leadership, innovation, improvement science, and change management. Early evaluations from the qualitative study suggested that providing such a program for frontline nurses enhances professional development and influences positive patient outcomes. The authors conducted case studies of the projects completed by the nurse fellows. Based on case findings and fellowship self-evaluation, Bramley et al. concluded that a nurse fellowship program is a sustainable, clinically-driven opportunity to enhance professional development and autonomy of practice for nurses.

In an effort to demonstrate the value nurses who have completed a fellowship in quality and safety may have on improving outcomes for patients, an article was reviewed by Patrician et al. (2012). The authors highlighted a program put in place at the Veterans Affairs (VA) called the

Veterans Affairs Quality Scholars (VAQS) fellowship program. The program was a partnership between the VA and the Robert Wood Johnson Foundation's Quality and Safety Education in Nursing project. The aim was to expand the VAQS program from physicians only to include nurses in 2009. Including nurses in the program promoted inter-professional education and team development, with a goal of improving healthcare quality and safety across the VA system. Dartmouth Institute for Health Policy provided the content of the fellowship. The VAQS has demonstrated marked success. The first three nurse fellowship graduates have published, are employed either in federal or academic institutions, and are leaders in improving care. The Patrician et al. article was not a research article, but provided validation that a nursing fellowship program focusing on improvement in quality and safety has merit.

Rationale

Complexity theory is a relevant and appropriate framework that provides guidance for the development of a fellowship program in PI/Lean. Complexity theory in healthcare describes order emerging from complex and dynamic systems prevalent in healthcare systems (McDaniel & Driebe, 2001). The elements of complexity science allow healthcare leaders to study systems that are characterized by non-linear dynamics. McDaniel and Driebe (2001) described complexity theory as a different way of observing healthcare organizations. In healthcare, using complexity theory as a framework for study and improvement invites leaders to accept that organizations are complex adaptive systems (CASs). In complexity theory, CASs are the main component of the theory. Within CASs are subcomponents, which include agents, interconnections, self-organization, emergence, and coevolution.

Agents, the first component, are described by Cilliers (1998) as people, human processes, medical processes, administrative processes, or computer systems. For example, nursing

processes, such as the implementation of an individualized care plan, are a form of agency. Cilliers described the second component as interconnections. This component is described as agents interacting and exchanging information through relatively valuable means. In addition, interactions in this component are described as localized in the system, but patterns of interactions can be seen globally. Relationships between people are examples of interconnectedness, such as the nurse-patient relationship. Complexity emerges from patterns of interactions among the agents (McDaniel & Driebe, 2001). Self-organization is the third component and is described as the process of people in the system adjusting their behaviors in ways needed to cope with the changing demands of the system. These demands could be from internal or external forces (Cilliers, 1998). An example includes how organizations developed clinical documentation programs to maximize reimbursement through Medicare but did not intend for that to be an outcome. McDaniel and Driebe (2001) described the fourth component, emergence, as agents interacting in a chaotic fashion, which may self-organize and cause system properties to emerge. For example, a post-surgical nursing unit has numerous caregivers; yet, the whole unit develops a culture as a whole and not just the sum of its parts. The final component is the notion of coevolution, which suggests that CASs are open systems, and the agents in the system interact with others outside the system, causing changes within the system. According to McDaniel and Driebe, due to coevolution, the system's current and future behaviors are strongly aligned to the organization's history. Instead of focusing on an individual who is *blamed* for an error, these concepts encourage healthcare leaders to look deeply at the failure of care systems.

This theory provides a framework that supports and provides a rationale for this DNP project. Nurse fellows in a complex healthcare organization with advanced training in PI and Lean served as agents of improvement, particularly focused on patient flow in the organization.

Interactions with others in the system invariably assisted with understanding system dynamics and allowed for the emergence of new methods for interacting within the system, allowing behaviors to change and lead to planned system improvements.

The components of the theory in CASs align with the phases of the project. The project established organizational change. The components of the complexity theory framework provided guidance in breaking down the project, and assuring the formulation of the project addressed all areas of the theory. The framework components guided measurement variables, such as improvement outcomes (i.e., coevolution) and the nurses' experience (i.e., agents), within the change process. According to Anderson, Crabtree, Steele, and McDaniel (2005), it is in the context of the organization where answers to healthcare improvement lie. The project supported Anderson et al.'s hypothesis since nurse fellows developed an understanding of the organizational context. Further, Anderson et al. (2013) propose participation in improvement efforts emerges as nursing staff and managers of varying expertise and values interact at the local level through a variety of means (e.g., chance encounters, informal meetings, and committee structures) in making formal and informal decisions which ultimately affect patient and organizational outcomes. The PI/Lean nursing fellowship upheld this notion as fellows involved nursing personnel at all levels in patient flow improvement efforts throughout the fellowship. Preparing future nursing leaders through mechanisms such as the PI/Lean nursing fellowships promotes the development of skills that are needed to lead healthcare into the future.

In the healthcare-focused Quantum Leadership Theory the authors suggest, "leaders must model and inculcate a predictive and adaptive capacity into the life of their organizations and into the skills of the staff at every place in the organization" (O'Grady & Mallach, 2015, p2)

Providing the fellows the opportunity to navigate through the organization's CAS contributes to a highly valuable capability needed in successful healthcare organization's future leaders.

Specific Aims

The following was the primary aim statement of the DNP project: To improve timely access to acute care by enhancing patient flow, as evidenced by a 5% decrease in median minutes over baseline from ED arrival to discharge to the inpatient floor, nurses selected for an innovative nurse fellowship program will gain knowledge and competencies to implement PI and Lean techniques in the ED arrival to admission process during the months of January through June 2020.

In addition, there were additional objectives that were significant and required consideration, measurement, and analysis as a result of the PI/Lean nursing fellowship program. The following objectives were identified to support measurement of the DNP project outcomes.

- Implement an effective nursing PI/Lean fellowship program for the healthcare organization, as measured by key stakeholders, including members of the PI department, achieving an 80% *strongly agree/agree* score on the effectiveness survey tool.
- Improve the nurse fellows' knowledge of PI/Lean techniques through the six-month nursing fellowship program, as measured by a 50% improvement in the nursing fellows' pre- and post-self-evaluation of PI/Lean management knowledge of key principles and techniques.
- Validate active engagement, collaboration, and learned PI/Lean principles by the nurse fellows through qualitative survey responses from key individuals observing the nurse fellows in action.

Section III: Methods

Context

There were numerous key stakeholders for this DNP project. First, the executive leaders in the healthcare organization were supportive of the concept of PI/Lean nursing fellowship. Through interviews and discussions with all executive leaders in the organization, full support was gained for the project (see Appendix B). Support of nurse leaders and staff in the PI department was garnered since they had the fellows embedded in their department for a six-month period. The PI department was supportive and viewed the fellowship program as an opportunity to disseminate and integrate PI/Lean knowledge throughout the organization (M. Gabriel, Director of Performance Improvement, personal communication, April 10, 2019). They also viewed the addition of the fellows in their department as additional resources available to assist in planning and executing PI/Lean management activities.

Frontline staff and the collective bargaining unit were also key stakeholders in the project's success. It is beneficial that the organization is an American Nurses Credentialing Center Magnet-designated organization, which highly values professional development and growth in nursing practice, along with applying best practices involving nurses. Frontline staff, shared governance councils, and the collective bargaining units were supportive of the project through expressed agreement to have members of the union selected as the nurse fellows. While details of required union working conditions will be adhered to, the overall support of the program was unanimous.

The ED staff and inpatient unit staff worked closely with the fellows to improve patient flow. The fellows participated in three rapid process improvement workshops (RPIWs), audited the changes that resulted from RPIWs, and worked to implement process improvement cycles,

commonly called plan, do, study, act (PDSA) cycles. The ED staff and inpatient unit staff worked with PI/Lean process improvement methodologies since 2011; therefore, the staff is familiar with the concepts, but in the past, they have not had continuous attention to patient flow for a prolonged period. Making evidence-informed change and sustaining new processes requires consistent attention and follow-through, with leadership attention also using the Lean management techniques, such as standard work and tiered checking.

Physicians in the ED were also a focus on improved patient flow. ED physicians were required to change workflows as a result of the RPIWs' outputs. While ED physicians were aware of the need to change, it can be difficult to see changes uniformly since they are a separate entity and a contracted service. However, ED physicians and hospitalists participated in the RPIWs and contributed to the newly designed workflows, which assisted in their adoption of new workflows, as well as patient flow outcome standards that were written into the contract for services for the contracted physician groups creating a win/win proposition since physicians are also measured on outcome performance metrics including efficiency improvements.

The inpatient staff have been involved in PI efforts to improve patient flow, specifically related to discharging patients by noon to assure inpatient beds are available for incoming ED patients. The inpatient units focused on this effort over the past fiscal year and achieved their target goal of 33% of patients discharged by noon. The nursing units continued to see this effort as a value-add proposition and were invested in continuing; therefore, many inpatient nursing units continued to improve discharge by noon during the timeframe for implementation of the DNP project. The fellows were assigned to nursing units as PI coaches to continue the improvement work to expedite patient discharges by noon. With the assistance of the fellows, the teams on the units continued to use PI/Lean management techniques to make the improvements.

The inpatient staff used visual management and daily huddles to track their progress on ED patient flow and discharge by noon. The nurse fellows continued to enhance the work already built on previous successes to assure patients were ready for discharge and that it was done efficiently and effectively, allowing for patients in the ED to receive timely access to the right level of care and treatment at the right time.

The University of San Francisco, the DNP student's university setting, was also an important stakeholder and supported the DNP project. It is important the project is viewed by the university as non-research, as evidenced by the DNP Statement of Determination form, which is signed by the student and the advisor (see Appendix C).

Interventions

The nursing fellowship program included the selection of two nurse fellows from the two-campus hospital. The purpose of the nurse fellowship was to allow direct care nurses the opportunity for formal evidence-informed training and practice implementing key concepts in PI/Lean and applying the learned principles to improving patient flow—a strategic goal of the organization. The comprehensive and systematic literature review, as viewed in the evaluation table (see Appendix A), strongly supports the notion that ED flow is a serious, worthy, and complex healthcare problem.

The nurses selected had a unique opportunity to seek solutions through the implementation of the PI/Lean nursing fellowship model approach. The positions were marketed to the direct care nurses in all areas of the organization. A job description for the nurse PI/Lean fellows was developed and broadly shared (see Appendix D), along with an application and selection process. A selection panel, consisting of the DNP student, PI team members, and nurse leaders, was deployed to conduct interviews and final selection of the fellows. There were 15

applicants for the two nursing fellow positions. Following the interview and objective selection process, two critical care nurses were selected and accepted the opportunity to participate in the fellowship. The PI/Lean nurse fellows were paired with members of the PI team serving as preceptors for the six-month period. After the six-month fellowship, the nurses had the option to return to their previous positions in their home nursing units, which were held for them during the fellowship. The nurse fellows were provided the most recent and relevant training practices in PI and Lean principles at the beginning of the fellowship and throughout. While site visits to other advanced PI/Lean healthcare organizations were part of the original plan, the visits were not possible due to the coronavirus pandemic and shelter-in-place orders. The PI team utilized the evidence-based core curriculum for the fellows to consume through didactic and online learning opportunities. There were three categories of skills and concepts covered in the fellowship program through the didactic and preceptorship learning opportunities: lean principles/tools, soft skills, and technical skills. There were distinct skill sets taught under each of these areas based on the individual needs of the fellows, as identified in the knowledge pre-assessment.

The PI/Lean nurse fellows had opportunities to *learn by doing* in several areas. They participated in two RPIWs and helped facilitate a third RPIW. With the assistance of their PI mentors, the fellows conducted several 5S projects at both hospitals, assuring that equipment and supplies were stored and replenished in a convenient and organized manner, so nurses had quick and easy access to items needed for patient care. Each fellow had opportunities to develop process maps for ED and perioperative patient flow. Both fellows collected and analyzed data on both patient flow and perioperative COVID testing. The data the fellows collected were self-analyzed and presented at several senior management level meetings, providing valuable

information to executives to assist in future decision-making related to resource allocation. The fellows also participated in the development of daily management systems on nursing units where they were assigned as a PI coach.

Gap Analysis

A comprehensive gap analysis was performed, which included the development of a document that outlined the project purpose, overview, AIM statement, current environment, methodology, scope, and resolution matrix (see Appendix E). The gap analysis and resolution matrix identified those gaps that existed in the hospital's current performance in patient flow, PI/Lean team composition, PI/Lean knowledge in the organization, and overall staff engagement in PI/Lean patient flow processes. Gaps were identified in current patient flow performance and staff engagement in PI/Lean processes. Resolutions included the development of a method to have more staff involved and engaged in PI/Lean, such as the nurse fellowship program in PI/Lean.

Gantt Chart

A Gantt chart of key and significant tasks was completed using a software tool (see Appendix F). The Gantt chart was a helpful project management tool to illustrate the schedule of the project. The Gantt chart also illustrates the dependency relationships between activities and schedule status. The Gantt chart described all key milestones and projected timeframes for this DNP project. The Gantt chart begins with the project inception stage, planning, and implementation. The Gantt chart final section refers to the data collection and project evaluation stage of the project. The final Gantt chart for the project was adjusted to account for the interruption in the fellowship during the COVID-19 pandemic.

SWOT Analysis of the Current State

Strengths, weaknesses, opportunities and threats (SWOT) analysis is valuable strategic planning tool for planning, decision making, and resource allocation within an organization. SWOT is used to determine the internal and external factors which are favorable and unfavorable to achieve an objective (Gürel, 2017).

The SWOT analysis for this DNP project examined internal strengths and weaknesses of the organization as well as the external opportunities and threats that would influence the success of the project (see Appendix G). There are numerous internal strengths identified. However, the alignment between the hospital's organizational strategy and the DNP project goals are highly aligned. Since developing a strong evidence-informed PI/Lean culture is a desired organizational strategy, the DNP project was a tactic to move the facility nearer to its strategic goal attainment. An additional strength is the organization's Magnet designation. In Magnet-designated organizations, professional development opportunities are expected and supported by leaders and staff. External opportunities include the popularity and evidence-based improvements that many organizations have achieved through PI/Lean activities which demonstrates its value in healthcare.

The most prominent internal weakness is the hospital's reimbursement pressures which could limit the investment in labor intensive programs such as the nursing fellowship. Further, the organization has many priorities and resources could be diverted from the fellowship if resources must be re-prioritized. The primary external threat is the financial pressure the healthcare organization faces which could limit the number of fellows or time of fellowship. If the budget for the program was reduced the amount of PI/Lean activities possible during the

inaugural nursing fellowship program would be limited not allowing for the full experience and improvement goals achievement would be constrained.

Work Breakdown Structure

The work breakdown structure (WBS) represents a top-down approach with the end result in mind (see Appendix H). The WBS consists of three levels for this project. The end result was the development of the nursing fellowship program and all its components. The project name or outcome is placed in the zero position of the WBS. Level one of the WBS describes each larger component of the project. For this project, the components in level one were project conception, planning, implementation, evaluation, and final write-up or closing of the project.

The WBS level two consists of sub-work components. Each component was considered a work package. Each work package was documented as an outcome. There were three-level two work components for the project conception, including a review of the evidence, the discovery of fellowship programs, and budget development. An important component of the project conception in level two for this nursing fellowship project was the budget development component. Martinelli and Milosevic (2016) indicated if the project manager is aware of the project and organizational situations that may influence the WBS, the WBS is more likely to be built correctly and truly reflect the project deliverables and accurate timing of work components. In the case of this project, philanthropic funding was sought and acquired to backfill the nurse fellows' work hours in their clinical units. The philanthropic funding schedule was known to the project manager and was not flexible. Therefore, the budget component was placed at level two during the project conception phase in order to meet the timing requirements for funding to be requested and received before the implementation phase.

In this project, WBS level three items described sub-work packages associated with the level two work components. This allowed for the project to be further delineated and broken down, further identifying essential components. In the WBS described for the fellowship program, there were numerous level three work components under many of the level two components that required significant time and attention. For example, under the project planning component, the fellow recruitment component required five level three steps, and significant time and effort were associated with those components.

Another important outcome listed as a level two work package under the project evaluation component was the sustainability plan. Creating a method for sustaining the program was essential to keeping the fellowship program in place. The success of the program was measured through the evaluation process, which immediately precedes the sustainability plan in the WBS. Therefore, the work packages were built as an integrated effort. In fact, Martinelli and Milosevic (2016) indicated that the WBS is meant to be used as a framework for integration of the project plan and for control.

The project closure and final write-up was an important aspect of the project. This essential step allows the project manager and project team to meaningfully reflect on the project. Martinelli and Milosevic (2106) suggested that the closure step includes documentation of what worked and what did not work during the different project phases. It was essential to document lessons learned, so they may be evaluated, disseminated, and socialized as key takeaways. In the case of the nurse fellowship program, the DNP student, who served as the project manager, had the opportunity to reflect, assess outcomes, and document the lessons learned in the final write-up. The lessons learned must also contribute to the further development of a sustainability plan.

The fellowship must be adjusted based on the findings of the lessons learned, contributing to the continuation of potential funding and success of the program.

Budget and Return on Investment

Numerous revenue and incremental volume assumptions were required to develop a budget and return on investment (ROI) for the project. Projections illustrate that patient flow will improve by 5% for the final four months of the fellowship due to the PI work of the fellows (e.g., patient arrival to admission from 277 minutes to 263 minutes). Efficiency improvements result in the ability to treat more patients with fewer patients leaving without being seen. This improvement results in 5% more patients treated in 24 hours in the last four months of the fellowship. Considering those assumptions, the current average daily census of 120/day patients will increase to126 patients/day. The average reimbursement for all ED patients (i.e., discharged and admitted patients combined) is $6,129. Six more patients per day result in a significant increase in revenue ($4.4 million) over four months. The expenses associated with the project are six months of the fellows' labor costs and externally provided educational costs. Other expense assumptions associated with the care of six additional patients are included in the budget spreadsheet (see Appendix I). The analysis only includes the six months of the fellowship. It was challenging to project ongoing revenue generation given the fellowship was for a limited time. However, if the results were achieved as projected in the six-month fellowship, and future fellows were funded to work on similar improvements, further projections and analysis evaluating the financial benefits of the fellowship would assist in the sustainment of ongoing fellowships. Indeed, this analysis demonstrates the impact ED LOS improvements may have on the bottom line of healthcare organizations.

Responsibility/Communication Plan

A responsibility and communication plan assignment matrix describes the participation by various stakeholders in completing tasks or deliverables, including communication tasks for a project or business process. For this DNP project, a communication/responsibility matrix was developed that outlines the key stakeholders for the project who must be communicated throughout the project duration (see Appendix J). The objectives, timing, format for communication, and responsibility for communication are documented and shared with stakeholders, as well.

Cost/Benefit Analysis

A cost-benefit analysis (CBA) was an essential aspect of this DNP project, assisting in determining its value and future support by the organization. Waxman (2018) described the CBA as the process of analyzing healthcare resource expenditures relative to their possible benefit. The analysis is necessary to assist the organization in priority setting, especially when resources are limited. With permission, a spreadsheet developed by Mikhail Schneyder, RN, BSN, MBA, a University of San Francisco School of Nursing and Health Professions guest lecturer, was utilized to analyze revenue and expense assumptions, and a final valuation serving as the ROI of the project return was calculated (see Appendix K). The analysis revealed a strong performance if the achievement of all fellowship goals and assumptions occur as proposed.

The increased ability to serve more patients due to the efficiencies achieved through the PI work by the fellows in the ED results in a $4.4 million increase in gross revenue, with a net operating income of $1.3 million, which is a 30.1% operating margin. The calculated earnings before interest, taxes, depreciation, and amortization (EBITDA) are $1.3 million, with an ROI of 30.1%. This valuation illustrates the benefit of improving efficiency in areas of the hospital that

are highly profitable, such as the ED. Through this analysis, fellowship support and sustainment of the program are more likely to be supported by critical stakeholders as the value of this ROI is demonstrated. Furthermore, an argument could be made that similar efficiencies could be readily transferable to other areas of the organization that rely on effective or optimized patient flow, such as the perioperative region. Furthermore, the elements of the program and the successes achieved will be disseminated through other mechanisms such as webinars, conferences, and individual consultation with other healthcare systems.

Study of Interventions

The study interventions for the project included the PI/Lean nursing fellows' skill and knowledge acquisition of PI/Lean principles, as evidenced by a pre- and post-self-assessment completed. Timely access to care was measured using several segments of care during the ED care to inpatient bed using minutes as the units of measurement. In addition, a quantitative electronic survey was developed and implemented to evaluate the effectiveness of the fellowship and administered to 12 individuals who came in direct contact with and observed the nursing fellows interactions and performance during the program. Finally, a qualitative survey was developed and administered to eight individuals to augment the outcome evaluation process and attain more in-depth feedback from those most closely associated with the fellows' work.

A quantitative pre- and post-self-assessment was completed through a questionnaire format using a Likert (1-5) rating system (see Appendix L). In addition, demographic data were collected for the two fellows, including age range, gender, length of time as a nurse, length of time at the hospital, and educational level. The survey is not a validated survey due to the unavailability of a reliable and relevant survey in the existing literature. The DNP student developed the survey tool with assistance from expert PI team members. A Survey Monkey tool

was developed and utilized. The PI/Lean skills knowledge self-assessment included the nursing fellows' knowledge level in key PI/Lean concepts based on an existing skills inventory used by PI trainers within the organization. Three main areas were evaluated, including Lean core skills (e.g., A3 thinking, standard work, and 5S); soft skills (e.g., coaching and humble inquiry); and technical skills (e.g., data analytics and data presentation.) (Mann, 2017).

EHRs were used to collect the throughput/patient flow data, which had no patient-specific or identifiable information assuring all Health Insurance Portability and Accountability Act (HIPAA) guidelines were met. Median minutes were used as the measurement value for each segment of patient flow. These data reports were already in place, accessible through the hospitals existing EHR. The segments of patient flow measured in minutes were patient arrival to the first consult, admit provider consult to admit order, admit order to ED departure, and arrival to ED departure to inpatient unit, which is the culmination of all the segments of care and the ultimate aim for improvement in the DNP project.

Comparisons of employee engagement of the ED staff was initially planned to be evaluated through the standard Press Ganey employee engagement quantitative survey pre- and post-nursing fellowship. However, due to the coronavirus pandemic, organizational leadership chose not to conduct the scheduled engagement survey, as it was planned and would have been conducted right at the height of the pandemic. Instead, another evaluation method was chosen, which consisted of a qualitative survey that was sent by an online survey tool to individual staff members who worked closely with the fellows (see Appendix M). This method was used in order to gain in-depth feedback from the perceptions and words of the individuals directly affected by the nurse fellows' work.

A non-validated evaluation tool, created by the DNP student in an electronic Survey Monkey questionnaire format using a Likert form, with a scale of 1 to 5, was utilized as an evaluation tool with the staff members who were familiar with the fellows' work to gain their feedback and perceptions of the effectiveness of the fellowship program (see Appendix N). The feedback will be used to determine potential changes or enhancements that may need to be made if the PI/Lean nurse fellowship is sustained.

Analysis

Comparisons of the knowledge gained for each area pre- and post-self-assessment tool for the nurse fellows were analyzed. To test the nurse fellows' pre- and post-PI/Lean self-assessment knowledge, descriptive statistics and a paired *t*-test were utilized. Microsoft Excel was used to run the paired *t*-test. According to Sylvia and Terhaar (2018), this is the most appropriate measure given these types of measures. Because there were only two nurse fellows enrolled in the program, the demographic data were collected via a simple data collection tool.

Data were gathered from the EHR to compare pre- and post-fellowship patient flow intervals, such as arrival to first consult, admit provider consult to admit order, admit order to ED departure, and ED arrival to ED departure to an inpatient unit. The care segments for the patient flow measures were analyzed using descriptive statistics pre-fellowship baseline median minutes to the post-fellowship measurement. In addition, a two-sample *t*-test was used to determine the statistical significance of patient flow from ED arrival to inpatient unit six months before the fellowship and during the six-month fellowship.

The PI/Lean Nursing Fellowship Program Effectiveness Survey was analyzed using descriptive statistics. A weighted average of each question was measured and reported in the data analysis. A six-question qualitative survey was developed to further assess the opinions

regarding the fellows' work from the individuals who came in closest contact with the PI/Lean nurse fellows during the fellowship period. The survey was conducted electronically through an anonymous Survey Monkey tool. The questions were open-ended, allowing the respondents to contribute free text in their own words. The qualitative results were tabulated and analyzed by a highly-qualified PhD nursing research consultant with demonstrated and documented experience in performing such analysis.

Ethical Considerations

The DNP project, which proposed to develop a nursing fellowship program with a focus on PI and Lean management to enhance patient flow, had minor ethical considerations. Nonetheless, ethical considerations must be evaluated and considered. In evaluating the project and its elements as it relates to the American Nurses Association Code of Ethics (Fowler, 2015), the nursing fellows and the project approach upheld the nine provisions outlined in the Code of Ethics. The two provisions that the nursing fellows were particularly engaged in were Provision 3 and Provision 5. Provision 3 includes language related to nursing promoting, advocating for, and protecting the rights, health, and safety of the patient. Provision 5 states the nurse owes the same duties to him or herself as to others, including the responsibility to promote health and safety, preserving wholeness of character and integrity, maintaining competence, and continuing personal and professional growth. Given that through the nurse fellowship, the nurses developed new evidence-informed skills and competence and advanced quality and safety by enhancing timely access to care, these two provisions were deemed important to uphold and relevant to the work of the fellows.

The Jesuit values were reviewed for their relevance to the DNP project. The six Jesuit values were reviewed and include *Magis* (meaning more) and striving for excellence; *Women &*

Men for and with Others; Cura Personalis (meaning care for the individual person); *United of Heart, Mind, and Soul; Ad Majorem Dei Gloriam* (meaning for the greater glory of God); and *Forming and Educating Agents of Change* ("Leader Tips," n.d.). The Jesuit values are intended to guide individuals in leadership and to educate people on Ignatian principles. These values were very relevant to this DNP project, as the nurse fellows strived for excellence (i.e., *Magis*) in improved access to care while maintaining patient safety and quality. The fellows were agents of systems and practice change. As modifications to processes were made to improve patient flow, the nurse fellows were key leaders in those efforts, which are highly related to Jesuit value *Forming and Educating Agents of Change*.

Since the focus of this project was on quality improvement, it is considered exempt from Institutional Review Board (IRB) approval for implementation. The project was evaluated and approved as a quality improvement project through the University of San Francisco School of Nursing and Health Professionals (see Appendix C) on September 28, 2019, and by the hospital Nursing Research Council and deemed a quality improvement project by the hospital's IRB on October 25, 2019 (see Appendix O). This DNP project was conducted according to the ethical standards of practice for DNP capstones and the implementation of scholarly projects.

Section IV: Results

The PI/Lean nursing fellowship was planned and implemented, with the initial inception and literature analysis completed in the first two quarters of 2019, including the funding request from the organization's philanthropic foundation (Appendix P). The development of the fellowship program, including job description development, application, and selection process, curriculum and training plan, and outcome measure development, occurred in the last two quarters of 2019.

In 2020, the fellowship kicked off as planned on January 12. The leader of the PI department very quickly took the fellows under her wing, and the didactic portion and self-study portion of the fellowship ensued quickly. The pandemic ensued just one month into the fellowship; however, even with the disruption of the pandemic, the fellows were able to practice newly-acquired skills with concomitant results.

The fellows' demographic data are as follows. There were one female and one male fellow, both with five to 10 years of nursing experience; both fellows were 30-40 years of age. One had been employed at the healthcare organization for less than one year, while the other had 5-10 years of employment at the healthcare organization. Both of the fellows were BSN-prepared and worked in the critical care unit.

The pre- and post-fellowship self-assessment (n = 2) had an 18-domain skills inventory and was administered two days prior to the fellowship and two days after the fellowship was completed (see Appendix L). A 5-point scale was utilized, with 1 = not trained, little knowledge; 2 = attended training, understands concepts; 3 = able to apply concepts with supervision; 4 = able to consistently apply concepts without supervision; and 5 = deep understanding, consistently practice, could teach/train others. In every domain, an improvement was noted, with an average

improvement across all domains of 2.28 (see Appendix Q) or a 60% improvement. To determine the highest skills improvement among the domains, a paired *t*-test was performed, which revealed the knowledge acquisition in 5S, daily management system development and implementation, process mapping, and humble inquiry had the greatest improvement.

The fellowship program effectiveness survey was administered to individuals highly associated with the fellows and who observed their work in action. The survey consisted of seven questions with a 5-point Likert scale (strongly agree to strongly disagree). The average score (n = 11) across all seven questions was 4.19, which is an 83.12% overall satisfaction rate (see Appendix R).

The qualitative survey consisted of seven questions (see Appendix M). The questions were administered anonymously through the Survey Monkey evaluation tool. Of the eight individuals surveyed, six responded. The text was analyzed by an expert PhD-prepared nurse with extensive qualitative research experience to produce several qualitative themes (see Appendix S). The themes emerging were mostly positive in nature. The individuals indicated they observed collaboration and two-way interactions between fellows and staff. In addition, the respondents noted the maturation of the fellows' knowledge over the period of the fellowship, which incorporated the fellows' personal growth in knowledge, respect for people, data use and analysis, and development of skills for the future. The constructive feedback provided pertained to the fellows' need for more extensive PI/Lean training, with a recommendation to extend the time of the fellowship so more extensive learning in PI/Lean methodologies could be incorporated during the fellowship time period.

The enterprise data evaluated for the patient flow from ED to inpatient floor consisted of several measures, including patient arrival to ED departure to inpatient unit, patient arrival to

first consult, admit provider consult to admit order, and admit order to ED departure. While each measure includes steps in the ED process, the overall measure incorporated in the aim statement was the overall patient arrival to ED departure to inpatient unit. The timeliness of access to care measured in median minutes in the ED was affected by a degradation of five minutes from ED arrival to ED departure to inpatient bed. ED arrival to inpatient bed was 255 minutes during the six months prior to the fellowship (July 2019-December 2019) and 260 minutes during the six-month fellowship (January 2020-July 2020), a 2% degradation (see Appendix T). However, a secondary finding was the patient flow results in the final 3.5 months of the fellowship (April, May, June, and first half of July), after the fellows returned to the fellowship following the return to their previously assigned units to provide direct care for COVID-19 patients. The average median minutes were 252, which is a three-minute improvement or 2% from the initial six-month period before the fellowship period. In addition, the median time in minutes from ED arrival to ED departure to an inpatient bed in fiscal year 2019 (July 2018-June 2019) was 282 minutes and in fiscal year 2020 (July 2019-June 2020) it was 257 minutes, which is an overall improvement of 9% year over year. Using another statistical test, which was a two-sample *t*-test, there was a statistically significant increase of 6.8 total minutes (not median minutes) from arrival to discharge to the inpatient unit during the fellows' program compared to the six months prior ($p < 0.001$).

After the fellows returned from their units on April 6, 2020, the organization began to contemplate when elective surgeries could be performed again following the statewide shelter-in-place restrictions. To provide support to the perioperative leaders and staff for the resumption of elective surgeries, which began on April 26, 2020, one of the fellows was reassigned to conduct PI work for perioperative patient flow. Patients coming for a procedure were required to be tested

for COVID-19. The fellow was instrumental in designing a process for drive-through, pre-procedure COVID-19 testing with only two weeks available to design the new process. Between April 26 and July 18, 2020, there were 3,199 patients who received a drive-through, pre-procedure COVID-19 test, allowing patients who had been waiting for a surgical procedure to undergo the procedure while reassuring all the healthcare workers involved with the procedure that patients were tested and negative for COVID-19 prior to their scheduled procedure.

While not a specific aim with a quantitative goal, an important measure of patient outcomes is patient experience scores. During the pandemic, CMS suspended the mandatory requirement to submit patient experience scores. Many healthcare organizations chose to discontinue surveying patients due to the unusual circumstances brought on by the pandemic. However, the healthcare organization chose to continue surveying patients to ensure the patient's voice was heard through this mechanism during the pandemic. Interestingly, the overall likelihood to recommend the ED to friends and family question on the survey improved during the pandemic, from 71.3 in 2019 to 77.9 in 2020. Nurses and staff took extra time and special care to keep patients safe—ensuring all personal protective equipment (PPE) was available and worn correctly at all times by staff, screening patients and visitors carefully, and developing specialized respiratory care and treatment areas away from other ED patients. During the initial months of the pandemic, no staff contracted COVID-19 while working in the ED. Keeping the staff and patients' safe was of utmost importance. Other studies have noted similar results, such as the study by Ng et al. (2010), who found in their patient flow improvement study, a 2.2% improvement in overall patient experience occurred while patient flow improved, validating that improved patient flow is strongly associated with overall patient satisfaction.

Section V: Discussion

Summary

Despite the numerous and unavoidable challenges of implementing a project amidst a global pandemic, the results of the fellowship demonstrated the overall benefit of the project in improving the majority of the project outcomes. The fellows' pre-post self-assessment yielded a 2.28 or 60% improvement in knowledge across all 18 domains, with an original aim of a 50% improvement. The fellowship program effectiveness survey yielded an 83% satisfaction rate, with an original aim of 80%. The qualitative measurement tool provided generally positive themes, validating the fellows' skill and knowledge acquisition of PI/Lean principles, with a favorable opinion regarding the value of the fellowship program for the fellows and the frontline staff involved. Constructive feedback from the qualitative questions indicated the fellowship could be improved if it were longer, with more opportunity for formal training in PI/Lean. Finally, while the patient arrival to ED departure did not improve as planned, the fellows were instrumental in planning for changes and improved patient flow while maintaining patient safety during the pandemic. A five-minute degradation during the entire six-month fellowship period occurred. However, considering the final 3.5 months, the fellows were most active inpatient flow work; the median minutes improved by three minutes or 2%.

The ROI was not achieved during the fellowship period. The pandemic had a tremendous effect on potential patients' perceptions about accessing care at healthcare organizations. Patients were concerned that healthcare organizations were places where COVID-19 was present and, therefore, putting them at risk for contracting the virus. In fact, data has shown that 30% of people are avoiding or delaying emergency and medical care due to COVID-19 concerns (Mayoclinic.org). This phenomenon was not isolated to this organization, but to most healthcare

organizations across the nation. The organization experienced a 50% reduction in ED patient census beginning in March 2020 through June 2020.

The lessons learned and identified during the DNP project were the need to adapt and change as priorities at the organization shifted based on internal and external factors. CASs are able to pivot quickly and remain agile in times of crisis or rapidly changing needs, congruent with the conceptual framework outlined for this project. The COVID-19 pandemic required pivoting away from the original plan to allow the fellows to go back to their units to provide direct care for the highest acuity COVID-19 patients. In addition, when the fellows returned, a decision was made to allow one of the fellows to work on the perioperative patient flow initiatives, which was identified as a critical organizational priority.

Extending the timeframe of fellowship to allow for expanded learning and skills development was identified as a worthy consideration for future fellowship planning. Feedback also indicated a more formalized approach to PI/Lean training is needed. Due to the pandemic, the training plan was cut short, with site visits and the PI conference attendance canceled due to the shelter-in-place order and suspension of planned educational events.

Even with the unavoidable disruption and necessary pivoting that occurred during the fellowship, the perceived value of the program to the fellows and feedback of those individuals associated with the fellows was positive. Embedding a continuous PI/Lean fellowship program is likely, based on continued funding from the organization's foundation, which was extended through 2021. The feedback obtained through the program was helpful in adjusting the fellowship timeframe and making further enhancements to the curriculum.

Interpretation

There is a scarcity of information in nursing literature regarding structured PI/Lean nursing fellowships. However, in the literature reviewed for this project, the outcomes resulting from the fellows' knowledge and skill development, no matter what the focus of the study, was clear and impactful. Patrician et al. (2012) noted significant contributions by the nurse fellows to the quality improvement programs at the VA. In comparison, a study by Turkel, Ferket, Reidinger, and Beatty (2008) found that nurses involved in a nursing research fellowship consisting of a structured, mentored program increased their knowledge of the research process. Finally, a study by Weeks, Moore, and Allender (2011) found that a regional, evidenced-based practice fellowship was beneficial to its nursing participants through its promotion of professional development. Participating fellows enrolled in graduate programs, pursued or obtained professional certification, presented at national conferences, or submitted manuscripts for publication. These studies illustrate that regardless of the fellowship focus, given the opportunity to be immersed in subject matter that enhances the professional practice of nursing, nurses are most successful when given the support, mentorship, and organizational investment. This DNP project contributes positively to that assumption. Nurses can impact and contribute to healthcare organization outcomes by being immersed in PI activities with guidance and support from PI experts and mentors.

The PI/Lean nursing fellowship has laid the groundwork for further opportunities for growth and development for nurses and other clinicians in the organization. The fellows made a positive impression on many individuals who worked with them in the organization, including the organization's executives who witnessed their work and outcomes firsthand, leading to the

perceived value and stakeholder support for this DNP project and expanded professional development model.

Limitations

There were confounding variables during the fellowship that were unable to be controlled for that clearly affected the outcomes of the project. Namely, the coronavirus pandemic was in its earliest stages just as the fellowship was getting underway. The healthcare organization had the second community-acquired case documented in the country, which put the organization into crisis mode very quickly in February 2020. A command center was stood up, and respiratory care treatment areas using tents were erected in the ED parking lots. PPE was cumbersome to don and doff for staff assigned to the respiratory care areas. The vigilance needed to care for the COVID-19 patients took extra time to protect the safety of physicians, nurses, and staff. The critical care unit (CCU) became the first COVID-19 containment unit at the hospital, and all personnel were needed to care for the potential surge that the county and state were predicting. Since the two fellows had come from CCU, the DNP student was in agreement they were essential to provide clinical care back in their home unit. Therefore, there was a three-week break during the fellowship, resulting in the interruption of the momentum of learning and patient flow initiatives.

Another change made during this time was the hiring of a new PI manager, who was very supportive of the fellowship program, but time was needed to become familiar with the program and the curriculum already covered and planned learning opportunities yet to be offered to the fellows. Given the turbulence that ensued during the fellowship period, it is understandable that the project outcomes were disrupted and affected. Further, there was construction in the triage section of the emergency room on one of the campuses, which adversely impacted patient flow.

Conclusions

The PI/Lean nursing fellowship program was an exciting new opportunity for nurses to be involved in solving problems, seeking solutions, and using an evidence-based PI framework for difficult and complex processes within the healthcare system. While enhancing timely access to care for patients is important, the experience of the nurse fellows in the improvement work was equally significant. Many of the organization's foundation board, executive team, frontline staff, and other leaders agreed the fellowship approach was effective in providing opportunities for nurses to learn by doing while making a positive and measurable impact on organizational and patient outcome goals and strategies. The improvement in the fellows' knowledge and skills will be translated to their individual departments, which will undoubtedly influence PI efforts within their own areas of practice or wherever they may practice or lead from in the future. In fact, following the fellowship, one of the fellows chose to stay in the PI department to continue and expand the patient flow initiative.

The PI/Lean nursing fellowship has laid the groundwork for further opportunities for growth and development for nurses and other clinicians in the organization. The fellows made a positive impact on many individuals they worked with by demonstrating engagement, collaboration, experiential learning, and maturation of knowledge and skills over time. Furthermore, patient care improvements were developed to improve patient flow, thereby improving quality and safety outcomes. The fellowship model is the first of its kind at the organization, and given its positive outcomes and the support of the key stakeholders, the organization is likely to continue the model of learning and development for nurses, as well as for other clinical specialties, leading to the spread of a continuous improvement culture throughout the enterprise. Further, given the nursing fellowship's impact and relevance on

today's rapidly changing healthcare systems, the project outcomes will add to the body of knowledge and information available on this subject. Dissemination of the outcomes through possible publications, podium and poster presentations or webinars will assist in achieving a continued expansion of such opportunities for nurses.

Section VI: Other Information

Funding

The funding for the inaugural fellowship program was awarded to the DNP student by the organization's philanthropic arm, also known as the foundation. The foundation provided a grant of $190,000 to cover the costs of the labor expenses of the nurses participating in the fellowship (see Appendix P). The foundation leaders and donors anticipate a full report with associated findings now that the fellowship is completed, which will be by October 1, 2020.

In addition, the PI leaders and the DNP student are planning to return to the foundation allocations committee in November 2020 with a second proposal for a PI/Lean fellowship program, with adjustments made to the program based on the feedback received from this inaugural fellowship. The subsequent fellowship proposed will be for one year and will be open to other clinicians beyond nursing, allowing for a transdisciplinary approach to knowledge and skill acquisition in PI.

Section VII: References

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Section VIII: Appendices

Appendix A

Evaluation Table

Author	Purpose of Study	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables Studied & Their Definitions	Measurement of Major Variables	Data Analysis	Level of Evidence	Study Findings	Appraisal: Worth to Practice
Nursing Fellowships										
Bramley et al. (2018)	Describe a preliminary evaluation of the junior nurse fellowship program.	None for the study. Two used for the fellowship training: VITAE researcher development framework and PARiHS framework for the fellows project work.	The fellowship program has two components: a bespoke development program and an improvement project by the fellows.	Six front-line nurses were in the first cohort of fellows at a large, inner-city, acute National Health System in Nottingham, UK.	Three areas of fellowship evaluated in the study: Structured feedback from fellows, case studies, and information on dissemination activities of fellowship projects.	Evaluation comments from fellows were qualitative. Case studies of fellows had quantitative findings (only two cases presented in article).	Qualitative methods were used to measure the nurse fellows' evaluation of the program. Positive quotes from the fellows were documented. Case studies were collated, examining patient outcomes. Dissemination of project outcomes were measured	Level V Poor Quality Due to small sample size (n=6)	Nurse fellows reported positive personal and professional development. Two case studies featured demonstrated improved patient outcomes.	Qualitatively demonstrated high value to the fellows in the program, although small sample size (n=6). More study of nursing PI fellowship programs needed.

Author	Purpose of Study	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables Studied & Their Definitions	Measurement of Major Variables	Data Analysis	Level of Evidence	Study Findings	Appraisal: Worth to Practice
							through database publications, awards, and conference presentations.			
Patrician et al. (2012)	A narrative description of the Veterans Affairs Quality Scholars (VAQS) fellowship program.	No conceptual framework was noted.	The VAQS program was described in depth. There were five aims set forth when the program was developed. Curriculum was developed using the five aims as guideposts.	The VAQS program started in 1998 and only physicians were included. In 2009 the program expanded to include RNs using the Dartmouth Institute (TDI) guidelines as the program structure. TDI is the hub for the fellowship program.	The program measurements included following the professional activities of the fellows after the graduation, as well as fellow evaluations.	The fellowship evaluation of the VAQS program was conducted using a survey tool methodology with the graduated fellows.	All fellows agreed the fellowship provided greater appreciation of the value of inter professional collaboration, 93% agreed and strongly agreed their learning will facilitate future collaboration with other disciplines, and 86%	Level V High Quality Rating	While this was not a research study, the fellowship evaluations demonstrated strong value for the fellows and to the VA organization in its quality improvement efforts.	A description of a fellowship program that has relevance to the proposed DNP project.

Author	Purpose of Study	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables Studied & Their Definitions	Measurement of Major Variables	Data Analysis	Level of Evidence	Study Findings	Appraisal: Worth to Practice
							thought improved patient care resulted from the fellowship learning. Three RN fellows have published and are employed as leaders in improving care.			
Performance Improvement/Lean										
DeAnda (2018)	Determine improve-ment in the ED throughput and staff satisfaction by adding a nursing flow coordina-tor.	The Model for Improve-ment: Plan, Do, Study, Act (PDSA)	A pre- and post-interven-tion measure-ment of throughput.	North Texas Hospital conducted the study over three cycles of PDSA.	Throughput improvements were measured by transport time and admit order to floor times.	A pre-post intervention measurement was completed and the key variables measured in minutes. In addition, a survey of RN satisfaction with the intervention was completed.	Improve-ments were measured in the variables studied before and after the introduc-tion of the interven-tion. The minutes of improve-ment were then	Level III Good Quality Rating	Transport times decreased by 20% (104 minutes to 80 minutes) and nurses were 92% satisfied with the interven-tion.	Illustrates introduction of RN flow coordinator is an important consideration when evaluating best practices for throughput.

Author	Purpose of Study	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables Studied & Their Definitions	Measurement of Major Variables	Data Analysis	Level of Evidence	Study Findings	Appraisal: Worth to Practice
							calculated into percent-ages for before and after the interven-tion.			
Holden (2011)	Systematic review of the literature to describe the use of Lean improve-ment methodo-logies in EDs.	Model of Lean in Health Care	18 articles describing the implement-ation of Lean in 15 EDs.	EDs were located in US, Australia, and Canada.	Six core questions about the effects of Lean on ED work structures/ processes, patient care, and staff were studied in the literature.	Systematic review examining 6 study questions, including: How does Lean transform work structures? How does Lean affect patient care? How does Lean affect employee working conditions and outcomes? How does Lean indirectly transform work structures? How does	Four trends were found, improve-ments were consistent-ly reported. First, EDs observed reductions in LOS, decreased LWBS, and wait times. Second, patient outcomes were improved, but clinical outcome improve-ments were less commonly	Level III Good Quality Rating	The review suggests that Lean appears to offer significant improve-ment opportu-nities in the ED.	While Lean generally has been shown to have favorable effects on ED flow, structure, and process, more work remains in understanding Lean in health care, especially in the area of patient safety and quality outcomes.

Author	Purpose of Study	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables Studied & Their Definitions	Measurement of Major Variables	Data Analysis	Level of Evidence	Study Findings	Appraisal: Worth to Practice
						Lean affect employee outcomes directly? How are patient care and employee effects on Lean linked? How does patient care and employee effects of Lean contingent on the features of the organization and design/ implementa-tion of Lean?	measured. Third, studies reported improve-ments, rarely were decrements reported. Fourth, not every study adequately reported pre- and post-metrics.			
Ng et al. (2010)	Does using Lean Manage-ment techniques reduce patient wait times, improve patient and staff satisfaction in an ED with	None	A pre-post interven-tion study was completed over a 3-year period.	All CTAS-2 to 5 patients deemed at initial triage deemed discharge-able at initial triage.	ED wait times defined as door to discharge, time to see MD as defined by door to MD visit, LWBS as defined by patients who left before seeing MD patient, and staff	Wait times, ED LOS, left without being seen, and patient satisfaction.	Mean time to see an MD, LWBS patients, mean ED LOS – for discharged and admitted patients, overall patient satisfac-	Level III Good Quality Rating	Mean time to see MD improved from 111 minutes to 78 minutes. LWBS improved from 7.1% to 4.3%. Mean LOS improved from 3.6 hours to	Lean improvement methodologies using front-line staff to implement changes has merit. Applying these same principles to other organizations attempting to

Author	Purpose of Study	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables Studied & Their Definitions	Measurement of Major Variables	Data Analysis	Level of Evidence	Study Findings	Appraisal: Worth to Practice
	55,000 visits.				satisfaction as measured in satisfaction survey.		tion		2.8 hours. Patient satisfaction improved from 79.8% to 82%.	improve ED wait times should be considered.
Stang et al. (2015)	Systematic review of the literature to identify existing measures of ED crowding using the IOM quality domains.	No conceptual framework noted	Systematic review of the literature from 1980 to 2012. There were 7,413 articles identified, with 32 articles included in the review.	Articles from all over the world were included in the systematic review.	There were 15 crowding measures linked to quality of care outcomes.	ED crowding measures were studied. Clinical outcomes, such as time to antibiotic, time to analgesia, door-to-needle time, time to asthma treatment, were also studied.	The three measures most commonly linked to quality of care were number of patients in the waiting room, ED occupancy, and number of admitted patients in the ED awaiting inpatient beds. There were statistically significant findings for failure to meet clinical quality	Level III High Quality Rating	The review provided data on the association between ED crowding and quality of care.	This study is valuable for clinical leaders to understand the impact of ED crowding and to design interventions for improvement.

Author	Purpose of Study	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables Studied & Their Definitions	Measurement of Major Variables	Data Analysis	Level of Evidence	Study Findings	Appraisal: Worth to Practice
							guidelines.			
Walker et al. (2016)	Systematic review of the literature to guide hospitals in imple-menting patient throughput strategies.	None	Systematic review was completed with 130 articles initially reviewed. After inclusion criteria applied, 57 articles were further reviewed, and 14 articles were reviewed for the systematic review.	Using Melnyk's criteria, only Levels III and IV and one expert opinion were used in the synthesis of the literature. Although the evidence was not high level, there were metrics describing improve-ments in each article.	To classify strategies for throughput improvement, the reviewers examined level of evidence sample/ facility, summary strategy utilized, and outcomes for each article.	Upon review, the authors described themes which emerged in the review—System entry, care coordination, admission, and discharge processes.	The 14 articles were synthesized and grouped in an evidence table within the article, indicating level of evidence and outcomes achieved for each strategy.	Level III Good Quality Rating	The use of Lean method-ologies within the strategies identified was a common thread yielding improved outcomes. Several other strategies were noted as best practices, including executive leadership support, centralized placement center, bed manage-ment software, daily morning bed huddles, EVS	The articles reviewed were displayed in a table that succinctly described which best practices had the greatest yield for improvement and the greatest evidence.

Author	Purpose of Study	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables Studied & Their Definitions	Measurement of Major Variables	Data Analysis	Level of Evidence	Study Findings	Appraisal: Worth to Practice
									process improve-ment, and balancing OR schedules.	
Nurses Seeking Solutions/Solving Problems										
Sharpe (2015)	Does empower-ing front-line nurses with quality and safety knowledge tools improve patient outcomes?	None	Before and after interven-tion studies were conducted. The areas studied were measured from 2006-2013.	Up to 37 hospitals in SF Bay Area. Different numbers of hospitals participa-ted in each clinical outcome.	Seventeen patient safety and quality improvement areas were studied. Seven were discussed in the article, including falls with injury, sepsis mortality, CLABSI, HAPI, VAP, medication errors, and AMI mortality.	Before and after interventions calculated using percentage improvements at the hospital level.	Baseline measure-ments using same definitions were collected before interven-tions, with rigorous regular data collection throughout the study. Percentage improve-ments across all participa-ting hospitals were measured.	Level III Good Quality Rating	43% of hospitals reduced falls with injury, 100% of hospitals reduced medication admin errors, 77.1% improved sepsis mortality, 82.9% improved CLABSI, 69.7% improved VAP, and 100% reduced MI mortality rates. Six months after the	The study demonstrates the potential of frontline RNs to lead quality improvement efforts.

Author	Purpose of Study	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables Studied & Their Definitions	Measurement of Major Variables	Data Analysis	Level of Evidence	Study Findings	Appraisal: Worth to Practice
									interven-tion outcomes were sustained.	
Stevens et al. (2017)	Understand frontline nurses' direct experience with operational failures in hospitals.	None	Nurses systematic-ally collected data by identifying operational failures (OFs) as they provided direct patient care.	Data were collected from 774 nurses working in 67 units across 23 hospitals in a national research network.	OFs were collected from the frontline nurses, including missing equipment/ supplies, physical layout constraints, information/ communicatio n problems, inadequate staffing/ training, medication problems, and other category was created for non-conforming problems.	Frontline RNs used pocket cards to record info about OFs encountered during a 12-hour shift for a max of 10 shifts over a 20-day period. Cards were collected at end of shift and sorted into themes and counted.	Descriptive statistics were used to analyze the data. Rates of OFs per 12-hour shift were calculated for all study units. *t*-tests were used to determine differences in OFs based on site character-is tics.	Level III High Quality Rating	All 23 hospitals reported OFs in all six categories. 27,298 OFs were recorded. The highest OF rate was equipment/ supplies category (1.59). The remaining frequency of OFs in descending order were Informatio n/ commune-cation, medication , other staff/ training, and	This study suggests nurses at the front line have great ability to identify OFs, which could provide organizations with rich data regarding potential operational failures that need improvement.

Author	Purpose of Study	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables Studied & Their Definitions	Measurement of Major Variables	Data Analysis	Level of Evidence	Study Findings	Appraisal: Worth to Practice
									physical layout.	
Tucker et al. (2001)	Understand the front-line nursing workers' approach to problem solving.	None	Qualitative data was collected from front-line nurses by observing problem solving during shifts.	23 nurses in 8 different hospitals on all three shifts were observed.	Observations of first-order problem solving (i.e., doing whatever it takes to provide care in the moment) were recorded through the observations.	Observers collected qualitative data noting nurses' problem-solving behaviors in actual clinical situations with patients and their environments.	Observations were recorded in notebooks and themes tabulated. 92% of the time, nurses responded to problems with first-order problem solving. Nurses engaged in second-order problem solving 8% of the time.	Level III Good/ High Quality Rating	Nurses' demonstrate-ted 3 heuristics: do whatever it takes, use trial and error, and involve other people who are closest work friends.	The study suggests lack of available time leads nurses to engage in only first-order problem solving. Second-order problem solving (i.e., root cause analysis) is rarely used by frontline nurses.

Johns Hopkins Nursing Evidence-Based Practice and Research Appraisal Tool,

Appendix B

Letter of Support from Organization

El Camino Health

Hospital Campuses

2500 Grant Road
Mountain View, CA 94040
650-940-7000

815 Pollard Road
Los Gatos, CA 95032
408-378-6131

elcaminohealth.org

September 14, 2019

University of San Francisco, School of Nursing
2130 Fulton Street
San Francisco, CA 94117-1080

To whom it may concern:

I am writing this to express my support for Cheryl Reinking, RN, MS, NEA-BC, to implement her Doctor of Nursing Practice Comprehensive Project at El Camino Health. Cheryl's project includes the development and implementation of a Performance Improvement/Lean Management Nursing Fellowship program. The nursing fellows will be assigned to use their learned performance improvement skills and concepts to enhance and improve patient flow throughout the enterprise.

We give her permission to use the name of our organization in her Comprehensive Project Paper and future publications and presentations. This letter also verifies that El Camino Health has an existing contract with the University of San Francisco's School of Nursing.

Sincerely,

Jim Griffith

Jim Griffith
Chief Operating Officer
2500 Grant Road, Mountain View, CA 94040
650-962-5914
Jim_Griffith@elcaminohealth.org
elcaminohealth.org

Appendix C

Signed Statement of Non-Research Determination Form

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DNP Statement of Non-Research Determination Form

Student Name: Cheryl Reinking, RN, MS, NEA-BC

Title of Project:

A Performance Improvement Nursing Fellowship to Enhance Timely Access to Care.

Brief Description of Project:

A) Aim Statement:

To improve timely access to acute care by enhancing patient flow as evidenced by a 5% decrease in minutes from ED arrival to admission to the inpatient floor, nurses selected for a nurse fellowship program will gain knowledge and competencies to implement performance improvement (PI) and Lean techniques in the ED arrival to admission process during the months of January-June 2020.

B) Description of Intervention:

A Performance Improvement/Lean nursing fellowship program will include the selection of two nurse fellows from a two-campus hospital system. The purpose of the nurse fellowship is to allow direct care nurses the opportunity to have formal training and practice implementing key concepts in PI/Lean and applying the learned principles to improving patient flow; facilitating the achievement of the organizational strategic goal to improve patient flow. There will be one fellow from each campus. The positions will be marketed to the direct care nurses in all areas of the organization. An application and selection process will occur. Once selected, the PI/Lean nurse fellows will be paired with a member of the PI team as a preceptor for six months. After the fellowship, the nurse may return to their previous position which will be held for them. They will be expected to continue to be a resource in the organization for PI/Lean efforts.

C) How will this intervention change practice?

The nursing fellows will champion and facilitate performance improvement efforts to improve patient flow using the skills, knowledge, and experience they acquire as a result of the fellowship program. New processes implemented and sustained as a result of the nurse fellow's work will improve patient flow across the two-hospital system.

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D) Outcome measurements:

A pre and post self-assessment will be completed by the nurse fellows which evaluates their knowledge of Lean/PI principles. The assessments will be completed through a questionnaire format using a rating system. Demographic data will be collected for the two fellows including, age range, gender, length of time as a nurse, length of time at the hospital, and educational level. Descriptive statistics will be used to measure the pre and post self-assessment.

Electronic health record (EHR) will be used to collect the throughput/patient flow data. Minutes will be used as the measurement value for each segment of patient flow. These reports already exist through the EHR at the hospital. Descriptive statistics will be used to describe the improvement measures at baseline, during, and post nursing fellowship.

Comparisons of employee engagement of the ED staff will be reported through the standard Press Ganey employee engagement survey pre and post nursing fellowship. An overall engagement score for the ED employee engagement will be used. A t-test will be used to analyze pre and post fellowship engagement scores.

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

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

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

Comments:

EVIDENCE-BASED CHANGE OF PRACTICE PROJECT CHECKLIST *

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

Project Title:	**YES**	**NO**
The aim of the project is to improve the process or delivery of care with established/ accepted standards, or to implement evidence-based change. There is no intention of using the data for research purposes.	**X**	
The specific aim is to improve performance on a specific service or program and **is**	**X**	

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

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

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

STUDENT NAME (Please print):
Cheryl Reinking

Signature of Student: _____ **DATE** 9/22/19

SUPERVISING FACULTY MEMBER (CHAIR) NAME (Please print):
JAMES N. D'ALFONSO, CHAIR

Signature of Supervising Faculty Member (Chair): James N. D'Alfonso, DNP, RN, FNP-BC, NEA-BC, FNAP **DATE** 9/20/19

Appendix D

Nursing Fellowship Job Description

SECTION I

Position Title: Performance Improvement/Lean Nursing Fellow	**Date Created:** 8/2019	**Emp. Name:**
Reports to: PI Senior Director/CNO	**FLSA Status:**	**Emp. Number:**
Department: PI Department/Nursing Division		

SECTION II

Position Summary:
The PI/Lean Fellowship is a 6 month position responsible for learning, developing, advocating, instructing, and enabling improvement tools and methodologies across El Camino Hospital. As the 6 months progress, strategic placement of the Fellow back out into the organization into their old position is expected. However, at the end of the fellowship, the fellow is welcome to apply to any position to which they are qualified. Performance improvement/Lean methodologies may include, but are not limited to Lean and Performance Improvement concepts and project management. The Fellow will provide departmental guidance and support to Executives, management, and non-management employees with the launch of relevant Lean work. Lastly, shadowing various areas and executives to gain a deeper understanding of the organization is expected.

Qualifications:
RN license with BSN preferred. Minimum of two (2) years' experience at El Camino Hospital required. Completion of a Lean/PI didactic education as assigned before the end of the Fellowship required. Strong leadership and interpersonal skills with proven ability to facilitate cross functional teams ranging from executive to staff level employees. Excellent communication (written and verbal), presentation and facilitation skills. Strong project management skills and ability to manage multiple projects. Visionary with long term focus-able to see the end result.

Working Conditions Essential position functions (EPF) required:
Works in a typical office environment. Works mostly performed while sitting but free to move about at will. Between 20% and 50% of the time is spent standing or walking. Between 5% and 20% of total work time is spent climbing, crawling, or in other non-sitting/standing positions. Majority of work requires manual dexterity. Work requires visual concentration on instruments or other types of equipment. Less than 15% of the time, the incumbent is exposed to conditions which could cause injury requiring medical attention, and where avoidance of such injury requires only ordinary care and attention. The majority of work is performed in an environment which is mostly clean and comfortable but may include some annoying factors such as noise, odors, fumes, etc.

Appendix E

Gap Analysis

Title: A Performance Improvement Nursing Fellowship to Enhance Timely Access to Care

Objective/Purpose:

The purpose of this gap analysis is to address the current state of the organization in relation to the subject matter of the project which will include patient flow and nursing's involvement in improvement efforts in the organization. This document will identify differences between the current state and proposed future state. The gap analysis will assist in identifying and minimizing the gap between the current and proposed state.

Overview

The project proposed is the development of a six-month nursing fellowship program at a 2-campus, 443-bed hospital focusing on performance improvement and Lean management. The nurse fellows will focus on enhancing and improving patient flow systems within the organization applying the performance improvement techniques gained throughout the fellowship program.

The Aim of the Project:

To improve timely access to acute care by enhancing patient flow as evidenced by a 5% decrease in minutes from ED arrival to admission to the inpatient floor, nurses selected for a nurse fellowship program will gain knowledge and competencies to implement performance improvement (PI) and Lean techniques in the ED arrival to admission process during the months of January-June 2020.

In addition, the following project objectives:

- Develop an effective nursing PI/Lean fellowship program for the healthcare organization as measured by the nursing fellows and PI department members.

- Improve the nurse fellow's knowledge of PI/Lean techniques through the six-month nursing fellowship program as measured by improvement in the nursing fellow's pre and post self-evaluation of PI/ Lean management knowledge of key principles and techniques.

- Improve patient flow from ED to the nursing unit using the nursing fellows as PI/Lean coaches as measured by minutes from arrival to admission to inpatient unit pre and post nursing fellowship as well as other patient flow intervals such as ED arrival to provider, ED arrival to consult, and ED arrival to admission order.

- Nurses in the emergency room setting will demonstrate improved employee engagement due to their involvement with nursing fellow's work to improve patient flow from Tier 3 (lowest score) to Tier 2 (middle score).

Current Environment

- At this time, there have been ongoing attempts to improve patient flow using PI/Lean management tools. Moderate improvements have been made over the past year. The PI team lacks resources with only 2 FTE's in the department and the manager. The team is heavily populated with PI/Lean experts that are not nurses and have no clinical background. To enhance the teams diversity and to represent the clinical voice on the PI team along with adding more depth of PI/Lean knowledge throughout the organization, the nurse fellowship approach was conceived to address these gaps.

Methodology

- To create this gap analysis, an organizational analysis was conducted through interviews and feedback from leaders and staff and other key stakeholders across the organization. Interviews were conducted with PI leaders, staff, and union leadership, nursing shared governance groups, nurse leaders, and executive leaders including the CEO, COO, CMO, and CHRO. The hospital foundation board was very supportive of the project and awarded a grant to support the nurse fellowship.

Scope

- The DNP project with include the establishment of the nursing fellowship program with two nurses only for the inaugural fellowship program. The six-month fellowship will include a focus on the strategic goal of patient flow only.

Matrix Definitions

- See below for the definitions for the gap analysis matrix table.

Topic: Category of the components in the gap analysis

Priority: Priority of each component (e.g., high, medium, low)

Current state: Description of each component of the existing process or system.

Proposed future state: Description of corresponding component(s) of the proposed process or system

Gap: The difference between the current and proposed systems (where a difference exists). A loss in functionality can be identified by a "–"symbol, whereas, a gain or a positive gap can be identified by a "+" symbol. No change in functionality can be noted as "no gap"

Resolution: Outline the proposed steps towards resolving the gap. This can also be called an Action Plan. The proposed steps can be categorized (e.g., system change, hardware, configuration, change management, no resolution required)

Gap Analysis and Resolution Matrix

Topic	Priority	Current State	Proposed State	Gap	Resolution
Patient Flow	High	Benchmarked patient throughput performance in bottom quartile nationally. Performance for FY18 was 319 minutes arrival to inpatient bed. Performance for fiscal year 19 was 277 minutes.	Perform in highest decile nationally by 2022 (i.e., 180 minutes). The performance goal for FY 2020 is a 5% improvement which is 250 minutes.	There is a 15-minute gap of FY19 performance and FY20 goal performance.	Continue to use PI/Lean concepts to identify pain points in the patient flow process and address them by using Lean techniques, such as rapid process improvement workshops, gemba walks, and visual management throughout the fiscal year.
PI/Lean Team Composition	Medium	PI team has 3 FTEs including leader. No clinical staff on the PI team.	PI team with more resources, including those in training to spread the knowledge of PI/Lean throughout the organization.	There is a lack of PI department resources and lack of trained PI/Lean staff throughout the organization especially in the clinical arenas.	Obtain resources in the PI department to increase the PI team to include clinical staff that will be exposed to the PI/Lean concepts to address this important strategic goal of patient throughput.
PI/Lean Knowledge in the Organization	Medium	Moderate knowledge of PI/Lean concepts throughout the organization.	Increase the number by 30% of the number of leaders and direct care staff trained in PI/Lean management concepts.	There is a gap between the current number of trained staff in PI and the future state.	Consider a training program for clinical staff in PI/Lean.
Staff Engagement in the Patient Flow Improvement Processes	High	Staff in the emergency room has increasing volumes of patients. While improvements have been attempted to improve flow.	More staff is engaged in the improvement processes at every point of the PI process to include their input and ideas.	Provide opportunities through PI/Lean processes to include a wide variety of ED staff to gain their perspectives on patient flow	Schedule PI/Lean activities around the ED staff schedules and find alternative methods to include the ED staff, such as shift huddles to gain their input.

		The staff feels pressure to improve flow and it has eroded their engagement because they have not been engaged as much as needed. Engagement scores are in the bottom tier for one campus and in the middle tier for the other campus.		improvement ideas.	

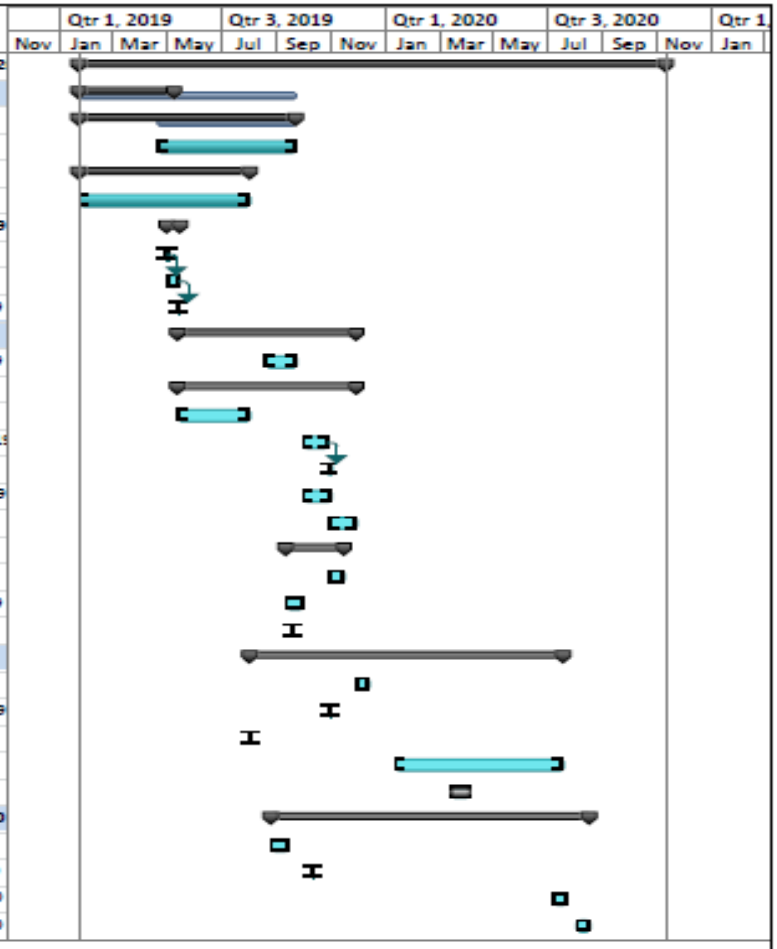
Follow Up/Action Items

- Compile a list of all the PI/Lean RPIW outputs thus far for fiscal year 20 with associated improvement efforts and results.
- Develop an opportunity such as a fellowship program for clinical staff to gain knowledge and practice PI/Lean concepts in the practice environment.
- Ask ED staff how they would like to be included in the PI/Lean improvement work.
- Establish methods for ED staff to be highly engaged in process improvement efforts.

Appendix F

Gantt Chart

ID	Task Name	Duration	Start	Finish
1	**DNP Project - Nursing PI Fellowship Program**	**472 days**	**Tue 1/22/19**	**Wed 11/11/2**
2	**Project Conception**	**77 days**	**Tue 1/22/19**	**Wed 5/8/19**
3	**Review of Evidence**	**175 days**	**Tue 1/22/19**	**Sun 9/22/19**
4	Create Evidence Table	112 days	Sat 4/20/19	Sun 9/22/19
5	**Discovery of Fellowship Programs**	**138 days**	**Tue 1/22/19**	**Thu 8/1/19**
6	Summary of Fellowship Programs	138 days	Tue 1/22/19	Thu 8/1/19
7	**Budget Creation**	**11 days**	**Wed 5/1/19**	**Wed 5/15/19**
8	Determine Number of Fellows	1 day	Wed 5/1/19	Wed 5/1/19
9	Determine Project Cost	9 days	Thu 5/2/19	Tue 5/14/19
10	Write a Grant for Funding	1 day	Wed 5/15/19	Wed 5/15/19
11	**Project Planning**	**145 days**	**Mon 5/13/19**	**Fri 11/29/19**
12	Qualifying Project Draft Prospectus	25 days	Tue 8/20/19	Mon 9/23/19
13	**Fellow Recruitment Plan**	**145 days**	**Mon 5/13/19**	**Fri 11/29/19**
14	Develop Fellowship Requirements	59 days	Mon 5/13/19	Thu 8/1/19
15	Develop Application Process	20 days	Tue 10/1/19	Mon 10/28/1
16	Development Selection Process	4 days	Tue 10/29/19	Fri 11/1/19
17	Market Program	23 days	Tue 10/1/19	Thu 10/31/19
18	Applicant Evaluation/Selection Process	22 days	Thu 10/31/19	Fri 11/29/19
19	**Curriculum Development**	**47 days**	**Thu 9/12/19**	**Fri 11/15/19**
20	Determine LEAN Curriculum to be Utilized	12 days	Thu 10/31/19	Fri 11/15/19
21	PI Staff OJT Training Plan	13 days	Thu 9/12/19	Mon 9/30/19
22	Communication Plan	1 day	Fri 9/20/19	Fri 9/20/19
23	**Project Implementation**	**251 days**	**Fri 8/2/19**	**Sat 7/18/20**
24	Onboarding Plan for Fellows	11 days	Sun 12/1/19	Fri 12/13/19
25	Fellow Progression Assessment Tool	1 day	Thu 10/31/19	Thu 10/31/19
26	Develop Tool for Outcome Measurement	1 day	Fri 8/2/19	Fri 8/2/19
27	Fellowship Period	137 days	Sun 1/12/20	Sat 7/18/20
28	Fellowship COVID Interruption	17 days	Sun 3/15/20	Sat 4/4/20
29	**Project Evaluation**	**256 days**	**Mon 8/26/19**	**Mon 8/17/20**
30	Develop Fellow Evaluation Tool	15 days	Mon 8/26/19	Fri 9/13/19
31	Develop Program Improvement Staff Evaluation Too	1 day	Sat 10/12/19	Sat 10/12/19
32	Evaluate Project Outcomes	11 days	Wed 7/8/20	Wed 7/22/20
33	Develop Sustainability Plan	11 days	Mon 8/3/20	Mon 8/17/20



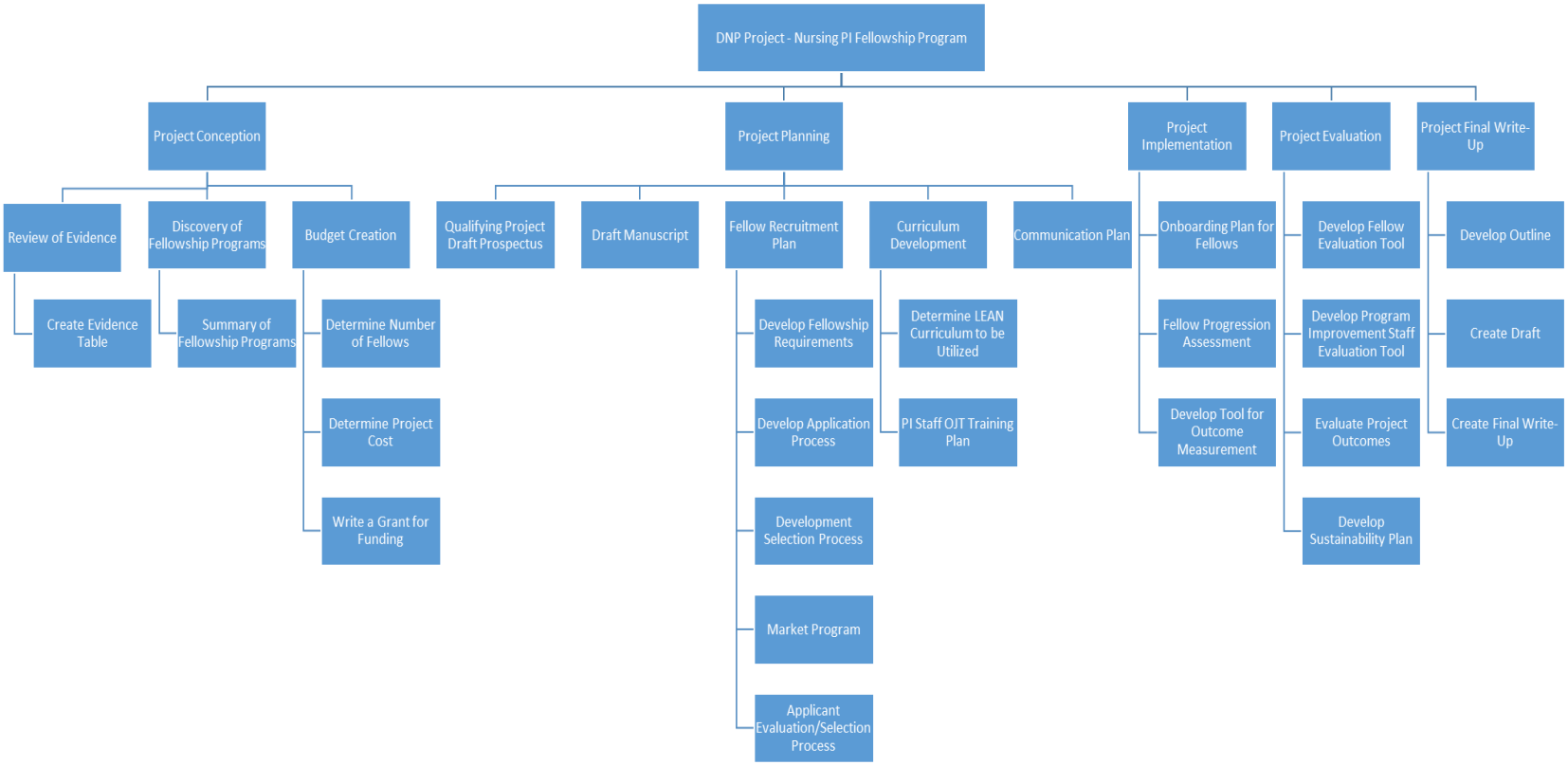
Page 1

Appendix G

SWOT Analysis for DNP Project

Appendix H

Work Breakdown Structure



Appendix I

Budget and Return on Investment

		BASE YEAR																
		1	2	3	4	5	6	7	8	9	10	11	12	BASE Q1	BASE Q2	BASE Q3	BASE Q4	BASE
REVENUE	**Revenue from Operations**									1,103,254	1,103,254	1,103,254	1,103,254			1,103,254	3,309,763	4,413,017
	Revenue Offsets / Discounts *(enter as a negative value)*																	
	Subtotal Revenue from Operations									1,103,254	1,103,254	1,103,254	1,103,254			1,103,254	3,309,763	4,413,017
	Other Revenue/ Incremental Savings																	
	Other Fees																	
	Miscellaneous Income																	
	TOTAL REVENUE									1,103,254	1,103,254	1,103,254	1,103,254	-	-	1,103,254	3,309,763	4,413,017

Compensation

		BASE YEAR																
		1	2	3	4	5	6	7	8	9	10	11	12	BASE Q1	BASE Q2	BASE Q3	BASE Q4	BASE
COMPENSATION	**PI Fellow #1**							14,733	14,733	14,733	14,733	14,733	14,733			44,199	44,199	88,398
	PI Fellow #2							14,733	14,733	14,733	14,733	14,733	14,733			44,199	44,199	88,398
	Total Wages							29,466	29,466	29,466	29,466	29,466	29,466			88,398	88,398	176,796
	Bonuses																	
	Taxes & Benefits							4,862	4,862	4,862	4,862	4,862	4,862			14,586	14,586	29,171

	Total Compensation							34,328	34,328	34,328	34,328	34,328	34,328			102,984	102,984	205,967	

Financial Spreadsheet provided by Mikhail Shneyder

Operating Expenses

		BASE YEAR																	
		1	2	3	4	5	6	7	8	9	10	11	12	BASE Q1	BASE Q2	BASE Q3	BASE Q4	BASE
OPERATING EXPENSES																			
	Indirect expenses for 6 additional patients									19,500	19,500	19,500	19,500			19,500	58,500	78,000	
	Labor for 6 additional patients									425,000	425,000	425,000	425,000			425,000	1,275,000	1,700,000	
	Supplies for 6 additional patients									150,500	150,500	150,500	150,500			150,500	451,500	602,000	
	Medications for 6 additional patients									125,000	125,000	125,000	125,000			125,000	375,000	500,000	
	Depreciation																		
	Operating Expenses									720,000	720,000	720,000	720,000			720,000	2,160,000	2,880,000	
	Total Operating Expenses							34,328	34,328	754,328	754,328	754,328	754,328			822,984	2,262,984	3,085,967	
	Net Operating Income							(34,328)	(34,328)	348,926	348,926	348,926	348,926			280,271	1,046,779	1,327,049	
	Operating Margin (%)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	31.6%	31.6%	31.6%	31.6%	0.0%	0.0%	25.4%	31.6%	30.1%	
INT																			
	Interest Income *(enter as a negative value)*																		

Interest Expense																	
NET INCOME BEFORE TAX	0	0	0	0	0	0	(34,328)	(34,328)	348,926	348,926	348,926	348,926	0	0	280,271	1,046,779	1,327,049
EBITDA	0	0	0	0	0	0	(34,328)	(34,328)	348,926	348,926	348,926	348,926	0	0	280,271	1,046,779	1,327,049
%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	31.6%	31.6%	31.6%	31.6%	0.0%	0.0%	25.4%	31.6%	30.1%

Financial Spreadsheet provided by Mikhail Shneyder, BSN, MBA, RN

Appendix J

Responsibility/Communication Matrix

Stakeholder	Objective	Timing	Format	Responsibly
COO, Executive Leader of Performance Improvement/Lean	To inform on project status and communicate any barriers to project success that needs executive level assistance.	Monthly	In-person meeting	DNP Student
Senior Director of Performance Improvement Department	Gain agreement for the fellowship program and its objectives and ongoing planning of fellows work in the PI department.	Project inception, initiation, and monthly	In-person meeting	DNP Student
Nurse Fellows	To assess fellow's progress to stated fellowship objectives, provide support and adjustments to fellowship program as needed.	Twice each month	In-person meeting	DNP Student
Performance Improvement Department Staff	Gain agreement for fellowship program at inception and then regularly check in to determine status of fellowship from PI department perspective.	At inception, then monthly during fellowship program	In-person meeting	DNP Student
Nursing Leaders	Inform of project status and gain needed support of staff time to participate in supporting project.	Project inception and quarterly	In-person at leadership meetings	DNP Student
Operations Cabinet (CEO, COO, CMO, CNO, CIO, CHRO, CFO)	Inform of project status and gain needed support of the executive team, if needed.	Once/month during project phase	In-person at operations cabinet meetings	DNP Student
Foundation President	Inform of project status since funding was provided from Foundation Board.	Project initiation and as needed throughout project and at the conclusion of the project providing key metrics and objectives met	In-person	DNP Student
Clinical Staff	Inform of project and potential impact to staff members involved in patient flow improvement. Regularly communicate project progress.	During rounds each week and at RPIW events	In-person rounds, then via weekly Gemba walks in ED	DNP Student
Union Leadership	Inform of project and gain support for direct care staff participation as PI/Lean fellows. Regularly communicate project progress.	Monthly at union/leadership meetings	In-person at project meetings and via email	DNP Student
Clinical Education Department	To inform of project and communicate any educational resources (i.e., modules) needed for the project.	At inception of project and as needed	In-person or by email, as needed	DNP Student and Director of Clinical Education

Appendix K

Cost/Benefit Analysis

Year	Base	Year 1	Year 2	Year 3	Year 4
Revenue	$ 4,413	$ -	$ -	$ -	$ -
EBITDA (cash-based)	$ 1,327	$ -	$ -	$ -	$ -
%	30.1%				

CapEx *(enter as a negative value)*	$ -	$ -	$ -	$ -	$ -	
Maintenance CapEx		$ -	$ -	$ -	$ -	Terminal Value (5x)
FCF	$ 1,327	$ -	$ -	$ -	$ -	$ -

NPV Incremental Cash Flow @ 15% WACC	**$ 1,154**
NPV Incremental Cash Flow @ 30% WACC	**$ 1,021**

Financial Spreadsheet provided by Mikhail Shneyder, BSN, MBA, RN

Appendix L

Nursing Fellows PI/Lean Self-Assessment

The following self-assessment is intended to gain an understanding of your current knowledge, skills and comfort with key concepts, techniques, and activities associated with Performance Improvement and Lean Management in healthcare. The self-assessment will be used to plan and implement the fellowship training program based on your personal developmental needs. This assessment will be taken prior to the implementation of the fellowship and again post fellowship. There is no right or wrong answer, but a true representation of your current knowledge is needed. There will be a comparison between your pre and post self-assessment to evaluate your progress in learning Performance Improvement and Lean concepts during the fellowship program. Thank you for completing the assessment. Please select the box that best describes your knowledge, skills and comfort with each item.

Skill/Knowledge/ Concept	Not trained, little knowledge	Attended Training, understands concepts	Able to apply concepts with supervision	Able to consistently apply concepts without supervision	Deep understanding, consistently practice, could teach/train others
Performance Improvement/Lean Management Core Concepts					
5S					
A3 Thinking/PDSA Problem Solving					
Daily Management System Development and Implementation					
Strategy and Goal Deployment					
Leader Standard Work					
Process Mapping					
Rapid Process Improvement Workshop Facilitation					
Visual Management Implementation					
Value Stream Mapping					
Waste Identification					

Performance Improvement/Lean Management Soft Skills					
Coaching Skills					
Facilitation Skills					
Giving and Receiving Feedback					
Humble Inquiry					
Performance Improvement/Lean Management Technical Skills					
Data Analysis					
Data Presentation					
Education/Delivery of Modules					
Project Management					

Appendix M

Nursing Fellowship Qualitative Survey

The below questions will be asked to 8 staff and managers who have been directly involved in observing the work of the PI/Lean Nursing Fellows over the past 6-months. The questions will be asked via an anonymous Survey Monkey Evaluation Tool.

1. What has been the nature of your interactions with the PI/Lean Nurse Fellows?

2. What PI/Lean skills/knowledge development did you observe of the fellows during the fellowship, provide example if possible, please?

3. Did you see the skill development of the nurse fellows mature over the 6-month time period?
    a. Yes or No

4. If yes, specifically, what happened that demonstrated a maturity in the development and demonstration of the PI/Lean skills of the fellows? If no skill development, please explain.

5. From your observations, did the fellow's participation/interactions make a difference in the department or organization's ability to meet its goals in regard to patient flow?
    a. Yes or No

6. If yes, please provide an example. If no difference in meeting goals, please explain.

7. From your observations, do you believe the PI/Lean nursing fellowship is an effective approach to teaching front-line nursing staff PI/Lean methods?
    a. Yes or No

8. If yes, please provide reason you believe it is effective. If no, please explain.

9. Do you recommend continuing or spreading the Fellowship Program in the future?
    a. Yes or No

10. Any other comments regarding the fellowship you would like to share?

Appendix N

Nursing Fellowship Effectiveness Survey

1. The nursing fellowship allowed enough time for fellows to demonstrate PI/Lean Management core concepts through application of knowledge of 5S, A3 thinking/PDSA problem solving, strategy and goal deployment, leader standard work, process mapping, RPIW facilitation, value stream mapping, and waste identification during fellowship program focusing on patient flow.
    a. Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree

2. The nursing fellowship allowed for the fellows to demonstrate PI/Lean Management soft skills through application of coaching, facilitation, giving and receiving feedback and humble inquiry as evidenced through fellowship program opportunities focusing on patient flow.
    a. Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree

3. The nursing fellows were able to demonstrate PI/Lean Management technical skills through application of data analysis, data presentation, education delivery and project management through fellowship program opportunities focusing on patient flow.
    a. Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree

4. The nursing fellows were able to experience methods used to conduct effective Gemba walks to emerge problems.
    a. Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree

5. The nursing fellows were able to assist in the identification of the problems/barriers observed in Gemba walks.
    a. Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree

6. The nursing fellows were able to illustrate a PDSA cycle observed during the PI/Lean nursing fellowship program.
    a. Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree

7. The nursing fellows were able to document an improvement that was made using data analysis during the PI/Lean Nursing Fellowship.

Appendix O

IRB Letter

El Camino Hospital
THE HOSPITAL OF SILICON VALLEY

Institutional Review Board
2500 Grant Road (ECH-1C35)
Mountain View, CA 94040

October 25, 2019

Cheryl Reinking, RN, MS, NEA-BC
c/o Mae Dizon, RN

Re:	**REVIEW OF QUALITY IMPROVEMENT PROJECT**
Project Title:	Performance Improvement/Lean Nursing Fellowship Program
Items Reviewed:	New Study Questionnaire/Protocol, NRC and Executive Committee Review Status, Quality Improvement Checklist, Data Collection Tools and Nurse Survey, CVs and NIH training.

Dear Ms. Reinking:

Thank you for your submission regarding the above-captioned Quality Improvement Project (QIP). On behalf of the El Camino Hospital Institutional Review Board, I have reviewed your submission materials and note the following:

The purpose of the QI project is to determine whether extensive Lean management and Performance Improvement training from frontline nurses, focusing on patient throughput using a nursing fellowship program model in the acute care environment, compared to current practice, affect patient throughput in the emergency department (ED) over the six-month nursing fellowship period. The project will involve two nurses (one per each campus) trained in Lean Management and Performance Improvement for six months. The nurses will work on improving throughput in the ED and helping reduce the amount of time the patients spend in the ED. The nurses will be involved in the whole process but more specifically, focusing on the first part of the admission, which is in the ED.

The project will be implemented to improve care at ECH. Data collected after implementation, to determine quality improvement outcomes, will not include any patient specific identifiers. Outcomes measured include 1. Pre and post self-assessment tool on the principles of LEAN and PI to be given to the nurses 2. Nurse engagement survey, specifically looking at the ED scores (using the overall engagement score in ED) and 3. Patient flow data (pre, during, and post – nursing fellowship program). De-identified patient flow data will be provided to Cheryl by Dee Shih, who is a data analyst at ECH. De-identified survey results are collected via Survey Monkey and Press Ganey on-line employee engagement surveys.

The primary use of the de-identified data and QI outcomes will be to disseminate information about evidence-based improvement at ECH and potentially submit the project findings to peer-reviewed nursing journals for publication. The results of the project will likely be submitted for poster and/or podium presentations. Per the Quality Checklist, all questions were answered yes, which confirms your project, as submitted, is a Quality Improvement project and not research involving human subjects. *This project was undertaken as a Quality Improvement Initiative at El Camino Hospital, and as such was not formally supervised by the Institutional Review Board per their policies.* Any posters, abstracts, publications or outcomes reporting resulting from the project as submitted is deemed Quality Improvement reporting of a QI project.

The secondary purpose will be to use the data and outcomes as part of the University of San Francisco Doctorate in the Nursing Practice Program. The Clinical Research Executive Committee confirms the project meets the following requirements for a primary purpose of Quality Improvement, and a secondary purpose of contributing to an Educational Degree, noting: 1. The QIP study aligns with the operational plans of the hospital to improve patient throughput within the Emergency Room. 2. The Nursing Fellowship will use lean management and performance improvement methodology across all ER patients during a 6-month period. 3. Any source data and/or reports/conclusions provided to USF will be aggregated or de-identified data and not include patient identifiers.

On the basis of the information presented, and in accordance with 45 CFR 46.101(b), the secondary purpose of this QIP is research that is Exempt from IRB oversight, because it involves only the use of data that is collected in such a manner that subjects and patient data cannot be identified. This research does qualify for expedited review, therefore approval is granted and the full board will be notified of this action at the next meeting. The IRB should be promptly notified of any changes in this QIP submission, which may have a bearing on the current status of Exemption from IRB review and oversight.

Sincerely, DocuSigned by: Christine Terbijhe

Christine Terbijhe
Administrator - Institutional Review Board

Appendix P

Foundation Allocations Grant Request

FY19 SPRING ALLOCATION REQUEST – DUE MAY 13, 2019 by 5PM

Using unrestricted gifts, the Allocations Committee of the El Camino Hospital Foundation meets twice a year to review and approve one-year funding project requests from El Camino Hospital. Please submit a request, no more than two pages, including the project contact information and project details listed below for which you seek funding. *NOTE: seeking one-year support from the Foundation should not be used to sustain an existing program, nor fund a project that can be supported through your operating budget or other financial sources.*

SAVE THE DATE: You will be invited to present your request at the May 30, 2019 meeting of the Foundation's Allocations Committee. Please hold 3-4:30PM on your calendar; a specific time will be assigned to you as the meeting agenda is confirmed.

WHEN FUNDS WILL BE AVAILABLE: Funding will be available by June 17, 2019

Project Contact Information

Project Name: Performance Improvement/Lean Nursing Fellowship Program

Amount of Request: $190,000

Project Contact Person and Title: Cheryl Reinking, RN, MS, NEA-BC

Department Name: Administration

Mailstop: Admin Telephone: X7121

Email:Cheryl_Reinking@elcaminohospital.org

Project Details

1. Could this project have been funded through your operating budget, another revenue source or the Hospital capital budget process (if request is for equipment)? If yes, please do not submit an application for funding. If no, proceed with addressing the remaining project details.

   This project is a pilot and requires a testing and evaluation phase before building into the operations budget. The Foundation has been generous in the past to provide opportunities to pilot/test new and innovative approaches that have allowed the organization to test and evaluate effectiveness (ie sepsis coordinator, pharmacy technicians in the ED, Pain Management Pharmacist, etc…) This project is similar to those previous projects.

2. Briefly describe the project for which you seek funds. Include the purpose, need that will be addressed, goals, other resources needed, and how you will evaluate its effectiveness.

   This project titled "Performance Improvement/Lean Nursing Fellowship Program at El Camino Hospital". Performance Improvement (PI) and Lean management are considered a set of tools and methods to improve quality, service, and efficiency in health care. Lean management may sound familiar as it is the fundamental approach to improvement the Toyota Manufacturing pioneered back in the later part of the 20th century. Healthcare has begun to adopt these techniques to make improvements in our systems of care. In fact, ECH has chosen to adopt these techniques as a fundamental approach to achieve our enterprise strategies and to improve our overall performance in quality, service and efficiency. According to Cohen (2018), Lean methods engage those closest to the work, such as nurses, to improve safety, quality and service. At ECH, while the organization has a few Lean experts, there needs to be many more to truly actualize embedding a Lean management culture in the organization. This project would be modeled after several others in the Bay Area including UCSF, Zuckerberg SF General and Sutter CPMC. These programs had philanthropic support. High potential nurses will have the opportunity to apply and be selected for the fellowship program. The fellowship will be 6 months in duration, likely starting around October/November 2019. There is much planning that will need to occur between now and the time that the fellows would start. The fellows will need to apply based on specific criteria, interview and be selected to participate. At this point, I am planning for 2 fellows for the pilot program. The fellowship will require the fellows to attend didactic training away from ECH, probably around 5 days. Then, the fellows will be embedded in the PI department at ECH, learning and developing the needed PI/LEAN tools and techniques. The fellows will have objectives and goals to meet during the fellowship program. Namely the pilot program fellows will be assigned to an important and strategic initiative, improving ED length of stay, or "Door to Floor." After completion of the fellowship, the nurses will go back to their positions and be able to provide expertise on PI/LEAN in their departments. There will be an evaluation of the program conducted that will not only evaluate the performance against objectives, but the fellows and PI staff satisfaction of the fellowship program.

3. Describe how the project will impact one or more of the building blocks outlined in the Hospital's FY19-22 strategic framework.

   One of the strategic framework pillars at El Camino Hospital is to become a high performing organization (HPO). This project will directly affect one of the initiative and tactics identified in the HPO pillar which is developing a LEAN management system. More staff trained and expert in the tools of Lean, the more rapidly the culture will be embedded. In addition, other organizations that have similar fellowship programs have seen the fellows become leaders within the organization. So, it may also be a pipeline for future nursing leaders. In addition, the nurses will see this as an interesting and unique approach to professional development.

4. Do you see a challenge with sustaining the project after one-year funding is secured from the Foundation? If yes, why and what will you put in place for funding to secure the future of the project?

   Upon evaluation of the pilot program, I believe this project may be moved under the operating budget.

5. Include the amount of funding that are requesting and the top expenses for which the funds will be used.

   Total= $190,000 (Two RN's salary for 6 months and cost of didactic training).

6. **The request must be "hard signed"** and dated by a member of the executive team who will serve as the executive sponsor for the project request.

Please scan and email request to cindy_zaldivar@elcaminohospital.org by May 13, 2019.

Cheryl Reinking

Executive Sponsor signature: _____

References

Cohen, R. L. (2018). Lean methodology in health care. *Chest*, *154*(6), 1448-1454. doi:10.1016/j.chest.2018.06.005

Appendix Q

Pre-Post Self-Assessment PI/Lean Nursing Fellowship

Questions	Pre-Self-Assessment (Weighted Average)	Post-Self-Assessment (Weighted Average)	Improvement (*N*=2)
1. 5S	1.0	4.5	3.5
2. Thinking/PDSA Problem Solving	2.0	4.5	2.5
3. Daily Management System Development & Implementation	1.0	4.0	3.0
4. Strategy and Goal Deployment	1.5	3.0	1.5
5. Leader Standard Work	1.0	3.5	2.5
6. Process Mapping	2.0	5.0	3.0
7. Rapid Process Improvement Workshop Facilitation	1.0	3.0	2.0
8. Visual Management Implementation	1.5	3.5	2.0
9. Value Stream Mapping	1.5	4.0	2.5
10. Waste Identification	2.0	4.5	2.5
11. Coaching Skills	1.5	3.0	1.5
12. Facilitation Skills	1.5	3.0	1.5
13. Giving and Receiving Feedback	2.0	4.5	2.5
14. Humble Inquiry	1.5	4.5	3.0
15. Data Analysis	2.0	4.0	2.0
16. Data Presentation	2.0	4.0	2.0
17. Education/Delivery of Modules	2.0	3.5	1.5
18. Project Management	1.5	3.5	2.0
Average	**1.58**	**3.86**	**2.28**

Appendix R

Effectiveness Survey Results

Survey Questions		**Weighted Average (*N* = 11)**
1	Enough Time for Fellows	3.82
2	Soft Skills Demonstration	4.27
3	Technical Skills Application	4.45
4	Effective Gemba Walks	4.00
5	Identification of Problems & Barriers	4.27
6	Illustrate PDSA Cycle	4.27
7	Document Improvement using Data Analysis	4.27
	Average	**4.19**

Appendix S

Qualitative Survey Question Analysis

Qualitative Question	Emerging Themes
Nature of Interaction with Fellows	• Fellows exhibited collaborative work on development and implementation of projects • Two-way interactions with frontline staff and leaders through the implementation of new processes
Knowledge Development Observed	• Personal growth and knowledge • Presence • Respect for People • Data use and analysis • Education
Maturation of skills over 6 month fellowship	• Observed development of Lean skills • Personal skill development observed including listening and humble inquiry
Fellow's participation influence over patient flow outcomes	• New tools developed by fellows to use in the future • Encouragement of staff growth in using tools • Still fragmented processes in overall ED patient flow • Not aware of anything new initiated
Fellowship effective approach to teaching front-line nurses PI/Lean methods	• External input of having fellows with "fresh eyes" was helpful • Two-way interaction eased with front-line staff because fellows are nurse peers • Learning by doing is powerful • Need more initial education of fellows • Need to build on past work at the organization
Recommendation for future fellowships	• All respondents (n=6) indicated future fellowship programs should be continued • Extend time of program to one year • The program provides value to fellow and front-line staff • Provide more didactic Lean training

Appendix T

Annotated Patient Flow Outcome Data