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A Systems Approach to Increase the ICU Nursing Workforce During a Pandemic

Jennifer Mendenhall
mendenhalljc@gmail.com

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Abstract

Problem: In March 2020, a pandemic threatened to overwhelm intensive care bed capacity, material resources, and critical care nurses for an integrated healthcare delivery system in Northern California. The first COVID related death occurred in this organization in early March. This impending crisis and related demands became an urgent priority. This new reality required immediate planning and implementation to increase the number of skilled intensive care unit (ICU) nurses to care for acutely ill patients.

Context: A systems approach was required to support the needs of patients and staff. The macrosystem was represented by regional leaders in Patient Care Services (PCS). The mesosystem was supported by a community of practice (CoP) of nursing leaders titled DCEPI, Directors of Clinical Education and Practice Informatics. The mesosystem also included key facility-specific leaders - the perioperative directors, who provided critical collaboration with the DCEPIs to address immediate education and skill-building needs for PACU nurses on the front lines of care. PACUs in each microsystem were operating at 50% capacity because non urgent surgeries had been cancelled as recommended by the Center for Disease Control (CDC). After a pilot self-assessment of PACU nurses to determine ICU skill level was conducted, three evidence-based interventions were planned and provided across PACU microsystems.

Interventions: Three interventions, two education focused, were introduced across 21 PACU/ICU microsystems to upskill PACU nurses. First, a skills assessment preceded the focused education of PACU nurses to care for ICU patients. Second, a paired preceptor/mentee intervention was completed to orient PACU nurses to ICU workflows. Third a tracking tool which identified the leaders responsible for this project and tracked the total number of nurses upskilled by each hospital was created and implemented.

Measures: Quantitative measures included the number of PACU RNs upskilled to take an individual ICU patient assignment at the macro and micro levels as well as the percentage increase in the ICU workforce at the macro and micro levels. The time frame for the quantitative measures was three weeks. Qualitative measures, over a time frame of six months, included the level of support non-ICU RNs in the ICU role experienced in the micro system and the a retrospective survey of nurses' willingness to volunteer in the future if a need was identified.

Results: In the microsystem studied stratification of PACU RNs skill level resulted in a 17% increase in the ICU nursing work force and an increase in nurses in supporting roles. Across the macrosystem this project resulted in a 31% increase in nurses able to take ICU individual patient assignments. The microsystem retrospective survey results showed that nurses with ICU experience adapted well, felt supported within the microsystem and were confident in their abilities to care for ICU patients. Nurses with no prior ICU experience lacked confidence in caring for ICU patients and did not feel supported within the microsystem.

Conclusion: This project was successful in upskilling PACU RNs to care for ICU patients. Prior experience in ICU played a key role in upskilling efforts. The plan to sustain and track ongoing education across the macrosystem was not realized. The plan to sustain and track education within the microsystem met with some success. A greater effort is required by the organization to support non-ICU RNs who care for ICU patients in times of crisis. This may be achieved by embracing the concepts of team nursing, ongoing education and a supportive culture. Organizations should consider ICU experience as a requirement for PACU RNs.

Keywords: COVID 19-critical care education, upskill, PACU, ICU, team nursing, community of practice

A Systems Approach to Increase the ICU Nursing Workforce During a Pandemic

An integrated healthcare delivery organization in Northern California addressed the 2020 COVID pandemic with a rapid response to support crisis management through a targeted education and staffing improvement project. This complex system includes 21 acute care community hospitals and employs over 23,000 nurses with 1400 frontline intensive care unit (ICU) registered nurses (RN) and 835 post anesthesia care unit (PACU) RNs. The target nursing population for this project included the PACU RNs in 21 microsystems. Two groups of hospital-based nursing leaders operationalized this project throughout the regional mesosystem. The Perioperative Directors were responsible for perioperative services which includes 21 PACUs. The Directors of Clinical Education and Practice Informatics (DCEPI) collaborated with their nurse educator teams, and were responsible for identifying staff learning needs, providing appropriate education and validation of skills and competencies in inpatient settings, particularly the critical care units. The role of macrosystem leadership was to track and co-ordinate the project by conducting a learning needs assessment and by providing standardized educational materials, resources and guidelines, on a single platform, across 21 hospitals within the time frame of three weeks. This paper will describe a regional improvement project (see appendix A) that incorporated rapid cycle testing. One key PACU pilot test in a large acute care community hospital was followed by successful implementation across the other 20 microsystems. A PACU microsystem is described in detail within the context of this quality improvement project to illustrate effective implementation. This complex project demonstrated a systems approach during crisis management and continually exemplified the organizational mission statement, "This organization exists to provide affordable, high quality healthcare to improve the health of our members and communities we serve."

Problem Description

The United States is experiencing a sustained pandemic. In March of 2020 this pandemic threatened to overwhelm available intensive care capacity, resources and healthcare workers in one healthcare system in Northern California. Available data from the Center for Disease Control and Prevention predicted a statewide surge of ICU patients requiring ventilators and intensive care (Ng, et al. 2020). The quality gap the institution identified was a potential shortage of ICU nurses to provide care to members needing ICU beds . A systems approach was required to support the needs of patients and staff. Efforts to recruit travel ICU nurses failed to meet the demands as the rest of the country faced the same challenges. Institutional leaders anticipated that immediate demand for ICU beds and nursing care would outpace the supply of ICU beds and the currently available 1400 ICU nurses. Before this project was initiated, this institution did not have a comprehensive organizational strategy to evaluate and upskill incumbent nurses in their microsystems to meet demands precipitated by such an unprecedented crisis.

Available Knowledge

California, in the spring of 2020, was the first state in the union to mandate lockdown in response to the COVID 19 threat (www.DCHS.org). COVID 19 was a novo virus with unknown etiology and disease course and few benchmarks. Healthcare workers found themselves in new unchartered territory, fighting an invisible enemy with limited knowledge and resources. Fear of the unknown, the increased risk of infection to self and others with dire consequences, caused fear and stressors for front line staff. PACU nurses, many of whom have prior ICU experience, have historically been called upon to meet the needs of patients in times of crisis (Stucky, 2020). PACUs

in each hospital microsystem were operating at 35-50% capacity because non urgent surgeries had been cancelled as recommended by the Centers for Disease Control and Prevention.

Evidence-based Search

PICOT Question

Evidence based practice requires a clear clinical PICOT question to identify best practices. A PICOT question includes population, intervention, comparison and time frame. The following question was developed: Will PACU nurses (P) feel supported and confident to care for ICU patients with the intervention of timely self-assessment , evaluation of skills and targeted education (I) compared to no intervention (C) to increase upskilling of PACU nurses (O) over a time period of three weeks (T)?

Rationale

To upskill PACU nurses, a systems framework, a conceptional framework, a nursing theory and quality methods were used as guiding constructs to train nurses over a three-week time period, to sustain the confidence and competence levels of nurses. A timeline for implementation was initiated (see appendix B). A planning document to analyze primary and secondary drivers revealed learning needs and opportunities for improvement (see appendix C).

Three Synergistic Conceptional Frameworks

The quality of the supporting literature and evidence was found to be strong for integrating these three synergistic frameworks: The IHI framework for safe, effective and reliable care; Communities of Practice (CoPs) and Watson's theory of human caring science. A literature search was conducted to identify evidence-based theories and best practices to support existing

unit cultures while rapidly preparing nurses to effectively care for ICU patients during a global pandemic (see appendix D).

IHI Framework

The first conceptional framework which guided this project was the Institute for Healthcare Improvement's (IHI) framework for safe, reliable and effective care, (Frankel et. al., 2017). The IHI is a well-respected organization. Evidence of the influence of culture on institutional outcomes has been well documented. The IHI models for improvement include Plan, Do, Study, Act (PDSA) cycles and process redesign. Outcome and balancing measures are established improvement and change management tools. The IHI framework identifies two overarching domains: learning systems and culture within which the patient safety domains operate. Culture as identified by the IHI is a major factor in societal learning and influences the ability of microsystems to create safe care environments (see appendix E).

Communities of Practice

Communities of practice (CoP) theory as originally described by Wenger (1998) identifies that CoPs provide opportunities for fostering a sense of belonging; knowledge exchange and creative resources for collective wellbeing and organizational cohesion. CoPs also provide members much needed support, opportunities for professional growth and improved retention of valuable nurses (Edmonson et al., 2017). CoPs in healthcare provide operationally significant communication channels in times of stress and uncertainty (see appendix F). Communities of practice demonstrate exemplars of like-minded professionals who meet to share goals, common interests and address similar challenges. CoPs currently abound in society, industry and are now gaining traction in healthcare (Wenger et al., 2002)

Watson's theory of human caring

Watson's theory of human caring is the foundation for this organization's model of professional nursing practice. Watson's theory provides the underpinning of nursing concepts to include authentic caring, equity and patient focused care (Watson, 2012). The concept of creating a transpersonal caring healing moment, is core to understanding and applying this nursing theory in practice (Clark, 2017). Jean Watson's theory of human caring is the only nursing theory which includes care of self as well as care of the patient and family. The pandemic has dramatically increased the toll on front line workers (Talaee et al., 2020). Nurses need to know that they are cared for and supported in the daily work that they perform on behalf of society. This literature review contributed to a better understanding by nurse leaders and educators in their efforts to support existing unit cultures while improving microsystems to optimize patient and organizational outcomes.

Specific Project Aim

Improvement projects require clear aim statements and outcomes. In this project, the specific aim was to educate PACU RNs to care for ICU patients during the COVID 19 pandemic. The primary outcome was to increase the ICU nursing workforce capacity within a three-week time frame. The global aim was to identify and educate unit based PACU RNs for future crises.

Methods

Context

Improvement projects demand a systems approach. One microsystem was chosen as an example to demonstrate the implementation of this project. This microsystem is a perioperative department which consists of PACU or recovery room

area, pre-op area and seven operating rooms (ORs). The 18 bed PACU and pre-operative area are staffed by 31 nurses. Nursing leadership is represented by a new assistant nurse manager (ANM) responsible for the day to day operations of the pre-op and PACU, an interim ANM responsible for OR and a nurse manager and perioperative director who oversee the entire perioperative department. This facility was one of the first to adopt caring science and Watson's theory of human caring within the framework of this health system's model of nursing practice. One perioperative clinical educator position is shared between two facilities, including the identified implementation microsystem; the two facilities are 20 miles apart.

Improvement tools

Clear concise communication and readily available online resources and tracking matrix laid the foundation for this improvement project. Microsoft teams (MST) provided a platform for rapid dissemination of information across the region and to the microsystem. The Clinical Nurse Leader (CNL) as a risk anticipator understands the need to use validated tools to successfully implement change. Several improvement tools were utilized to increase the sense of urgency to garner action and support implementation to optimize patient and organizational outcomes.

SWOT Analysis

A strengths, weaknesses, opportunities and threats (SWOT) analysis revealed this microsystem has an inclusive, supportive culture with a history of preceptorship for student nurse clinical rotations (see Appendix G). Watson's theory of human caring which serves as the framework for this organization's model of nursing practice is another strength. A weakness and an opportunity for improvement existed because this

microsystem is staffed by less ICU trained PACU nurses than other hospitals; however,

the majority have experience in emergency room or medical-surgical nursing. Threats

were characterized by fear and anxiety among unit staff as the crisis unfolded.

Situation, background, assessment, recommendation (SBAR)

Team strategies as described by the Agency for Healthcare Research and Quality

(AHRQ) offer a concise communication tool called SBAR (Harris, 2018). A SBAR

script was sent by this author (project lead) to macrosystem leadership to convey a

sense of urgency and solicit support to provide standardized regional education for

PACU and former ICU nurses (see Appendix H).

Project approval and resource documents

As a result of the SBAR macrosystem and microsystem team leaders and the

DCEPIs met to review existing educational documents and resources. Documents

approved for dissemination included the PACU to ICU process (see appendix I); a supporting

power-point for implementation, (see Appendix J) and a lesson plan for the educational roll

out (see Appendix K). The learning needs self-assessment as part of the ICU competency

checklist (see Appendix L) and recommended online modules, (see Appendix M) were

placed on the Microsoft Teams (MST) site first as the learning needs assessment was the

initial step in the upskilling process.

Microsoft Teams (MST) site as a communication tool

A communication plan was developed. This communication plan was placed on the

MST site and served the dual purpose of matching perioperative directors with their facilities'

DCEPI, while identifying who was responsible for training in the microsystem. During the

initial program launch the Perioperative directors and DCEPIs reported out daily to the

regional offices using the communication and data collection tool to report out on the number of nurses trained. This communication plan developed into the data collection tool when education was completed (see Appendix N). These planning tools for implementation were rapidly compiled in response to the need for education and staffing. Therefore, a final budget and return on investment analysis was not generated until project completion.

Budget Analysis of the Macrosystem

Providing a "plug and play" lesson plan strategy avoided hours of work by individual educators, calculated at eight hours of preparation for one hour of deliverable education. Regionally provided, accessible, standardized, approved education was supplied via MST to the educators and front-line nurses. Using the single MST platform saved valuable time. Educators were then able to use critical time for training instead of preparing materials prior to training. Cost savings were realized by providing regional educational materials. By providing standardized educational materials the estimated time to evaluate and print per educator was calculated @ $72.00 per hour for two hours of time vs. 16 hours prep time if creating the materials at the facility. Eight weeks of valuable time calculated at 336 hours of preparation time across 21 hospitals was saved using a work week of 40 hours (see Appendix O).

Budget Analysis of the Microsystem

Travel nurses if hired, because PACU RNs were not available, would cost more than employed nurses. Not only are short term travel RNs more expensive than incumbent nurses, they are less familiar with organizational culture and structure. At $110.00 per hour, with hard hit COVID 19 areas paying more, travel nurses increased patient care costs (Walker, 2020). Travel nurses also need to be onboarded prior to providing patient care, incurring additional expenditures (see Appendix P).

Perioperative departments incurred decreased revenue streams during this time.

Three factors contributed to lost revenue; a reduction in surgical cases, overtime costs

due to orientation of staff to ICU and reclassification of the PACU as an overflow ICU

unit. Suspension of non-urgent surgeries resulted in perioperative departments operating at 35%-

50% capacity. In this institution the operating room budget is based on case hours. The PACU

budget is based on hospital patient care hours (HPPD) and the full-time employee count is a

flexible variable cost, because the patient case load changes from day to day (Penner, 2017).

Cancellation of non-urgent cases adversely impacted the budget. Experienced perioperative

leaders initiated no cancellation protocols and moved productive people into the "no cancellation

bank" which according to the California Nurses' Association (C.N.A.) contract ensures the

employee has paid work or can take time off without pay (C.N.A. 2017). No Cancellation also

allows nursing leaders to re-assign the employee within their qualifications to another area as

needed. Within the microsystem there were two pay periods with little money coming in and no

clear direction on the education required. In the third pay period the directive was given to

educate the PACU nurses. ICU education was considered productive time and funded. Overtime

costs occurred when PACU nurses orientated to the ICU. This was an expected cost because

PACU nurses work eight hour shifts while the ICU nurses work 12-hour shifts. The perioperative

director in the microsystem made the decision to allow the PACU nurses to work alongside their

ICU colleagues for 12-hour shifts. " I made the choice based on what was right for the patient:

safe, economically sound and sustainable care, with the PACU RN working with one ICU RN

per 12-hour shift." (Alex Long, personal communication, June 22, 2020). In addition to incurred

overtime costs and decreased revenue stream due to cancelled surgical cases, the

microsystem lost revenue during the surge with reclassification of the PACU area as an ICU

overflow unit. When the PACU became an ICU overflow unit, the ICU patients were coded as

perioperative, but the beds were reclassified as ICU. PACU nurses were caring for ICU patients

in the PACU and paid from the perioperative budget, however, the revenue dollars were allotted

into the ICU budget. Initially there was a delay between the time that elective surgeries

were stratified into urgent, non-urgent or cancelled and when education for PACU RNs

was approved and funded. When approved the decreased number of surgical cases per day

allowed productive budgeted hours for PACU RNs to be available for assessment,

education and orientation.

Cost-Avoidance Analysis of the Microsystem

If this healthcare organization had not been able to care for members needing ICU

care, patients would have been cared for outside of the organization's ICUs at increased

cost to the organization. The cost of outside care is approximately $3000.00 per ICU day

with the added cost of nursing care (see Appendix Q).

Interventions

One microsystem pilot site initiated the learning needs assessment and the lesson plan

and reported back to the DCEPI group. The ICU self-assessment was approved for system-wide

spread, during the pilot microsystem implementation. PACU RNs were available due to surgical

case cancellations and perioperative patient capacity at 35%-50% region wide. Urgent, emergent

and cancer related surgeries continued to be scheduled and performed throughout the crisis.

To achieve the primary outcome, three interventions were implemented:

1. Assessment of learning needs and education of PACU nurses to care for ICU patients.

2. Orientation of PACU RNs to ICU in partnership with an ICU volunteer preceptor

   nurse.

3. Tracking of number of upskilled nurses with the correct skill mix to care for patients in the pilot ICU and subsequently in other ICU microsystems and PACUs across 21 hospitals.

This three-part intervention consisted of upskilling and educating PACU RNs to care for ICU patients during the COVID 19 pandemic and resulted in effectively increasing the ICU nursing work force within the time frame of three weeks. A standardized regional learning needs assessment of ICU skills was assigned to each PACU nurse to complete. This evaluation indicated current skill level and identified knowledge gaps and required education for upskilling. The assessment tool became the competency document when completed and was carried by the nurse as proof of competency. The results of the learning needs assessments were collated, and knowledge gaps identified in the hospital-based microsystem. Based on the results of the learning needs assessments and microsystem manager approval, RNs were stratified into one of three ICU skill levels.

The three levels of competency (see appendix R) included the ability to:

Level 1. Take an individual ICU patient assignment. Certain skills were exempted.

Level 2. Take an individual lighter than average ICU patient assignment.

Level 3. Contribute in a functional or team nursing role in the care of ICU patients or care for post-surgical patients in PACU.

Criteria for inclusion in the ICU upskilling program:

I. Voluntary participation.

II. Completion of a standardized ICU RN learning needs skills assessment with manager evaluation of current RN skills and validation, or not, of the PACU nurse's self-evaluation of ICU skills and attitude.

III.   Individualized orientation to the designated unit, based on current competencies and skill

level. (CNA contract, 2017)

Implementation of the training in a short period of time, across 21 hospitals, was dependent

on a readily available lesson plan and strategy for spread. Technology aided in tracking and

communication first with the core group of educators and later for dissemination of the plan and

materials. MST was the primary platform for communication. MST provided multiple ways to

communicate via a designated channel. Posted comments or messages to individuals or the

entire team akin to email were used and group access to files in editable or pdf format made

available. This greatly assisted the macrosystem in making standardized vetted materials

available quickly to the microsystems. Some materials were provided in editable form to

accommodate local needs.

The self-assessment and competency were standard across the macrosystem. MST enabled

face to face remote access meetings with key stake holders and the front-line educators, who

conducted the education on site in the microsystems. As the first requirement in the lesson plan

was individual RN completion of the ICU learning needs self-assessment this was made

available first to the microsystems via MST. Making the materials available is only half the

battle; people must know the materials are available and ready to use. Macrosystem leadership

initiated a report out on ICU education and ICU completions of PACU RNs. Daily required roll

call of leaders each representing their facility was implemented to report out on the number of

nurses upskilled for ICU with orientation and competency completed data. This process

prompted busy nurse managers to focus on this project during the crisis.

Study of the Intervention

The intervention was studied concurrently with implementation. The outcome was adequate staffing and beds for the influx of COVID 19 patients. Reports were shared in regional meetings. When feedback was received from the microsystems that some nurses were hesitant to complete the self-assessment, talking points were created regionally and shared locally. A retrospective survey of the education and orientation process was conducted in the microsystem. Results showed that PACU RNs without ICU experience were more stressed during the training than those RNs with ICU experience. The PACU RNs (level 3) who identified as having no ICU experience and who did not work in ICU during the surge, did not feel supported during the upskilling (see Appendix S). In contrast the PACU RNs with ICU experience who cared for ICU patients during the surge felt supported. All PACU RNs who volunteered went through the same training process. Level 3 functional nursing when combined with team nursing resulted in greater staff satisfaction. In response to this feedback, resources were made available to unit leaders across microsystems that described the benefits of team nursing. This reality presented an opportunity to showcase the organization's rich history of nursing innovation (D' Alfonso, 2018). Clearly, the implementation microsystem had a need for ICU focused education for non-ICU RN staff.

Measures

The primary goal was to upskill through education and clinical orientation PACU RNs to care for ICU patients during the COVID 19 pandemic and increase the ICU nursing work force within the time frame of three weeks. Quantitative measures

included the number of PACU RNs upskilled to take an individual ICU patient

assignment in one microsystem and across the macrosystem.

   Qualitative measures included the feedback via a retrospective survey of PACU

RNs perceptions of the upskilling program and willingness to participate in the care of ICU

patients. By October 2020 an education and sustainability plan will be revised and

evaluated in anticipation of preparing unit based PACU RNs to care for ICU patients

during a possible COVID 19 resurgence.

Outcome measures: The initial education resulted in the care of overflow ICU patients

in non-ICU areas by PACU and other nurses in sister facilities. A database was created to

track PACU RN education with sustained ICU experiences.

Process measures: Conduct one pilot and disseminate the process and educational

materials developed by the pilot site to other sites via technological platforms and

educational communities of practice. Conduct a retrospective survey in the microsystem

of interest to measure PACU RNs perceptions of support and willingness to volunteer for ICU

assignments in the future.

Balancing measures: Monitor absentee rate for PACU RNs, during the initial surge and

during the sustained pandemic.

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Ethical considerations

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   If this organization had not been able to care for its members, healthcare providers

could have faced ethical dilemmas with inadequate resources for the influx of patients

with COVID 19. Doing nothing, before the surge and resurgence would have exacerbated

an additional crisis. The bioethical principle of beneficence requires that no harm is done.

Without an effective intervention events would have overtaken the healthcare system

resulting in chaos, increased risk of infection to patients and staff with increased costs,

loss of reputation and a potentially unmanageable situation in some impacted hospitals.

Expecting the individual microsystems to create their own training programs in a short

time frame was unrealistic. This project received an exemption based on the institution's

human subject's research policy and was approved as a quality improvement project and

did not require IRB approval (see Appendix T). The implemented, standardized, regional

solution met the requirements of care for patients, staff and providers. The risk of

inadequate resources and the inability to care for very sick patients was averted. By

providing sustained support the macrosystem enabled the microsystems to practice the

bioethical principle of distributive justice. (American Nurses Association, 2015)

Results

The goal to provide timely, cost effective and standardized skills resources to DCEPIs

and clinical educators with a plan for implementation across 21 hospitals was successful.

Training programs were implemented across the macrosystem within the time frame of three

weeks. The program increased available ICU RNs by 17% in one microsystem. 436 PACU

RNs were able to care for ICU patients' region wide. This increased ICU RNs by 31%

across the macrosystem (see Appendix U). The maintenance of a regional database with

identified PACU RNs upskilled to ICU and able to take an individual patient assignment

was not so successful. A database was created to show total numbers of trained RNs

ready to take an independent patient assignment but not implemented or populated.

During the summer resurgence, when California tried to reopen, travel nurses were

available and onboarded, the organization decided not to close the operating rooms,

partly due to the back log of surgeries created by the cancellations of elective surgeries in

the spring. PACU RNs are needed to care for surgical patients as surgical schedules were

running at 100%. The PACU RN to ICU data base was not used during the second surge.

Since the first surge PACU RNs were needed to care for surgical patients, not ICU

patients. This adversely impacted the proposed goal of implementing an education plan to

maintain ICU skills of PACU RNs through the summer.

Discussion

Consideration should be given to include the team nursing model as a viable

option in times of crisis to augment the nursing workforce (Fairbrother, 2010). Level 3

nurses (as described previously) were not able to take an ICU individual patient

assignment. Level 3 nurses did report feeling useful as part of a nursing team. PACU

nurses, without ICU experience, stated they were willing to support and assist ICU

nurses with ICU patient care. The idea that competent nurses will learn new skills and

gain knowledge while working alongside an experienced nurse is not new and should

be explored. The culture of the ICU or other units where nurses are floated to is also a

factor in nursing perceptions of support. Nursing leaders need to be aware of the

prevailing culture in their units and work to create a welcoming environment. As stated

by one nurse in the retrospective survey question "What other feedback do you have

about the PACU to ICU program?" This nurse emphasized that it is "Really important

for ICU staff to support PACU staff transition to ICU role."

PACU RNs often have a background in ICU nursing. If ICU is full or understaffed, post-

surgical patients will spend the night in PACU under the care of PACU nurses. Patients from

the emergency room may be sent to the PACU prior to surgery and require nursing care.

Education plays a key role in preparing the nursing workforce to respond well in crisis

situations. In the microsystem of interest, a need for ICU focused education for non-ICU

RN staff was identified. In future efforts, the recommended education plan should include

hybrid learning activities such as pre-work online which potentially reduces the cost of a nurse

educator for knowledge transfer (Pollack, 2015). This augments the value of pre-work with

inclusion of hands-on instruction by an educator conducted after completion of the online

content. An exemplar of appropriate hybrid education is illustrated by a medication delivery

system (pump). The nurse reviews the features of the pump online and then completes a skills

assessment and validation with an educator or assigned super user. This hybrid format would

have been the preferred method of knowledge transfer prior to the pandemic crisis; however,

time did not permit.

Communities of practice

A key, often undervalued, contribution to rapid dissemination of an important time

saving intervention is the contribution of communities of practice. (Wenger, 2012) Two

communities of practice were instrumental to the time sensitive success of this intervention.

Both the DCEPI and perioperative educators CoPs were well established, already functioning

on MST; in addition, DCEPIs and educators had trusted relationships with each other and

employed multiple communication methods to connect to each other and the macrosystem

leaders. Educators are crucial during crisis management where patient safety and requisite

nursing skills are paramount. Clearly, experienced nurse educators can no longer be perceived as

"just" available to onboard and orient new staff. The true value of nurse educators and clinical

nurse leaders (CNLs) is integral to improve quality and safety outcomes, optimize patient care

delivery and maximize organizational effectiveness (King et al., 2019, Warren, 2020).

Summary

The CNL identifies risk at the micro and macro level not only for patients but also healthcare workers especially within the realm of quality and safety. (King et al., 2019) The CNL utilizes frameworks, such as the Institute for Healthcare Improvement's framework for safe, reliable and effective care, to identify strengths, risks and weaknesses within the microsystem. (Frankel, et al., 2017). Change theory is also applied when rapid change, assessment and action is required such as during a pandemic. (Kirkpatrick & Kirkpatrick, 2006) Being able to quickly assemble resources and disseminate those resources for this project saved valuable time and enabled the microsystems impacted to pivot quickly to meet the needs of staff, providers and patients.

Lessons learned

- Non PACU former ICU RNs volunteered to participate in the program and successfully floated to ICU units.

- Team nursing was implemented successfully at some facilities. (Dickerson, 2017) "Functional nursing did not work so well, we should combine functional nursing with team nursing." (M. Machon, personal communication, April 29, 2020)

- Front line nurses and leaders appreciated the organized structure of the program. Volunteer nurses reported their increased skill levels as they worked in their designated float unit. As their skills and confidence increased, the nurses were able to care for more acutely ill patients.

- The surge impact varied across the region which allowed identified volunteer nurses to take shifts in hospitals that were heavily impacted by an influx of COVID 19 patients.

- The community of practice formed by the DCEPIs who continuously met face to face once a month for three years provided a robust infrastructure and network of nurse leaders. (Edmondson, 2017; Wenger et al., 2002).

- The perioperative clinical educators also had a strong community of practice, including an email distribution list, Teams' site and monthly virtual meetings. Other clinical educator groups without robust communication systems were difficult to reach and not immediately engaged in the project.

Conclusion

This systems level improvement project achieved its primary goal of caring for the influx of ICU and COVID 19 patients during the first surge wave of 2020. To date, the secondary goal of maintaining a database for upskilled PACU RNs to ICU has not been realized. PACU RNs are not available for training or deployment to other areas because Perioperative departments are operating at 100% capacity and therefore PACU RNs are unavailable to support ICU staffing needs. This workforce development program has demonstrated success through upskill training in response to the pandemic. Stucky and colleagues(Stuckey et al., 2020) remind nurse leaders that PACU RNs are routinely called upon to care for ICU patients.

Community of practice

The role of the nurse educator community of practice in rapid response situations was key to the success of this project in conjunction with rapid dissemination of information via a single platform. The DCEPIs are a strong outspoken cohesive community of practice within the organization. (Wenger, et al., 2002) The future of nursing report calls for nurses to practice to the full extent of their license, (Institute of Medicine, 2010) this cannot be

accomplished in an educational vacuum. Healthcare is becoming increasingly complex and dynamic, with the expectation that healthcare providers are to be nimble and highly skilled.

Culture and systems

The IHI framework which encompasses leadership culture and learning systems lends itself to micro and macrosystem implementations of new technology, such as MST (Frankel, 2017) Recent occurrences, in both California and the United States indicate that healthcare will face many new and recurring challenges in the future. COVID 19 will not be the last scourge to ravish humankind. Wildfires and earthquakes can continue to be anticipated in the future. During the 2020 COVID 19 crisis, in one integrated healthcare organization, a systems approach combined with vital educational CoPs served to rapidly disseminate education and training. The microsystems were supported by the meso and macro systems which functioned within the community of practice framework to disseminate knowledge transfer and training to create a culture of continuous learning in support of patient safety, information and resources in the form of educational materials and consultation. Healthcare organizations do not have control over mother nature. They do have control over the infrastructure to support resource allocation and how to best prepare the healthcare workforce for eventualities such as COVID 19. The professional practice of nursing in this organization has risen to manage this pandemic crisis with compassion, pride, resourcefulness, creativity and an unwavering focus on patient care. Healthcare executives need to include nurses from all levels of the organization in planning and executing systems improvement in response to emergency preparedness.

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Appendix A

Project Charter

Project Charter There is an urgent need for Intensive Care Unit (ICU) nurses to support the anticipated COVID 19 surge in the coming weeks/months in our hospitals.

Global Aim To provide timely, cost effective and standardized assessment and skills resources to Directors of clinical education and informatics (DCEPIs) and clinical nurse educators with a regional plan for implementation across 21 hospitals.

Specific Aim To educate peri-anesthesia care (PACU) RNs to care for ICU patients during the COVID 19 pandemic and increase the ICU nursing work force within the time frame of four weeks. By October 2020 identify and educate unit based PACU RNs for mobilization during a COVID surge plan.

Background
The demand for ICU beds has grown significantly related to the admissions of critically ill COVID-19 positive patients and patients under investigation (PUIs). Data predicts that there will be a surge of ICU patients. ICU staffing capacities may be maxed out and few travelers are available. To augment ICU staffing, a back-up plan has been created to up skill PACU nurses to the ICU. At one acute care hospital this came about organically because many PACU nurses volunteered to help their ICU colleagues. Leadership is also meeting with the California Nurses Association (C.N.A.) to discuss cross training moving forward. This healthcare organization has a history of innovative response to needs in a time of crisis. (D'Alfonso & Jones. 2018)
Target audience: Peri-anesthesia Care Unit (PACU) RNs.
Criteria for inclusion in the program:
1. Voluntary or mandatory participation.
2. Completion of a standardized ICU RN skills assessments.
3. Home department manager evaluation of current PACU RN skills.
4. Individualized orientation to the designated unit, based on current competencies and skill level. (CNA contract, 2017)

Sponsors

Chief Executive Officer N. California	G. A.
Chief Nursing Executive	A. W.

Team Members/Stakeholders

Project Lead	Jennifer Mendenhall
Co-Lead	P.J.
Project Manager	T.B.
Regional nurse consultant	S.C.
Perioperative Director	A.L.
Directors of Clinical Education and Informatics	M.M., K. K., I.N., J. H.
PeriOp and ICU Educators	L.N., T.G., M.P.
PACU Assistant Manager	V. I.

Goals

To provide standardized care and management of non COVID 19 surge patients in perioperative post anesthesia units by enhancing the skill level of ICU prepared PACU RNs:

Micro-system goals:

1. Create a supportive learning environment to achieve this project in a short time frame, while acknowledging natural stress and anxiety. (Pollack, et al, 2015).
2. 100% Volunteer PACU RN self-assessments completed and documented.

Family of measures

Increase the ICU nursing workforce to care for increased ICU capacity by 25% in three weeks.

Measure	Data Source	Target
Increase the ICU nursing workforce to care for increased ICU capacity	Regional N. Cal tracking tool	Increase ICU nursing workforce region wide by 25% in three weeks.
Outcome		
Recognize cost savings by providing standardized educational materials	Regional N. Cal tracking tool and cost benefit analysis Cost effective analysis	Cost benefit >$50,000 by providing standardized training across the region
Identify and educate unit based PACU RNs for mobilization during a COVID surge plan.	Post survey will show an increase in confidence	Increase the microsystem ICU workforce by 15%
Process Measures		
Identify and educate unit based PACU RNs for mobilization during a COVID surge plan.	Pre and post survey Microsoft Teams data tool Health-stream reports	Conduct one pilot test in one microsystem for eligible PACU RNs including a comprehensive continuing education program by October 2020
Balancing		
Monitor absentee rate for PACU RNs during COVID surge	COVID/ Staffing office -related to PACU RNs	80% PACU RNs (N =31) in the data base will have an absentee rate at or below regional average metric.

Appendix B

Gantt Chart

Timeline 2020 Weeks	3/14 1	3/21 2	3/28 3	4/4 4	4/13 5	4/18 6-11	5/30 12	6/6 13	July	Aug-Sept	Oct	Nov-Dec
Project & Aim	■											
Project pilot	■	■										
Rapid regional implementation		■	■	■	■							
Track/document		■	■	■	■	■						
Project Charter							■					
Driver Diagram								■				
Measurement Strategies		■	■	■	■	■	■	■				
Retrospective survey								■	■	■		
Finalize Project										■	■	
Presentation												■

Appendix C

Driver Diagram
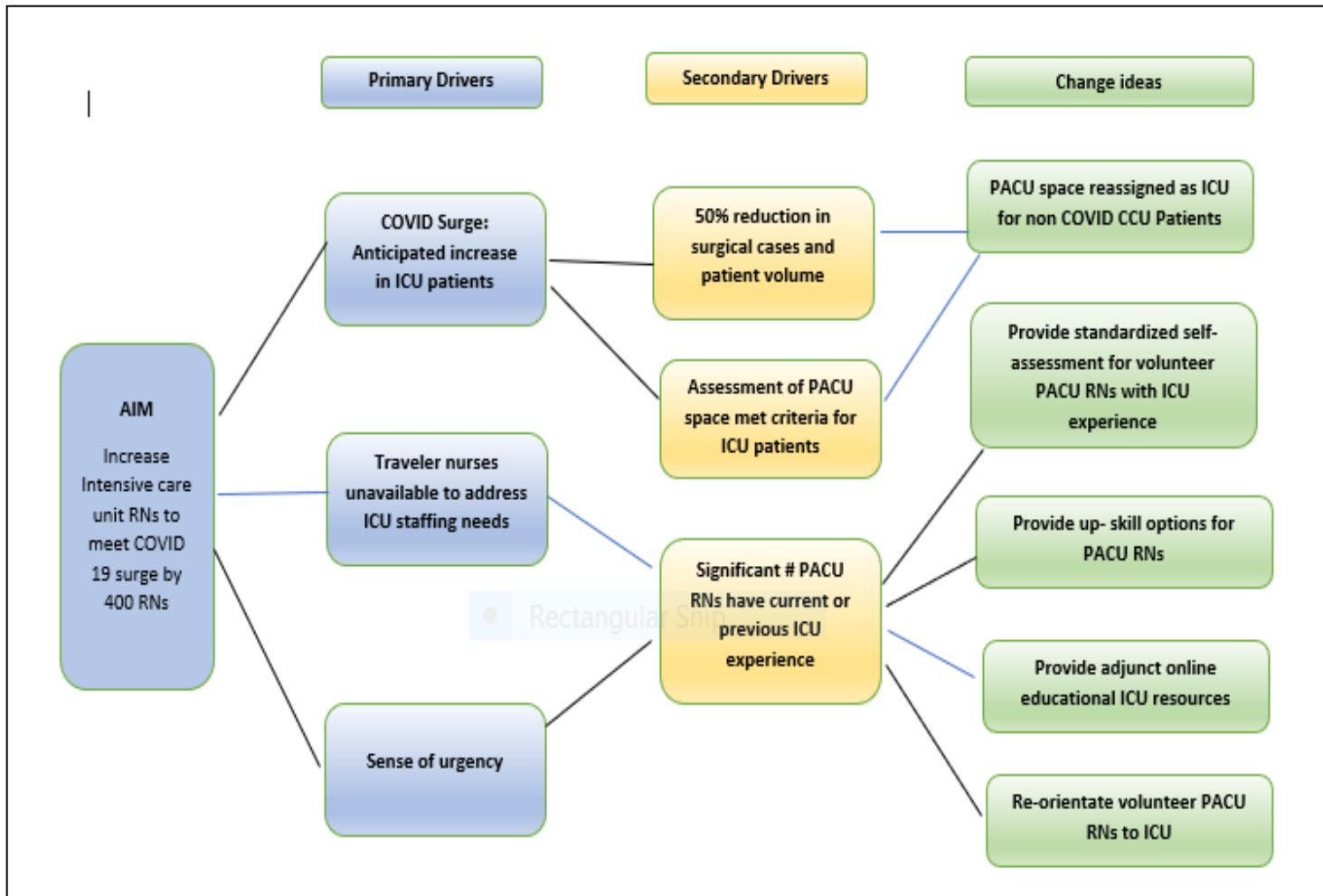
Appendix D

Evaluation Table

Citation	Conceptual Framework	Design/ Method	Sample/ Setting	Variables Studied and their Definitions	Measurement	Data Analysis	Findings	Appraisal: Worth to Practice
Clark, C.S. Watson's human caring theory: Pertinent transpersonal and humanities concepts for educators *Humanities, 5*(2), 21. doi:10.3390/h5020021	Watson's human caring theory	Qualitative study. Explores the history of transpersonal psychology (TP) and the TP philosophers who influenced Jean Watson's human caring theory	Faculty, nurse educators and senior nursing students	Theories of PT to include: Maslow's higher and lower levels of need within the construct of education. Discusses the inclusion of skills and tools to promote caring in nursing curricula Compares theories of TP	N/A	N/A	Reviews PT theorists and applications educators can adopt to promote caring for self and others at a deeper level of self-awareness and human connection. Managing stress and providing mechanisms to develop self-reflection and transpersonal skills in nursing students	**JHNEBP Evidence Appraisal Tool L III B** Watson's seminal work and nursing theory is unique in that it incorporates care of the care giver as well as the patient. This, in the time of stress and uncertainty allows leaders and educators to incorporate caring science into the learning curricula.

Citation	Conceptual Framework	Design/ Method	Sample/ Setting	Variables Studied and their Definitions	Measurement	Data Analysis	Findings	Appraisal: Worth to Practice
D'Alfonso, J., Jones, D., Moss, T. (2018) Kaiser's school of nursing, A 70-year legacy of disruption. *Nursing Administration Quarterly* 42(1), 35-42. doi 10.1097/NAQ.0000000000000262.	Historical context through the voices of school alumni	Legacy Project Expert opinion and perspective	Students and graduates of the Kaiser School of Nursing 1947-1976	The innovative legacy of the school	N/A	N/A	Recommendations: Ensure alignment of proposed innovations to the organization's overarching mission and vision. Identify talent and empower nurses to critically think, innovate, and practice in ways that challenge the norm and promote EB approaches to value-added care.	**JHNEBP Evidence Appraisal Tool Level V B** The recommendations in this work align with the current project

Citation	Conceptual Framework	Design/ Method	Sample/ Setting	Variables Studied and their Definitions	Measurement	Data Analysis	Findings	Appraisal: Worth to Practice
Dickerson, J., Latina, A. (2017). Team nursing: A collaborative approach improves patient care. *Nursing, 47*(10), 16-17. doi:10.1097/01.NURSE.0000524769.41591.fc	Team nursing	project Pre and post surveys Implementation of Team nursing Novice with expert nurse Time frame 90 days	Novice and expert nurses in 18 bed Transitional Care Unit High ratio of novice nurses to experienced nurses Pre and post surveys Time frame 90 days	Staff satisfaction and moral Patient safety Introduction of team nursing	Goal: Increase patient satisfaction by 10% Increase staff satisfaction by 10% Increase staff moral by 10	88% compliance with team nursing model Pre survey 61% nurses felt supported during their shifts Post survey 72% of nurses felt supported during their shifts. Staff perception of continuity of care increased by 45% Unit gained Tier 1 (highest) on Press Ganey staff engagement survey. Incidental finding patient falls were zero during the 90- day period. Average before intervention had been 1-2 patient falls in a 90- day period	Staff results in the pre survey showed a perceived lack of teamwork and collaboration on the unit. Post introduction of team nursing staff satisfaction and moral rose by 11%. Nursing engagement was enhanced. Team nursing was adopted as the nursing model for this unit. The charge nurse was more available to help on the unit. Hand offs took longer with 2 RNs & incurred incidental overtime: hand offs reverted to 1 RN with good results	**JHNEBP Evidence Appraisal Tool Level V A** The recommendations in this work align with the current project. Team nursing is a flexible, viable option for units with a high ratio of novice nurses and/or patients with high acuity. Team nursing should also be considered during times of crisis and impacted nursing units.

Citation	Conceptual Framework	Design/ Method	Sample/ Setting	Variables Studied and their Definitions	Measurement	Data Analysis	Findings	Appraisal: Worth to Practice
Edmonson, C., McGough, K., Phillips, M., Blaine, Y., & Mackoff, B. (2017). From a class to a community: A blueprint for building a sustainable community of practice for nurse managers. *Nurse Leader, 15*(3), 179-183. doi:10.1016/ j.mnl.2017.0 3.008	Practice (CoP) + Learning	Qualitative and Quantitative study. Diamond model of leadership **Purpose:** support and develop New NLs by establishing a CoP facilitated by experienced nurse managers, who were prepared through four learning labs taught by an expert. A disruptive **3 step process** to build a CoP **Steps** 4 learning labs taught by expert to NM 4 NM trained to facilitate NMs plan, meet and hold 3 learning labs with new NLs	New Nurse Leaders (NL) Experienced Nurse Managers (NM) Hospital, Dallas, Texas U.S.A.	IV1 N/M Learning labs x 4 IV2 N/L Learning labs x 3 DV1 NL/NM engagement rated by clinical nurses through NDNQI DV2 NM transformation (qualitative data) DV3 employee engagement	engagement Press Ganey + NDNQI NDNQI N/A Employee engagement Press Ganey National Database of Nursing Quality Indicators NDNQI survey Magnet status of hospital	NL/NM engagement 4.5 on scale of 1-5 Press Ganey 0.36 Improvement over last year. Clinical nurses rated NL & NM at 4.97 on a scale of 1-6 98th percentile employee engagement NDNQI Magnet Status The organization continues in the top 2% of all magnet hospitals	NLs Increase in knowledge with immediate application of knowledge. **Themes:** I. Power of spending time with a peer community 2.Importance of the lived experience 3.High levels of energy, engagement and comfort 4.Richness of peer learning, support and consultation	**Evidence Appraisal Tool Level V A** The establishment of a CoP in combination with the learning labs not only benefited the new NL it transformed the relationship between the 4 NMs who, through this process became a well-functioning team. Provides a tested working model for NL/NM support and development and retention using CoP and a learning lab framework. New nurse manager turn-over (nurse managers leaving) is at unstainable rates in many healthcare organizations. Nurse educators are also at risk, Transition programs such as described in this article can provide a way forward to support and retain both nurse managers and nurse educators

Citation	Conceptual Framework	Design/ Method	Sample/ Setting	Variables Studied and their Definitions	Measurement	Data Analysis	Findings	Appraisal: Worth to Practice
Edmonson, C., McGough, K., Phillips, M., Blaine, Y., & Mackoff, B. (2017). From a class to a community: A blueprint for building a sustainable community of practice for nurse managers. *Nurse Leader, 15*(3), 179-183. doi:10.1016/ j.mnl.2017.03.008	Practice (CoP) + Learning	Qualitative and Quantitative study. Diamond model of leadership **Purpose:** support and develop New NLs by establishing a CoP facilitated by experienced nurse managers, who were prepared through four learning labs taught by an expert. A disruptive **3 step process** to build a CoP **Steps** 4 learning labs taught by expert to NM 4 NM trained to facilitate NMs plan, meet and hold 3 learning labs with new NLs	New Nurse Leaders (NL) Experienced Nurse Managers (NM) Hospital, Dallas, Texas U.S.A.	IV1 N/M Learning labs x 4 IV2 N/L Learning labs x 3 DV1 NL/NM engagement rated by clinical nurses through NDNQI DV2 NM transformation (qualitative data) DV3 employee engagement	engagement Press Ganey + NDNQI NDNQI N/A Employee engagement Press Ganey National Database of Nursing Quality Indicators NDNQI survey Magnet status of hospital	NL/NM engagement 4.5 on scale of 1-5 Press Ganey 0.36 Improvement over last year. Clinical nurses rated NL & NM at 4.97 on a scale of 1-6 98th percentile employee engagement NDNQI Magnet Status The organization continues in the top 2% of all magnet hospitals	NLs Increase in knowledge with immediate application of knowledge. **Themes:** I. Power of spending time with a peer community 2.Importance of the lived experience 3.High levels of energy, engagement and comfort 4.Richness of peer learning, support and consultation	**Evidence Appraisal Tool Level V A** The establishment of a CoP in combination with the learning labs not only benefited the new NL it transformed the relationship between the 4 NMs who, through this process became a well-functioning team. Provides a tested working model for NL/NM support and development and retention using CoP and a learning lab framework. New nurse manager turn-over (nurse managers leaving) is at unstainable rates in many healthcare organizations. Nurse educators are also at risk, Transition programs such as described in this article can provide a way forward to support and retain both nurse managers and nurse educators

Citation	Conceptual Framework	Design/ Method	Sample/ Setting	Variables Studied and their Definitions	Measurement	Data Analysis	Findings	Appraisal: Worth to Practice
Frankel, A., Haraden, C., Federico, F., Lenoci-Edwards, J. (2017) *A framework for safe, reliable and effective care.* White Paper. Institute for Healthcare Improvement	Institute for Healthcare Improvement White paper. United States Two domains Culture and learning systems.	International collaboration over 15 years	Healthcare systems, patients and healthcare workers.	Culture and learning systems and how they interact with each other. Provides 9 interconnected components **Leadership** is part of both systems **Culture:** Psychological safety. Accountability. Teamwork and communication. Negotiation **Learning system**: Transparency. Reliability. Improvement and Measurement. Continuous learning	Provides various tools and methods to measure existing improvement projects and identify strengths and defects in the systems which prevent growth and improvement Engagement of patients and families in their care.	Recommends various methods of data analysis to drive the improvement process. Utilizes improvement science to move new or existing projects forward.	A growing realization that metrics can only go so far. Measurement of a problem does not resolve the problem. To improve patient centric care & outcomes healthcare organizations must look at the whole system of care. This framework provides comprehensive methods & tools to guide organizations on their journey to improve healthcare across systems.	**JHNEBP Evidence Appraisal Tool** **L I A** Overarching domains: Culture and learning systems, with engagement of patients and families at the center: pertinent in times of great change. Meets organizations where they are, recommends analysis tools to identify gaps in knowledge (learning system) and areas for improvement (culture) with recommendations and resources to move forward. Designed with enough flexibility to be adopted during P.I. projects as well as

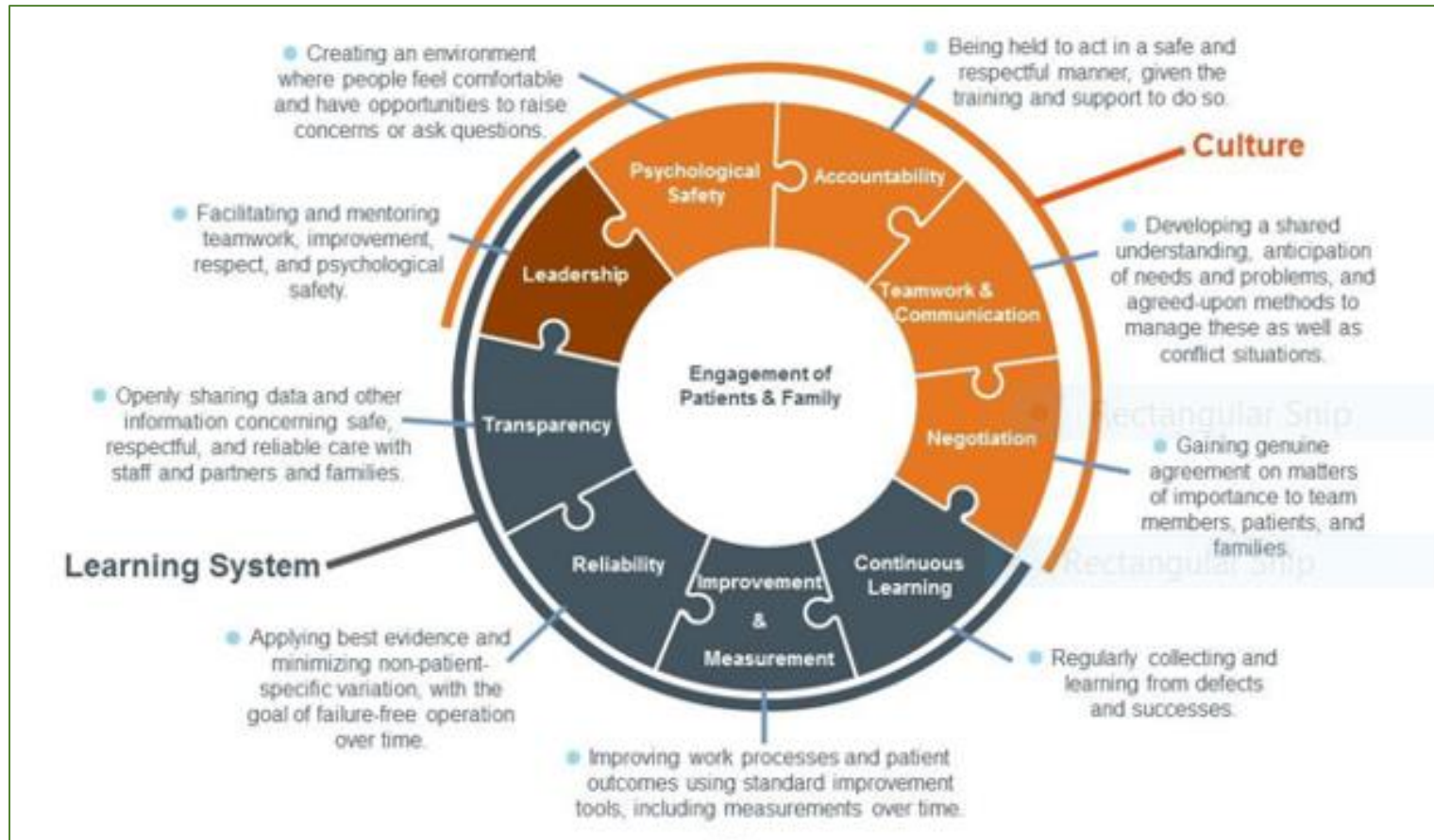| Citation	Conceptual Framework	Design/ Method	Sample/ Setting	Variables Studied and their Definitions	Measurement	Data Analysis	Findings	Appraisal: Worth to Practice
Stucky, H. De Jong, M. J., Matthews, B. (2020) COVID-19: Initial Perioperative and Perianesthesia response in a military medical center	Opinion This descriptive work is representative of training, workflows changes & staff utilization in non- military healthcare systems.	Descriptive account of the steps taken to meet the COVID 19 Surge in one military hospital	Perioperative and perianesthesia RNs 167 bed Military hospital 11 surgery suites 12 surgical specialties	Peri-anesthesia skills sets and application Perioperative skills sets and application	N/A	N/A	Military nurses must retain competence in Med surg and emergency trauma nursing. Training refamiliarized perioperative nurses with patient care to include medication administration, catheter care and point of care testing. A tiered approach was used to match skills with needs PACU Level 1 RNs were a good fit for ICU assignments Perioperative nurses developed processes and policies for UV light use hospital wide	**JHNEBP Evidence Appraisal Tool L V B** Surgical services continued care for urgent & emergent cases. Healthcare systems prioritized cohorts of patients to include cancer surgeries. Identifies the value of peri-anesthesia and perioperative nurses in times of crisis. Consideration should be given to optimizing staff skill mix with required training for identified skills which build flexibility and agility in the nursing workforce.

Citation	Conceptual Framework	Design/ Method	Sample/ Setting	Variables Studied and their Definitions	Measurement	Data Analysis	Findings	Appraisal: Worth to Practice
Watson, J. (2012) *Human caring science: A theory of nursing.* 2nd edition. Jones & Bartlett learning.	Human caring science	Phenomenological qualitative research into human caring science. Explores conceptual and empirical problems in nursing and the human sciences. Capturing the experiences of patients and care givers in the language of human experience.	Watson acknowledges the unique science that is nursing based as it is in clinical, empirical phenomena but also ethical, philosophical and spiritual phenomenon.	Applied humanities Study of transpersonal care	N/A	N/A	Jean Watson challenges science to include truths such as the power of love and human connectiveness within the framework of nurses contribution to humanity. Watson's theory is separate from but aligns with the conceptional framework of communities of practice by identifying the basic need to be loved, accepted and to belong, as inseparable from the human condition	**JHNEBP Evidence Appraisal Tool L I B** Watson's seminal work is unique among nursing theories in that it incorporates care of the care giver as well as the recipient of care. This, in the time of stress and uncertainty, encourages nursing leaders and educators to incorporate caring science into the learning curricula for nurses.

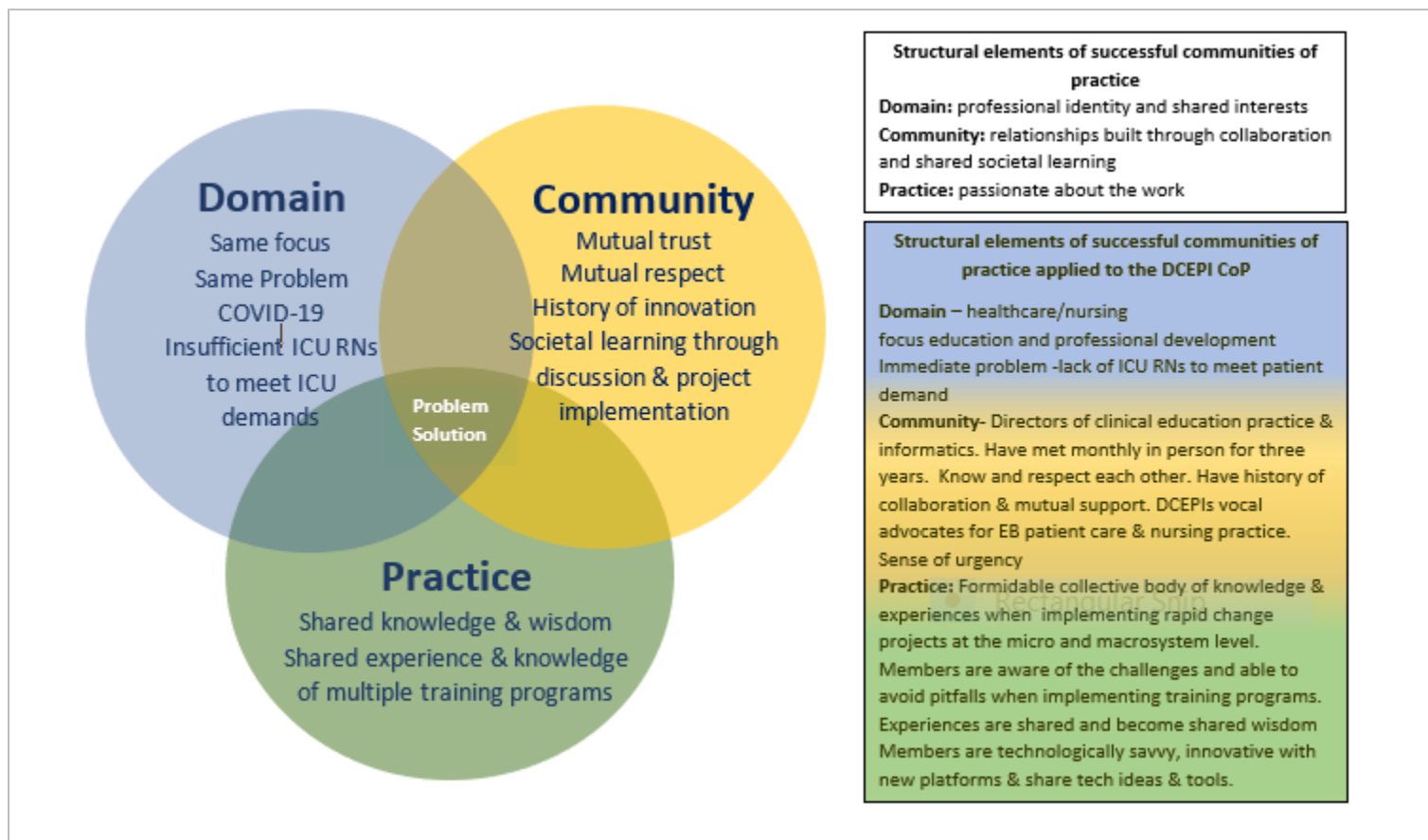| Citation	Conceptual Framework	Design/ Method	Sample/ Setting	Variables Studied and their Definitions	Measurement	Data Analysis	Findings	Appraisal: Worth to Practice
Wenger, E. (1998) *Communities of practice: Learning, meaning and identity* *Cambridge University Press.*	A social theory of learning Learning through social participation Communities of Practice CoP	Original research on communities of practice CoP	Business and professional communities Healthcare communities within a disciple or specialty	**Domain** common ground and identity of issues which draws people together. **Community** cares about the members, generates a sense of belonging to optimize structure, socialization and fosters the fabric of social participatory learning **Practice** recognition that the group has knowledge, and passion. Energy is generated to collect, document & organize that knowledge into useful information.	The business value added by collaborating either formally or informally in business, science communities & healthcare is measured in companies with active CoPs compared to those companies without CoPs. The value of CoPs may be hard to measure.	Improved outcomes in diverse fields such as science innovation, car industry and healthcare	CoPs underpin collective knowledge within a formal or informal structure of social interaction. CoPs provide a competitive edge, resilience & sense of belonging through engagement alignment & imagination. CoPs take work. A healthy CoP offers levels of engagement & welcomes new ideas & members.CoPs do not replace formal learning modalities. CoPs do enhance & reinforce knowledge learned.	**JHNEBP Evidence Appraisal Tool L II A** This original work explores the synergy between likeminded people with similar goals and interests. CoPs in healthcare have developed organically or been developed intentionally with good results.

Appendix E

IHI Framework for Safe, Reliable and Effective Care

Reprinted with permission IHI, 2017

Appendix F

Conceptional Framework-Communities of Practice During a Pandemic

Structural elements of successful communities of practice
Domain: professional identity and shared interests
Community: relationships built through collaboration and shared societal learning
Practice: passionate about the work

Structural elements of successful communities of practice applied to the DCEPI CoP

Domain – healthcare/nursing
focus education and professional development
Immediate problem -lack of ICU RNs to meet patient demand
Community- Directors of clinical education practice & informatics. Have met monthly in person for three years. Know and respect each other. Have history of collaboration & mutual support. DCEPIs vocal advocates for EB patient care & nursing practice. Sense of urgency
Practice: Formidable collective body of knowledge & experiences when implementing rapid change projects at the micro and macrosystem level. Members are aware of the challenges and able to avoid pitfalls when implementing training programs. Experiences are shared and become shared wisdom Members are technologically savvy, innovative with new platforms & share tech ideas & tools.

Domain
Same focus
Same Problem
COVID-19
Insufficient ICU RNs
to meet ICU
demands

Community
Mutual trust
Mutual respect
History of innovation
Societal learning through
discussion & project
implementation

Problem
Solution

Practice
Shared knowledge & wisdom
Shared experience & knowledge
of multiple training programs

Pictorial design created by the author; adapted from Wenger (1998)

Appendix G

SWOT Analysis

Strengths

- Respected healthcare system with a reputation for nursing innovation
- Strong integrated communities of practice
- Directors of Education experience in rapid change management
- Collaborative, knowledgable, astute leaders who practice Watson's theory of caring science
- PACU RNs with current or substantial critical care experience
- ICU RNs welcome their PACU colleagues

Weaknesses

- Nurses' resistance, fear and anxiety
- Lack of knowledge about COVID 19
- Lack of PPE with multiple, confusing mitigation workflows
- Different terminology between PACU and ICU RNs created misunderstandings
- ICU RNs not welcoming to their PACU colleagues

Opportunities

- Increase skill level & confidence of PACU RNs
- Create business model for upskilling staff to meet patient needs
- Fast track electronic staff schedule updates
- Improve collaboration, break down silos
- Create robust tracking systems
- Optimize huddle message exchange

Threats

- Healthcare providers become infected
- Increased absenteeism
- Potential for union action
- Nurses working two jobs may choose to work at a facility outside of the organization
- ICU RNs and PACU RNs resistant to working collaboratively together

Appendix H

SBAR COVID 19 Surge Planning Script to Leadership

Situation

COVID 19 is impacting our hospitals, especially in the south bay. We have an urgent need of ICU nurses to support the anticipated surge in the coming weeks in several of our facilities.

Background

The demand for ICU beds has grown significantly related to the admissions of critically ill COVID-19 positive and PUIs. Data predict that there will be a surge of ICU patients. ICU staffing capacities are maxed out and few travelers are available. Leadership is meeting with C.N.A. to discuss cross training moving forward. To augment ICU staffing, a back-up plan was created to cross train PACU nurses for the ICU. At Roseville this came about organically because many PACU nurses volunteered to help their ICU colleagues.

Assessment

A self-assessment needs to be completed prior to cross training. PACU RNs with ICU experience can be cross trained to ICU if the completed self-assessment indicates the PACU RN has the appropriate skill mix for cross training.

 Educational materials are available

- PACU to ICU orientation process
- ICU competency and self-assessment checklist
- Hospital Surge Playbook
- Plan for Critical care RN cross training

Recommendations

1. Have PACU RNs complete self-assessment
2. Assess learning needs and train to needs identified
3. PACU RNs precept with experienced ICU RN in ICU
4. Complete identified didactic modules in Health-stream to support learning

Appendix I

PACU to ICU Orientation Process

1. **Perform a skills assessment in PACU nurses for their ICU level skills**
    1. Use the attached ICU Competencies Checklist and ask the PACU RN's to complete the self-assessment section
2. **Stratify ICU patients into groups of diagnosis based on their acuity (See below for details)**
    1. PACU **Level 1**= All ICU skills are confirmed with some exceptions.
    2. PACU **Level 2**=Respiratory support including ventilators, moderate levels of titration gtts (example: 1 pressor, Insulin with Auto Cal, etc.)
    3. PACU Level 3=Stable ICU patients= no ventilators; Bipap/CPAP/high flow O2 OK; gtts. with minimal or no titration (example: Amio, dilt, insulin non-DKA, vasopressin)
3. **Determine which of the 3 acuity groups each PACU RN** fits into (taken from the skills assessment)
4. **Create a skills checklist for each acuity group** (this is the document above, with skills delineated as 1,2,3)
5. Send the PACU nurses to ICU and pair with a nurse to be signed off on their skills checklist

	PACU RN **level 1**	PACU RN **level 2**	PACU RN level 3
*** other critical care high acuity skills based on your ICU	No	No	No
Stroke with NIHSS or aNIHSS	No	No	No
IABP	No	No	No
Targeted Temp Mgmt	No	No	No
Proning	No	No	No
Paralyzed with TOF	No	No	No
PA catheter	No	No	No
Transvenous pacemaker	Yes	No	No
Intra-abdominal Pressure	Yes	No	No
Ventilator	Yes	Yes	No
BiPap, CPAP, Hi flow O2	Yes	Yes	Yes
Titrating gtts	Yes	Yes	No
Non-titrating gtts/rate change >1hr (Amio, standard Insulin, heparin, etc.)	Yes	Yes	Yes
Femoral Sheaths maintenance (not pulling)	Yes	Yes	No
Auto Cal insulin gtt	Yes	Yes	No
TR bands	Yes	Yes	Yes

PACU to ICU Orientation Process

Skills that may require a refresher or a class:

1. NICOM
2. Ventilator refresher
3. CAM ICU
4. ABG interpretation refresh (with vent class?)
5. CADD pump (Fentanyl gtts with vents)
6. TR Bands

Skills that may require a job aid or JIT coaching

1. Rapid Infuser refresher (different equipment)
2. Complex neuro assessment
3. TR band process
4. Code Status/No Code (cover in orientation?)
5. TPN-lab results and protocols
6. CIWA protocol
7. Auto Cal protocol
8. Documentation
9. Skin assessment

Appendix J

Implementation Deck for Implementation and Spread

RN PACU > ICU PLAN

J. M., B. Y., D. J., S. C., C. W.

Pilot team led by M.M. DCEPI

1
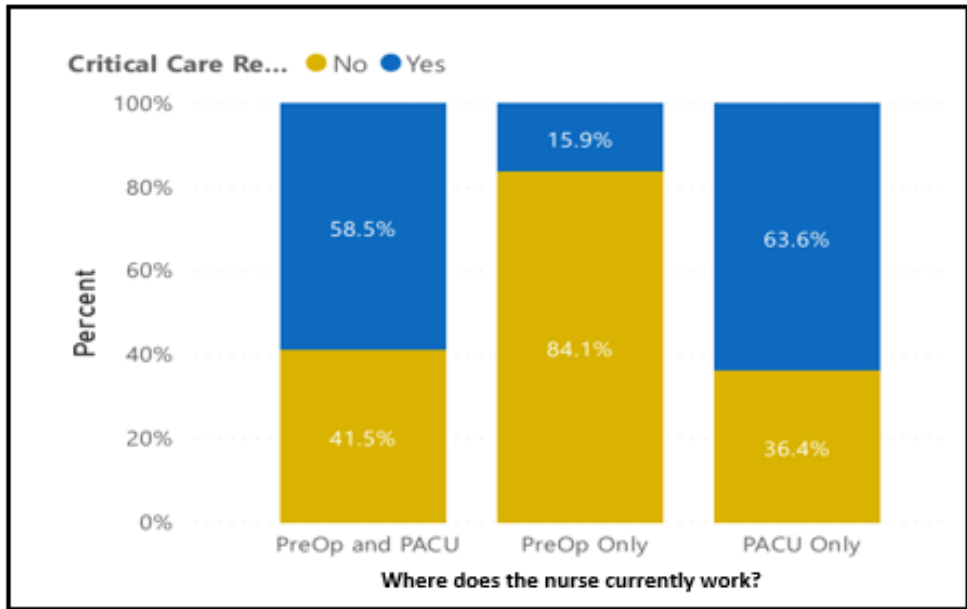
2

Roseville Pilot

Current strategy to mitigate the situation:

• With elective surgeries now at 50%, surge cross training assessment of PACU RNs to ICU has already started.

• Pilot at Roseville is initiating self-assessments of learning needs for volunteer PACU RNs.

• The macrosystem organization is reaching out to schools of nursing and nursing instructors to possibly help with training

• Resources and educational documents are available in Microsoft Teams:

Teams: **PACU to ICU Training Curriculum** (renamed COVID 19 Training curricula, as this training model was expanded to other nursing disciplines)

3

Surge training curriculum based on 3 tiers of PACU RNs

• PACU RN Level 1- recent ICU experience – able to transition to ICU quickly, all ICU skills confirmed with some exceptions

• PACU RN Level 2 – some ICU/ED experience – respiratory support including ventilators, moderate levels of titration gtts (example: 1 pressor, Insulin with Auto Cal, etc.)

• PACU Level 3 – little or no ICU experience – Stable ICU patients= no ventilators; Bipap/CPAP/high flow O2 are okay; gtts with minimal or no titration (example: Amio, dilt, insulin non-DKA, vasopressin)

4

Curriculum for ready to go PACU RNs Level 1

- Workflow
- PACU RNs *will not* care for the sickest ICN patients see PACU-ICU orientation process.

PACU RNs with recent ICU experience can:

1. Complete the ICU skills checklist self-assessment and competency
2. Precept with an ICU RN for 1-3 shifts
3. Complete identified didactic modules in Healthstream to support learning

5

PACU Level 2

- PACU RN with less ICU or recent ICU experience who wish to volunteer will be able to:

- Access learning modules in Healthstream – Region (Carrie and team) are identifying pertinent modules and will create a regional ICU curriculum. Facilities will be able to add local content.

- Resources
- Educational materials are available in Teams
- PACU to ICU process
- Critical care competency and self-assessment checklist
- ICU Surge Playbook
- Plan Critical care RN cross training

6

PACU Level 3

- PACU RNs with little or no previous ICU experience who wish to volunteer will be able to:
- Continue to care for post surgical patients in their home unit
- Help in a functional nurse role in ICU or converted PACU to ICU unit.
- Resources
- Educational materials are available in Teams
- PACU to ICU process
- Critical care competency and self-assessment checklist
- ICU Surge Playbook
- Plan Critical care RN cross training

7

Other resources

- Other resources:
- N Cal regional emergency share point has the most current information on PPE etc.
- All PACU RNs now have access to the Critical Care complex in the electronic healthcare record (E.H.R.) and can create their own profiles for ED, ICU and Med/Tele nursing documentation.

8

Appendix K

Evidence -Based Lesson plan

Topic	**Program Title: PACU to ICU surge training**				
SPRING 2020	**PACU RN skills development pilot project**				
Goal & Objectives	Goal: PACU RNs will complete the ICU self-assessment & identify ICU learning needs with review of identified learning opportunities • Conduct an ICU skills assessment and identify learning opportunities for personal and professional growth • Utilize regional standardized learning modules on teams-site • Provide face to face and virtual learning opportunities • Utilize the flipped classroom method • Identify available resources for independent learning based on needs • Utilize Microsoft teams (MST) as a repository for information, resources, questions, conversations, interactive and recorded modules. • Build a supportive mutually beneficial relationship between PACU and ICU departments. • Foster collaborative experiential learning through mutual respect, evidence-based nursing practices and shared knowledge. • Utilize the Institute Healthcare Improvement (IHI) safe, reliable and efficient framework to inform this work.				
Health-stream modules	See PACU to ICU Bundles 1,2,3. Can be assigned or accessed via the catalogue.				
Orientation	PACU to ICU – with clear identified skill objectives for one -three ICU shifts				
Recommended reading Assignments	**Recommended reading** **Suggested additional reading on-line via the clinical library** The Nurses survival guide to critical care nursing AACN procedural manual of high acuity progressive and critical care				
You tube	Lucas 3 overview video https://www.youtube.com/watch?v=7qY8kP15a70 Level 1 https://www.youtube.com/watch?v=r8V4WhyqzNc				
ICU resources available on line	https://www.aacn.org/education/online-courses/covid-19-pulmonary-ards-and-ventilator-resources Society for critical care medicine: https://sccm.org/Home				
Sim Lab	Per facility				
Scenarios	Per facility				
Applicable regional Policies	Hand off Hand Hygiene Refer to Regional command center share-point for PPE latest updates				
Other	Resources available on teams site COVID 19 surge training curriculum				
Created by	JM 11/16/16 revised				
Edit date	3.28.2020				

Appendix L

ICU Self Assessment Tool and Competency Checklist for Cross Training RNs

Level 1

Employee Name (print)	
Employee Identification Number	
NUID	
Number of years ICU experience (if any)	
START DATE	
PRECEPTOR SIGNATURE: *I have reviewed this packet with the employee listed above*	
EMPLOYEE SIGNATURE: *This packet has been reviewed with me and my questions have been addressed*	

Directions: To indicate employee competency, the preceptor will write the method of verification (letter) and date and sign with preceptor initial.

KEY – Self Assessment and Competency Verification Method

Self-Assessment		Competency Verification Method	
1	Limited or no experience	R	Return Demonstration
2	Intermittent experience, needs review	D	Describe/ Discussion
3	Can perform independently	E	Evidence of Daily Work
4	Fully competent, able to act as a resource for others	S	Simulation/Case Study
	Red indicates Not Applicable	NYDC	Not Yet Deemed Competent

Documentation / Communication			
Element	Self-Assessment	Verification method	Date/Preceptor Initial
Locate and review relevant policies and procedures			
Required ICU documentation: • Admission • Shift Assessment Flow sheet with ADLs • LDAs • Notes • MAR • Plan of care – customized & with patient outcomes • Patient Education • Transfer • Discharge • Wound assessment • Patient belongings			
Document pertinent patient care information related to: • Test results/critical labs • Procedures / Observations • Consults / Referrals			
Document interventions timely			
Phone/verbal order entry with readback			
Downtime process			
Tele Critical Care			

Messaging HBS			
Smart Phrases/dot phrases			
Others:			

Infection Prevention			
Element	**Self-Assessment**	**Verification method**	**Date/Preceptor Initial**
Locate and review relevant policies and procedures			
Isolation Types (contact, contact plus, droplet, airborne)			
Education Resources & Tools: *Go to NVLY web > Policies & Procedures> Roseville>Infection Control > Education Resources & Tools for the Staff*			
Isolation Supplies • Location of supplies • Appropriate donning and doffing • Disposal protocols			
Others:			

Neurologic System			
Element	**Self-Assessment**	**Verification method**	**Date/Preceptor Initial**
Locate and review relevant policies and procedures			
Neurological assessment and documentation: • General, Glasgow Coma Scale, complex neuro			
Seizure precautions assessment: • Safety precautions-padded rails • Lumbar puncture • Swallow screen/Speech therapy consult			
Stroke: • Signs and symptoms • FAST assessment • Code Stroke process • Documentation *NOTE: This does not include caring for stroke patients, only general care for suspected stroke. Please see the management team for stroke patient care requirements.*			
Care of combative patients: • Green blanket program • Safety measures (see Safety section)			
Care of patients with delirium: • CAM-ICU assessment and nursing interventions			
Peripheral nerve stimulator (TOF): • Set up and use • Documentation	N/A	N/A	N/A
Others:			

Respiratory System			
Element	**Self-Assessment**	**Verification method**	**Date/Preceptor Initial**
Locate and review relevant policies and procedures			
Respiratory assessment and documentation			
Oxygen delivery system: • Nasal cannula, face mask (simple, OxyMask, venti, full), high flow, tracheostomy • Portable oxygen tank use and storage • Airway management • Aerosol/MDI			

Effective incentive spirometer patient education			
Ventilator care: • Documentation • Mode, volume, rate, Fi02 • In-line suction • Weaning protocol: SAT/SBT • Ventilator Associated Pneumonia (VAP) prevention bundle • RN responsibilities • RT responsibilities • Emergency equipment-bedside and unit supplies			
Bipap/CPAP • RN responsibilities • RT responsibilities • Documentation			
Prone Therapy: • Safety while positioning (patient and staff) • Policy review • Documentation	N/A	N/A	N/A
Thoracentesis review: • Set up • Monitor			
Tracheostomy care: • Suction • Inner cannula change • Dressing/ties change • Bedside sign • Documentation			

Arterial blood gas (ABG)
• Specimen collection-include lab slip completion and transport
   o Puncture
   o Art Line draw
• Analysis and MD notification
• Documentation			

Chest tube management: • Set up • Assessment • Trouble shooting • Documentation			
Pulse oximeter machine: alarm limits, waveforms			
Collaborate with RT -How to contact, etc.			
Others:			
Cardiovascular System			
Element	**Self-Assessment**	**Verification method**	**Date/Preceptor Initial**
Locate and review relevant policies and procedures			
Cardiovascular assessment and documentation			
Code STEMI • Responsibilities of the RN • Communication with the MD			

Element	Self-Assessment	Verification method	Date/Preceptor Initial
• Documentation			
Blood/blood products administration: • Informed consent • Safety check/verification procedure • Patient assessment/vital signs • Transfusion reaction • Documentation (BPAM)			
Cardiac Monitors: • Review of the Phillips monitor at the station • Review of the Phillips monitor at the bedside • Lead placement, rhythm interpretation and documentation • Transportation monitoring			
Cardiac Care: • Cardioversion • Targeted Temperature Management protocol • Pacemakers (internal/external) • Post Cath Lab care (TR bands, femoral access) • No Code/DNR	N/A	N/A	N/A
Hemodynamic monitoring • Arterial lines: set up, monitoring/maintenance • NICOM/hemodynamics: set up, monitoring/maintenance • PA Catheter (invasive): set up, monitoring/maintenance	N/A	N/A	N/A
Note: IABP Therapy is addressed separately. This form does not imply competency for IABP patients			
Others:			
Gastrointestinal System			
Element	**Self-Assessment**	**Verification method**	**Date/Preceptor Initial**
Locate and review relevant policies and procedures			
GI assessment and documentation			
Feeding tubes: • NG tube insertion/maintenance • Dobhoff insertion/maintenance • G tube assessment/care • Suction set-up • Feeding pump and tubing use/set up • Types of feeding formula and storage			
Ostomy/colostomy care: • Stoma assessment and care • Bag/pouch change • Patient/family education			
Parenteral Nutrition: • TPN/PPN & fat emulsion administration • Lab values and its relationship to TPN/PPN • Tubing change policy			
Calorie Count			
Intake and Output: measure and document			
Abdominal girth measurement			

Rectal Care/Stool: • Specimen collection: C-diff/guaiac/other tests • Enemas • Rectal tube insertion/care			
Others:			

Genitourinary System			
Element	**Self-Assessment**	**Verification method**	**Date/Preceptor Initial**
Locate and review relevant policies and procedures			
GU Assessment and documentation			
Bladder Irrigation: • Continuous Bladder Irrigation (CBI) set-up • Calculation I&O • Documentation			
Catheter-Associated Urinary Tract Infection (CAUTI) prevention: • Daily assessment of urinary catheter needs • Daily care • Aseptic insertion			
Urinary collection system: • Invasive: Foley, suprapubic, straight • External: male and female			
Nephrostomy / Urostomy site care			
Care of patient on dialysis: • Hemodialysis • Peritoneal			
Intra-abdominal Pressure Monitoring • System set up • Maintenance			
Others:			

Musculoskeletal System			
Element	**Self-Assessment**	**Verification method**	**Date/Preceptor Initial**
Locate and review relevant policies and procedures			
Musculoskeletal assessment and documentation • Including splints, casts, etc.			
Hip precautions			
Ambulation • Role of the mobility tech			
Assess and document Patient Level of Function (PLOF) and Clinician Assessed Level of Function (CLOF) appropriately			
Others:			

Integumentary System			
Element	**Self-Assessment**	**Verification method**	**Date/Preceptor Initial**
Locate and review relevant policies and procedures			
Skin assessment and documentation: • Braden Scale • ICU Skin check • Wound Care Flowsheet			
Drains: JP/Hemovac/Constavac/Penrose			
Pressure Injuries: • Assessment and documentation, photographs			

Element	Self-Assessment	Verification method	Date/Preceptor Initial
• Injury care and prevention measures • Negative pressure vacuum-assisted closure • Incision management system • Reporting skin breakdown			
Suture removal			
Wound care & dressing change			
Skin care: • Bed surface • Turn frequency • Incontinence • Nutrition			
Collaborate with Wound Care RN • Ordering a wound care consult			
Others:			

Medication Administration			
Element	**Self-Assessment**	**Verification method**	**Date/Preceptor Initial**
Locate and review relevant policies and procedures - HAMP			
Administer medications safely according to policy: • 8 Rights • Assesses for Allergies • PO/IM/SC/rectal/intradermal/ophthalmic/otic/topical/IVPB/ IVP			
Administer titratable IV drips: • Antiarrhythmics • Vasopressors • Neuromuscular blocking agents • Sedatives/narcotic/controlled drugs Non-titratable IV drips • HAMP medications • IV maintenance • Thrombolytics			
Bar code scanning process			
Narcotic inventory/waste & documentation			
Insulin administration protocol: • Auto-Cal • Critical value notification • Documentation • Pump set up			
Procedural Sedation • Policy review • Checklist review			
Standard IV pump use and tubing change			
Patient education			
Others:			

IV Management			
Element	**Self-Assessment**	**Verification method**	**Date/Preceptor Initial**
Locate and review relevant policies and procedures			
Central and PICC Line Management:			

	Self-Assessment	Verification method	Date/Preceptor Initial
• Dressing change including measuring catheter length • Blood withdrawal: 　○ Routine lab 　○ Blood cultures • Care of triple lumen/tunneled catheter • De-clotting • CLABSI bundle • Antimicrobial caps on all ports			
Peripheral/ Midline Management: • Insertion & dressing change (use of antimicrobial disc) • Flushing/removal/documentation/maintaining saline lock • Antimicrobial caps on all ports			
Venous Access Ports: • Assessment • Access/deaccess • Needle & dressing change			
Others:			

Pain Management			
Element	**Self-Assessment**	**Verification method**	**Date/Preceptor Initial**
Locate and review relevant policies and procedures			
Use of PCA/PCEA pump: • Set-up, programming, independent double check • Tubing change • End of shift documentation/clearing totals			
Pain assessment and documentation: • Verbal/non-verbal pain scales • Individualized comfort zone • Intervention & follow-up assessment • Documents pain score assessment and reassessment timeframes			
Comfort Care: • Policy/order set review • Documentation			
Others:			

Safety			
Element	**Self-Assessment**	**Verification method**	**Date/Preceptor Initial**
Locate and review relevant policies and procedures			
Fall Risk: • Assessment: Schmid Plus Fall Scale & plan of care • Documentation			
Restraints per physician order: • Assessment, documentation & care plan • Use of alternatives • Soft/leather/mitts/freedom sleeves/roll belt • Behavioral/Non-behavioral			
ETOH withdrawal: • Assessment, documentation & plan of care			

• CIWA Protocol			
Ceiling Track Lift			
Others:			

Surgical Interventions			
Element	**Self-Assessment**	**Verification method**	**Date/Preceptor Initial**
Pre-Op: Consent**,** diet, carbohydrate load (unless contraindicated), CHG wipe, teaching, hygiene, checklist documentation			
Post-Op: Diet order, early nutrition and ambulation, incentive spirometer use, multimodal pain management, drains			
Others:			

Specimen Collection, Handling, & Transport			
Element	**Self-Assessment**	**Verification method**	**Date/Preceptor Initial**
Locate and review relevant policies and procedures			
Lab communication, KPHC Legible and accurate information on paperwork			
Sputum: culture & sensitivity, AFB, cytology			
Wound culture: culture & sensitivity			
Stool: Clostridium difficile collection algorithm, occult blood, other			
Urine: urinalysis, culture & sensitivity, 24-hour urine			
Blood and blood cultures: • Phlebotomy • Direct/indirect vacutainer/needle/syringe • Site selection & preparation			
Others:			

Emergent Situations/Code Blue			
Element	**Self-Assessment**	**Verification method**	**Date/Preceptor Initial**

System activation and Unit policy:
• Code Stroke
  o Code Stroke Binder
• Code Blue
  o Code team responsibilities
  o Defibrillator/monitor/pacer set up & function
  o Suction equipment
  o Bag-valve mask use
  o Documentation/evaluation
  o Crash cart checks
  o Debriefing
• Code Grey/ Threat Management Response
• Review "Rainbow Flip Chart"			

Others:			

Equipment			
Element	**Self-Assessment**	**Verification method**	**Date/Preceptor Initial**
Sequential compression devices			
Doppler			
12-lead EKG			
Bladder scanner			

Thermal blanket			
Bear Hugger/warmer			
Glucometer: • Specimen testing • Maintenance and daily cleaning • Reporting to physician • Documentation			
Mobility Equipment: • Sit-stand lift • Vertical lift – mobile • Vertical lift - overhead • Lateral Transfer			
Bed: side rails, positions, alarms, scale			
Specialty beds and mattresses (type, how to obtain)			
Others:			

Unit Specific Skills *(add as needed)*			
Element	**Self-Assessment**	**Verification method**	**Date/Preceptor Initial**

Transition to Practice		
ATTESTATION: *I have completed the Initial Job Specific Competencies.*		
Nurse's Name	**Signature**	**Date**
Preceptor Name & Initial (PRINT)	**Signature**	**Date**
Preceptor Name & Initial (PRINT)	**Signature**	**Date**
Dept. Manager/ANM Name	**Signature**	**Date**

Appendix M

Online PACU to ICU Education

PACU to ICU # 1 initial bundle

Courses:			Add Courses
Name	Course Status	Inactivation Date	Remove
COVID-19 FREE: Pulmonary: Pulmonary, ARDS, and Ventilator Resources - AACN	Approved	9/30/2020 12:00:00 AM	☐
NCAL PCS Delirium for RN 2018	Approved	No Inactivation Date	☐
NCAL TR (Radial Compression) Band 2020	Approved	No Inactivation Date	☐
Nihon Kohden: Life Scope G9 Bedside Monitor	Approved	9/11/2020 12:00:00 AM	☐
Nihon Kohden: Life Scope SVM-7200 Series Vital Signs Monitor	Approved	9/11/2020 12:00:00 AM	☐
Nihon Kohden: Patient Monitoring Overview V7	Approved	9/11/2020 12:00:00 AM	☐
Nihon Kohden: Patient Monitoring with the GZ Series of Telemetry Devices	Approved	9/11/2020 12:00:00 AM	☐

PACU to ICU # 1 initial bundle

Courses:
Name
BD Alaris™ System Module: Anesthesia Mode v9.33
BD Alaris™ System Module: End Tidal CO2 (EtCO2) v9.33
BD Alaris™ System Module: Introduction and Point of Care Unit (PCU) v9.33
BD Alaris™ System Module: Patient Controlled Analgesia (PCA)
BD Alaris™ System Module: Pump Programming v9.33
BD Alaris™ System Module: Syringe v9.33

PACU to ICU # 2 medications and infusions

Name	Course Status
Cheetah Starling™ SV 5.5 Software Overview & Training (new)	Approved
Pacemaker Therapy	Approved
Why Measure Intra-abdominal Pressure and How Will You Use It? (Recorded Webinar)	Approved

PACU to ICU # 3 Additional resources

COVID 19 PACU -ICU Health stream bundled courses x 3 are now available to be assigned. Initial Training Bundle content, can be assigned as a bundle or participants can access individual courses through the Health-stream catalog

Appendix N

Data Collection Tool

Macrosystem Tracking of PACU RNs to ICU Upskilling 3/16/20-4/6/20								
Medical Center by location	Periop Directors responsible for RN Self-assessment completion, assessment of RN skills + RN release for training & orientation to ICU	DCEPIs responsible for training based on self-assessment results & competency validation by Unit manager	PACU, ASU, Self Assessments Complete	Total Number PACU, ASU RNs	Date training initiated	Assign only one level for each RN		
						Able to take average ICU patient care assignment with Competency Returned	Able to take lighter than average ICU patient care assignment with Competency Returned	Able to take functional care assignment or telemetry light assignment with competency returned
Antioch	Name	Name, Cell, emai	24	30	4/1/2020	6	7	10
Fremont	Name	Name, Cell, emai	20	20	3/30/2020	5	8	7
Fresno	Name	Name, Cell, emai	33	33	3/25/2020	4	11	2
Manteca	Name	Name, Cell, emai	17	14	3/30/2020	1	2	1
Modesto	Name	Name, Cell, emai	44	40	3/27/2020	4	2	0
Oakland	Name	Name, Cell, emai	31	32	4/1/2020	6		
Redwood City	Name	Name, Cell, emai	20	20	3/30/2020	6	9	2
Richmond	Name	Name, Cell, emai	25	25	3/30/2020	25		
Roseville	Name	Name, Cell, emai	62	125	3/16/2020	41	27	7
Sacramento	Name	Name, Cell, emai	31	46	4/3/2020	15	28	13
San Francisco	Name	Name, Cell, emai	23	27	3/31/2020	9	6	5
San Jose	Name	Name, Cell, emai	31	39	3/23/2020	6	0	
San Leandro	Name	Name, Cell, emai	39	42	3/30/2020	27		12
San Rafael	Name	Name, Cell, emai	21	24	3/25/2020	8	7	8
Santa Clara	Name	Name, Cell, emai	60	75	3/24/2020	6	14	6
Santa Rosa	Name	Name, Cell, emai	36	36	3/31/2020	7	12	0
South Sacramento	Name	Name, Cell, emai	53	90	3/31/2020	19	20	14
South San Francisco	Name	Name, Cell, emai	18	20	3/27/2020	2	2	2
Stockton (ASU)	Name	Name, Cell, emai	12	16	3/31/2020	0	0	0
Vacaville	Name	Name, Cell, emai	25	28	4/1/2020	12	3	0
Vallejo	Name	Name, Cell, emai	19	23	3/30/2020	1	0	0
Walnut Creek	Name	Name, Cell, emai	21	19	4/6/2020	0	0	0
Total			644	824		210	158	89
% complete			78.16%			32.61%	24.53%	13.82%

Data collection tool for tracking the number of PACU RNs upskilled to ICU. Data gathered at daily report out 3/25-4/6

Appendix O

Macrosystem Cost Effective Analysis

Cost to the facility of providing regional standardized lesson plan & materials		Cost to the facility of creating all materials and lesson plan at the facility	
Regional materials utilized		Materials created at facility	
2 hours prep time	$130.00	16 hours prep time	$1040.00
2 educators	$260.00	2 educators	$4160.00
Totals	$260.00		$ 4160.00

Macrosystem: Cost effective analysis of providing regional standardized online resources to 21 facilities vs estimated cost of time to evaluate and create educational materials at each facility

Cost to macrosystem across 21 acute care hospitals = $83,200.00

Time to create the education 16 hours x 21 hospitals = 336 hours of work saved.

Appendix P

Microsystem Cost Effective Analysis Staffing

Time	Educator	PACU RN	TRN
Hourly	$72.00	00.00	$110.00
8 hours	$576.00	00.00	$880.00
Prep x 4 hrs.	$288.00	00.00	
Totals	$864.00	00.00	$1,320.00

Microsystem: Cost effective analysis of onboarding one Travel RN (TRN)

vs utilizing one PACU RN

Cost of Educator + 4 hours of prep time $864.00 + TRN 1,320.00 = $2184.00

Cost to microsystem within the organization = $ 2184.00

Appendix Q

Microsystem Cost Avoidance Analysis

Estimated cost of outsourced care	ICU cost per day	Average LOS 28 days per ICU patient	Costs ICU Patients x 9 x 28 days
LOS cost per patient	$3000.00	$84,000.000	$756,000.00
TRN x 2 per 24 hours	$2640.00	$73,920.00	$665,280.00
Totals	$2940.00	$157,920.00	**$1,421,280.00**

Microsystem: Cost avoidance of outsourcing care, outside of the organization's microsystem, for nine ICU patients x 28 days with Travel RNs

Cost of outsourced ICU care in one microsystem cared for in non-organization hospitals if PACU

RNs had not been available to care for ICU patients

Potential cost to the microsystem within the organization = $1,421,280.00

Appendix R

Power-Point Deck for Surge Tracking

Surge Tracking Pilot

Surge tracking workgroup

A Micro and Macro Systems Approach to Pandemic Preparation, Implementation and Tracking

1

Micro and Macro Systems Synergy

Facility/department level

- Identify volunteer RNs
- Completes self assessment
- Identify skill deficits
- Up skill to ICU level 1,2 or 3
- Re-orientate to ICU
- Designate initial skill level
- Track via teams/spreadsheet
- Provide opportunities to maintain ICU skills

Regional support

Make widely available:
- self assessment
- Skills checklist/s
- Regional Teams site
- Regional tracking via facility spread sheet or access to teams in Healthstream with completion dates & initial skill level obtained
- Track on going skills validation

2
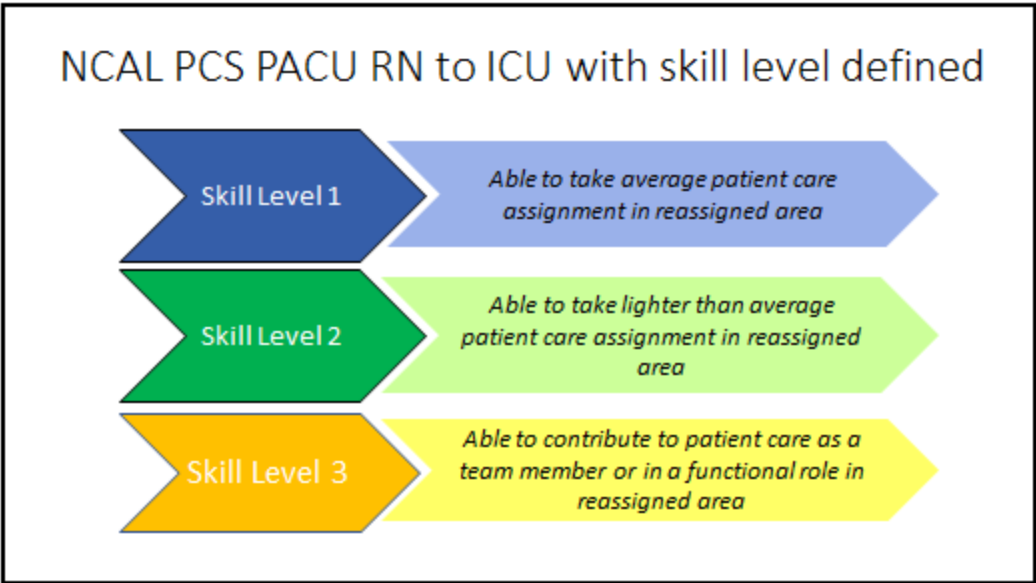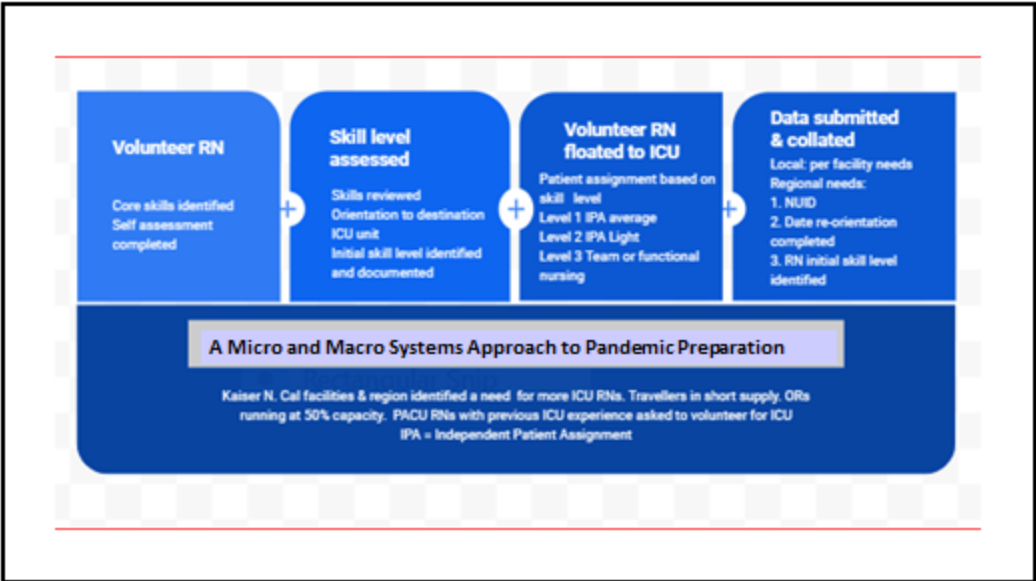
Next steps

- Create spread sheet on Teams site to get feedback and agreement on skills validation for each level.
- Identify resources for team nursing model
- Gather ideas for on-going sustainability of ICU skills
- Present to DCEPI group 5/21/20
- Present to regional leadership
- Thank you to the DCEPI subgroup for this work to-date

Appendix S

Retrospective Qualitative Survey
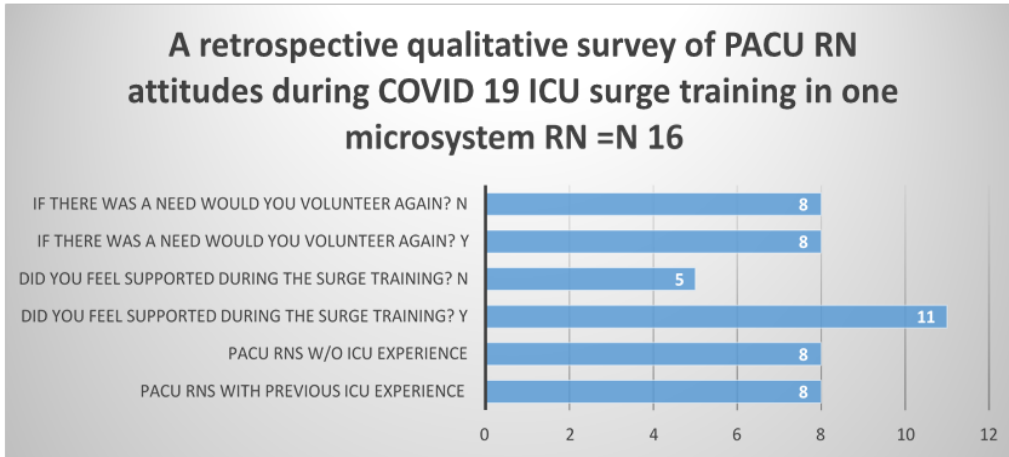
A retrospective qualitative survey showing a correlation between PACU RNs in one microsystem with no ICU experience and reluctance to volunteer a second time Time frame April to June. The survey was conducted 6/10/20

Appendix T

IRB Exemption for Non-Research Statement of Determination Form

CNL Project: Statement of Non-Research Determination Form

Student Name: Jennifer Mendenhall

Title of Project:

A Systems approach to increase the ICU nursing workforce during a Pandemic.

Brief Description of Project: The demand for ICU beds has grown significantly related to the admissions of critically ill COVID-19 positive patients and patients under investigation (PUIs). This project describes the process to achieve this goal.

  A. **Aim Statement:** Up skill peri-anesthesia care (PACU) RNs to care for ICU patients in anticipation of a surge of COVID 19 patients requiring ICU level care. Increase the ICU nursing workforce within the time frame of four weeks.

  B. **Description of Intervention:** PACU RNs' completed skills self-assessments. RN skills were reviewed, checklists were completed and tracked at the microsystem and reported to the mesosystem. At successful completion of the program and orientation RNs were assigned a skill level of 1, 2, or 3 indicating their ability to take an independent ICU patient assignment (1 or 2), or another nursing role in ICU (3).

  C. **How will this intervention change practice?** This intervention provided a needed increase in the ICU nursing workforce during extra-ordinary circumstances. Changes to practice include routine cross training to enhance the skills in other areas of the microsystem and to provide a RN float pool within the micro and meso systems in times of need.

  D. **Outcome measurements:** Increase the number of RNs able to care for ICU patients by 400 RNs across the meso system. Increase the percentage of available ICU RN workforce by 17% in the microsystem.

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

  ☑ This project meets the guidelines for an Evidence-based Change in Practice Project as

outlined in the Project Checklist (attached). Student may proceed with implementation.

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

Comments:

EVIDENCE-BASED CHANGE OF PRACTICE PROJECT CHECKLIST *
Instructions: Answer YES or NO to each of the following statements:

	YES	NO
Project Title: A Systems approach to increase the ICU nursing workforce during a Pandemic.		
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.	**Yes**	
The specific aim is to improve performance on a specific service or program and **is a part of usual care**. ALL participants will receive standard of care.	**Yes**	
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.	**Yes**	
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.	**Yes**	
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.	**Yes**	
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.	**Yes**	
The project has **NO** funding from federal agencies or research-focused organizations and is not receiving funding for implementation research.	**Yes**	
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.	**Yes**	
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* ▆▆▆▆▆▆▆ *and as such was not formally supervised by the Institutional Review Board."*	**Yes**	

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): Jennifer Mendenhall

Signature of Student:

Jennifer Mendenhall   **DATE** 6/17/2020

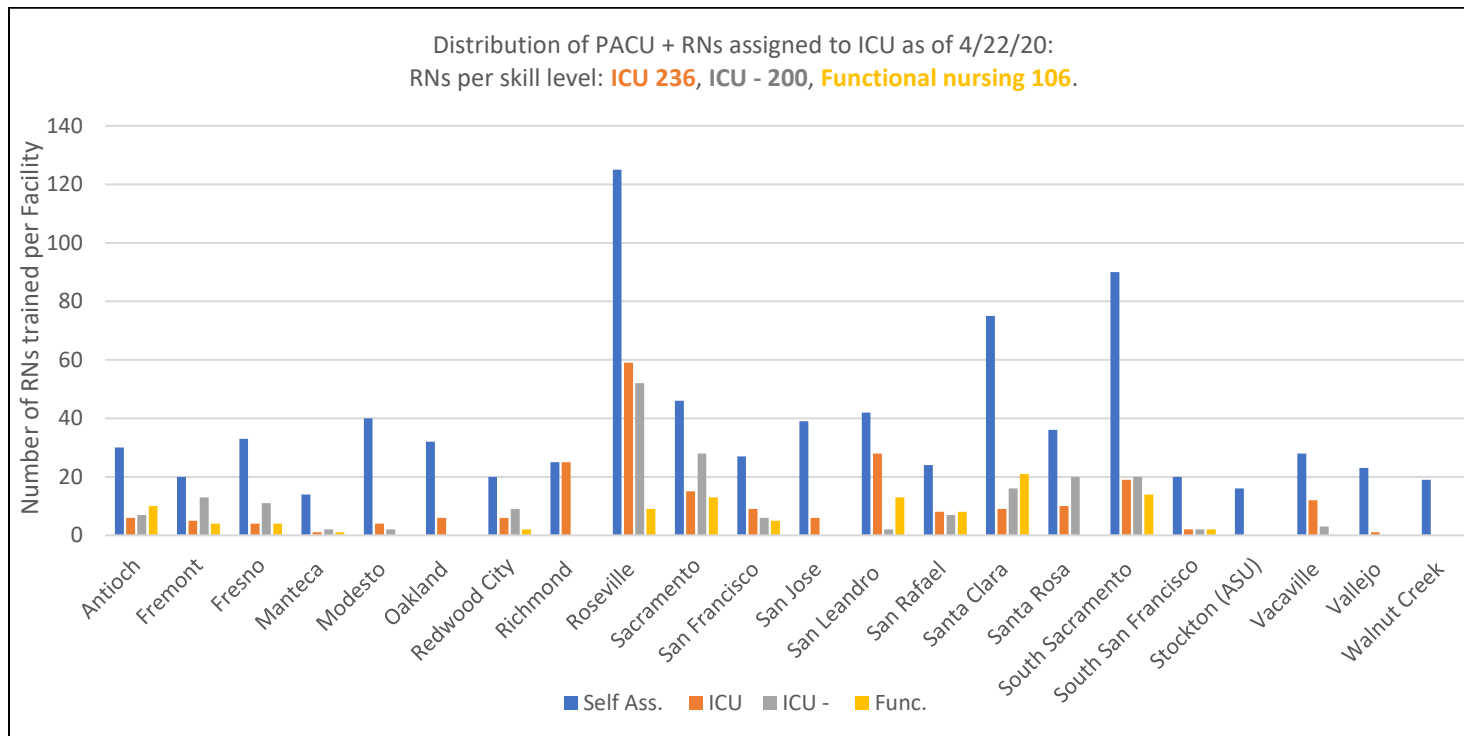**SUPERVISING FACULTY MEMBER NAME (Please print):** Dr. Coleman

Signature of Supervising Faculty Member

DATE

Appendix U

Results: Redistribution of Upskilled RNs to ICU

Distribution of PACU + RNs assigned to ICU as of 4/22/20:
RNs per skill level: ICU 236, ICU - 200, Functional nursing 106.

Macrosystem workforce increase of 31% and one microsystem increase of 17%