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Abstract

Practice Problem: In the United States, it is estimated that hospitalized patients experience an adverse event that require a rapid response and/or code blue event in 3% to 18% of hospitalizations.

PICOT: In the adult medical-surgical inpatient (P), does the implementation of a daily NHPPD calculator (DNC) (I) compared to an annual staffing methodology for calculating NHPPD (C) reduce rapid response calls, code blue episodes, and unplanned admission to critical care (O) over 8 weeks (T).

Evidence: Seven studies provided evidence that implementation of staffing methodology, nursing surveillance, and nurse staffing that supports meeting targeted nursing hours per patient day (NHPPD) decreased patient adverse events such as rapid responses, code blue episodes, and unplanned transfers to critical care.

Intervention: The project implemented a daily NHPPD calculator (DNC). The DNC provided adequate daily staffing.

Outcome: The result of the two-tailed independent samples *t*-test was not significant based on an alpha value of 0.05, t (73) = 0.61, p = 0.543. Although not statistically significant, the number of codes and unplanned transfers decreased. The DNC proved to be clinically significant to ensure nurse staffing resources were allocated appropriately and has been adopted at the organization.

Conclusion: The daily NHPPD calculator provided an objective tool that facilitated resource utilization and staff sharing. Evidence supports use of the daily NHPPD calculator to meet staffing needs, which correlated to improved nurse surveillance and care.

Implementation of a Daily NHPPD Calculator for Acute Care

This project was an evidence-based practice (EBP) change in three medical/surgical acute care unit's staffing methodology, which calculated daily versus annually to provide the appropriate level of nurse staffing to reduce unplanned admissions to critical care from rapid response calls, and code blue episodes. Staffing Methodology was developed in 2010 by the Veterans Health Administration (VHA) to provide a standardized budgeting and forecasting tool to approximate adequate full-time employees and nursing skill mix to provide safe and quality care (Taylor et al., 2015). Each VA facility conducts an annual review that considers specific nursing sensitive indicators, data-driven metrics, and input from the unit's expert panel, which is well suited for an annual budget, but does not consider the daily fluctuations of patient acuity, census, and staffing levels (Taylor et al., 2015). Higher nurse staffing levels have been associated with improved patient outcomes (Twigg et al., 2016). However, when target nurse staffing levels are not met, adverse patient events and mortality increase (Pappas et al., 2015).

Significance of the Practice Problem

In the United States (US), it is estimated that 3% to 18% of hospitalization will experience a patient adverse event such as a rapid response or code blue episode (Granitto et al., 2020). The goal of a rapid response called, is to prevent a cardiopulmonary arrest and unplanned admissions to a critical care unit (Granitto et al., 2020). According to the American College of Surgeons (2020), once a patient has experienced an unplanned transfer to a critical care unit, they experience an increase in length of stay, hospital costs, and face a mortality rate of 18-25 percent, as compared to patients with a planned transfer (Frank et al., 2020). In an acute care setting, nursing surveillance plays a vital role in identifying a deterioration in a patient's condition and act appropriately (Fasolino & Verdin, 2015). Patients can begin displaying

symptoms 48-72 hours prior to an adverse event and meeting the nursing hours per patient day (NHPPD) allows the nursing staff to recognize, anticipate, and act to prevent further deterioration (Garvey, 2015). Staffing methodology takes a macro viewpoint as it analyzes data from a fiscal year and determines the appropriate nurse staffing levels and provides a target nursing hours per patient day. However, this process does not consider the daily fluctuations that a nursing unit experiences with consideration to the census and nursing staff. As a VHA Directive, staffing methodology was implemented in all VHA facilities to determine the nurse staffing levels for a given unit (Van et al., 2020). The ever-increasing literature supports that the number of nurse staffing is associated with quality of care, complications, falls, pressure ulcers, and mortality (Van et al., 2020). The process for determining appropriate staffing levels has been standardized across VHA. However, calculating daily NHHPD ensures adequate staffing, which may have a positive impact on rapid responses, code blue episodes, and unplanned admissions from a medical-surgical unit to critical care.

The hospital where this project was implemented experienced a total of 268 rapid responses and 79 code blue episodes during fiscal year 2020 (FY20), Out of the 268 rapid responses 180 patients transferred to a critical care unit, which were unplanned. When a nursing unit is meeting the projected NHPPD, it is providing enough nurses to identify patient deterioration before the need for a rapid response call or a code blue episode, and unplanned admissions to critical care (Fasolino & Verdin, 2015).

PICOT Question

The PICOT question that guided this project was: In the adult medical-surgical inpatient (P), does the implementation of a daily NHPPD calculator (DNC) (I) compared to an annual

staffing methodology for calculating NHPPD (C) reduce rapid response calls, code blue episodes, and unplanned admissions to critical care (O) over 8 weeks (T).

Population

This project was implemented in the acute care setting, in three 27-bed medical-surgical units of a comprehensive healthcare system. The organization is a teaching hospital and is the healthcare provider for more than 50,000 Veterans (Veterans Health Administration, 2021).

Intervention

The intervention will be the implementation of a daily NHPPD calculator. This tool calculates the NHPPD based upon the current census of the unit and the staff assigned to work that shift. In calculating the NHPPD daily, the organization allocates staff to nursing units to be within a ±10% variance of the target NHPPD. The target NHPPD is established annually with staffing methodology. Permission to use the DNC was requested and granted to utilize for this project (Appendix E1).

Comparison Population

The comparison population will be the data retrieved from the same units. Data retrieved was the number of rapid response calls, code blue episodes, and unplanned admissions to critical care pre and post implementation of the daily NHPPD calculator.

Outcome & Timing

The desired outcome is a decrease in the number of rapid response calls, code blue episodes, and unplanned admissions to critical care collected from the cardiac arrest committee for 8 weeks, pre- and post- implementation.

Evidence-Based Practice Framework & Change Theory

The Johns Hopkins Nursing Evidence-Based Practice Model (JHNEBPM) was utilized to guide the project. The Johns Hopkins model was developed by nurses to facilitate EBP into nursing practice (Friesen et al., 2017). The JHNEBPM is comprised of three components, known as PET: 1) practice question, 2) evidence, 3) translation (Dang & Jones, 2018).

The practice component involved revealed the organization conducted staffing methodology on an annual basis to determine the nursing hours per patient day to provide the correct number of nursing staff to care for the Veterans. The healthcare organization lacked a standardized method to provide staffing that met the daily target NHPPD of the nursing units. The DNC has been created and implemented at a neighboring VA facility that takes into consideration the census at that time, the nursing staff present, and automatically calculates the daily NHPPD on a shift-by-shift basis with the use of embedded formulas.

The change theory identified for the project is ADKAR. ADKAR is an acronym for Awareness, Desire, Knowledge, Ability, and Reinforcement (Balluck et al., 2020). To successfully implement change, the healthcare organization acknowledged the need for the change. The awareness stage utilized evidence from the literature, which was presented to the chief nurse, nurse manager, off tour supervisors, and the charge nurses to determine the need for the change. Desire to implement the DNC was garnered by providing examples of how another VA has utilized the DNC, which benefited their hospital. The knowledge stage consisted of creating an implementation timeline and assigning roles and responsibilities. The ability stage was in reference to supporting nurses in the completion of the task. Guidance and coaching were crucial during this phase. The reinforcement stage focused on the utilization of the DNC so that it became embedded within everyday practice. The change reinforcement occurred during the daily staffing huddle attended by the stakeholders.

Evidence Search Strategy

The evidence search strategy performed included Cumulative Index to Nursing and Allied Health Literature (CINAHL), Gale Academic OneFile, Gale OneFile: Health, and Medline. The Boolean operators 'AND', and 'OR' were applied in the search process, which included acute care, nurse staffing, patient outcomes, and failure to rescue (Galvin and Galvin, 2017). The literature search yielded 1,221 articles. The search was then limited to peer reviewed journals, full-text, English language, and a date range of 2015-2021. The titles and abstracts were reviewed using the following inclusion criteria: nurse staffing, acute care, patient outcomes, and failure to rescue. The studies included were required to identify elements associated with nurse staffing, failure to rescue, patient outcomes, and acute care. A second search strategy involved reviewing the references of the articles chosen. Articles were excluded if the study was not in an acute care setting.

Evidence Search Results

There were 301 total citations, of which 140 citations from CINAHL, 87 citations from Gale Academic OneFile, 77 citations from Gale OneFile: Health and Medicine, and 27 citations from Medline. Further screening removed 47 duplicates and excluded articles that were set in the nursing home, mental health, pediatrics, and substance abuse and if it was not relevant to nurse staffing. A total of 254 articles were screened and found 20 articles met the criteria from reviewing the titles and abstracts for evaluation. The final full literature review of the articles reduced the number of articles providing the evidence to support the project's PICOT resulted in 7 articles (Figure 1, Prisma Table).

The John Hopkins Nursing Evidence-Based Practice Level and Quality Guide was utilized to review the quality and level of research of each article. The evidence table (Appendix

A & B) outlined the different evidence levels and grades for selected articles. The articles included four high quality articles, two good quality articles, and one low quality article. The primary research articles identified were one level II grade A, one level II grade C, one level III grade A, one level III grade B, and one level IV grade A (Appendix C). There were two systemic reviews found, which included a level II grade A, and a level III grade B (Appendix B). The quality and level of the seven articles supported project implementation.

Themes with Practice Recommendations

Seven studies were assessed, and the main themes found were implementation of staffing methodology, nursing surveillance, and nurse staffing. Drawing on the themes found in the literature provided evidence to guide the project. The literature revealed evidence that supports meeting targeted nursing hours per patient day decreased patient adverse events.

Implementation of Staffing Methodology

Van et al. (2020) and Twigg et al. (2015) are two studies that review the effect of implementation of a national NHPPD and found that increasing the NHPPD resulted in lowering adverse patient events such as length of stay and mortality. In both studies, staffing methodology was implemented as a standard for a nation and each subsequently experienced nursing units NHPPD increased steadily over time.

Nursing Surveillance

The systematic reviews were hospital observational studies that demonstrated the relationship between patient outcomes and nurse staffing. When nursing hours per patient day are met, nurses provide surveillance allowing for early detection of signs and symptoms of patient deterioration (Allen, 2020; Twigg et al., 2019). Early detection allows for quicker interventions that prevented the need for rapid responses, code blues, and unplanned admissions

to critical care. During nurses' assessment, physiological changes in a patient that precede a cardiac arrest or unplanned admission to critical care can occur up to 24 hours prior (Allen, 2020). NHPPD is one component for a nurse's ability to recognize and act upon patient deterioration. Education, knowledge, skill mix, and workload play a role in providing adequate staffing to meet patient needs (Allen, 2020).

Nurse Staffing

Determining the correct nurse staffing as provided by nursing hours per patient day improves the quality of care and greatly impacts nurse sensitive outcomes (Van et al., 2020; Juve-Udina et al., 2020; Chang et al., 2016; Twigg et al., 2016; Twigg et al., 2019). In one study, nurse staffing in a general medical-surgical unit is nearly half of a step-down unit that experiences similar patient acuity and resulted in an average missed nursing care of 21% (Juve-Udina et al., 2020).

The final article by Rochefort et al., 2020 has not been completed as it was delayed due to Covid-19 restrictions. As it is still in progress, definitive data cannot be gleaned from the study, but the overarching themes and narrative from the variables it is studying combines all the themes found in the literature. The data analysis of this study may provide a greater understanding to the complex relationship between nurse staffing and the risk of adverse events (Rochefort et al., 2020).

Practice Recommendations

A thorough and rigorous review of the literature supported the PICOT question. Implementation of a daily NHPPD calculator should decrease rapid response calls, code blue episodes, and unplanned admissions to critical care units. The Johns Hopkins Nursing Evidence-Based Practice Level and Quality Guide was used as a guide to review the literature and support

the practice change (Appendix A & B). The conclusions and evidence drawn from the literature was that a daily NHPPD calculator would decrease nurse sensitive outcomes, specifically rapid response calls, code blue events, and unplanned critical care admissions.

Setting, Stakeholders, and Systems Change

The setting for this Doctor of Nursing Practice (DNP) scholarly project was a large tertiary complex healthcare system. Comprehensive healthcare is delivered to several patient care areas such as inpatient, outpatient, and extended to the surrounding areas. The vision set forth by the executive leadership team is to be the #1 Healthcare System. The healthcare system services over 50,000 patients in the area, while employing over 2,200 full-time employees. The project focused implementation of the NHPPD calculator in the acute inpatient setting of three medical-surgical units.

The large and comprehensive healthcare system includes an acute hospital and five community-based outpatient clinics. The hospital is a teaching facility and partners with a local university. The organizational structure consists of the Medical Center Director, Chief of Staff, Associate Director of Patient Care Services, Deputy Nurse Executive, two Assistant Directors, and Chief Nurses. Within a care line, a Chief will have managers who directly manage the individual units.

The organization realized it had not completed the annual staffing methodology the prior year due to COVID-19. During this time, COVID-19 had placed tremendous pressure upon nurse staffing. The implementation of a daily NHPPD calculator was suggested to be used as a tool to allocate nursing personnel to various units to meet their target NHPPD. As the organization is on the journey to becoming a High Reliability Organization, decreasing the number of rapid response calls, code blue episodes, and unplanned admissions to critical care

will improve patient quality indicators. Based upon the evidence from the literature, providing the correct nursing hours per patient day with the use of a daily NHPPD calculator may decrease the rapid response calls, code blue episodes, and unplanned admissions to critical care.

Stakeholder support included the executive leadership team, comprised of the medical center director, associate director of patient care services, deputy nurse executive, chief nurse, and the off-tour supervisor (OTS). Support from the OTS ensured the daily NHPPD calculator was utilized daily and upon each shift. The cardiac arrest committee and computerized patient record system (CPRS) department was essential to gather data on the rapid response calls, code blue episodes, and unplanned admissions. Other stakeholders included the nurse managers, nurses, patients, and patient's family members.

Organizational support for project implementation was confirmed by the Associate Director of Patient Care Services. The process changes required interprofessional collaboration with the OTS, nurse managers, and charge nurse. The collaboration began with awareness and clear communication to drive organizational change. A daily meeting was set twice a day, at 0900 and 1400, with the NOD and nurse managers to discuss issues of the day and staffing. This meeting utilized the daily NHPPD calculator to see the needs of the organization and allow it to allocate staff appropriately to meet the evolving needs of the nursing units. Organizational support was garnered through the Chief Nurse of the service and the nurse managers, which was backed by the Associate Director of Patient Care Services. Stakeholders were told why the change was happening and how it would be beneficial.

A strengths, weakness, opportunity, and threat (SWOT) analysis (Appendix D) was completed to assess hospital readiness for change. Key strengths included executive leadership team (ELT) and nursing supervisor's support. ELT announced its support of the daily NHPPD

calculator use within acute care. Weaknesses included transitioning former practice and acclimating managers to the new process. Since in-person meetings were limited related to COVID-19 precautions, the use of virtual meetings presented a unique opportunity. Another local VA had created and implemented the DNC at their site and has granted permission for project adoption (Appendix E). External threats included another COVID-19 surge that disrupts normal operations, nurse manager turnover, and unplanned leave.

The levels of system change for the project were micro, meso, and macro. According to Likosky (2014) the micro changes were within each unit of the hospital, while the meso changes were exhibited in the daily staffing meeting where each unit was working together. A macro change would be defined by adoption of the DNC at the VISN level. This project was a micro system change as the implementation of the daily NHPPD calculator affected the three units within the medical-surgical care line and eventually developed into a meso system change as it expanded to use within the entire hospital organization. Permission was granted from the developer of the calculator to expand to the other inpatient care units (Appendix E2).

Implementation Plan with Timeline and Budget

The objective of this project was to decrease the number of rapid response calls, code blue episodes, and unplanned admissions to Critical Care by using a daily NHPPD calculator to assist with calculating the current NHPPD and allocating staff to meet target NHPPD. The short-term objectives of this project included the following:

1. That 95% of all nursing managers and nursing supervisors used the daily NHPPD calculator post project approval,

2. Nursing staff redistributed to other units to be within ±10% of their target NHPPD once project is approved. The balance outcome determined the percentage of times target NHPPD was met within the organization.
3. Ninety percent of nursing managers and supervisors was able to input staffing levels and census within the daily NHPPD calculator.
4. Completed audits of the daily NHPPD calculator and staffing identified potential barriers to implementation weekly.

Long-term objectives included:

1. A decreasing unplanned admission from acute care to critical care from rapid response and code blue events. According to the organization, the average costs of receiving care in the ICU is $35,000-$50,000 with the possibility of it increasing depending on the care received (UCLA Health, 2021).
2. Expansion of the daily NHPPD calculator to all nursing inpatient units at the healthcare facility at the end of the project implementation.
3. One hundred percent of nursing managers and supervisors competently input staffing levels and the census in the daily NHPPD calculator.

The nursing supervisors were responsible for the implementation of the daily NHPPD calculator. Due to COVID-19 social distancing measures, training of the template was conducted virtually. The template is an Excel spreadsheet document (Appendix G). Each nursing unit inputs data such as census and nursing staffing present to calculate NHPPD delivered. A virtual group was created so that a live document was available for real-time edits and changes by stakeholders. Any staffing changes and staffing needs of a unit was discussed during the afternoon staffing call attended by all nursing inpatient units.

Implementation Plan

The Johns Hopkins Nursing Evidence-Based Practice Model (JHNEBPM) and the ADKAR change theory was used to guide the practice change. JHNEBPM found that nurse staffing was conducted utilizing nurse patient ratios and not considering how that effected the NHPPD delivered at that moment in time. The evidence demonstrates that increased nurse surveillance improves patient outcomes. The final translation of the evidence involved the implementation of a daily NHHPD calculator to meet the needs of the units and the organization.

The ADKAR change theory is a useful framework for project implementation (Balluck, 2020). It involves five steps: (a) awareness for change, (b) desire to participate, (c) knowledge on how to change, (e) ability to implement change, (f) reinforcing practice to sustain change (Balluck, 2020).

The initial awareness of change for this project began with the planning phase and started when the practice problem was identified. The hospital was utilizing a paper system whereby the nursing units would relay the number of staffing scheduled for a shift and then proceeded to ask other units for surplus nursing staff available to float. There was no standardized tool for nursing hours per patient day to be met on a daily shift by shift basis. In addition, more rapid responses and code blue episodes occurred when lower NHPPD occurred. A review of the rapid response and code blue episodes for the last quarter was conducted and compared to the staffing and census of that day. Nursing hours per patient day was then manually calculated on the unit that had the rapid responses and code blue episodes and showed events were called when the NHPPD was lower. This data was shared with nursing leadership, hospital resuscitation committee, and the nurse managers.

The daily NHPPD calculator was used daily during the project and support for its adoption was gained from the nurse managers utilizing the calculator. The DNC provided an objective tool that supported the needs of the patients, staffing, and the unit. Training on how to utilize the DNC was conducted by the off-tour supervisors (OTS) and incorporated embedded comments that described what each column required.

Nurse managers supported the implementation of the DNC on a day-to-day basis and was instrumental in project implementation. Meetings with nurse managers provided clarification and an opportunity to receive feedback on the DNC. During this stage, all stakeholders received continuous support, feedback, and looked for opportunities for improvement. After the daily staffing huddle, the chief nurse, OTS, and the lead nurse met to discuss what went well and strategies to reinforce the change. A reassessment of the accuracy of the DNC was conducted by the OTS every six hours to determine if staffing changes must be made to meet target NHPPD. Rapid response and code blue data were readily available from the daily OTS report and was presented to the stakeholders daily. Being able to see the NHPPD from the day prior and comparing it with rapid responses and code blue events reinforced the need for the change.

Timeline and Budget

The projected timeline of completion was eight weeks. A Gantt chart was created for the project that included project planning, logistical planning, project implementation, and data collection (Appendix F). Project completion was set for eight weeks. Prior to the start of the project, the project manager received approval from the Evidence Based Practice Project Review Council (EPRC) and the Investigational Review Board (IRB) of the hospital. After approval was received, data on rapid responses and code blue episodes and the NHPPD was collected in week one. Information on the DNC was provided to all involved. Audits of the DNC was performed

to provide feedback in addition to training provided as needed. The time needed for each aspect of the project was itemized within the Gantt chart (Appendix F).

The project's resources included the DNP student, OTS, nurse managers, informaticist, data analyst, and the chief nurse. Since it is a need for the organization, training took place during paid time. Data analysts running reports are part of their role for the organization and did not involve a separate budget. The total cost of project implementation was approximately $5.995.00 (Table 1).

Selection Process

Participants of the DNP project included adult patients admitted to the medical-surgical units during the eight weeks for the period of the project implementation. The project excluded patients that are admitted to the emergency department, intensive care unit, mental health, rehabilitation, and community living center.

Protection of Human Rights and Privacy

Approval from the EPRC from the University of St. Augustine School of Health Sciences and the IRB committee was obtained prior to implementation. Data collected was stored on the facilities' network computers, which requires a password protected identification card to unlock the system. Files are only accessible through a password protected computer. The data was stored on a password-protected Microsoft Excel spreadsheet that only the project manager can access. Private identifiers such as patient names were not collected, which avoided any HIPAA violation concerns. Only aggregate data was received from the cardiac arrest committee. At the end of the project, all data was securely disposed of according the medical facilities' policy and procedure. There were no financial incentives for this project.

Roles of the Project Manager

The DNP student assumed the role of the project manager and was responsible for successful initiation, planning, implementation, evaluation, and dissemination of the project. The project manager set deadlines, schedule meetings, and assign tasks. Monitoring the process metrics occurred three times a week by manually calculating the NHPPD for each rapid response and code blue episode. As the leader, the project manager ensured communication was clear and feedback was provided in a meaningful manner. At completion of the project, the project manager provided closure and shared the results with the organization.

Results

The impact of the Daily NHPPD Calculator was determined through a pre- and post-intervention plan. The measures included the number of rapid responses and code blues episodes to trigger an event such as determining the NHPPD for that shift. Data was collected for the 8-week period pre- and post- implementation of the daily NHHPD calculator intervention. Face validity of data collection tools (Table G2) was determined by review from subject matter experts in which the data collection tools were deemed appropriate and valid for this project.

Data related to rapid responses and code blue episodes was collected through the cardiac resuscitation committee. Once an event was confirmed by data collected through chart reviews via CPRS and aggregated reports, the staffing data was collected from the DNC and cross checked against the staffing reports. The project manager conducted weekly audits, three times a week, to ensure compliance and accuracy of data input. Any variances noted in NHPPD were further investigated to determine the root causes of the variance. To determine short-term objectives, random audits were collected and determined that 100% of nurse managers and OTS were utilizing the DNC.

The primary outcome measure was expressed in the number of rapid responses and code blue events that transferred to critical care in the acute care setting. To establish the relationship between the intervention and outcomes, rapid responses and code blue events were evaluated pre- and post- implementation of the DNC. Another outcome measure was to determine the number of patients transferred to a higher level of care pre- and post- implementation.

Statistical Analysis

The statistical software program Intellectus was used to conduct a Chi-square Test of Independence to examine whether the pre- and post- intervention with the disposition of the patient were independent. There were two levels of disposition: transferred and stayed on unit.

The results of the Chi-square test were not statistically significant based on an alpha value of .05, $\chi^2(1) = 0.00$, $p = 1.000$, suggesting that pre post intervention and disposition could be independent of one another. This implies that the observed frequencies were not significantly different than the expected frequencies. Table 2 presents the results of the Chi-square test.

NHPPD_Present is the actual NHPPD delivered at the time of the rapid response or code blue event. A two-tailed independent samples *t*-test was conducted to examine whether the mean of NHPPD_Present was significantly different between the pre- and post- intervention. A Shapiro-Wilk test was conducted to determine whether NHPPD_Present could have been produced by a normal distribution for each category of pre- and post- intervention (Razali & Wah, 2011). The result of the Shapiro-Wilk test for NHPPD_Present in the Pre category was not significant based on an alpha value of .05, $W = 0.96$, $p = .137$. This result suggests that a normal distribution cannot be ruled out as the underlying distribution for NHPPD_Present in the Pre category. The result of the Shapiro-Wilk test NHPPD_Present in the Post category was not significant based on an alpha value of .05, $W = 0.95$, $p = .150$. This result suggests that a normal

distribution cannot be ruled out as the underlying distribution for NHPPD_Present in the Post category. The Shapiro-Wilk test was not significant for either the Pre or Post categories of Pre_Post, indicating the normality assumption is met.

A Levene's test was conducted to assess whether the variance of NHPPD_Present was equal between the categories of Pre_Post. The result of Levene's test for NHPPD_Present was not significant based on an alpha value of .05, F (1, 73) = 1.50, p = .225. This result suggests it is possible that the variance of NHPPD_Present is equal for each category of Pre_Post, indicating the assumption of homogeneity of variance was met. The result of the two-tailed independent samples t-test was not significant based on an alpha value of .05, t (73) = 0.61, p = .543, This finding suggests the mean of NHPPD_Present was not significantly different between the Pre and Post categories of Pre_Post. The results are presented in Table 3. A bar plot of the means of what of the NHPPD present shows that there was no significant difference between the NHPPD pre- and post- intervention (Figure 2).

From a clinical perspective, the number of rapid responses remained the same, but the number of code blue events decreased from 5 to 1. The number of patients transferred to critical care decreased from 28 to 22. The direct result from proper staffing and nurse surveillance is indicative of reduced codes and unplanned transfers.

Impact

The daily NHPPD calculator evidence-based project results did not result in data that was statistically significant. Although, the clinical significance of this project did not escape the attention of the executive leadership team, the tool was later expanded to include all inpatient care service units. The DNC proved to be an important tool to ensure nurse staffing resources are allocated appropriately. This proved to be critical during the latest COVID-19 surge

experienced by the healthcare organization and assisted in widespread adoption and acceptance of the tool. By providing the correct number of nursing staff to meet target NHPPD, nurse surveillance increased to allow for prompt recognition and early intervention by the nurse that could lead to a decrease in unplanned admissions to critical care from rapid responses and code blue events on medical surgical unit. Due to the DNC being integrated into the daily staffing meetings, 100% of participants have been using the tool in the first month. The DNC strengthened communication between care line managers and improved the sharing of nursing resources to stay within the ±10% variance of target NHPPD.

Dissemination Plan

The projects results were presented to the executive leadership team and the nurse managers. The usage of the daily NHPPD calculator was completed daily during the staffing meeting reinforcing the change. Project outcomes were shared on the unit level via their huddle boards. The results of the project were shared via PowerPoint during the nursing leadership committee meeting (NLC). The NLC is a meeting forum that all the key stakeholders such as the associate director of patient care services, deputy associate director, chief nurses, and nurse managers were present. The results were also shared with the cardiac arrest committee, quality management, and the nursing supervisors.

This project holds significant clinical importance, and the results will be presented to the VA National Staffing Methodology Committee. The organization's nursing SharePoint will be used to present the project for peer review. Following peer review, a copy of the manuscript will be submitted to the *Journal of Nursing Care Quality*, which has a strong focus on evidence-based practice for nursing leaders. This project was submitted to the University of St. Augustine for Health Sciences Library, Scholarship, and Open Access Repository (SOAR) to assist in

dissemination of information. The final project will be submitted and presented at the Sigma Theta Tau Scholarly Symposium.

Conclusion

The daily NHPPD calculator provided an objective tool that facilitated identification of the nursing units who are meeting, exceeding, or below their target NHPPD. Resource utilization and staff sharing were enhanced within the organization that lead to NHPPD being consistently met for the nursing units. With NHPPD met, quality of care increased, and patient's needs were being met. There was a decrease and in code blue events and unplanned admissions to critical care, but the number of rapid response events remained the same. The literature search and review were completed utilizing the Johns Hopkins Evidence Based practice framework and the ADKAR theory was the change model that guided the project implementation. The success of the project was measured by a decrease in unplanned admissions to critical care and code blue events in the acute care setting. The adoption of the DNC throughout the organizations adds credence to its utility in meeting needs of patients, nurses, and the organization.

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Table 1

Budget

EXPENSES		REVENUE	
Direct		Billing	N/A
Salary and benefits	$5,400.00	Grants	N/A
Supplies	$175.00	Institutional budget support	$8,000.00
Services	$100.00		
Statistician	$280.00		
Indirect			
Overhead	$0.00		
Total Expenses	$5,955.00	Total Revenue	$8,000.00
Net Balance			$2,045.00

Table 2

Observed and Expected Frequencies

	Disposition				
Pre_Post	Transferred	Stayed on Unit	χ^2	*df*	*p*
Pre	28[28.00]	14[14.00]	0.00	1	1.000
Post	22[22.00]	11[11.00]			

Note. Values formatted as Observed [Expected].

Table 3

Two-Tailed Independent Samples t-Test for NHPPD_Present by Pre_Post

	Pre		Post				
Variable	*M*	*SD*	*M*	*SD*	*t*	*p*	*d*
NHPPD_Present*	9.09	1.06	8.91	1.50	0.61	.543	0.14

Note. N = 75. Degrees of Freedom for the *t*-statistic = 73. *d* represents Cohen's *d.*

*NHPPD_Present refers to the NHPPD delivered at the present time during which a rapid response or code blue event was called.

Figure 1

PRISMA Literature Search Strategy Diagram

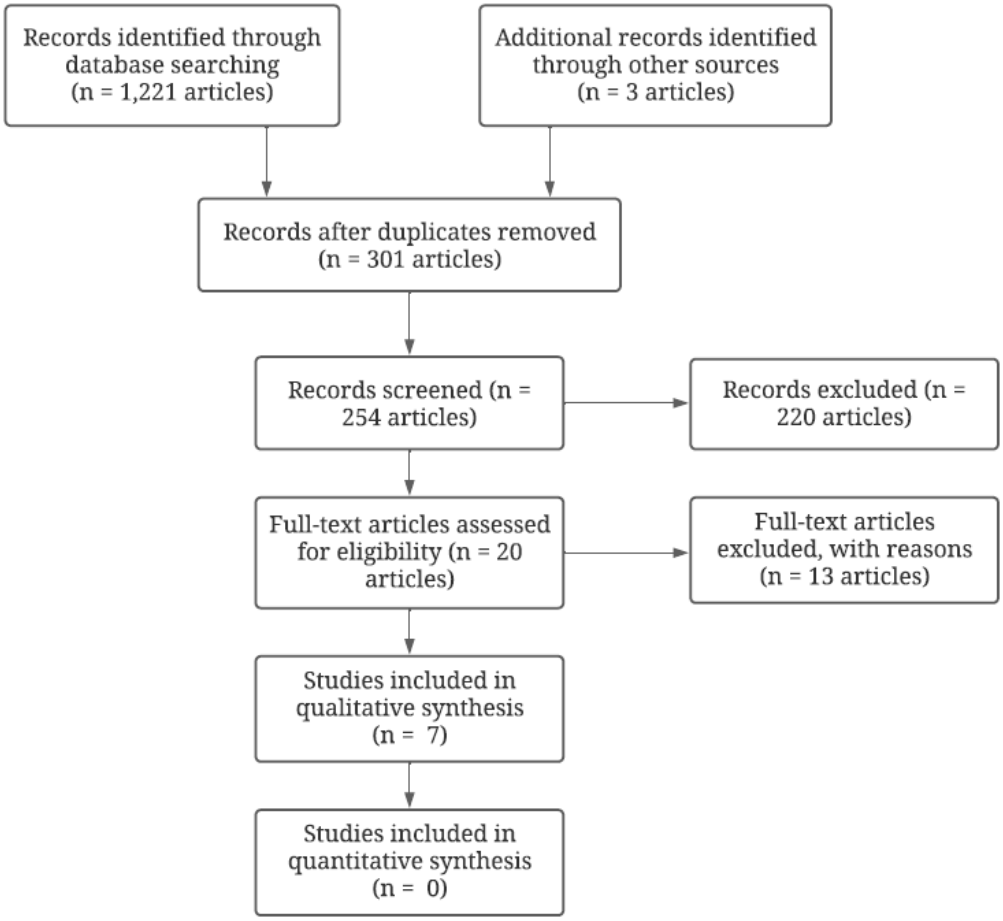
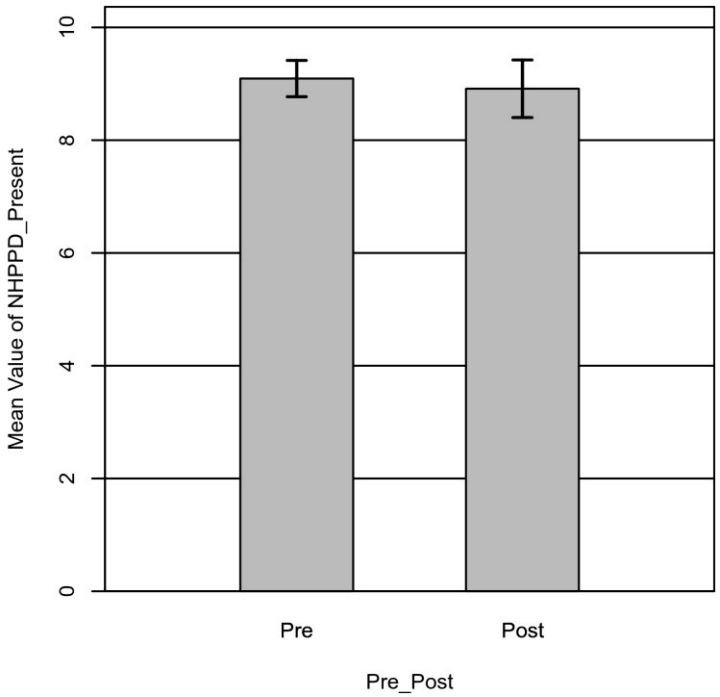


Figure 2

The mean of NHPPD_Present by levels of Pre_Post with 95.00% CI Error Bars



Two-Tailed Independent Samples *t*-Test that shows mean of the NHPPD delivered by the units pre- and post- intervention

Appendix A

Summary of Primary Research Evidence

Citation	Design, Level Quality Grade	Sample Sample size	Intervention Comparison (Definitions should include any specific research tools used along with reliability & validity)	Theoretical Foundation	Outcome Definition	Usefulness Results Key Findings
Van et al., 2020	Design: Observational, descriptive, multi-center design. Level III, Grade A	From fiscal year 2009-2015. The sample size consists of 123 major medical centers and their 162 affiliated smaller extensions.	This study was one component of a national evaluation of the Staffing Methodology Directive, which includes qualitative interviews and surveys. As this was an evaluation of Staffing Methodology implementation, this is not a research study and no research tools were used.	Theoretical framework for this study was not clearly identified.	Post Staffing Methodology implementation nursing hours per patient day steadily increased. Increased NHHPD provided supports other time series and longitudinal analyses of reducing adverse patient events such as length of stay, and mortality.	The findings from this study must be taken in context of several Veterans Health Administration initiative to improve the care delivered.

Juve-Udina et al., 2020	Design: Observational, and descriptive. Level III, Grade B	Patient and workforce data from January to September 2019 at a public hospital system that includes three urban hospitals and two community facilities. A descriptive design from four unit-clusters: medical, surgical, combined, and step-down units.	To compare patient acuity and nurse staffing with missing nursing care and selected nurse sensitive outcomes.	Theoretical framework for this study was not clearly identified.	General patient acuity in general medical-surgical units is similar to step-down units and require an average of 5.6 RN hours per patient day. Given that patient acuity is similar, patient outcomes still vary among unit-clusters.	Nurse coverage in general medical-surgical is almost half of a step-down unit and an average missed nursing care is 21%. Mortality, skin injuries, and risk of family compassion fatigue rates are higher in medical-surgical units.
Chang et al., 2016	Design: Retrospective longitudinal study. Level IV, Grade A	35 hospitals (four medical centers, nine regional hospitals, and 22 district hospitals). Out of the 35 hospitals, 155 nursing units provided 3-15 months of data.	To explore the relationship between NHPPD and mortality rate	Theoretical framework for this study was not clearly identified.	Higher NHPPD was associated with lower inpatient mortality rate after controlling for confounding variables. Significant relationships to inpatient mortality were found in levels	When the NHPPD is doubled, the inpatient mortality rate declines by 1.1%. NHPPD affects patient mortality rate among hospitalized patients in Taiwan.

					of hospitals, seasonal variation, and nurse's work experience.	
Rochefort et al., 2020	Design: Multisite patient-level longitudinal study. Level II, Grade C	16 hospitals with all adult patients admitted to the hospital between January 1, 2015 to December 31, 2019. Based on historical data on admissions, 225,000 records are to be reviewed and analyzed.	Participants will be followed from admission until 30-day post discharge. Five staffing practices will be measured nursing worked hours per patient, skill mix, overtime use, education mix, and experience. Four high impact adverse events (nursing sensitive outcomes) will be measured: failure to rescue, in-hospital falls, hospital-acquired pneumonia, and venous thromboembolism.	Theoretical framework for this study was not clearly identified.	This study was placed on hold due to COVID precautions and will resume in October 2020. It is expected to be completed within 5 years.	The data analysis gleaned from this study will provide a better understanding of complex temporal relationships linking patterns of past nurse staffing with the risk of adverse events. The results will assist development of a managerial support system that will update shift-by-shift risks for adverse events on their unit give patient characteristics and available nursing resources.
Twigg et al., 2015	Level II, Grade A	The study was done at a large metropolitan teaching hospital in	Staffing methodology was implemented in 2002, which increased the NHPPD for all	This study was a secondary data	The prevalence ratio showed that for each NSO there was	Prevention of understaffing is a consideration for improving the

		Perth, Western Australia. The sample included all adult patients (18 years or older) admitted to hospital medical and surgical wards between November 30, 2004 to October 30, 2006. Patients were multiday admissions, where length of stay was 1-90 days. 268,332 staff rosters for the same period were also collected. There was a total of 36,529 patient admissions during the study period.	units. Patient record data utilizing ICD-10 codes were used to create variables to indicate whether patients acquire a nursing sensitive outcome (NSO). The NSOs used in this study were central nervous system complications, surgical wound infection, pulmonary failure, urinary tract infections, pressure injury, pneumonia, deep vein thrombosis, upper gastrointestinal bleed, sepsis, physiological/metabolic derangement, shock/cardiac arrest, failure to rescue and mortality. The staff rosters were obtained to see the number of staff hours worked on each ward and shift during the study period. Logistic regression models were applied to patient record data	analysis of existing patient and nurse staffing datasets.	an increase in prevalence for those who were exposed to an understaffed shift.	quality of care for patients.

			using backward stepwise selection.			

Appendix B

Summary of Systematic Reviews (SR)

Citation	Quality Grade	Question	Search Strategy	Inclusion/ Exclusion Criteria	Data Extraction and Analysis	Key Findings	Usefulness/Recommendation/ Implications
Twigg et al., 2019.	Level II, Grade A	What effect does skill mix have on nursing sensitive patient outcomes?	Nursing, nursing outcomes, outcome assessment, outcomes (healthcare), outcomes research, patient outcomes assessment, review, skill mix, systematic review, treatment outcome	The inclusion criteria was adult patient (18 years or older) in acute care hospital units, studies reviewing a particular nursing skill mix or skill mix level and/or compared with a different skill mix level, a different nursing skill mix level or no comparator, patient outcomes (nurse-sensitive), and study designs that were observational/descriptive, experimental, quasi-experimental, and mixed methods were included if the quantitative component was relevant to the research question.	The systematic review guidelines of the Joanna Briggs Institute and its critical appraisal instrument was used. One author conducted the initial extraction of data, and a second author checked for accuracy. Disagreements would be resolved via discussion between the two authors and if consensus was not reached, a third author would be consulted.	Nursing skill mix affects patient outcomes. Higher nurse staffing levels are associated with reduced mortality, medication errors, and infections.	Nurses provide surveillance for patients continuously, which enables early detection and intervention when a patient's condition deteriorates. However, nursing hours per patient day delivered and patient outcomes is inversely related to skill mix.

Citation	Quality Grade	Question	Search Strategy	Inclusion/ Exclusion Criteria	Data Extraction and Analysis	Key Findings	Usefulness/Recommendation/ Implications
				The exclusion criteria were participants in peri-operative, maternity, pediatrics, mental health, substance abuse, nursing home, and studies examining patient-to-nurse, and qualitative studies.			
Allen, 2020	Level III, Grade B	What are the barriers or factors that surround non-critical care nursing practices of detecting, reporting, and responding to signs of patient deterioration.	A literature search using PubMed and CINAHL with the keywords: barrier, general ward, medical surgical, vital signs, recognize, respond, cardiopulmonary arrest, adverse event, deterioration,	Limits applied to the search included peer-reviewed articles with studies pertaining to adult, non-critical care inpatient populations and a second search strategy involved reviewing reference lists in articles retrieved through the database search. 47 articles in which title and abstract met inclusion criteria, and after sorting and using the Melnyk and Fineout-Overholt	Findings from the literature review suggests that circumstances contributing to a nurse's failure to recognize and respond are complex and overlapping. Articles with high levels of evidence show healthcare environments and culture play a part in this failure. Barriers were identified so that	Several factors contributing to nurses' failure to recognize and respond to early signs of patient deterioration were noted: Inadequate monitoring and observation, lack of clinical knowledge regarding change ins vial signs, lack of experience among nurses, lack of confidence in nurses,	Patient deterioration when assessed and identified early, timely nurse response often led to positive outcomes, decreased unplanned intensive care admissions, decreased hospital length of stay, and decreased mortality. Clinical tools such as an early warning scoring system can assist in identifying patients at risk for clinical deterioration.

Citation	Quality Grade	Question	Search Strategy	Inclusion/ Exclusion Criteria	Data Extraction and Analysis	Key Findings	Usefulness/Recommendation/ Implications
			and patient deterioration.	Levels of Evidence, level VI and VII were eliminated leaving 16 articles left for review.	interventions can be designed in a later study to ensure patients receive appropriate t and timely care during hospitalization.	workload and patient assignments, and poor communication between healthcare providers	

Appendix C

John Hopkins Evidence Level and Quality Guide

<table>
<tr><th>Evidence Levels</th><th>Quality Guides</th></tr>
<tr><td>Level I – Experimental study, randomized controlled trial (RCT), systematic reviews of RCTs, with or without meta-analysis</td><td rowspan="3">A. <u>High quality</u> – Consistent, generalizable results; sufficient sample size for the study design; adequate control; definitive conclusions; consistent recommendations based on comprehensive literature review that includes thorough reference to scientific evidence.
B. <u>Good quality</u> – reasonably consistent results; sufficient sample size; some control; fairly definitive conclusions; reasonably consistent recommendations based on fairly comprehensive literature review that includes some reference to scientific evidence.
C. <u>Low quality or major flaw</u>s – little evidence with inconsistent results; insufficient sample size for the study design; conclusions cannot be drawn.</td></tr>
<tr><td>Level II – Quasi-experimental study, systematic review of a combination of RCTs and quasi-experimental, or quasi-experimental studies only, with or without meta-analysis</td></tr>
<tr><td>Level III – Non-experimental study. Systematic review of a combination of RCTs, quasi-experimental and non-experimental studies, or non-experimental studies only with or without meta-analysis. Qualitative study or systematic review with or without a meta-synthesis</td></tr>
<tr><td>Level IV – Opinion of respected authorities and/or nationally recognized expert committees/consensus panels based on scientific evidence which includes clinical practice guidelines and consensus panels</td><td>A. <u>High quality</u> – material officially sponsored by a professional, public, private organization, or government agency, documentation of a systemic literature search strategy, consistent results with sufficient numbers of well-designed studies.
B. <u>Good quality</u> – material officially sponsored by a professional, public, private organization, or government agency; reasonably thorough and appropriate systematic literature search strategy; reasonably consistent results.
C. <u>Low quality or major flaws</u> – materials not sponsored by an official organization or agency; undefined, poorly defined, or limited literature search strategy.</td></tr>
</table>

Level V – Based on experiential and non-research evidence that includes literature reviews, quality improvement, program or financial evaluation, case reports, and opinion of nationally recognized experts based on experiential evidence	A. **High quality** – clear aims and objectives; consistent results across multiple settings; formal quality improvement, financial or program evaluation methods used definitive conclusions and consistent recommendations. B. **Good quality** – clear aims and objectives; consistent results in a single setting; formal quality improvement or financial or program evaluation methods used; reasonably consistent recommendations. C. **Low quality or major flaws** – unclear or missing aims and objectives; inconsistent results; poorly defined quality improvement, financial or program evaluation methods; recommendations cannot be made.

Appendix D

Strengths Weakness Opportunities and Threats Analysis

Internal Forces (Project)	**External Forces (Organization or Environment)**
Strengths (Internal) • Associate Director of Patient Care Services' support • Executive leadership team support • Nursing supervisor's support • Existing daily NHPPD calculator utilized at other VA healthcare systems	**Opportunities (External)** • Virtual meetings can be utilized • Decrease unplanned admissions to critical care and Code Blue episodes • Decrease hospital length of stay • Decrease possibility of sentinel events • Hospital cost savings
Weaknesses (Internal) • Absence of a standards of process • Transitioning from former practice • Acclimating managers to new process • Poor hospital layout	**Threats (External)** • COVID-19: if surge rises, change projects will be placed on hold • Manager turnover • Unplanned leave • Computer hackers • Hospital system changing to different tool

Appendix E

Figure E1

Permission for DNC Tool

From: Miller, Bernard <Bernard.Miller2@va.gov>
Sent: Thursday, July 8, 2021 12:19 PM
To: Cho, Spencer Y. <Spencer.Cho@va.gov>
Subject: RE: Permission to use NHPPD Calculator

Good afternoon,

Yes, you have permission to use the calculator. I have included in this email an attachment of our latest updated calculator.

Good luck!

Thank you,

Bernard Miller MSN-ADM, RN, PHN
Nurse Manager, Patient Flow/Hospital Operations
AcuStaf Staffing Methodology Coordinator
Office: 310.478.3711 Ext. 40236
Cell: 310.894.1269
VA of Greater Los Angeles Healthcare System
11301 Wilshire Boulevard
Bldg. 500, Room 1601E
Los Angeles, CA 90073

From: Cho, Spencer Y. <Spencer.Cho@va.gov>
Sent: Thursday, July 8, 2021 11:33 AM
To: Miller, Bernard <Bernard.Miller2@va.gov>
Subject: Permission to use NHPPD Calculator

Good morning Mr. Miller,

My name is Spencer Cho, and I am a student at the University of St. Augustine completing my DNP. My dissertation is about implementing a daily NHPPD calculator to meet target NHPPD at a daily basis. As staffing methodology coordinator for your healthcare organization, I request your permission to utilize the daily NHPPD calculator as my DNP project. This is not for research purposes, but this tool will be utilized at the organization I intend to do my DNP project at.

Please let me if you have any questions.

Thank you,

Spencer Cho, BSN, RN

Figure E2

Permission to Expand DNC Tool

From: Miller, Bernard <Bernard.Miller2@va.gov>
Sent: Tuesday, December 14, 2021 2:42 PM
To: Cho, Spencer Y. <Spencer.Cho@va.gov>
Subject: RE: Permission to Expand NHPPD Calculator

Good afternoon,

Yes, you have permission to expand the usage of the NHPPD calculator to include other inpatient units at Long Beach.

Thank you,

Bernard Miller MSN-ADM, RN, PHN
Nurse Manager, Patient Flow/Hospital Operations
AcuStaf/Staffing Methodology Coordinator
Office: 310.478.3711 ext 40236
Cell: 310.894.1269
VA Greater Los Angeles Healthcare System
11301 Wilshire Boulevard
Bldg 500, Room 1601E
Los Angeles, CA 90073

From: Cho, Spencer Y. <Spencer.Cho@va.gov>
Sent: Monday, December 13, 2021 9:49 AM
To: Miller, Bernard <Bernard.Miller2@va.gov>
Subject: Permission to Expand NHPPD Calculator

Good morning Mr. Miller,

A few months ago, I asked permission to utilize the daily NHPPD calculator and I would like to now request for permission to expand the usage of the calculator to all of the inpatient units at VA Long Beach Healthcare System. Please let me know if this is allowable.

Thank you,

Appendix F

Project Schedule

	NUR7801								NUR7802								NUR7803							
Activity	Week 1	Week 3	Week 5	Week 7	Week 9	Week 11	Week 13	Week 15	Week 1	Week 3	Week 5	Week 7	Week 9	Week 11	Week 13	Week 15	Week 1	Week 3	Week 5	Week 7	Week 9	Week 11	Week 13	Week 15
Meet with preceptor	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Prepare project proposal	X	X	X	X	X	X	X	X																
Review EPRC and IRB proposal approval process									X	X	X													
Submit for EPRC approval from USA Receive EPRC approval									X	X	X													
Submit for IRB approval from hospital											X													
Receive IRB approval												X												
Prepare training materials									X	X	X	X												
Initiate training for staff												X												
Conduct pre-implementation assessment and collection of data pre-implementation												X												
Implementation of Daily NHPPD Calculator													X											
Ongoing assessment of use of tool													X	X	X	X								
Data collection													X	X	X	X	X	X						
Data analysis																			X	X	X			
Evaluation of project																						X		
Dissemination of findings to key stakeholders																							X	
Project closure																								X

Appendix G

Table G1

Daily NHPPD Calculator Worksheet

26-Jul-21		Day Shift Projections 0730 - 1530											Evening Shift Projections 1530 - 2330										Night Shift Projections 2330 - 0730									
Units	Max Capacity	Direct Obs Patients	**Occupied Beds**	Available Beds	Occupancy	**Target NHPPD**	Projected NHPPD	RN Staff Count	LPN Staff Count	NA Staff Count	**Total Direct Care Staff**	Safety Attendant	**Occupied Beds**	Available Beds	Occupancy	**Target NHPPD**	Projected NHPPD	RN Staff Count	LPN Staff Count	NA Staff Count	**Total Direct Care Staff**	Safety Attendant	**Occupied Beds**	Available Beds	Occupancy	**Target NHPPD**	Projected NHPPD	RN Staff Count	LPN Staff Count	NA Staff Count	**Total Direct Care Staff**	Safety Attendant
South 8	24	6	24	0	100%	11.0	10.0	7.0	0.0	3.0	10.0	2.0	24	0	100%	11.0	8.5	6.5	0.0	2.0	8.5	2.0	24	0	100%	11.0	9.0	7.0	0.0	2.0	9.0	2.1
South 10	24	1	24	0	100%	10.7	9.5	7.0	0.0	2.0	9.0	1.0	24	0	100%	10.7	9.5	7.0	0.0	2.5	9.5	1.0	24	0	100%	10.7	10.0	7.0	0.0	3.0	10.0	0.7
North 4	24	4	24	0	100%	11.2	9.5	6.5	0.0	3.0	9.5	2.0	24	0	100%	11.2	8.5	6.5	0.0	2.0	8.5	2.0	24	0	100%	11.2	9.0	7.0	0.0	2.0	9.0	1.4
TOTAL																																

Table G2

Data Collection Tools

Code Blue, Rapid Response Calls and Unplanned Admissions to Critical Care Pre-Intervention

South 8	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Total
# Of Code Blue Calls	0	1	0	0	0	0	0	0	1
# Of Rapid Responses	2	2	1	0	0	2	1	1	9

South 10	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Total
# Of Code Blue Calls	1	0	0	0	0	0	0	0	1
# Of Rapid Responses	0	3	3	3	2	0	3	3	17

North 4	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Total
# Of Code Blue Calls	0	1	0	1	0	1	0	0	3
# Of Rapid Responses	1	2	1	0	0	1	1	3	9

Code Blue, Rapid Response Calls and Unplanned Admissions to Critical Care Post Intervention

South 8	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Total
# Of Code Blue Calls	0	1	0	0	0	0	0	0	1
# Of Rapid Responses	4	0	1	0	2	0	0	1	8

South 10	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Total
# Of Code Blue Calls	0	0	0	0	0	0	0	0	0
# Of Rapid Responses	3	2	2	2	4	0	3	3	19

North 4	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Total
# Of Code Blue Calls	0	0	0	0	0	0	0	0	0
# Of Rapid Responses	0	2	1	1	1	1	1	0	7

Table G3

Daily NHPPD Calculator Compliance

Date	Pre- or Post-	Disposition	Code Blue / Rapid Response	NHPPD Present	Unit Location
9/21/2021	Pre	Transferred	Rapid Response	8.6	8 South
9/23/2021	Pre	Transferred	Rapid Response	7.3	4 North
9/24/2021	Pre	Transferred	Code Blue	7.4	10 South
9/25/2021	Pre	Stayed on Unit	Rapid Response	9	8 South
9/26/2021	Pre	Stayed on Unit	Code Blue	8.6	4 North
9/27/2021	Pre	Stayed on Unit	Rapid Response	9.7	10 South
9/27/2021	Pre	Transferred	Code Blue	6.8	8 South
9/28/2021	Pre	Stayed on Unit	Rapid Response	8.3	8 South
9/28/2021	Pre	Transferred	Rapid Response	7.3	10 South
9/30/2021	Pre	Transferred	Rapid Response	8.5	8 South
9/30/2021	Pre	Stayed on Unit	Rapid Response	9.4	4 North
10/2/2021	Pre	Transferred	Rapid Response	7.6	4 North
10/2/2021	Pre	Transferred	Rapid Response	9.4	10 South
10/4/2021	Pre	Transferred	Rapid Response	6.5	4 North
10/5/2021	Pre	Stayed on Unit	Rapid Response	8.8	10 South
10/6/2021	Pre	Stayed on Unit	Rapid Response	9.1	10 South
10/6/2021	Pre	Stayed on Unit	Rapid Response	9.1	10 South
10/9/2021	Pre	Transferred	Rapid Response	9.7	8 South
10/10/2021	Pre	Transferred	Code Blue	10.9	4 North
10/15/2021	Pre	Transferred	Rapid Response	8.6	10 South
10/16/2021	Pre	Transferred	Rapid Response	10.3	10 South

10/16/2021	Pre	Transferred	Rapid Response	10.3	10 South
10/19/2021	Pre	Transferred	Rapid Response	9.3	10 South
10/19/2021	Pre	Stayed on Unit	Rapid Response	9.3	10 South
10/25/2021	Pre	Transferred	Code Blue	8.6	4 North
10/25/2021	Pre	Transferred	Rapid Response	8.6	4 North
10/25/2021	Pre	Transferred	Rapid Response	9.7	8 South
10/26/2021	Pre	Transferred	Rapid Response	9.2	8 South
10/31/2021	Pre	Stayed on Unit	Rapid Response	10.9	10 South
11/3/2021	Pre	Stayed on Unit	Rapid Response	9.3	8 South
11/3/2021	Pre	Stayed on Unit	Rapid Response	9.9	10 South
11/4/2021	Pre	Stayed on Unit	Rapid Response	9.5	10 South
11/4/2021	Pre	Transferred	Rapid Response	9.4	4 North
11/7/2021	Pre	Transferred	Rapid Response	9.5	10 South
11/8/2021	Pre	Transferred	Rapid Response	10	10 South
11/8/2021	Pre	Transferred	Rapid Response	9.8	4 North
11/10/2021	Pre	Stayed on Unit	Rapid Response	9.4	4 North
11/11/2021	Pre	Transferred	Rapid Response	9.6	4 North
11/11/2021	Pre	Transferred	Rapid Response	11.7	8 South
11/12/2021	Pre	Transferred	Rapid Response	9.3	10 South
11/15/2021	Pre	Transferred	Rapid Response	8.8	8 South
11/15/2021	Pre	Transferred	Rapid Response	8.9	10 South
11/15/2021	Post	Stayed on Unit	Rapid Response	8.8	8 South
11/15/2021	Post	Stayed on Unit	Rapid Response	8.3	10 South
11/16/2021	Post	Stayed on Unit	Rapid Response	7.9	10 South
11/16/2021	Post	Transferred	Rapid Response	6.1	8 South
11/17/2021	Post	Transferred	Rapid Response	9.2	8 South

11/23/2021	Post	Stayed on Unit	Rapid Response	10.9	10 South
11/24/2021	Post	Transferred	Rapid Response	13.4	4 North
11/25/2021	Post	Transferred	Rapid Response	8.7	10 South
11/26/2021	Post	Transferred	Rapid Response	9.1	4 North
11/27/2021	Post	Transferred	Code Blue	8.9	8 South
11/29/2021	Post	Stayed on Unit	Rapid Response	9.6	8 South
11/30/2021	Post	Transferred	Rapid Response	7.5	4 North
12/2/2021	Post	Stayed on Unit	Rapid Response	9.5	10 South
12/4/2021	Post	Stayed on Unit	Rapid Response	9.9	10 South
12/7/2021	Post	Transferred	Rapid Response	5.8	10 South
12/9/2021	Post	Transferred	Rapid Response	6.6	4 North
12/11/2021	Post	Transferred	Rapid Response	8.9	10 South
12/12/2021	Post	Transferred	Rapid Response	7.2	8 South
12/13/2021	Post	Transferred	Rapid Response	9.2	8 South
12/13/2021	Post	Stayed on Unit	Rapid Response	8.9	10 South
12/14/2021	Post	Transferred	Rapid Response	8.4	10 South
12/15/2021	Post	Stayed on Unit	Rapid Response	8.3	10 South
12/16/2021	Post	Transferred	Rapid Response	8.3	10 South
12/18/2021	Post	Transferred	Rapid Response	9.9	4 North
12/21/2021	Post	Transferred	Rapid Response	11.4	4 North
12/28/2021	Post	Transferred	Rapid Response	9.2	10 South
12/29/2021	Post	Stayed on Unit	Rapid Response	8.8	4 North
12/30/2021	Post	Transferred	Rapid Response	9.2	10 South
1/1/2022	Post	Transferred	Rapid Response	7.4	10 South
1/3/2022	Post	Transferred	Rapid Response	9	8 South
1/5/2022	Post	Stayed on Unit	Rapid Response	8.7	10 South

1/8/2021		Transferred	Rapid Response	10.2	10 South
1/8/2021		Transferred	Rapid Response	10.9	10 South

Key Terms Table

Item	**Description**
Date	Date of occurrence
Pre/Post	Denotes if the occurrence happened pre- or post- intervention
Disposition	Patient outcome
Stayed on Unit	Patient did not require transfer to higher level of care
Transferred	Patient transferred to critical care unit
NHPPD Present	The actual NHPPD delivered at the time of the rapid response or code blue event
Unit Location	The medical-surgical unit in which the rapid response or code blue event occurred

Table G4

Process, Measures, and Outcomes

Measure	Type of Measure	Expected Outcome
Decrease in unplanned admissions to critical care from rapid responses and code blue events	Outcome	Decrease in unplanned admissions to critical care
Data collected to record the number of rapid responses and code blue episodes	Process	100% collected
NHPPD calculated when an event occurs	Process	NHPPD within ±10% of target NHPPD
Nurse staffing is realigned to units to place with within ±10% of target NHPPD	Balancing	Increase from 70% to 90%