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Evaluating the Impact of Nurse Server Standardization on Patient Safety

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Abstract

Aim: The aims of nurse server (supplies at bedside) standardization program evaluation were to: (1) examine supply costs; (2) identify staff efficiency; (3) evaluate patient safety; (4) identify staff satisfaction and acceptance.

Background: A healthcare facility in the Midwest implemented standardization of the nurse server. Standardization was done to improve patient safety and staff efficiency

Methods: The literature provided metrics for evaluating standardized nurse servers to determine the impact on patient safety. Specific measures used in this quality improvement project were: census data, costs analysis, supply room observations, semi-structured interviews, and data from the VOICE reporting system (system for adverse events) for concerns.

Results: There was a 40% decrease in VOICE files, indicating an improvement in patient safety and quality of care. The overall cost reduction that occurred was not significant, although the number of supplies in the nurse server decreased significantly. Staff feedback indicated increased efficiency and satisfaction.

Conclusions: The standardization of supplies in nurse servers shows positive effects on patient safety and quality of care, staff efficiency, and cost.

Implications for Nursing Management: Nurse leaders could achieve their aim of increasing patient safety and quality of care, increase nurses job satisfaction, provide more budget flexibility from cost savings.

Key Words (5): Standardization, nurse servers, bedside, supplies, patient safety

Background

For many years, inpatient units have kept an abundance of supplies in patient rooms to assist staff with efficient access for patient care. Some research suggests that reducing supplies in nurse servers may not only reduce waste in the form of time and expired items, but also create other financial savings (Crimlisk et al., 2018; Cockerham et al., 2016; Morrow et al.,2013; Voldan et al., 2016).However, there may be regulatory risks as well as product viability issues due to ineffective management of expiration dates (Marrow et al., 2013). The leadership of the organization examined at this time sought a clear understanding of the impact of a recent standardization project. The literature review provided key metrics to be evaluated for this program evaluation

Supply costs account for 15% of the operating budget for the average healthcare organization (Abdulsalam & Schneller, 2017). Reducing costs and increasing efficiency are classic needs of healthcare organizations and other businesses. Part of reducing costs involves reducing waste (Cockerham et al., 2016; Voldan et al., 2016). Waste of supplies comes in two forms: expiration due to overabundance and contamination (Peck, 2019). Cockerham et al., (2016) showed a 63% decrease in wasted supplies and an 80% decrease in the amount of supplies in the bedside servers post-standardization. In their studied facility, this translated into a projected saving of $72,654.40 per year. Marrow et al., (2013) reported a savings of $2,327 over a 2-week period in the critical care areas.

With the standardization of supplies, an organization can evaluate the true usage and overall needs of certain supplies (Cockerham et al., 2016; Friedman & Fulton, 2016). Periodic automatic replenishment (PAR) levels of supplies are monitored to provide data on which items are used more and when more stock is needed. PAR levels help to mitigate overabundance and

shortages of stocked supplies (Peck, 2019). When done correctly, there can be a balance between cost reduction and patient safety. Guzman et al., (2015) used a standardization model that showed cost savings, while not jeopardizing the quality or the efficiency of care.
Several other literature sources reported that there is a strong likelihood of improving safety and quality of care by standardizing nurse servers (Crimlisk et al., 2018; Cockerham et al., 2016; Morrow et al.,2013; Voldan et al., 2016).

With nurse efficiency being a top priority for patient care in the hospital setting, many organizations are turning to standardization for process improvement. Standardized drawer arrangements allow nurses and other staff members to reliably know where supplies are and react quickly. Richard et al., (2014), showed that staff time spent looking for supplies decreased by 2.5 times post-implementation. Belanger et al., (2018), found through qualitative data from staff, that productivity increases with the appropriate supplies available at the bedside. Having supplies that are consistently arranged and readily available helps to increase staff satisfaction. Access to the correct tools to perform the job is imperative (Ansmann & Pfaff, 2017).

Patient safety and staff efficiency often coincide. Having both an adequate amount, and an appropriate selection of supplies on hand are necessary for patient safety and staff efficiency. Evidence has shown to be beneficial for the staff caring directly for patients. Patient safety is at the center of healthcare, and supply levels are directly linked to patient safety (Lawton, et al., 2012). Tucker et al., (2014), found that multiple failures in patient safety resulted from lack of supplies, 14% of nurses time was spent working around those failures. Having proper supplies in the room increases time spent at the bedside with the patient, instead of searching for supplies. Morrow et al., (2014) indicated that nurse time at the bedside increased, decreasing patient safety events. While there is strong literature support to standardizing supplies, it should be noted that

there is a gap in the literature regarding studies on standardizing across service line types, such as medical surgical, critical care, etc., as most of the literature addresses standardization across an entire organization. This organization began standardization in just one service line, that being the acute care service line.

Conceptual Frameworks

Lewin's theory of planned change is a three-stage model that was used to guide the program evaluation (McEwen, & Wills, 2014). These three stages are unfreeze, change, and refreeze. Lewin describes the process of change as creating the perception that a change is needed. Once a perception is created, a shift toward the new process and desired level of behavior can occur. Finally, the new behavior or process can be solidified as the standard norm, in other words, a refreeze occurs. This theory was used to understand the change and its effects.

The Context, Input, Process, Product (CIPP) evaluation model (Stufflebeam, 1983) was used to guide the systematic approach of evaluating the standardization project. The CIPP model starts with "Context Evaluation" also specified as goals. The next section, known as "Input Evaluation', is where strategies are developed. "Process Evaluation", or the action section, is where the monitoring data occurs. Lastly, the "product Evaluation" or outcomes, is where the final analysis of the program evaluation occurs.

Purpose of the Project

The goal of the evaluation was to provide an in-depth analysis of standardizing the nurse servers to provide understand the effectiveness and identify outcome measures and possible revisions for future standardization projects. The aims of this program evaluation were to: (1) examine supply costs related to standardization; (2) identify staff efficiency with standardization;

(3) evaluate patient safety related to nurse server standardization; (4) identify staff satisfaction and acceptance of standardization.

Methods

Design and Setting

The project design was a program evaluation, guided by both the CIPP evaluation model and Lewins' theory of change. Strategies to complete the program evaluation were: forming relationships with frontline staff and other key stakeholders; an organizational assessment for readiness, strengths, weaknesses, opportunities, threats; a literature review to inform key metrics for the evaluation. The internal review board (IRB) determined this was a quality improvement project.

The setting was an acute care service line that consisted of four inpatient units in a rural healthcare facility in the Midwest. The four units provided general medical, surgical, urologic, and orthopedic surgery care and consisted of a total 128 inpatient beds over four units (see Table 1 for detailed description). None of the units cared for COVID-19 patients during the allotted time. The patients were considered to be typical of their respective unit populations, as they did not see disruptions by caring for COVID-19 patients. As part of the standardization project, standard items were established via feedback given to those rounding on the nursing units and a data review of current supplies and usage by the supply staff. Nurse servers, in the room, were typically stocked Monday through Friday, between 10:00 and 14:00, depending on the unit. While they were stocked daily, the PAR levels were set to accommodate two days because no restocking was done on weekends. Considering available usage data from the institution and feedback from the nurses, these items and their respective PAR levels were reviewed with key stakeholders to determine placement in the nurse servers.

Measures

Measures for evaluation were identified by using the literature, observations conducted during leadership rounding, interprofessional team input, and site mentors. This program evaluation examined the effects of standardization on patient safety, efficiency, and costs. The specific measures were: census data, overall costs analysis for each unit, supply room observations, semi-structured interviews, and VOICE (a reporting system for events) report data. Data collection occurred over a 3-month period, during both day and night shift and on both weekdays and weekends. The items located in the nurse server were standard supplies most commonly used by nursing staff. Additional patient care supplies remained accessible in the main supply room, located in each nursing unit.

Census data for each year were used to compare patient days and admissions to ensure parallel cost data. Census data tells the number of patients present i.e. patient days, and the number of patients admitted during the specified time period. The months of August, September, and October were used for both 2019 and 2020 to compare a similar set.

Supply costs were obtained to determine if there was a measurable cost benefit. Both cost and PAR level data were obtained for the months of August through October for both 2019 and 2020. Census data was also used to compare patient days and admissions to assess for similar patient numbers to account for costs.

Staff efficiency was measured by observing post-implementation of the standardization project and how often nurses needed to go to the main clean supply room for required items. In addition to these observations, employees were asked semi-structured interview questions to give insight into efficiencies, stage of change acceptance, and supply needs.

Semi-structured interview questions were asked, post-implementation, of the frontline nurses on the units during leadership rounding. The questions centered around patient safety, staff efficiency, staff's acceptance of the change, and feedback to improve current nurse server arrangements. These interviews were completed with 30% of the staff, or until a representative sample based on saturation of theme was completed. Once a unit had common themes identified, no more interviews were conducted.

Safety events were measured through the evaluation of VOICE files. The facility employs the use of the VOICE reporting system so that employees may express concerns without fear of retaliation or penalty. VOICE files from August through October from both 2019 and 2020 were analyzed, looking for potential changes from before and after implementation. VOICE is how the organization performs learning by defects ("Learning from mistakes, learning by effects" commonly used in hospital settings [Agency for Healthcare Research and Quality, 2012]). It is used to compile data to identify trends and track issues in the hospital. VOICE files are associated with many different areas and issues within the organization, but mainly relate back to patient safety and quality of care. VOICE file reports are entered by staff for concerns that occur while at work. These can be actual events or near misses. Census data can also be reflected in the VOICE file data.

Results

This project evaluated nurse server standardization for: (1) supply costs, (2) patient safety, (3) staff efficiency, (4), staff acceptance. The program evaluation showed, with qualitative data, how the service line moved through Lewins' stages. Most importantly, it demonstrated that the organization is in the refreeze stage and implementing a sustainability plan.

Aim 1: Supply costs

In 2020, due to COVID-19, some supply costs increased due to the lack of availability of raw materials and an increase in demand. Table 2 shows cost analysis data. The *z*-values seen in this project ranged from -0.323 to -0.916. Based on this, the assumption can be made that the groups were evenly distributed for costs. The "n" used was the total number of supplies from both 2019 to 2020. The "n" was then further broken down for each unit to compare 2019 to 2020. As expected, the data showed that with higher patient days and admissions, the use of supplies increased, as well the cost. None of the units had significant *p*-values, as displayed in Table 2.

After standardization was put into practice in 2020, all nurse servers contained exactly the same 36 items. Pre-implementation, the units had varying levels of supplies in the nurse server. Unit A had 82 items, resulting in a 56% reduction with the standardization to 36 items. Unit B had 54 items, a 33% reduction. Unit C had 42 items, a 14% reduction. Unit D had 88 items, a 59% reduction.

AIM 2: Patient Safety

Of the VOICE files reviewed related to patient safety, 15 were from 2019 and 9 from 2020. There was a 40% decrease in 2020, even though there were more patient days. VOICE files surrounding supplies indicated there were safety concerns, although none were serious safety events. Examples included, supplies not available in the nurse server causing patient harm, expired supplies accidently being used on a patient, etc. The reduction indicates there was an improvement in patient safety and quality of care, as in the past a reduction of staff completing files is not seen with increase patient days. Pre- implementation one VOICE file related to expired supplies potentially being used. Post-implementation, supply staff were putting the items

set to expire first on top, so they were used first before expiration. Also, during the observations it was noted supply staff were stocking the drawers Monday through Friday during day shift, and were checking expiration dates.

Aim 3: Staff Efficiency

Supply room observations were collected over a total of 54 hours. The supply room was entered 85 times during the observations, or 1.5 times an hour. Supply room observations indicated that socks, also identified during the semi-structured interview questions, were one item for which staff entered the main supply room frequently on the unit. Other items, such as IV fluids and personal care items were also identified, but would not be supplies typically found in a nurse server. Semi-structured interview questions revealed that staff felt as though they were spending less time searching for supplies, and felt that they had the items needed to properly perform their jobs.

An analysis of the combined data provided a few commonalities across the different units. Needed items identified from across all four units were: socks, Tegaderms, Attends, ABD pads, EZ lube, additional secondary tubing, Sani-hand wipes, and nasal cannulas. It was identified that the empty 10 cc syringes were rarely used, but staff were either unsure about removing them from the drawer, or felt they should remain in the drawer. The overall data also indicated a few unique items. These items were only identified by one or two staff members. These included: soap, suture and staple remover kits, pill splitters. However, the staff did not provide any input as to how this would improve efficiency or patient safety. Displayed in Table 1 is a breakdown of the unit analysis.

Every department gave similar indications as to why each item should be added to the nurse server. The following are the indications given for the above-mentioned items.

· **Socks:** because they relate to fall risk precautions. Patients somehow seem to get their socks wet or dirty and need a new pair, and this happens multiple times a day.

· **Tegaderms**: are sometimes in the drawer and sometimes not. Staff stated, “it seems like maybe we need more or just need to make sure they are part of the stockers list”.

· **Attends**: needed frequently for incontinent patient throughout the day to prevent skin breakdown and keep patients clean.

· **ABD pads:** are used frequently for dressing changes, since the other frequently used dressing supplies are in the drawer these should be added.

· **Nasal cannulas:** are needed, as it is always an emergency when you need one. Nasal cannulas are not currently close enough to the patients.

· **Sani-hand wipes:** because it is hard for bed bound patients to wash their hands before meals, and these could easily be grabbed and placed on the bedside prior to tray delivery.

· **Secondary tubing sets:** this would increase efficiency of having to go to the main clean utility room.

·**EZ lube:** for pulse checks on vascular patients. The current doppler equipment for pulse checks requires the use of EZ lube, and vascular patient need pulse checks at lease every four hours if not more.

Aim 4: Staff Acceptance

As indicated by staff feedback during the semi-structured interviews, the standardization of the nurse server was helpful for workflow efficiency. The standardization aided in increasing

the comfort level of staff members when they needed to be pulled from their home unit to help another unit. Float pool staff recognized how standardization created an environment where supplies were easy to find. This was especially helpful in that they did not have to acclimate to different arrangements when moving from unit to unit during their shifts. Staff acknowledged that overall, the standardization has eased an aspect of their everyday work.

Discussion

The data obtained lead to new recommendations for the organization. Based on the interviews, feedback, and supply room observations, additional items identified by staff were under consideration for addition or removal from the nurse servers. Each suggested addition or subtraction related to patient safety and/or staff efficiency.

Patient safety was of utmost importance to this project, and a major value of the organization. The results of this program evaluation were in agreement with previous literature. The organization saw an increase in patient safety in relation to standardization of supplies in the nurse servers.

Previous literature indicated that the standardization of supplies would lead to an increase in staff efficiency (Belanger et al., 2018; Richardson et al., 2014). Qualitative data from this program evaluation indicated that the staff felt that it was helpful to their daily work to have this standardization. The nurses interviewed indicated that it increased their level of comfort during their work day, decreased their time searching for supplies (made it easier for them to know where the supplies are located), and increased their comfort level when being sent to other units in the service line. Time wasted searching for supplies is taken away from time spent with patients, decreasing safety and quality of care. This evidence all suggests that standardization aided in staff efficiency and patient safety.

Staff members at this organization are currently in the refreezing stage of Lewin's theory, and have accepted the change (McEwen, & Wills, 2014). This has proven true based on the qualitative feedback gathered by observers. Staff even indicated areas where they would like to see more standardization similar to this project. Feedback from the nurses provided rich and roust data. Based on these interviews, staff feedback is vital to the success of standardization of the bedside supplies. Going to the units and observing provided validation in staff feedback and success.

Cost data did not show a statistically significant reduction after standardization of supplies, but costs did decrease. Although the previous literature indicated costs can be reduced significantly by standardizing supplies, this was not reproduced in this evaluation. Without having similar months with similar patient days, it may be hard to show the cost reductions. Overall savings may also have been offset by increased unit prices, which can occur from one year to the next, particularly during a pandemic.

There are limitations to this program evaluation. Having pre-observation data regarding the number of times staff entered the main clean supply room would have provided more information and statistical analysis, as seen in other research. This data may have provided better insight as to the effects of the changes made as they relate to the number of visits to main clean supply rooms. In the literature review, multiple studies included wasted supply data. In this evaluation, while there was some waste data provided by the infection prevention department, the supply department did not maintain records on expired supplies or other forms of waste. The infection prevention data was limited, as they examine only a few supplies during each monthly visit. This information could have added to the cost analysis, as it would have shown what was truly used, as compared to what had to be discarded by the department. There was no way during

this program evaluation to determine if waste from the nurse servers would have significantly affected supply costs. Also, given that supply costs are changing rapidly, overall units used could be a better guide than price per unit.

Although not related to this particular program evaluation, it was found that a majority of the staff would like to see all the clean supplies rooms arranged in the same way. This should be considered for future quality improvement projects. Staff felt that there were parallels to be drawn between this project and the standardization of main supply rooms. They felt that it could lead to increased efficiency overall. This program evaluation showed the benefits of standardizing supplies. Future studies should also consider that supply costs are changing rapidly, and overall units used could be a better guide than price per unit.

Conclusions

The program evaluation to assess standardization of supplies in nurse servers and the effects on patient safety and quality of care, staff efficiency, and cost was effective. Patient safety and overall quality of care was improved from 2019 to 2020. Patient safety and quality of care are major factors influencing the moving towards standardization. The nursing staff was satisfied with the change. They also provided information on a few minor changes and additions to the current nurse server that would improve the current standard arrangement. Standard nurse servers increased efficiency and helped staff members when moving between units. When assigned elsewhere, they did not have to be concerned as to where to find supplies in the server, they were arranged just as they were on their home unit. Though the savings were not significant, costs related to supplies did decrease. The implications from this program evaluation offer organizations a way to improve bedside practice, patient safety, and quality of care while increasing staff efficiency.

Implications for Nursing Management

Nurse leaders should implement standardization in nurse servers to increase patient safety and quality of care and improve staff satisfaction and efficiency. These increases come in the form of a sense of comfort and confidence, with the nurses having the resources and supplies to properly perform their job. When supplies are laid out in a thoughtful manner and thoroughly evaluated for relevance at the bedside, staff will have increased trust and confidence in the organization, boosting satisfaction scores. As indicated in the literature, standard nurse servers will provide nursing leaders with a reduction of waste in two forms; supply waste, and time (Crimlisk et al., 2018; Cockerham et al., 2016; Morrow et al.,2013; Voldan et al., 2016). The cost savings associated will provide nursing leaders with more budget flexibility.

The standardization across service lines helps staff be more efficient when floating to other units. Implementation across the services line brings unity to multiple departments. This will help leaders engage frontline staff in improvement efforts and foster a better understanding of operations between different units. This helps to foster a culture of unity and aids in developing relationships outside of staff's normal home units. Standard nurse servers support leaders by providing cost reduction, patient safety, and staff efficiency.

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Tables

Table 1

Unit Metrics Overview							
Unit	**# of beds**	**Number of staff**	**Number of staff interviewed**	**% of staff interviewed**	**Items to add**	**Items rarely used**	**Is the standardization helpful**
General Surgery/ Unit A	39	45	13	29%	Socks, ABD pads, and EZ lube	Empty 10 cc syringes	Helpful, one less thing to think about when being pulled to another unit
Urologic/ General Surgery/ Unit B	20	33	15	45.5%	Socks	None	Helpful, one less thing to think about when being pulled to another unit
General Medical/ Unit C	45	48	12	25%	Socks, Tegaderms	Empty 10 cc syringes	Helpful, one less thing to think about when being pulled to another unit
Orthopedic/ Unit D	24	38	15	39.4%	Socks, Tegaderms, ABD pads	None	Helpful, one less thing to think about when being pulled to another unit
Float Pool	N/A	10	5	50%	Socks, Tegaderms, Attends, ABD pads, EZ lube, more secondary tubing, Sani-hand wipes, nasal cannulas	Empty 10 cc syringes	Helpful, makes the work day easier

Table 2

Results: Cost Analysis Pre and Post								
Unit	**Patient days (PD)**	**Number of admissions**	**Total number of supplies (N)**	**# of supplies 2019**	**# of supplies 2020**	**Mean**	***Z*-value**	***P*-value**
General Surgery	**2019 = 2,365** **2020 = 2,555**	**2019 = 477** **2020 = 517**	**86**	**82**	**36**	**2019 = 220.63** **2020 = 241.26**	**-0.846**	**0.396**
Urologic/ General Surgery	**2019 = 1,236** **2020 = 1,341**	**2019 = 273** **2020 = 239**	**64**	**54**	**36**	**2019 = 174.98** **2020 = 173.29**	**-0.916**	**0.360**
General Medical	**2019 = 2,120** **2020 = 2,455**	**2019 = 389** **2020 = 400**	**61**	**42**	**36**	**2019 = 336.64** **2020 = 344.63**	**-0.323**	**0.747**
Orthopedic	**2019 = 1,387** **2020 = 1,521**	**2019 = 432** **2020 = 368**	**92**	**88**	**36**	**2019 = 116.42** **2020 = 120.05**	**-0.735**	**0.463**

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DNP Project Final Defense

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Objectives for Presentation

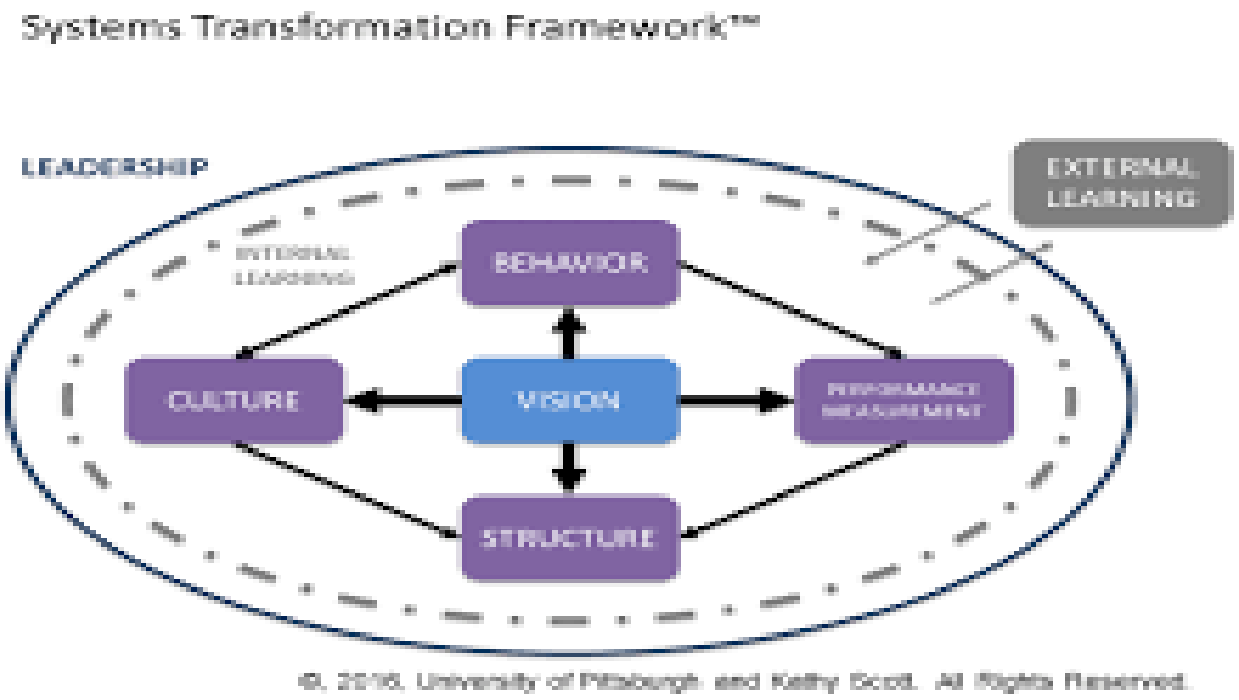
1. Review the clinical problem
2. Review the organizational assessment and literature
3. Describe the results and analysis
4. Discuss implications for practice, sustainability, and dissemination
5. Describe how the DNP essentials were met

Introduction

- The phenomenon of interest is “The Standardization of Supplies in Nurse Servers to Improve Patient Safety”.
- The organization was interested in standardization due to patient safety, staff efficiency, supply chain costs, regulatory guidelines, and infection prevention measures.
- The acute care service line had already implemented this as they are advancing with standardizing many aspects of the service line.

Organizational Assessment

Framework For the Organizational Assessment



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Current State of the Organization

- On the journey to becoming a system, resulting in much change
- Implementing Lean Management methodologies
  - Values standardization/standard work
- "True North" values
  - Patient centered care

Clinical Practice Question

- How did supply standardization in nurse servers impact patient safety, staff efficiency, and costs in acute care settings?

SWOT Analysis

Strengths	Weaknesses
• **The service line was already working on standardizing many aspects.** • Supply chain staff and leadership were supportive of standardization. • **Nurse leaders were supportive and believe this would support float nurses** • Executive leaders were interested to understand the outcomes of the standardization	• **Organizational culture was changing, some resistance to change is still seen** • The organization was working on becoming a larger system • This service line was also newer to standardization • **Staff feel their VOICE is not heard by leadership.**
Opportunities	**Threats**
• **Improving patient outcomes based on national benchmarks** • Reducing supply costs that have already increased due to COVID-19 • **Addressing potential patient safety concerns around supplies availability as data is compiled, but no one is using it**	• **Supply chain item availability- due to COVID-19 many items are unavailable** • **Cost savings may be minimal due to suppliers increasing prices** • Due to COVID-19 many changes have occurred recently and staff are feeling overloaded

Literature Review

Literature Search

Literature review question:
Does standardization of supplies at the bedside increase patient safety and quality of care, and decrease costs?

Aim:
1. To obtain literature about standardization of supplies at the bedside or in nurse servers

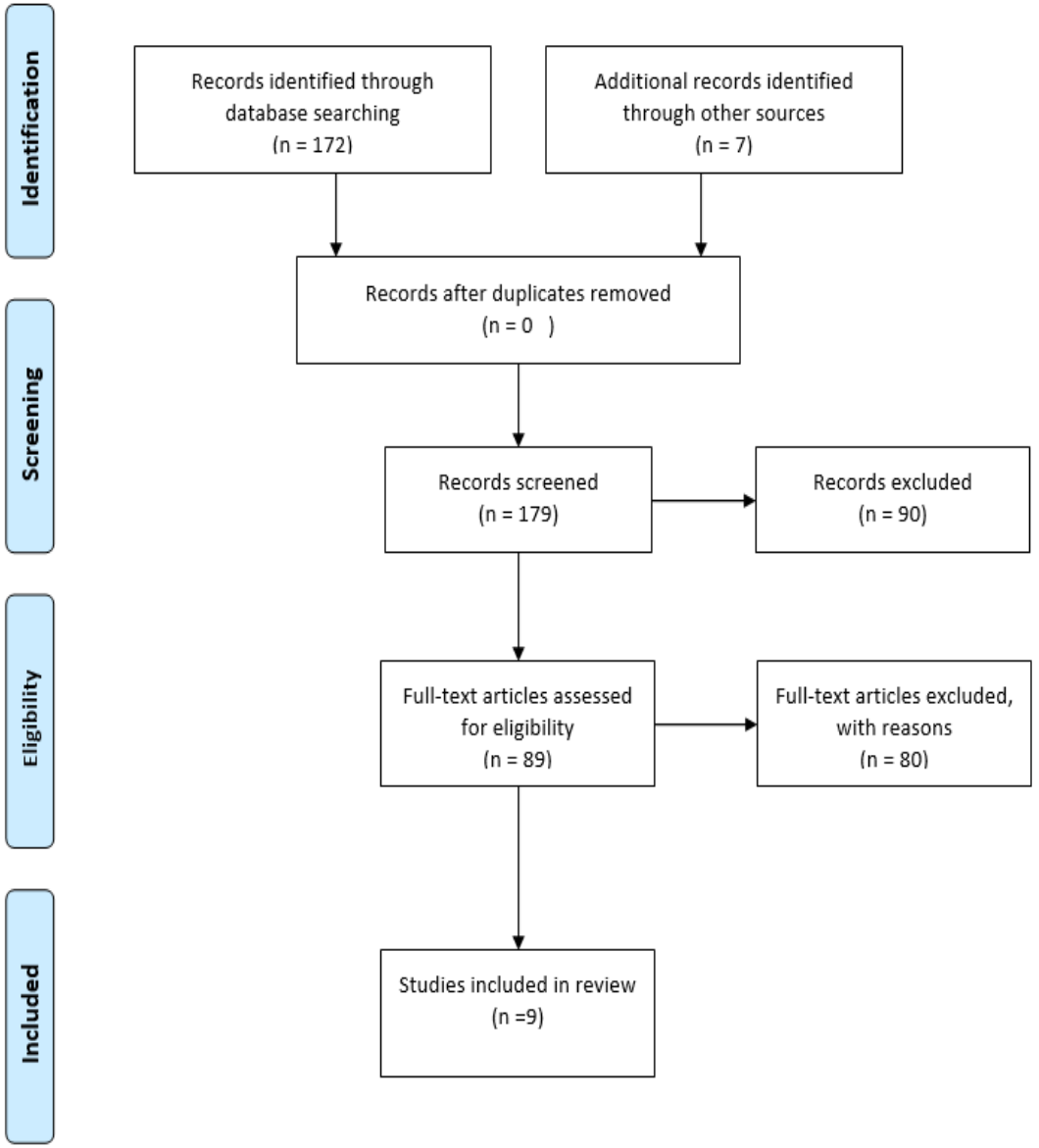
2. To identify metrics to measure the impact of standardization on quality of care, costs, and patient safety.

Method:

- **Databases:** CINHL, PubMed, ProQuest, ScholarWorks, and Google Scholar
- **Key words**: supplies, nurse servers, patient safety, cost reduction, bedside carts, LEAN and standardization.
- **The Boolean operator:** OR was used to include articles with variant phrasing, as initial literature search did not provide enough literature.
- **Inclusion/Exclusion:** Studies were included if: they focused on supplies and either standardization, cost reduction, patient safety, or staff efficiency; the timeframe was from 2012 to 2020; they were full text articles in English.

PRISMA Figure

Figure 1 Flow diagram of search selection process



Adapted from : "Preferred Reporting items for systematic review and meta-analysis protocols (PRISMA-P)" by D. Moher, L. Shamseer, M.Clarke, D.Ghersi, A. Liberati, M. Petticrew.,...2015, *Systematic Reviews*, 4(1). Doi:10.11.86/2046-4053-4-1.

Synthesis of Literature

Author	Purpose	Results
Bélanger, V., Beaulieu, M., Landry, S., & Morales, P. (2018).	Case Study: Identify how nursing unit supply location interferes with performance Multiple types of nursing units were used	Aides in staff performance **Metrics:** Productivity based on supply replenishment data, staff feedback
Richardson, D. M., Rupp, V. A., Long, K. R., Urquhart, M. C., Ricart, E., Newcomb, L. R., ... & Kane, B. G. (2014).	Pre-post observation to investigate time staff spend obtaining supplies needed for patient care in the emergency room	Decreased staff time searching for supplies, increased time at the bedside **Metrics:** Observational time study on staff searching for supplies
Zadeh, R. S., Shepley, M. M., & Waggener, L. T. (2012).	Cross sectional study: Standardizing location of supplies in acute care settings (medical-surgical units)	Easier for staff to obtain items quickly, better response time to patients needs **Metrics**: Staff movements to obtain supplies

Synthesis of Literature Cont.

Author	Purpose	Results
Crimlisk, J. T., Doherty, M. M., Fernandes, E., Leblanc, E., Guarino, R., & Costello, K. V. (2018).	QI project: To evaluate standardized drawer setup of crash carts and affects workflow and patient. This was an entire hospital not specific to one location	Improved patient safety and workflows **Metrics:** Staff evaluation and supply costs
Cockerham, M., Haverland, A., & Solvang, N. (2016)	QI project: Standardization of supplies to reduce costs in the ICU hospital setting	Decreased costs, and increased time at the beside **Metrics:** Supply costs
Morrow, J., Hunt, S., Rogan, V., Cowie, K., Kopacz, J., Keeler, C., ... & Kroh, M. (2013).	QI project: Standardization of supplies to reduce costs in the ICU hospital setting	Decreased costs, increase in time at the beside, staff efficiency, maintaining optimal patient care **Metrics:** Costs of supplies and patient safety events
Voldan, D., Hammad, R., & Svec, A. (2016).	Improve staff workflow and decrease wasted time and supplies	Reducing workarounds, improves staff efficiency, and decreased costs **Metrics:** Supply costs data and staff time to gather supplies

Synthesis of Literature Cont.

Author	Purpose	Results
Lawton, R., McEachan, R. R., Giles, S. J., Sirriyeh, R., Watt, I. S., & Wright, J. (2012).	Mixed methods systematic review: To develop a framework of factors that affect patient safety. The Yorkshire contributory factors framework.	Supplies and equipment affect patient safety. **Metric:** Patient safety incident reports
Tucker, A. L., Heisler, W. S., & Janisse, L. D. (2014).	Qualitative research: Lack of standardization of supplies and nurse efficiency in the hospital setting in medical-surgical units	Failures in patient safety, time wasted, ordering and stocking to periodic automated replenishment (PAR) levels is difficult **Metrics:** Cost, clinical quality, and patient experience

Summary

Themes:

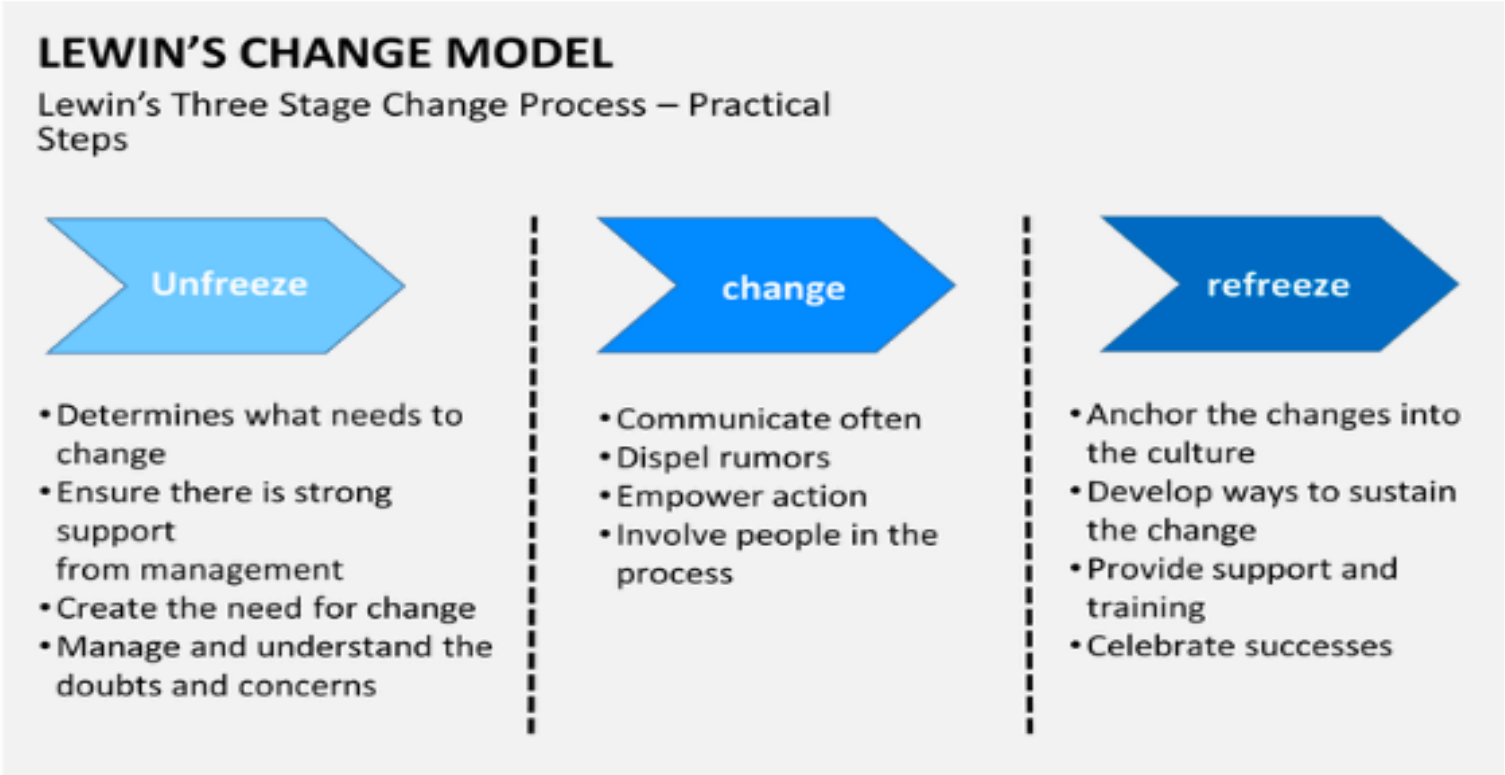
- Standardization of supplies increases patient safety and nurse efficiency
- Standardization reduces cost
- Settings varied from medical surgical to critical care and emergency room

- The overall results from the literature were decreased cost and increased safety

PROJECT PLAN

Conceptual Model for Phenomenon

- **Lewin's Theory of Change**



McEwen, M. & Wills, E.M. (2014).

Project Purpose and Objectives

Project purpose:

To evaluate the impact of standardizing supplies in the nurse servers across the acute care service line.

Objectives:

1. Evaluate patient safety outcomes by utilizing VOICE data before and after implementation
2. Evaluate efficiency by performing periodic observations and time measures of staff entering the clean utility room in their area to retrieve items
3. Evaluate costs associated with PAR levels of supplies and wasted supplies prior and after implementation
4. Evaluate staff feedback on how standardization is working and what supplies are needing to be added versus what is not necessary, through semi-structured interviews during leadership rounds

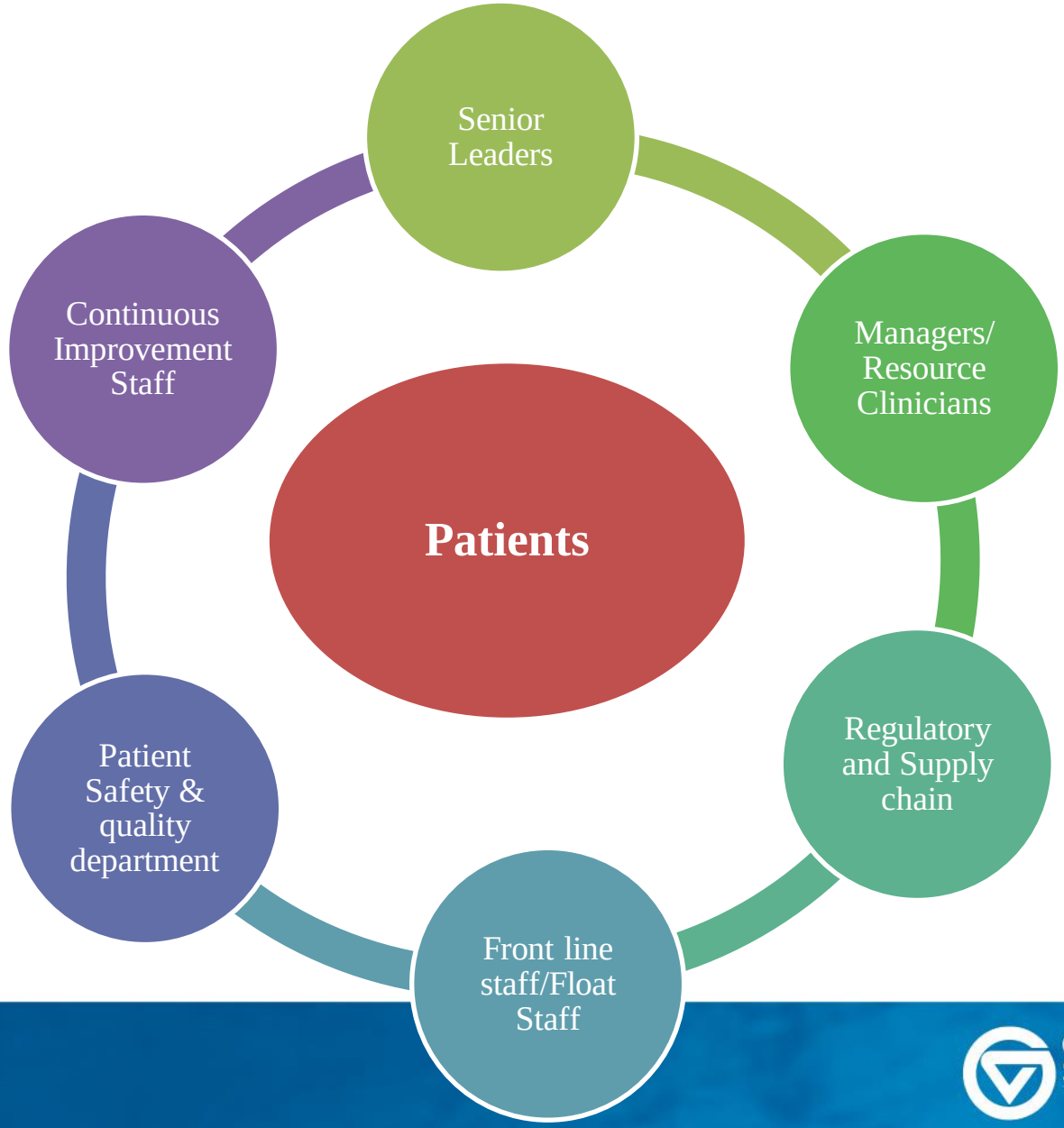
Project Type/Current State of the Organization

Program evaluation

- Setting: Acute care service line

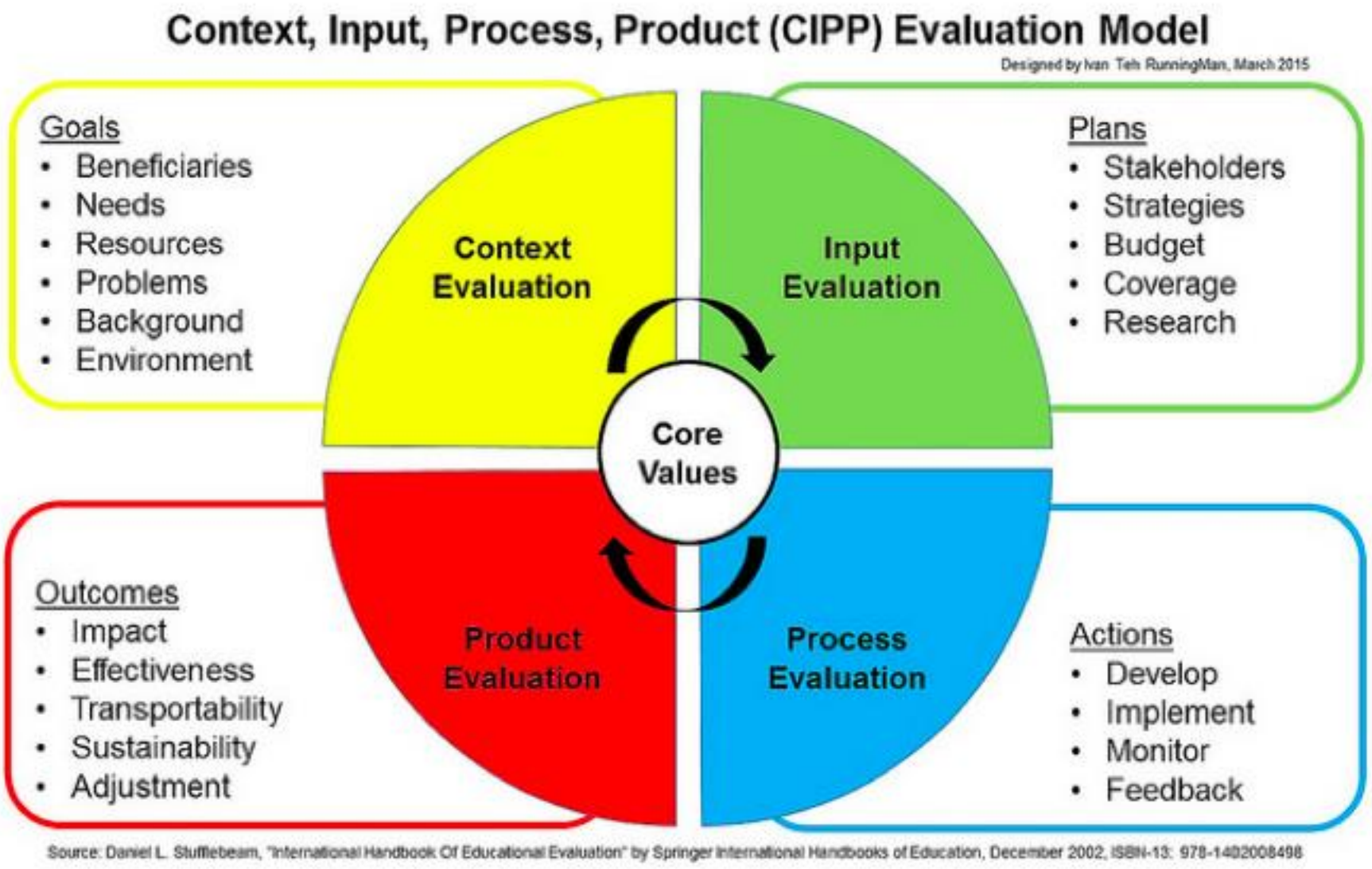
- Large rural healthcare facility
  - Teaching and research hospital
- Resources
  - Supply vendor
  - Patient safety staff

Key Stakeholders



Methods: Project Plan

Program Evaluation Framework



Implementation Strategies & Elements

Powell et al. (2015) Strategies	DNP Student Action
• Assess for readiness and identify barriers and facilitators • Identify early adopters • Assess Program Evaluation	Perform an organizational assessment to assess for readiness, strengths, weaknesses, opportunities, and threats
• Build a coalition • Inform local leaders • Involve frontline staff	Form a relationship with staff and leadership in the acute care service line, by attending huddles weekly, leadership rounds weekly, and monthly unit meetings
• Capture and share local knowledge • Develop a formal implementation blueprint (program evaluation)	Preform a literature review, and identify gaps in performance

Implementation Strategies & Elements (cont'd)

Powell et al. (2015) Strategies	DNP Student Action
• Audit and provide feedback to the organization • Obtain and use staff feedback • Conduct local consensus discussions • Conduct local needs assessment	Evaluate staff perceptions and efficiency of current practices through observation/leadership rounds, semi-structured interviews, and safety event data
• Purposely reexamine the implementation • Work with educational institutions	Present the recommendations to the healthcare organization; write scholarly paper and submit to ScholarWorks

Supplies Set Up In the Nurse Servers

Recommended supplies to be stored in patient room drawers	
4 IV secondary set	10 IV blue caps
6 2X2in gauze	10 Band aids
6 4X4in gauze	1 Roll paper tape
6 1ml syringe	5 Plastic spoon
6 3ml syringe	2 Facial tissue box
6 10 ml syringe	2 Toothbrush
6 27g x 5/8 needle	1 Denture cleaner
6 BD SafetyGlide 1 ml	2 Toothpaste
10 Needle Safety 30gX5mm	2 Denture cups with lids
20 5 ml flush	1 Emesis bag
20 10 ml flush	2 Urinals
20 30ml med cups	4 Secondary tubing
10 Insulin pen needle caps	2 Urine hats
20 Needless adapters	4 Mouth swabs
10 CHG swabs	2 Shampoo plus body wash
40 Alcohol swabs	

Evaluation & Measures

Unit	Type	# of beds	# of staff
A	General Surgery	39	45
B	Urologic/General Surgery	20	33
C	General Medical	45	48
D	Orthopedic Surgery	24	38
N/A	Float Pool	N/A	10

Evaluation & Measures

Topic	Concept	How Measured	When Measured	Who Measures
Patient Safety	Safety events with scoring if available and near miss events	VOICE file data submitted by staff	Pre-implementation (August- September- October 2019) and post-implementation (August- September- October 2020)	DNP Student and patient safety staff. This staff monitors and tracks and trends VOICE data
	Safety events and near miss events	Semi-structured interviews with 30% of the staff or until saturation of themes	Staff feedback on supplies and incidents not submitted to VOICE. What items are not necessary and what items may need to be added to drawers	DNP Student
Staff Efficiency	How often staff need to go to clean utility supply room for needed items	Observation data on the unit counting how many times staff go to the clean utility room Semi-structured interviews	Post-implementation Staff feedback (December 2020- February 2021)	DNP Student
Supply Costs	To assess for decrease costs	PAR and cost data from Northern Michigan Supply Company (NMSA)	Pre-implementation (August- September- October 2019) and post-implementation (August- September- October 2020)	DNP student with cost and PAR data provided by supply manager

Analysis Plan

Qualitative:

- Semi-structured interview responses from staff nurses
  - General themes were identified (30% of staff or saturation of themes)
- VOICE file data pre- and post-implementation of standardization project were evaluated
- Observational data of number of times entering the supply room were evaluated for items to compare high use to those items in the nurse server

Descriptive statistics

- The cost of supplies (PAR) data pre- and post-implementation: Wilcoxon Signed Rank Test

Ethical Considerations

Maintain confidentiality of data

- Only the project team had access to the data file.
- The data file was only used to complete the project.
- The collected data was stored on the organization's network, and that data was not be stored, shared, or saved on a thumb drive, in cloud storage, or on any university devices (to include the transfer of data by university or personal email).

Timeline

	Start Date	Stop Date	Nov-20	20-Dec	Jan-21	Feb-21	Mar-21	Apr-21
Oral project proposal Defense	November 6, 2020	November 6, 2020						
Obtain VOICE data	November 9, 2020	January 10,2020						
Obtain PAR level and cost data and analyzed	November 10, 2020	January 10,2021						
Start leadersjhip rounds and semi structured inverviews	November 16, 2020	December 31, 2020						
Analyze PAR level and cost data	December 10,2020	February 20,2020						
Complete Semi structured interviews	January 4, 2021	February 1, 2021						
Anayze Interview results	January 4, 2021	February 12, 2021						
Disseminate findings to stakeholders	March 8, 2021	March 31, 2021						
Sustainbility plan	March 8, 2021	March 31, 2021						
Project Defense	April 9, 2021	April 9, 2021						
Scholar works Submission	April 9, 2021	April 30, 2021						

Results

Patient Census Data

- Census data, number of patients present during the specified time period
- Data will relate to the costs of supplies, and VOICE file volume
- From August thru October 2019 the combined census (number of patient days) for all units was 7108 and number of admissions was 1571
- From August thru October 2020 the combined for all for units was 7872 and number of admissions was 1524

Results: Cost Analysis

Unit	Patient days	Number of admits	Total number of supplies (N)	# of supplies 2019	# of supplies 2020	Mean	*Z*-value	*P*-value
Unit A	2019 = 2,365 2020 = 2,555	2019 = 477 2020 = 517	86	82	36	2019 = 220.63 2020 = 241.26	-0.846	0.396
Unit B	2019 = 1,236 2020 = 1,341	2019 = 273 2020 = 239	64	54	36	2019 = 174.98 2020 = 173.29	-0.916	0.360
Unit C	2019 = 2,120 2020 = 2,455	2019 = 389 2020 = 400	61	42	36	2019 = 336.64 2020 = 344.63	-0.323	0.747
Unit D	2019 = 1,387 2020 = 1,521	2019 = 432 2020 = 368	92	88	36	2019 = 116.42 2020 = 120.05	-0.735	0.463

Results: Supply Room Observations

- 20 observations over 54 hours
  - Day and night shift
  - Weekdays and weekends
- Supply room was entered a total of 84 times
  - 1.5 times an hour
- Items most retrieved were:
  - IV fluids, socks, and personal hygiene items
- Entry occurred more during the following timeframes
  - 0500 to 0700
  - 0900 to 1000
  - 1400 to 1600

Results: Semi-Structured Interviews

- In total, 40-day shift and 20-night shift staff were interviewed
- These were utilized to evaluate staffs' thoughts on this change
- These questions were asked during leadership rounding to frontline staff using the nurse servers
- The questions related to patient safety, staff efficiency

Results: Semi-Structured Interviews

Unit	What supplies do you feel are needed in the nurse server for efficiency and patient safety?	How will adding that supply to the drawer address patient safety and increase your efficiency?	What supplies in the nurse server are rarely used?	Can those be removed from the drawer?	Are there any items that you have to run to the clean supply room for multiple times a day?
Overall common items between all units.	Socks, Tegaderms, attends, ABD pads, EZ lube, more secondary tubing, sani hand wipes, nasal cannulas	**Socks:** Fall risk **Tegaderms :** IV and wound safety **Nasal cannula:** Patient safety and needed in emergent situations **Sani-hands:** Patient safety **Secondary tubing:** Staff efficiency **EZ lube:** Staff efficiency **Attends:** Patient safety and staff efficiency	Empty 10cc syringe	N/A or not sure	Socks, Tegaderms, attends, ABD pads, EZ lube, more secondary tubing, Sani-hand wipes, nasal cannulas, IV fluids,
Unique items (mentioned by 2-3 people)	Soap, suture and staple remover kits, pill splitters	**Soap:** Patients always need body soap. **Pill splitter: S**o do not have to go to the med room to get one, will still need to go to label it **Suture/staple removal:** Need to walk all the way to clean utility room	Mixed array of answers, random	None, I use it all	N/A

Results: Semi-Structured Interviews CONT

Unit	# of staff, day/night, weekday (WD)/ Weekend (WE)	What supplies do you feel are needed in the nurse server for efficiency and patient safety?	How will adding that supply to the drawer address patient safety and increase your efficiency?	What supplies in the nurse server are rarely used?	Can those be removed from the drawer?	Are there any items that you have to run to the clean supply room for multiple times a day?	Does having standard nurse servers in all units aid in efficiency when you are pulled to work outside your home unit?
Unit A	7 day/WD 2 day/WE 2 night/WD 2 night/WE Total 13 staff	Socks, ABD pads, EZ Lube	**Socks:** Fall risk **ABD pads:** Patient safety and staff efficiency **EZ lube:** Staff efficiency.	Empty 10cc syringe	No	Socks, soap, nasal cannulas, IV fluids, attends, EZ lube, and Tegaderms	Yes, one less thing to worry about when floating elsewhere
Unit B	7 day/WD 3 day/WE 2 night/WD 3 night/WE Total 15 staff	Socks	**Socks:** Fall risk	None	N/A	Socks, IV fluids, attends, and Tegaderms	Yes, one less thing to worry about when floating elsewhere

Results: Semi-Structured Interviews CONT

Unit	# of staff, day/night, weekday/ weekend	What supplies do you feel are needed in the nurse server for efficiency and patient safety?	How will adding that supply to the drawer address patient safety and increase your efficiency?	What supplies in the nurse server are rarely used?	Can those be removed from the drawer?	Are there any items that you have to run to the clean supply room for multiple times a day?	Does having standard nurse servers in all units aid in efficiency when you are pulled to work outside your home unit?
Unit C	7 Day/WD 2 Day/ WE 2 Night/WD 1 Night/WE Total 12 staff	Socks, Tegaderms	**Socks:** Fall risk **Tegaderms:** IV and wound safety.	Empty 10cc syringe	Not sure, we do use it once in awhile to discontinue a Foley	Socks, Secondary tubing, EZ Lube, soap, nasal cannula, Tegaderms,	Yes, one less thing to worry about when floating elsewhere
Unit D	7 Day/WD 2 Day/WE 2 Night/WD 4 Night/WE Total 15 staff	Socks, Tegaderms , ABD pads	**Socks:** Fall risk . **Tegaderms** IV and wound safety. **ABD pads:** Patient safety and staff efficiency	None	N/A	Socks, IV fluids, Attends, dressing supplies, and Tegaderms	Yes, one less thing to worry about when floating elsewhere

Results: Semi-Structured Interviews CONT

Unit	# of staff, day/night, weekday/ weekend	What supplies do you feel are needed in the nurse server for efficiency and patient safety?	How will adding that supply to the drawer address patient safety and increase your efficiency?	What supplies in the nurse server are rarely used?	Can those be removed from the drawer?	Are there any items that you have to run to the clean supply room for multiple times a day?	Does having standard nurse servers in all units aid in efficiency when you are pulled to work outside your home unit?
Float Pool Staff	3 Day/WD 2 Night/WD	Socks, Tegaderms, attends, ABD pads, EZ lube, more secondary tubing, Sani-hand wipes, nasal cannulas	**Socks:** Fall risk **Tegaderms:** IV and wound safety. **Nasal cannula:** Patient safety and needed in emergent situations. **Sani-hands:** Patient safety **Secondary tubing:** Staff efficiency. **EZ lube:** Staff efficiency. **Attends:** Patient safety and staff efficiency **ABD pads:** Patient safety and staff efficiency	Empty 10cc syringe	Yes	Socks, Tegaderms, attends, ABD pads, EZ lube, more secondary tubing, Sani-hand wipes, nasal cannulas, IV fluids,	Yes, it is great to have the same items and set up everywhere. One less thing to think about during the shift

Results: VOICE Reports

VOICE reports relate to patient safety and quality of care.

VOICE File Data Related to Supplies	
August 2019	**2**
August 2020	**0**
September 2019	**2**
September 2020	**3**
October 2019	**11**
October 2020	**6**

VOICE File Totals	
Total 2019	**15**
Total 2020	**9**
Combined Total	**24**

Discussion

- Semi-structured interviews indicated benefits to staff and patients-increased safety/efficiency
- Supply staff can cover each others' assignments as the set ups are identical
- Patient safety increased as seen by the VOICE file data
- Semi-interviews indicated additions, reductions, and considerations
- Re-freeze was seen

Implications for Practice

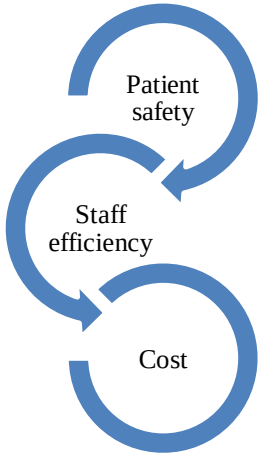
- Standardization improves nursing practice efficiency and patient safety
- Semi-structured interviews are valuable
- Waste data would help inform cost data

Limitations

- Lack of pre-observation data on trips to the supply rooms
- Deficiency of pre- and post-standardization waste data
- COVID-19 pandemic

Summary/Conclusions

- Evaluation of standardization of supplies to increase patient-safety, staff efficiently, and decrease costs
- Lewin's Theory of Change and the CIPP model
- Standardization promotes staff satisfaction
- Staff indicated improved efficiency when floating to other units



Budget & Resources

Cost Mitigation if Patient Safety Events Increase	
Cost of one safety event	$2,830
Cost of ten safety events	$28,300

Expenses for Implementation of Project	
DNP student time (in kind donation)	
Site mentor meetings $55/hour 20 hours	$1,100
Frontline staff time during leadership rounds $38/hour 15 hours	$570
Patient safety staff time (VOICE) $38/hour 3 hours	$114
Supply vendor staff time for PAR and cost data $40/hour 5 hours	$200
Supplies (notebooks, pens)	$6
Total expenses	$1,990
Cost Mitigation	**$26,310**

Mittmann, et al., 2012

Sustainability Plan

- The units will conduct audits of the nurse servers quarterly.
- Once three quarters have passed with no deviance from the standard, audits will be done on a yearly basis.
- Supply staff will also be ensuring daily that they are not adding supplies to the nurse servers that are not part of the standardization.
- To add supplies, as this may be needed in the future, staff will submit the request to their manager with a clear indication on how it will increase efficiency, improve patient safety, or decrease waste.

Dissemination

- Present to:
  - Organizational leadership and stakeholders by April 16, 2021
  - System infection prevention group in April 2021
  - Agency for Supply vendor leadership in April 2021
  - Healthcare system CNOs in April 2021
- Submit manuscript the Journal of Nursing Management by July 2021
- Submit for poster presentation at MEDSURG conference in 2022

DNP Essentials Reflection

Essential I: Scientific Underpinnings for Practice

- Applied conceptual frameworks
- Integrated knowledge of patient centered principles

Essential II: Organizational and Systems Leadership for Quality Improvement and Systems Thinking

- Effectively communicated with hospital team members from multiple leadership roles from the macro and micro system
- Utilized the Systems Transformation Framework to conduct an organizational assessment

DNP Essentials Reflection

Essential III: Clinical Scholarship and Analytical Methods for Evidence-Based Practice

- Literature review performed and frameworks used to guide the analytical methods of the student to complete a program evaluation
- Obtained IRB approval
- Provided outcome analysis and recommendations from program evaluation
- Dissemination of finding from program evaluation

DNP Essentials Reflection

Essential IV: Information Systems/Technology and Patient Care Technology for the Improvement and Transformation of Health Care

- Developed evaluation of metrics plan, and partnered with graduate student statistician on statistical analysis
- Used Excel
- Participated in full informatics evaluation of new data mining system for the organization

DNP Essentials Reflection

Essential V: Health Care Policy for Advocacy in Health Care

- Examined and contributed to the development and approval of several organization policies

Essential VI: Interprofessional Collaboration for Improving Patient and Population Health Outcomes

- Interprofessional project work
- Effective communication with all disciplines
- Consultant for nurse server standardization team

DNP Essentials Reflection

Essential VII Clinical Prevention and Population Health for Improving the Nation's Health

- Evaluated care delivery models and strategies using concepts related to community, culture, occupational health, and socioeconomics

Essential VIII Advanced Nursing Practice

- Completed organizational assessment, literature review, and program evaluation
- Completed clinical hours required for DNP-HSL leadership development

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