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Implementation of an Electronic Scheduling Platform

Rachel Miles

Submitted as Partial Fulfillment for the Doctor of Nursing Practice Degree

Regis University

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Abstract

The relationship between hospital nurse staffing and quality of care continues to be a significant concern for health services researchers, health care executives, policymakers, and consumers. The evidence supporting inadequate nurse staffing and negative patient outcomes is well documented in the literature. A national nursing shortage, nursing turnover, and increased acute care patient admissions intensifies the need for consistent scheduling and staffing for a Denver Metro hospital. The nursing shortage has been further impacted by the recent COVID-19 pandemic. The purpose of this quality improvement (QI) DNP pilot project was to look at the implementation of a scheduling and staffing tool for nursing in a medical surgical department of an acute care hospital allowing for transparency of open shifts and allow nurses the ability to fill those needs through a self-scheduling and extra shift option. The intervention was the ClairVia Scheduling Platform after providing specific education to nursing leaders, staffing associates, and frontline nurses. Three outcome objectives were identified (1) improved nursing engagement, (2) decreased nursing turnover, and (3) improved hospital acquired pressure injuries. Pre-data was collected 90 days prior to implementation and 90 days post implementation. Engagement showed a percent improvement of 7.58, the department had zero HAPIs post implementation, and turnover data was not found to be statistically significant with a p-value of 0.2338.

Key words: DNP Project; Nurse Staffing; Self-Scheduling Tools

Electronic Scheduling System

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Executive Summary

Problem

A national nursing shortage, nursing turnover, and increased acute care patient admissions intensifies the need for consistent scheduling and staffing for a Denver Metro hospital. When hospitals do not have the nurses needed for daily operations or the simple demand of the community for which they serve then services are limited. The study question for this project was: Will the implementation of a standardized electronic scheduling and staffing platform, ClairVia Workforce Solution, for a medical surgical unit of an acute care hospital improve staffing and affect nursing engagement, 12-month rolling turnover, and hospital acquired pressure injuries?

Purpose

The purpose of this quality improvement (QI) DNP pilot project was to look at the implementation of a scheduling and staffing tool for nursing in a medical surgical department of an acute care hospital allowing for transparency of open shifts and allow nurses the ability to fill those needs through a self-scheduling and extra shift option.

Goals

The major goal of this pilot project was to implement standardized use of ClairVia on a medical-surgical/trauma inpatient unit within an acute care hospital. A secondary goal for this DNP project was to compare results of nursing engagement survey questions, nursing turnover, and HAPI rates pre-post ClairVia intervention.

Objectives

First, nursing engagement will be improved by reported Glint survey scores. Second, nursing turnover rates in the medical surgical department will be reduced post implementation. Third, hospital acquired pressure injuries rates will improve.

Plan

After receiving IRB approval from the practice site and Regis University and collecting pre-data, training of the ClairVia Scheduling Platform took place. Post-data were obtained. Data were analyzed using a calculator and percent change.

Outcomes and Results

Engagement showed a percent improvement of 7.58, the department had zero HAPIs post implementation, and turnover data was not found to be statistically significant with a p-value of 0.2338.

Acknowledgements

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Implementation of an Electronic Scheduling Platform

The relationship between hospital nurse staffing and quality of care continues to be a significant concern for health services researchers, health care executives, policymakers, and consumers. Negative patient outcomes related to inadequate nurse staffing is well documented in the literature. Nurses experience burnout, leading to increased turnover, when they feel they are unable to deliver the require standard of care. Since 2012, the National Forum of State Nursing Workforce Centers have conducted a biennial nursing workforce study. In the most recent survey, data was collected from 42,021 RN respondents and 39,765 LPN/LVN respondents between Feb. 19, 2020 and June 30, 2020. An alarming trend uncovered is that a fifth of the nursing workforce plans to leave the profession within the next 5 years (National Nursing Workforce Survey, 2020). A national nursing shortage, nursing turnover, and increased acute care patient admissions intensifies the need for consistent scheduling and staffing for a Denver Metro hospital.

The nursing shortage has been further impacted by the recent COVID-19 pandemic. In March 5, 2020, the first COVID positive patient was admitted to a health care facility in Summit County, Colorado. The demand for nurses and their clinical expertise is high, while the supply is low and in many areas within the country are lowering due to early retirements or changes in careers. In addition, nurses have lucrative opportunities with travel positions offering \$5000 per week for three shifts and 43,000 travel positions posted, up from 13,000 a year ago (Koons & Court, 2021). The low supply of this precious human resource adds to the complexity of other low supplies in healthcare such as equipment, supplies, and hospital space. It becomes a vicious cycle. When hospitals do not have the nurses needed for daily operations or the simple demand of the community for which they serve then services are limited. This can be with closures or

beds or units, boarding in the Emergency Department, cancelations of procedures, and transfers of patients outside of their communities and away from their primary care physicians. On top of this as nurses continue to work with lower supply of colleagues, their burnout and frustration with their profession grows which then leads to more demand and supply issues.

This Doctor of Nursing Practice (DNP) capstone project is scholarly work that focuses on a clinical practice problem with an evidence-based solution to that problem (Zaccagnini & White, 2017). This capstone project concentrates on the implementation of an electronic scheduling system and the effect on nurse engagement and patient outcomes. This paper includes a clear problem statement, the significance and scope, nursing theory used, systematic review of the literature and the market and risk analysis. In addition, clear project objectives, methodology and evaluation plan including analysis of the findings, limitations, and recommendations for a practice change are presented.

Problem Recognition and Definition

Purpose

The purpose of this quality improvement (QI) DNP pilot project was to look at the implementation of a scheduling and staffing tool for nursing in a medical surgical department of an acute care hospital allowing for transparency of open shifts and allow nurses the ability to fill those needs through a self-scheduling and extra shift option. As a Doctor of Nursing Practice (DNP) student, it is foreseen this project will influence healthcare quality, such as hospital acquired pressure ulcers, at both the macro and micro level (Moran, et. al., 2020). Scheduling and staffing the right number of nurses for the level of care needed on a given unit will directly impact patient care and outcomes on the unit as well as the engagement of those nurses. In addition, on a more macro level, having integrated platforms for scheduling

will allow for shifting of resources as needed, ability to track unfilled shifts, and collectively understand what financial impact will have on a health system when the right staffing levels of nurses is achieved. This is an evidence-based project that is not meant to develop new knowledge or to be generalized outside of the agency.

Problem Statement

The problem is the organization lacks an integrated scheduling and staffing platform that supports transparency of filled and unfilled shifts at the department level. The organization's current system for staffing and scheduling is not robust and not used consistently across all departments. At the leadership level there is lack of understanding of the system's ability to facilitate appropriate and adequate staffing based on the department's staffing plan for the average daily census and budget. The lack of an electronic integrated scheduling and staffing platform has forced the use of many manual processes such as spreadsheets to ensure the right staffing level of nurses were available to provide necessary patient care. Stakeholders across the health care system have identified this problem which include clinical frontline nurses, Chief Nurse Executive, Chief Nursing Officers, Human Resources, and Finance Leaders.

The nursing turnover is higher than market and national trends with nursing engagement not at the benchmarked goal. The COVID-19 pandemic has heightened this problem. From January 1, 2021 through December 31, 2021, the rolling 12-month RN turnover experienced in this unit was 57%. The last engagement survey in August of 2021 for the identified medical surgical department had a response rate of 34% with an engagement score of 66. Benchmark for the health care organization is 71%. Use of critical need pay practices have risen due to needs for covering nurse staffing gaps, and use of premium pay for labor such as contract nurses has doubled. HAPI rates in fiscal year 2021 (July 2019 through June 2021) were 0.70 per 1000 patient

discharges. This equated to three Stage III/IV in the timeframe among medical surgical patients ages 18 years and older. The health care organization's goal is 0.46 which is the 75th percentile.

Each of these points led to the identification of this problem and the need for a robust consistent approach for both leadership and clinical frontline nurses to improve the process for scheduling and staffing the medical surgical department. These problems were directly addressed with this DNP quality improvement project.

Self-scheduling is a current process that is utilized and will continue with the use of the ClairVia platform with an added feature of accessing the schedule from home. Additional desirable abilities are seen with the implementation of the platform for leadership, clinical frontline nurses, and staffers. For leadership the budgeted unit of service with an associated staffing plan is available for the department. There is also a position control associated with the department built from the staffing plan that is provided as a direct feed from the Lawson System, a human resource tool housing all of the organization's associate detail. This information is critical for the leader to ensure that the right skill mix, shift, and full-time equivalent employees are hired into the department to fulfill the staffing and scheduling needs.

Clinical frontline nurses will have transparency into the staffing plan at all census levels for the department and how shifts are being filled (i.e., float staff, agency, critical need pay). ClairVia will support a balanced schedule as clinical frontline nurses sign up for shifts by prohibiting abundance of staff scheduled for a shift or day of the week. Finally, the staffers are able easily to see who is scheduled to work within one system and can float team members to like units as needed to cover staffing needs for a particular shift.

PICO Statement

The capstone project utilizes the “PICO” question format rather than a formal research hypothesis. The PICO acronym stands for: Population or Patient (P), Intervention (I), Comparative Analysis (C), and Outcome (O) (Houser & Oman, 2011). The population (P) of the study for this project were nurses on a medical surgical unit in acute care hospital. The intervention (I) is the ClairVia Workforce Solution. The comparison (C) for this study is pre/post nursing staff turnover rates, nursing engagement results, and HAPI rates. The outcome (O) of the project was improved staffing and nurse engagement, along with decreased acquired patient pressure injuries and nurse turnover rates. Therefore, the PICO question for this project reads as follows: Will the implementation of a standardized electronic scheduling and staffing platform, ClairVia Workforce Solution, for a medical surgical unit in an acute care hospital improve staffing and affect nursing engagement, 12-month rolling turnover, and hospital acquired pressure injuries?

There was a change from the original PICO question. The original intervention, Kronos Workforce Dimensions, was changed to the ClairVia Workforce Solution due to unforeseen circumstances with Kronos. The use of ClairVia is a similar solution for the intervention; no other changes were made to the PICO.

Project Significance, Scope and Rationale

The scope of this QI pilot project was limited to a 231-bed community hospital in Colorado. The project is significant to clinical practice to ensure the right staffing and workload volume to provide appropriate care to the identified patient population. As a DNP student it is also important to identify how this project aligns with the American Association of Colleges of Nursing (AACN). The second essential identified by AACN, 2006 is the DNP as a systems

thinker. This essential aligns well with understanding practice management including conceptual and practical strategies to balancing productivity with quality of care (AACN, 2006). The DNP prepared nurse leader can identify issues and strategically lead system redesign.

Theoretical Foundation

The first foundational theory for this QI project was Kotter's Change Theory (Kotter, 2020). Kotter's theory is based on Lewin's Change Theory developed in 1951 (Lewin, 1951). Kotter moved from Lewin's simplified three steps of change and expanded the change process into three phases with eight total steps of change. Kotter's change theory leads the change process, step by step through planning, implementing, and sustaining the change. The three phases and eight steps include:

1. Creating the Climate for Change
 - a. Step 1: Create Urgency
 - b. Step 2: Form a Powerful Coalition
 - c. Step 3: Create a Vision for Change
2. Engaging and Enabling the Organization
 - a. Step 4: Communicate the Vision
 - b. Step 5: Empower Action
 - c. Step 6: Create Quick Wins
3. Implementing and Sustaining for Change
 - a. Step 7: Build on the Change
 - b. Step 8: Make it Stick (Kotter, 2020, p. 15)

Kotter's theory integrated easily into this quality improvement pilot project because the project includes a change in process for staff self-scheduling and impacts how leaders would manage and post schedules. Staffers who will use the platform daily are also impacted by the change. According to this theory, all eight steps of change must be included and followed. Including each step helps to ensure a successful and sustained change over time. Kotter's change theory was the

framework for this implementation of an electronic scheduling platform quality improvement pilot project to implement and sustain this change.

The second theory chosen for this pilot project is Nursing Services Delivery Theory (NSDT) (Meyer & O'Brien-Pallas, 2010). The NSDT theory links nursing work, staffing, work environments and outcomes. It is easily applied to varied settings, cultures, and countries. The theory can guide future research and the management of nursing services in large scale organizations (Meyer & O'Brien-Pallas, 2010).

The NSDT derivation was guided by these questions: "What is the nature of an organization? How do Healthcare organizations produce nursing services? How do management structures contribute to the delivery of nursing services?" (Meyer & O'Brien-Pallas, 2010). The theory has five concepts:

1. Inputs
2. Throughput
3. Output
4. Systems as cycles of events
5. Negative feedback (Meyer & O'Brien-Pallas, 2010, p. 2832)

The NSDT identifies that care is delivered by nurses clustered in work groups that are housed in a department or program in a larger organization. These work groups transform inputs to deliver nursing services and to yield outputs. One input is staffing that feeds into the nursing production subsystem which is also made up of the nature of work, structure, and work conditions. The outputs then include clinical outcomes, human resource outcomes, and organizational outcomes. For these reasons this theory fits well into the framework for this quality improvement project for implementation of an electronic scheduling platform (Meyer & O'Brien-Pallas, 2010)..

Review of Evidence

Literature Selection/Systematic Process

A robust systematic review of the literature was completed in preparation for this quality improvement project regarding the implementation of a standardized electronic scheduling and staffing system. Data bases searched included Medline, PubMed, EBSCO, and CINAHL. Search terms were nurse, staff(ing), and hospital. These terms resulted in 2,980 articles. The search was further narrowed with variations of these terms. These terms included nurse, nursing, resilience, engagement, turnover, schedule, patient acuity, patient, and ratio. This distilled the search down to 134 articles. Inclusion criteria included articles that were (a) peer reviewed, (b) written in English, (c) published between 2000 and 2021, and (d) addressed nurse staffing in acute care hospitals. Articles were excluded from the review for the following reasons: (a) only nursing engagement, turnover or resilience (b) only nurse patient ratios, (c) only financial focus on staffing. Review of the abstracts assisted with final article selection. Thirty articles were selected for full review based on relevance to the PICO question and problem statement. After review, 14 articles were used as reference for this pilot project.

Scope and Quality of Evidence

Melnik's and Fineout-Overholt (2015) hierarchy of evidence was utilized to rate the evidence provided within each of the thirty articles. Out of the 14 articles selected, none of the articles provided Level I or II evidence. Five articles were ranked at Level III, two at Level IV, four at Level V, two at Level VI, and one at Level VII. See Appendix A for a list of articles (authors' names) and their association with each level of evidence.

Background of Problem and Systematic Review of Literature

Four major themes were identified through the literature review. These include use of acuity systems to direct nurse staffing, patient outcomes show positive impact with higher nurse staffing, workload forecasting and the ability to adequately staff what is needed for patient population, and nursing leadership's effect on the work environment.

Use of Acuity Systems to Direct Nurse Staffing

Numerous staffing models and strategies have been implemented within healthcare organizations over the years. The flexible or acuity-based staffing model and the fixed staffing model are the two most used models within acute care hospitals (Comeaux & Bumpus, 2019). The traditional unit-based staffing grid, or matrices, identify staffing levels of nurses based on a census point and determined by the unit's budget of hours per patient day. The hours per patient day is driven by the level of care for the patient nursing needs, such as a medical surgical unit versus a critical care unit which has a higher hour per patient day. The use of acuity systems to direct nurse staffing can assist with identifying the workload and guide the number of nurses needed to provide care to a patient population. An acuity-based staffing model determines staffing needs based on patient status including stability, intensity, and acuity (Comeaux & Bumpus, 2019). Heslop and Plummer (2012) were able to show that in comparison to nurse patient ratios, computerized nurse acuity tools provide managers with continuous patient dependency data for allocating and predicting staff allocation based on nursing care requirement. Hummel et. al. (2020) showed how the combined use of an acuity system in an electronic medical record (EMR) with an acuity staffing calculation would have impact on staff and patient satisfaction. Utilization of an acuity system will satisfy the need for reliable data showing the individual needs of patients for nursing care to standardize staffing decisions

(Trepanier et. al., 2017). The method of hours per patient day with a grid approach and standard ratios does not incorporate acuity into the decision to minimize variability in nursing resource deployment.

Too few studies are available showing consistency on the topic of acuity-based nurse staffing as it relates to costs and outcomes (Heslop & Plummer, 2012). This is driving organizations to create their own acuity tools and take the steps necessary to calculate the appropriate number of nursing hours needed for patient care. Most nurses expect assignments to be equitable with each nurse sharing the workload so all patients can receive high quality care (Comeaux & Bumpus, 2019). Staffing is a challenging process with the goal of matching patient needs at various points throughout their hospitalization with the skills and competencies of many nurses.

Patient Outcomes Show Positive Impact with Higher Nurse Staffing, Work Environment, and Education

Optimal staffing is more than just a number, and the second major theme in the literature review shows that patient outcomes are positively impacted with higher nurse staffing, positive work environment, and level of education. There are many factors to consider with making nurse assignments. One article from Cho et. al. (2015) looked at staffing and patient mortality as it relates to nursing ratios, the work environment and education level such as a BSN. Each added patient to a normal nurse's workload was associated with a 5% increase in mortality. Patient mortality was shown to be 48% lower in hospitals with good work environment, and with each 10% increase in BSN educated nurses there was a 9% decrease in patient mortality (Cho et. al., 2015). Stalpers et. al. (2015) looked at five patient outcomes and the association of nurse staffing and work environment. The

findings showed lower patient falls with more favorable staffing hours, a mixed result on nurse staffing and pressure ulcers, no studies to support delirium or malnutrition, one study related to pain management, and work environment characteristics other than staffing were collaborative relationships, education, and experience.

Contemporary health care requires that the quality of nursing care is excellent, and therefore, understanding the relationship with nurse work environment is imperative. Stalpers et. al. (2015) emphasizes the need for longitudinal research with well-defined outcome measures and comparable samples of hospitals to further understand the impact of nursing ratios, work environment, education.

Workload Forecasting and the Ability to Adequately Staff What is Needed for Patient Population

Workload forecasting and the ability to adequately staff what is needed for a patient population is the third theme revealed during the literature review. A few articles selected discussed the need for workload forecasting. As noted above, there are two traditional models of care: fixed and acuity based. Long-term workforce management decisions, such as determining the size and composition of the nurse workforce needed for a patient population and workload is beneficial (Wright et. al., 2006). Yet acute care organizations have not fully solved for the complexities surrounding staffing and scheduling for patient care delivered by nursing. The findings suggest that organizations need to review and evaluate models to address the age-old problem around workload forecasting and scheduling. This would include the workload forecasting such as fluctuations in census as well as acuity.

Niday et. al. (2012) highlighted work to improve many elements of nurse staffing at a 500-bed tertiary facility. The goals identified by a newly for Staffing Committee were

enhancing financial performance, identifying opportunities for improved function across the facility and healthcare system, creating a safer environment for staff and patients, and attracting and maintaining high quality nurses. The health system adopted a web-based software solution that assisted with reducing a staffing and scheduling process for 12 steps to seven steps. In addition, the tool provided predictive modeling showing the demand for nurses daily and by shift. Managers were able to balance their schedules and monitor productivity real-time. The work resulted in a \$7.2 million annual savings, while maintaining patient satisfaction scores, and improved nursing satisfaction (Niday et. al., 2012).

Nursing Leadership's Effect on the Work Environment

The final theme to emerge is the effect on the work environment from nursing leadership. Wei et. al. (2020) conducted an extensive literature review which indicated nursing leadership plays a significant role in alleviating nurse burnout. Evidence has shown that the reasons nurses state for leaving include a lack of support from peers and nurse managers (Ulep, 2018). The two leadership styles that were identified as most favorable are authentic and transformational (Penque, 2019). In addition, structured nursing leadership rounds were shown to have a strong correlation on nursing satisfaction and strengthening the emotional commitment to an organization's success (Wahl et. al., 2018). Nurse leaders who promote a positive work environment develop and strengthen staff engagement resulting in staff who are satisfied with their nurse leaders. Nursing administrators develop trust with their staff when they are visible and listen to staff concerns. "Implementing consistent, structured leader rounding fosters a personal connection, builds relationships between managers and staff, and is critical to building a healthy work environment" (Blake & Bacon, 2020, p. 461).

With a variety of diagnoses and treatments, many nursing units require that their nursing leaders have targeted processes to assign the nurse with necessary competencies to patients. Culture, along with staff personalities and the overall work environment can differ from unit to unit within the same organization. “Translating and applying evidence from the nursing leadership literature in complex, highly specialized organizations is challenging and not a linear process.” (Dumias & Hyrkas, 2019, p. 34). The nursing leader role is not an easy one, and the Health Resources and Services Administration estimates that there are 67,000 nurse manager vacancies. This number is staggering making it imperative for health care organization to invest in succession planning for the future. Succession planning involves identifying, mentoring, and training younger nurses to shift into leadership roles when senior nurses transition out of these roles and retire. “By having a formal succession plan in place, hospitals can provide education, mentorship, and ongoing interdisciplinary support to emerging nurse leaders and improve their commitment and engagement to the organization, ultimately impacting hospital finances.” (Dumias & Hyrkas, 2019, p.36).

The systematic review of literature revealed four major themes emphasizing that nurse scheduling and staffing in the acute care environment relies on many elements. These elements include workload forecasting, budgeted unit of service, productivity measures, skill mix, and acuity. A positive work environment is highly correlated to nurse satisfaction and retention which can have direct impact on scheduling and staffing. Achieving the right or wrong schedule and staffing in a department can positively or negatively impact nursing satisfaction as well as patient outcomes. Very few of the articles reviewed used the same methodology, and standardized outcome measures for patients and nurse satisfaction were

lacking. The review of the literature supports the need and approach for this quality improvement project.

Project Plan and Evaluation

Market-Risk Analysis

An important component of any project is understanding the market where the project will occur and analysis of potential risks to the project. An assessment can be used to evaluate the strengths and weaknesses of a variety of phenomena, such as strengths and weaknesses of a community, organization, program, project, or even a process (Moran et al., 2020). One tool used to perform an assessment is called a strengths, weaknesses, opportunities, and threats (SWOT) analysis. The next portion of this paper will present a SWOT analysis, driving and restraining forces, needs/resources and sustainability, the stakeholders and project team, along with the cost-benefit analysis for this DNP quality improvement project.

Strength, Weaknesses, Opportunities, and Threats (SWOT)

A SWOT Analysis was completed to determine the strengths, weaknesses, opportunities, and threats to the quality improvement project. See Appendix B for a visual representation of the SWOT analysis for this project. Within a SWOT analysis, the strengths and weaknesses are internal factors. The opportunities and threats are external factors. Several internal factors were identified under strengths and weaknesses. The organization's mission, vision, and values were leading strengths for this project. All three are well known throughout and used as a foundation for work and change. This along with executive and financial support sets the project up for success. Other strengths identified were the Magnet designation of the hospital and the strong functionality of the electronic platform that was already available for use within the organization. This lends to a final strength of minimal cost to the organization for this project. A weakness

identified included nursing turnover rates which were currently higher than the national average for nursing. An additional weakness was overall lack of understanding for use of the ClairVia scheduling platform and its multiple abilities to enhance the process. The organization has also identified an opportunity for a centralized staff and resource center to assist nursing leaders with the day-to-day scheduling and staffing challenges.

Opportunities and threats were considered external factors that could affect this project. Threats identified include workplace violence which can continue to have a negative impact on nursing turnover, continued struggle with the COVID pandemic and other infectious diseases that put strain on the workforce, and the market competition with other healthcare organizations and ability for nurses to easily travel with high compensation. In addition, there has been growing nursing union activity in the Denver Metro area that is considered a threat. Opportunities identified included the reporting functionality for staffing and scheduling, market growth for the organization, and budget processes for units of services/HPPD which incorporates the average daily census.

Driving and Restraining Forces

Every project has driving and restraining forces. It is important to identify each to understand where support will come from to have a successful project and where potential barriers will be met. Multiple driving forces were noted in this project with the most important three being executive support, standardization in scheduling, and the organizational desire to “fix” staffing. Executive leadership, which include the Chief Nurse Executive and Chief Nursing officers, has sought out a way to improve nurse staffing processes. Having a standardized electronic platform that provides easier processes for nursing staff, staffers, and leaders is seen as the first step in managing this complex and ever-changing need for

resources at the frontline to care for patients. Other driving forces included patient outcomes, nursing engagement, and the need for transparency with staffing and scheduling.

Four restraining forces have been identified. The most concerning was the change in process for nursing leaders, staffers, and nursing staff with the use of the new tool. While there are several identified benefits to the new platform it will be a change to current process for scheduling and staffing the department. Processes around entering paid time off (PTO), identifying “premium pay shift”, and floating staff to other departments have been identified as challenges with this change. Ensuring that all end users of the tool have been educated and comfortable using was important during this pilot project. Use of the Kotter Change Management Model was very useful in this pilot by moving through the three stages and eight steps.

Need, Resources, and Sustainability

The need for this pilot project has been identified. To be complete the project resources and sustainment factors are necessary. The two largest resources are IT time to complete upgrades and builds to the already existing ClairVia scheduling platform, and hours spent to train nursing leaders, nursing staff, staffers, and development of position controls and staffing plans for departments. This resource has been secured by the organization and is supported by executive leadership from a clinical and financial perspective. A project manager was identified to support the IT build and testing of the platform. Executive Nursing leadership was both a needed resource as well as a sustainment factor. The leaders needed education on using the tool and see value as well as efficiencies in how it functions. This assisted with the adoption of the ClairVia platform during the pilot project and after as it continues to be implemented in other departments. Education was provided by the Manager

of the Staffing Resource department and the Vice President of Nursing for Denver Metro Group through live classes; computers needed for the education was a resource provided by the pilot hospital. The successful pilot has led to roll out continuing throughout the facility and 17 hospitals part of the health care system; continued Executive support and a Central Staffing Model Concepts with processes for daily accountability will be the final product.

Feasibility, Risks, Unintended Consequences

Through review of the organizations turnover data, nursing engagement with comments, and quality outcomes there was an identified need around scheduling and staffing processes for nursing. A pilot introducing a standardized electronic platform with standardized processes was determined to be feasible. A pilot study conducted to determine feasibility should replicate the larger study as close as possible in setting, intervention, data collection, and analysis (Moran et. al., 2020). Therefore, a medical surgical department within an acute care hospital in the health care system was identified.

For this pilot project there were no risks to the organization or to the participants identified. The schedule timelines did not change, therefore there was not an impact on operations or nurses from a scheduling standpoint. Prior to the project the organization used 6-week schedules and continued with this process during the pilot. Also, there were no changes to policies regarding schedules or staffing guidelines.

Prior to the start of this pilot there were no unintended consequences identified. As a result of the pilot and continued roll out in nursing departments throughout the organization, there is an identified need and ask to do the same work with other areas in the organization.

Stakeholders and Project Team

Identifying stakeholders ahead of time with any project is critical to the overall success and sustainability in the future. For this quality improvement project there were multiple stakeholders that included chief executive leaders, system CNOs, nursing associates, patients/community, human resources, finance team, and the compensation team. Each of these stakeholders had a vested interest in the project implementation and success. Once the pilot site was identified, a project team formed to guide the operational implementation and timeline. The project team included this DNP student, Chief Nursing Officer (CNO) of the hospital, pilot unit nurse manager, pilot assistant nurse managers, acute care nursing director, project manager, information technology (IT), central staffing office leaders and staffers, communications and change management leads, educator, DNP Clinical Mentor and Project Chair.

Cost Benefit Analysis

A cost-benefit analysis was completed for this quality improvement project. Cost for this pilot project is minimal and were already budgeted and planned for by the organization. The benefits will outweigh the costs associated with this quality improvement project. Cost associated include the price of upgrading the ClariVia Scheduling Platform, build and testing time of the IT team, training of leaders and staffers, and the training of the frontline nurses on how to use the scheduling tool. Additional costs were identified for hours of education on building a position control and staffing plan for the department with nursing leaders and frontline nursing staff. In addition, the organization identified a full-time project manager for this implementation. Benefits of the project include decreased RN turnover, increased RN engagement, decrease in HAPIs, increased patient volume accepted with adequate staffing levels, and a decrease in the use of contract labor and/or critical need pay practices. Nursing turnover is

the most significant benefit for this project. It is estimated that replacing a nurse within the organizations is \$84,000 and the onboarding costs of a newly hired nurse ranges from \$30,000 to \$58,000. Refer to Appendix C to review the Budget Summary Costs for this project and cost to replicate.

Mission, Vision, and Project Goal

The mission statement for this quality improvement project was to complete a pilot of an electronic scheduling and staffing platform, ClairVia Scheduling Platform and evaluate the impact on an inpatient unit. The vision for this project was that the electronic tool will provide transparency to the scheduling and staffing processes and support correct staffing number for the right patient at the right time.

The major goal of this pilot project was to implement standardized use of ClairVia on a medical-surgical/trauma inpatient unit within an acute care hospital. A secondary goal for this DNP project is to compare results of nursing engagement survey questions, nursing turnover, and HAPI rates pre-post ClairVia intervention. Refer to Appendix D to review the timeline for this evidence-based project DNP project.

Project Outcome Objectives

There are three outcome objectives identified for this QI pilot project. First, nursing engagement will be improved by reported Glint survey scores. Second, nursing turnover rates in the medical surgical department will be reduced post implementation. Specifically, the unit will have less than 5 RNs resign after the implementation to the completion of this pilot project. Third, HAPI rates per NDNQI will improve by 10%. Each of these objectives were chosen based on current performance of the unit and identified as areas of improvement. The

measurement tools used can benchmark nationally. This data will be collected post-intervention

Logic Model

Logic models are developed to depict how the investigator envisions the flow of an individual project. “A logic model is a picture of how the project developer believes the program will work. It is a series of diagrams to indicate how parts of the program are linked together or sequenced” (Zaccagnini & White, 2017, p. 478). The model illustrates the identified project, problem identification, inputs, constraints, activities, outputs, and short-term and long-term outcomes. The project and problem identification have been discussed in detail in the previous sections of this paper. The inputs in the logic model included any factors necessary for the DNP quality improvement project moving forward.

Appendix E the logic model associated with the identified PICO question. Along with the identified problem, input, activities, outcomes, and potential constraints are highlighted. Input addresses potential resources needed during the course of the project timeline. Activities are areas of preparation for the start of the project as well as things that will occur along the full course of the project. Outcomes are broken down into three areas: short term, long term, and impacts. The short and long-term outcomes focus on immediate and then 12 to 24 months post implementation, with impacts identifying areas of improvement for the organization through over several years post implementation.

Nursing engagement, HAPI, and nursing turnover all have national benchmarks which will be utilized to measure the outcomes for the PICO question. Nursing engagement will benchmark against the national database provided by the external vendor, Glint, used to administer the survey. National Database of Nursing Quality Indicators (NDNQI) will

provide the national benchmarks for each department within the project for HAPI. Nursing turnover will be collected on a rolling 12-month timeline and benchmarked at the state level as well as nationally.

Population and Sampling Parameters

Nurses employed at the hospital in the medical surgical department at the time of survey (full time, part time, and PRN) were eligible to complete the nursing engagement survey. The exclusion criteria for engagement survey participation includes those RNs hired less than 30 days of hire at start date of survey, RN travelers, and those employed into the Flex Team. It was expected that the unit would have 51% or more of the nursing staff to participate for each interval of the survey. Recruitment occurred through staff meetings, email, and facility town halls encouraging the completion of the survey to provide their voice. Glint Survey participation was completely anonymous, so the same individuals may not participate in each survey. The overall engagement percentage, along with the breakdown of the two questions asked for engagement allows for an analysis of the percent change. Nursing turnover would capture 100% of turnover at the time the data is pulled, and HAPI with NDNQI was based on prevalence per 1000 patient discharges.

The sampling described above for both NDNQI and nursing engagement was a convenience sampling. The major advantage for this type of sampling is the ease with which the researcher can locate research subjects; the major disadvantage is that the risk for researcher bias is greater than in any other type of sampling (Terry, 2018). This is considered to be the weakest form of sampling due to the volunteering of the participants and the possibility of not representing the overall population.

Setting

The setting of the quality improvement pilot project is at an acute care hospital in Colorado. This hospital is a non-profit, community hospital licensed for 231-beds. The hospital was Joint Commission accredited and is a Medicare approved facility through the Centers for Medicare and Medicaid Services. In 2020 the hospital received Magnet designation through the American Nurses' Credentialing Center. The quality improvement pilot project occurred on a 32-bed medical-surgical/trauma inpatient nursing unit. Patient population on this unit includes those who are 18 years old or older who are post-surgical or post trauma admissions.

QI Design Methodology and Measurement

A clinically based quantitative quality improvement capstone project was designed using a quasi-experimental approach, specifically a pre-post survey design with the collection of pre-post HAPI/turnover rates. The quantitative design will establish correlational and causal relationships between variables (Terry, 2018). The quasi-experimental approach does not employ randomization and will show a comparison of before and after implementation of an independent variable or intervention. Quasi-experimental works well with intact groups such as the nursing workforce for an identified hospital, but there can be rival opinions that arise once outcomes are measured (Quantitative Study Designs in Outcomes Research, February 2021).

Within the proposed project there were independent, dependent, and extraneous variables to consider. The primary independent variable is the implementation of a staffing and scheduling platform. Dependent variables include:

- nursing Engagement,
- rolling 12-month nursing turnover, and
- HAPI.

An extraneous variable to be considered is newly recruited nurses joining the organization after implementation of the staffing and scheduling tool and participate in the post-nursing engagement survey. Other extraneous variables may include process improvement actions taken by nursing leadership during the project timeline focused specifically on nursing engagement, nursing turnover, and HAPI.

Description of Intervention and Treatment Procedure/Protocol and Data Collection

Intervention

The project intervention included implementation of ClairVia Scheduling Platform, a standardized scheduling and staffing platform. A four-hour education course was provided to nursing leaders. A two-hour education course was provided to staffers. A one-hour education course was provided to the nurses. Both courses started off with the “why” of the needed change for the health care system as an organization. Both courses were taught in partnership with the Vice President of Nursing, Vice President of Nursing Operations, Manager of Central Staffing, Human Resources, and Finance. The longer class for nursing was more in depth on how to build and manage position control based on the unit’s budget, build a staffing plan, balance schedules, posting the schedule, how to make edits after finalizing a schedule, managing PTO, and communicating through the platform. The two-hour course for staffing associates reviewed the ClairVia platform, running reports for position control and balancing schedules, scheduling codes for PTO, on call, and delayed start. The one-hour course was much simpler for the RNs and showed how to access the platform remotely and with a mobile device, how to self-schedule, and communication through the platform. In each class proctored hands on practice time was provided as well as sufficient time for questions and answers. Following training, there was a 4-week timeframe for “Go-Live” self-scheduling in

ClairVia to occur. Next, there was a 2-week timeframe for the nurse leaders and staffing associates to balance and post the final schedule.

Treatment Protocol and Data Collection

Site approval was obtained for this project, and approval from the health care organization's Research Committee was received. In addition, approval from Regis University IRB was received. See Appendix F for this documentation. The nursing leaders and nursing associates on the medical surgical floor were informed of this pilot QI project through staff meetings, huddles, and email. An information sheet was provided which can be viewed in Appendix G. Pre-intervention data were collected by the facility for the employee engagement in August 2021, which is the normal hospital timeline for collecting this data, as well as RN turnover, and HAPI. Demographics were collected for both employee engagement and RN turnover. The finalized schedule for intervention covered two 6-week schedule periods. Finally, post-intervention data were collected December 2021 through February 2022 on HAPI rates, turnover rates, and participants were asked to voluntarily complete the post engagement survey in March 2022. Accessing and completing the survey questions implied consent. All data collected were de-identified and in aggregate form and stored on a password protected personal computer for up to three years following completion of project.

Protection of Human Rights

Federal regulations for human subject's research exist to protect vulnerable populations (Office for Human Research Protections, 2016). Special considerations are given to particularly vulnerable subjects, such as children, prisoners, pregnant women, mentally disabled persons, or educationally disadvantaged persons. Understanding this information, the implementation of the ClairVia Scheduling Platform in the pilot project was internal to the organization and as

determined by both IRB committees it was not considered to be a human research study. The investigator followed the ethical principles of autonomy, beneficence, nonmaleficence, justice, fidelity and veracity and ensured protection of nursing staff and patients throughout the quality improvement project. Educational program and the use of ClairVia were mandatory for all nursing leaders, staffers, and nursing staff. All nurses and nursing leaders were made aware that all participation in the response to the Glint engagement survey was voluntary and not required as a condition of employment. There were no risks to any of the nurses or nursing leaders in this quality improvement project. This DNP student successfully completed the Social-Behavioral-Educational modules in the Collaborative Institutional Training Initiative (CITI) training as shown in Appendix H.

Instrument Description, Validity and Reliability

There will be three measurement instruments for this quality improvement pilot project. The first instrument of measurement is an internal business analytics dashboard published utilizing a Microsoft Power BI application. This is an existing instrument unique to the organization and does not have any published reliability or validity data. This instrument is used for the collection of RN 12-month rolling turnover and also shows 90 day and first year turnover. Data is de-identified in the tool and captures 100% of turnover for full-time, part-time, and PRN associates.

The second measurement instrument was the Glint associate engagement survey. Glint is an associate engagement firm that continues to do research on associate engagement. Glint's framework for engagement is, "operationalized primarily as a cognitive, and emotional state that overlaps with job satisfaction, commitment, involvement, and motivation" (GLINT, 2019). Glint participated in a study of 500 commonly used engagement survey items that spanned 50 years of

research and academia in the field of psychometrics to determine what engagement questions are most relevant in assessing associate engagement (GLINT, 2019). This tool is considered valid and reliable in health care and has comparable benchmarks. Nursing engagement can be directly affected by having a robust self-scheduling platform which supports a hiring and staffing plan. These tools allow for the department to plan and implement the ability to have the right number of nurses for the number of patients at a given time.

The health care system's goal for employee engagement is the 75th percentile. The two questions on the survey that measure engagement are (1) I would recommend ____ as a great place to work, (2) How happy are you working at _____. The Likert Scale has five choice answers:

1. Strongly Agree
2. Agree
3. Neutral
4. Disagree
5. Strongly Disagree

In addition, the Glint survey provides a "People Report" that includes de-identified demographic aggregate data on job category, FTE type, generation, work shift, gender, and years of service. The survey is delivered through a link and/or QR Code that is web based and takes about 30-45 minutes to complete. The RN Turnover Dashboard also provides de-identified aggregate data points: involuntary, voluntary, job category, retirement risk, ethnicity, voluntary reason for leaving, gender, and generation.

The third instrument chosen that is considered valid and reliable is NDNQIs HAPI rates per 1000 patient discharges. The NDNQI was developed under the American Nurses

Association to track and benchmark nursing quality indicators nationally and internationally. Nursing hours per patient days is another nursing sensitive indicator tracked by NDNQI. Implementation of a robust fully utilized self-scheduling and staffing tool with integrated position controls and staffing plans will allow for more in-depth comparison into staffing and HAPI prevalence. Literature review shows that there could be a direct link into nurse staffing levels and HAPIs. There are currently over 1000 health care facilities participating in NDNQI. HAPI data is collected quarterly with standardized tools and can be used to benchmark units with other like units. The hospital uses an interrater reliability process for collecting the HAPI data to ensure accuracy.

Identifying potential threats to validity and reliability as well as potential bias is a necessary step in the process of analyzing data. For this project there are many potential internal threats and a couple of external threats to consider. Internal threats to reliability identified included changes to hour per patient day (HPPD), vacancy rates, leadership changes, and other process improvements arounds HAPI, turnover, and engagement that may occur outside of this project. The organization works on a fiscal year of July 1st through June 30th of the following calendar year. There could have been a change in the summer of 2021 where the HPPD was affected for inpatient nursing units causing an impact on staffing matrices either positively or negatively. For the period of the project there was not a change to budget or HPPD. To address the identified threats, its necessary to know what changes occurred during the timeline of the project. They are acknowledged within the final data analysis. An external threat to reliability was COVID and the continued effect on patient volumes, but also the negative effect on recruitment and retention of nurses in the acute care environment. Missing data was minimal; incomplete or missing data was excluded.

Data Analysis and Statistics

The data analysis section of the Doctor of Nursing Practice capstone organizes the data in a way that answers the clinical, or PICO, question (Moran et. al., 2020). Understanding what data points will be collected allows the student to know what statistical test to be used for analyzing the data. The quantitative data consists of information in numerical form to show outcomes pre and post intervention.

Outcomes data for nursing engagement, nursing turnover, and HAPI will produce ordinal, interval, and ratio levels of measurement. Ratio data ranks objects or events on a scale with equal intervals between the numbers on the scale and the presence of an absolute zero, representing the actual amount of the condition that an object possesses (Terry, 2016). Turnover will be measured on this type of scale with an absolute zero which will represent ratio data. Engagement will produce ordinal data; HAPI data will produce interval data. Ordinal data is a categorical, statistical data type where the variables have natural, ordered categories and the distances between the categories are not known. The ordinal level uses the mode and median as appropriate measures of central tendency and the range and frequency distribution as appropriate measures of variability (Terry, 2018). Interval data which is in numerical form and rank-ordered, is measured along a scale with equal distances (Heavey, 2015). A paired t-test is used when the observed measurements are an interval or ratio and measured on the same subject over two time points (Lambert, 2020). For this project and data analysis, a t-test was not able to be utilized through SPSS due to the small sample size for turnover.

To bring meaning to the data it is important to provide description and new insight into how the information provided from the project can impact everyday life, improve the clinical

environment, and how it may have cost effectiveness implications (Moran, et. al., 2020). Using a factor analysis to reduce a large number of variables into fewer numbers of factors. This technique extracts maximum common variance from all variables and puts them into a common score (Statistic Solutions, 2021). Visual representation of the data will be provided through multiple ways:

- Run Charts with Benchmarking
- Tables
- Bar Graphs and Pie Charts

The engagement and turnover data will produce the most visual data representation with the ability to examine the information in multiple ways. Demographics, ethnicity, work shift, tenure in the organization, years of experience, and generation are just some of the ways to compare this data. It will be important to look at each area to see if there are differences identified during the project. Appendix I provides both a database outline and data dictionary.

Project Findings and Results

RN Engagement: Outcome Objective 1: Nursing engagement will be improved by reported Glint survey scores.

Pre-intervention data was collected in August 2021 utilizing the Glint Employee Engagement Survey Platform. Post-intervention data was collected in March of 2022. The objective was to show improved scores with more than 50% participation of the RNs eligible to complete the survey. A percent change was utilized to analyze the data. August 2021 data showed a 50% participation with an overall engagement of 66%; in March of 2022, the RN engagement was 71% with a 71% participation. For both survey windows there were a total of

28 RNs eligible to complete the survey. For overall engagement there was a 7.58 percentage change. Table 1 below shows this data in table form.

Table 1

RN Overall Engagement Percent Change

<i>Month/Year</i>	<i>Aug. 2021</i>	<i>Mar. 2022</i>	
Total RN Response	14	20	
Number Eligible RN	28	28	
Percent Response	50	71	
Engagement (Percent)	66	71	
Engagement Percent Change			7.58

Two questions which make up the overall engagement can be broken down individually to show a percentage change for both. The two questions are: (1) I would recommend ___ as a great place to work. (2) How happy are you working at _____? Each are answered on a five-point Likert scale with 1 as Strongly Agree and 5 Strongly Disagree. Engagement is captured by the answers of 1 and 2, Strongly Agree and Agree. Both questions saw a positive percentage change from pre-intervention. Below, Table 2 is a table showing this data.

Table 2

Percent Change of Engagement by Question

Question	Engagement Aug. 2021	Engagement Mar. 2022	Percent Change
#1	68	71	4.41
#2	64	71	9.86

Limited demographic data was also compared through the survey results pre- and post-intervention. Due to the anonymous response process, some demographics were not available for both surveys. The demographic data available for analysis of percent change included:

tenure with the organization in years, generation, shift time, tenure in current role and department in years, full time equivalent, and ethnicity. Table 3 below is a table with the percent change seen pre- and post-intervention. RNs with two-four years tenure with the organization and those in full time roles saw the greatest improvement in their engagement. There was negative percentage change seen in those with zero to one year with the organization and in the Generation Y category.

Table 3

Percent Change of Engagement by Demographic

Descriptor	Demographic	Percent Change
Tenure with Organization in Years	0-1	-2.53
	One-Two	8.95
	Two-Four	21.33
Generation	Gen Y	-5.48
Shift Time	Days	3.17
	Nights	7.35
	Variable	8.7
Tenure in Current Role and Department in Years	One-Two	4.62
	0.9 (Full Time)	20.31
Ethnicity	White	1.45

RN Turnover: Outcome Objective 2: Nursing turnover rates in the medical surgical department will be reduced post implementation.

The second outcome objective identified for this pilot project was RN Turnover. The outcome of a 10% decrease or less than 5 RNs would separate from the organization post implementation of the scheduling platform was chosen. Data for turnover of all associates and

job role are kept and reviewed internally for the organization. This data can be broken down by hospital, department, and role. For this pilot project, voluntary turnover was the focus. In Table 4, the table shows that for fiscal year 2021, there was a rolling 12-month voluntary turnover of 37.50% for all RNs in the medical surgical department. The less than one year rolling 12-month turnover was 70.59%. The fiscal year for the organization is July 1st through June 30th. As of February 28, 2022, the fiscal year rolling 12-month turnover for RNs is 30.13% and 13.64% for first year.

Table 4

Department RN Turnover by Fiscal Year

(Updated 03/01/2022)

Turnover		Fiscal Year	Overall	Involuntary	Voluntary	1st Year	<90 Days
Updates: First day of each month Job Family: NURS SUPPT (57.42%), NURSING (32.70%) 180 Days Net Hires - Terms: -2 1 Year Net Hires - Terms: 0		FY 20	(Blank)	(Blank)	(Blank)	(Blank)	(Blank)
		FY 21	37.50%	(Blank)	37.50%	70.59%	25.00%
		FY 22	30.13%	(Blank)	30.13%	13.64%	(Blank)
Rolling 12 Months							
		3/29/2021 2/28/2022	35.97%	(Blank)	35.97%	39.34%	21.43%

From August of 2021 through October 2021, 7 RNs voluntarily left the medical surgical department and organization. From December 2021 through February 2022, 5 RNs voluntarily left the department. Due to the small sample size and short time period for pre- and post-data, an independent t-test could not be run in SPSS. The means and standard deviation for the 90 days was calculated and a calculator through MedCalc (2022) was utilized to find a p-value of 0.2338. A 95% confidence interval was identified as 1.9680 to 0.6480. Below Table 5 shows the breakdown of turnover by month, the mean, and standard deviation. The turnover data yielded an analysis that did not show a statistically significant difference pre- and post-intervention.

Table 5*RN Turnover by Month, Mean, and Standard Deviation*

Turnover	Pre		Turnover	Post	
August	3	3	Dec	2	2
Sept	2	2	Jan	1	1
Oct	2	2	Feb	2	2
Mean & Standard Deviation	2.333333333	0.577350269		1.666666667	0.57735027

Hospital Acquired Pressure Injuries: Outcome Objective 3: HAPI rates per NDNQI will improve by 10%.

The third, and final, outcome objective selected for this pilot project was to show a 10% improvement in Stage 3 and 4 HAPI rates for this medical surgical department. This was selected as an important indicator as a nursing sensitive quality metric, the harm to patients, and the potential cost to a health care organization mentioned earlier in this paper. Data around HAPIs is collected internally by the organization on a regular basis. In the 90 days prior to the intervention, the medical surgical department had 2 Stage 3 HAPIs which was a rate of 2.43 per 1000 patient discharges. For the 90 days post implementation, December 2021 through February 2022, the department had zero Stage 3 or 4 HAPIs identified.

This QI project posed the following PICO question: Will the implementation of a standardized electronic scheduling and staffing platform, ClairVia Workforce Solution, for a medical surgical unit of an acute care facility improve staffing and affect nursing engagement, 12-month rolling turnover, and hospital acquired pressure injuries? Analysis of the pre- and post-intervention data for all three objectives has yielded positive results. RN engagement improved by 7.58%. There were zero Stage 3 or 4 HAPIs post intervention. Turnover trends are positive, although the sample sizes did not yield a statistically significant outcome.

Limitations, Recommendations, and Implications for Change

Four main limitations were identified within this pilot project. The first is timeframe. Due to the nature of the DNP course work, there was about a 7-month timeframe for gathering pre-data, implementation, and post-data collection. With the identified outcome objectives this resulted in small samples sizes for data, with turnover being the most affected. The data collection tools for turnover and HAPI were very appropriate for the project, but the Glint Engagement Survey was limited in the analysis due to the questions around engagement and the level of anonymity involved. This identified a potential need for a specific data collection tool focused on the intervention for pre- and post-data. The pilot project focused on RNs and the medical surgical department selected yielded a small sample size of 28. This has been identified as a limitation. Finally, through attrition as noted in the turnover numbers, some RNs who took the pre-survey were not included in the post-survey and vice-versa.

Several recommendations and implications for change have been identified through completing this DNP quality improvement pilot project. First, consider the development of a specific survey tool to measure pre- and post-implementation. The focus could be staffing, and scheduling gaps and concerns specific to the role of the individual answering and the outcome he/she would like to see. Another focus would include the gaps pre-education and post-education of not only the staffing and scheduling tool, but also the development of a department specific staffing plan and position control to support hiring. One recommendation is to have a separate tool to measure the engagement level of the nursing leadership pre- and post-intervention. Through the review of literature this was a strong theme showing that nursing leaders have a direct impact on work environment and engagement levels of the nursing team. Increasing the timeline to a full year, or longer, would yield more statistically significant data.

Finally, one should consider including the entire care team of the department not just a focus on the RN.

Conclusion

In conclusion, this paper discussed the implementation and outcomes of implementing a scheduling platform for a DNP quality improvement pilot project to standardize processes for nurse scheduling and staffing. The PICO question was “will the implementation of a standardized electronic scheduling and staffing platform for inpatient nursing departments of a Denver metro hospital improve staffing and effect nursing engagement, 12-month rolling turnover, and hospital acquired pressure injuries (HAPI)?” Details were provided on the problem statement, review of literature with levels of evidence, concept model, proposed methodology, data analysis, limitations, and recommendations for change. Due to unforeseen circumstances, the staffing and scheduling platform selected was changed from Kronos Workforce Dimensions to ClairVia Scheduling Solutions. Education was provided to nursing leaders, staffers, and frontline nurses on a medical surgical department of an acute care hospital. All outcome objectives saw positive improvements; nursing turnover did not yield statistically significant change.

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Appendix A

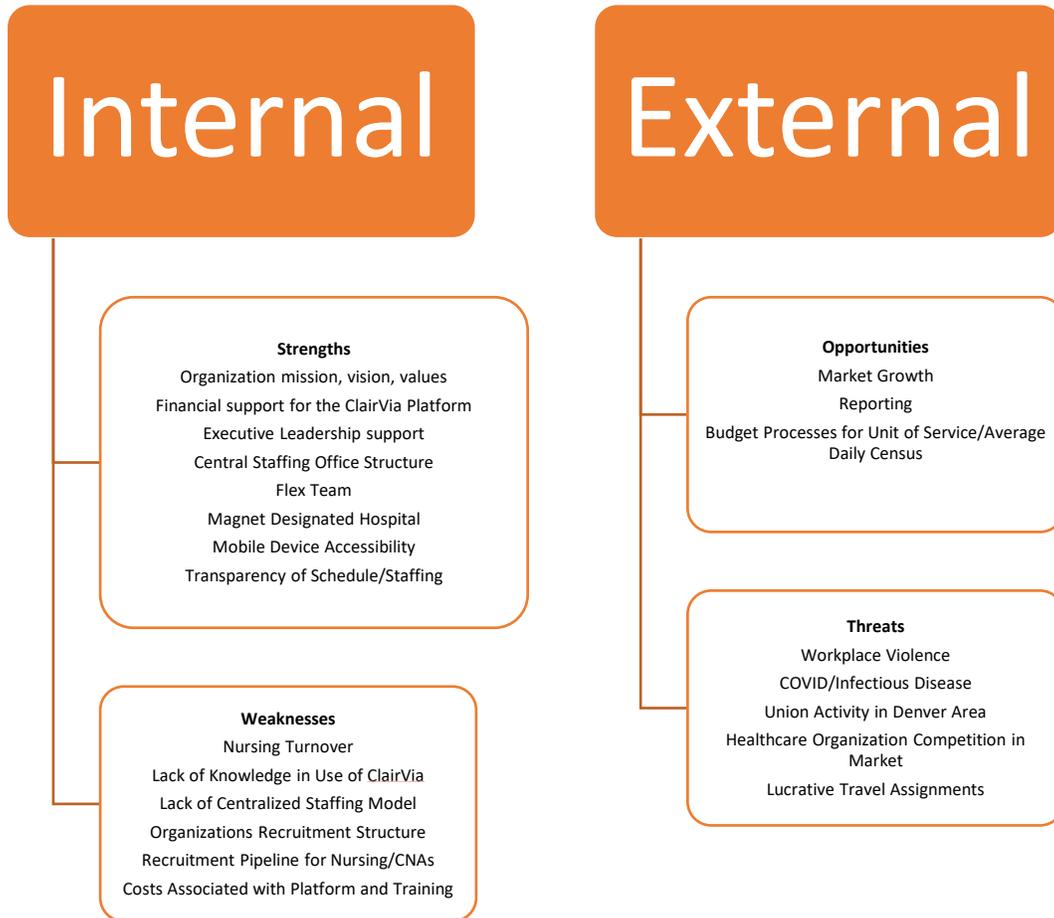
Scope of Evidence Table

Levels of Evidence	Number of Articles	Authors and Dates
I Systematic review & metaanalysis of RCT; clinical guidelines based on systematic reviews or meta-analyses	0	NA
II One or more RCT	0	NA
III Controlled Trial without Randomization	5	Blake, P.G., & Bacon, C.T. (2020); Wahl et. al. (2018); Penque, S. (2019); Hummel et. al. (2020); Wright et. al. (2006)
IV Case-control or Cohort Study	2	Cho et. al. (2015); Heslop, L., & Plummer, V. (2012)
V Systematic review of descriptive or qualitative studies	4	Ulep, K. (2018); Dumias, T.W., & Hyrkas, K. (2019); Wei et. al. (2020); Stalpers et. al. (2015)
VI Single descriptive or qualitative study	2	Trepanier et. al. (2015); Niday et. al. (2012)
VII Expert opinion	1	Comeaux, Y., & Bumpusk S. (2019)

Melnyk, B.M. & Fineout-Overholt, E. (2015).

Appendix B

SWOT Analysis



Appendix C

Budget Summary Costs

<i>Item</i>	<i>Cost in Dollars</i>
Server Upgrade	500,000
ClairVia Annual Fee	250,000
ClairVia/Nursing Dept	2,212.39/annual nursing department cost
Project Lead	95,000 (Annual Salary)
4 Hour Class x 6 Attendees (1 Nurse Manager, 1 Assistant Nurse Manager, 4 Clinical Coordinators (Charge Nurse))	200.00 (avg hourly rate used \$40 with nurse manager salaried)
1 Hour Class x 28 RNs	952.00 (avg hourly rate used \$34)
2 Hour Course to Staffers (4 People)	160.00 (avg hourly rate \$20)
4 Hour IT Time for Build of Cost Center	Salaried Time

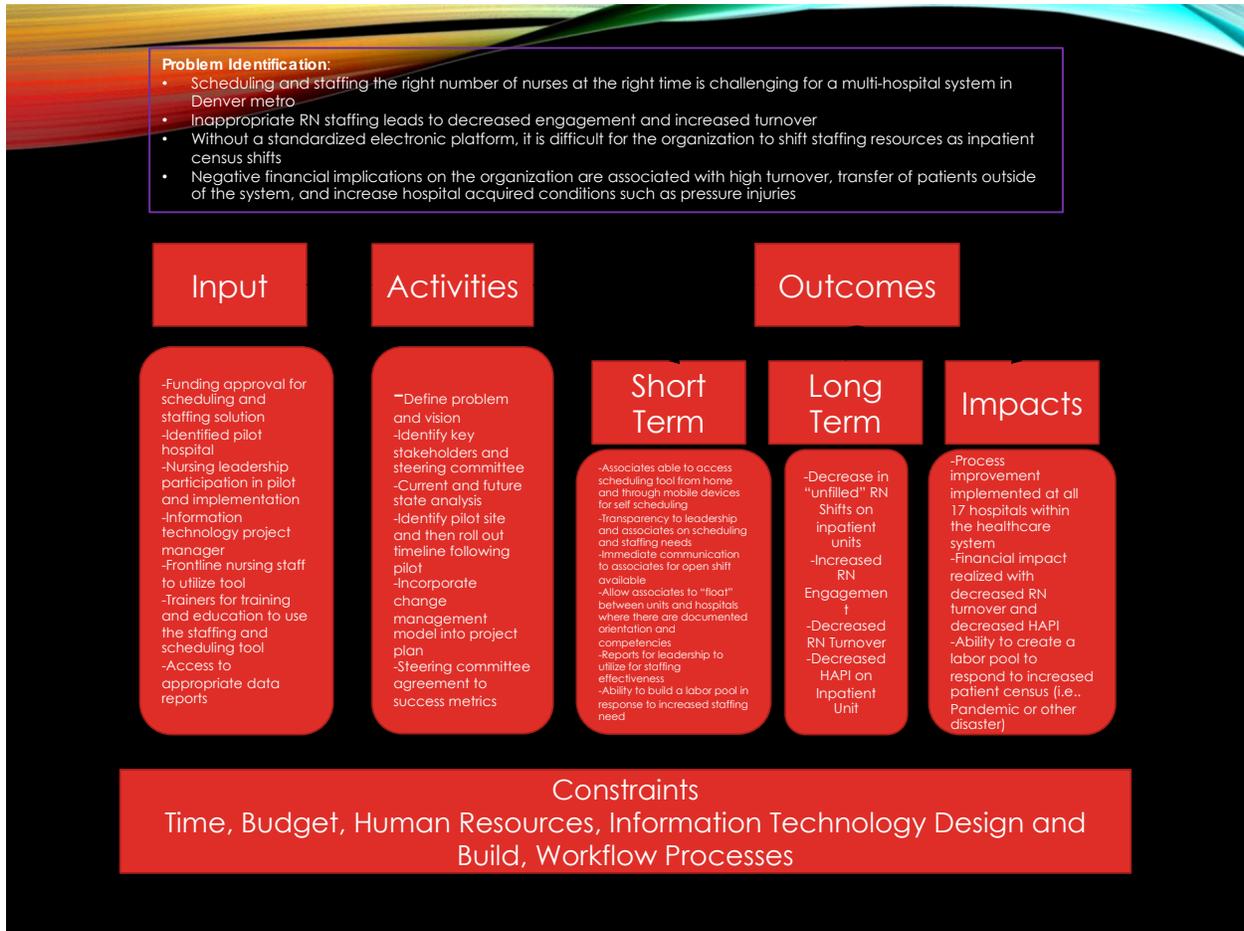
Appendix D

Project Timeline

- Nov. 2020: SROL completed
- Nov. 2020: PICO identified
- Dec. 2020: Lit review write-up using themes to support PICO completed
- May 2021: Write project proposal
- June 2021: Defend proposal
- July 2021: Site approval letter signed
- July 2021: Submit to Regis IRB/Research Committee
- Sept. 2021: Project starts: Recruitment with information letter
- Oct. 2021: Change in intervention
- Nov. 2021: Intervention
- March 2022: Complete data collection
- March 2022: Analyze data
- April 2022: Defend final project
- April 2022: Upload final approved written project to library

Appendix E

Logic Model



Appendix F
IRB Approval



REGIS.EDU

Institutional Review Board

DATE: August 31, 2021

TO: Rachel Miles
FROM: Regis University Human Subjects IRB

PROJECT TITLE: [1792022-1] Implementation of an Electronic Scheduling Platform
SUBMISSION TYPE: New Project

ACTION: DETERMINATION OF NOT RESEARCH
DECISION DATE: August 31, 2021

Thank you for your submission of New Project materials for this project. The Regis University Human Subjects IRB has determined this project does not meet the definition of human subject research under the purview of the IRB according to federal regulations.

The project may proceed as written.

We will retain a copy of this correspondence within our records.

If you have any questions, please contact the Institutional Review Board at irb@regis.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Regis University Human Subjects IRB's records.

Appendix G

Information Sheet

Dear Nursing Associate,

My name is Rachel Miles and I have worked as the Vice President of Nursing Services/CNO for the Denver Metro Group since January of 2021. My tenure began with _____ in January of 2019. I am working towards my Doctor of Nursing Practice (DNP) degree at Regis University and am conducting a Quality Improvement (QI) project which is required for this degree.

My QI project titled, Implementation of an Electronic Scheduling Platform, will study the effect of an electronic scheduling and staffing platform on nurse staffing levels of a medical surgical department for an acute care hospital in the Denver Metro area. This project is important to support appropriate RN self-scheduling and staffing levels. Additionally, there will be benefits to you by providing easier access to the electronic system and your schedule.

This is a new process for _____ Health and will first be piloted at _____. To successfully implement this new process for scheduling and staffing your department, participants (nurse leaders, staffers, and nursing associates) will be asked to:

1. Attend training on how to utilize *Workforce Dimension Advanced Scheduler*,
 - a. 4-hour training for leaders and staffers
 - b. 1-hour training for nursing associates
2. Use platform to self-schedule and leadership will use to post a final schedule.

Training will be in person, and you will be compensated for your time.

The effects of using the *Workforce Dimension Advanced Scheduler* platform will be evaluated using current processes to measure 12-month rolling nursing turnover rates and hospital acquired pressure injuries for your selected medical-surgical department. In addition, participants will be asked to complete the voluntary *Employee Engagement Survey* post-implementation. There are no risks associated with participation or non-participation in the engagement survey and does not affect employment in any way. You will be compensated for your time to take the survey. All responses and results are anonymous and completed through a third-party vendor, Glint.

Thank you for your time and consideration. Please contact me at 210-883-8278 for any questions. You may also contact the Regis University Capstone Chair, Dr. Kathleen Whalen, at kwhalen@regis.edu or _____.

Sincerely,

Rachel Miles MSN, RN, NEA-BC

Appendix H

CITI Training Completion Report

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COMPLETION REPORT - PART 1 OF 2
COURSEWORK REQUIREMENTS*

* NOTE: Scores on this [Requirements Report](#) reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- **Name:** Rachel Miles (ID: 9901691)
- **Institution Affiliation:** Regis University (ID: 745)
- **Institution Email:** rmiles@regis.edu
- **Institution Unit:** Nursing
- **Phone:** 2108838278

- **Curriculum Group:** The RCR for Social & Behavioral
- **Course Learner Group:** Same as Curriculum Group
- **Stage:** Stage 1 - RCR
- **Description:** This course is for investigators, staff and students with an interest or focus in **Social and Behavioral** research. This course contains text, embedded case studies AND quizzes.

- **Record ID:** 40953837
- **Completion Date:** 12-Feb-2021
- **Expiration Date:** 12-Feb-2024
- **Minimum Passing:** 80
- **Reported Score*:** 84

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED	SCORE
Authorship (RCR-Refresher) (ID: 15661)	12-Feb-2021	5/5 (100%)
Collaborative Research (RCR-Refresher) (ID: 15662)	12-Feb-2021	4/5 (80%)
Conflicts of Interest (RCR-Refresher) (ID: 15663)	12-Feb-2021	3/5 (60%)
Data Management (RCR-Refresher) (ID: 15664)	12-Feb-2021	4/5 (80%)
Peer Review (RCR-Refresher) (ID: 15665)	12-Feb-2021	5/5 (100%)
Research Misconduct (RCR-Refresher) (ID: 15666)	12-Feb-2021	5/5 (100%)
Mentoring (RCR-Refresher) (ID: 15667)	12-Feb-2021	5/5 (100%)
Research Involving Human Subjects (RCR-Refresher) (ID: 15668)	12-Feb-2021	5/5 (100%)
Using Animal Subjects in Research (RCR-Refresher) (ID: 15669)	12-Feb-2021	2/5 (40%)

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

Verify at: www.citiprogram.org/verify/?kd8b58596-ca7d-4d21-850d-0eca08563afb-40953837

Collaborative Institutional Training Initiative (CITI Program)

Email: support@citiprogram.org

Phone: 888-529-5929

Web: <https://www.citiprogram.org>

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COMPLETION REPORT - PART 2 OF 2
COURSEWORK TRANSCRIPT**

** NOTE: Scores on this [Transcript Report](#) reflect the most current quiz completions, including quizzes on optional (supplemental) elements of the course. See list below for details. See separate Requirements Report for the reported scores at the time all requirements for the course were met.

- Name: Rachel Miles (ID: 9901691)
- Institution Affiliation: Regis University (ID: 745)
- Institution Email: rmiles@regis.edu
- Institution Unit: Nursing
- Phone: 2108838278

- Curriculum Group: The RCR for Social & Behavioral
- Course Learner Group: Same as Curriculum Group
- Stage: Stage 1 - RCR
- Description: This course is for investigators, staff and students with an interest or focus in Social and Behavioral research. This course contains text, embedded case studies AND quizzes.

- Record ID: 40953837
- Report Date: 12-Feb-2021
- Current Score**: 84

REQUIRED, ELECTIVE, AND SUPPLEMENTAL MODULES	MOST RECENT	SCORE
Authorship (RCR-Refresher) (ID: 15661)	12-Feb-2021	5/5 (100%)
Collaborative Research (RCR-Refresher) (ID: 15662)	12-Feb-2021	4/5 (80%)
Research Involving Human Subjects (RCR-Refresher) (ID: 15668)	12-Feb-2021	5/5 (100%)
Conflicts of Interest (RCR-Refresher) (ID: 15663)	12-Feb-2021	3/5 (60%)
Data Management (RCR-Refresher) (ID: 15664)	12-Feb-2021	4/5 (80%)
Peer Review (RCR-Refresher) (ID: 15665)	12-Feb-2021	5/5 (100%)
Research Misconduct (RCR-Refresher) (ID: 15666)	12-Feb-2021	5/5 (100%)
Mentoring (RCR-Refresher) (ID: 15667)	12-Feb-2021	5/5 (100%)
Using Animal Subjects in Research (RCR-Refresher) (ID: 15669)	12-Feb-2021	2/5 (40%)

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

Verify at: www.citiprogram.org/verify/?kd8b58596-ca7d-4d21-850d-0eca08563afb-40953837

Collaborative Institutional Training Initiative (CITI Program)

Email: support@citiprogram.org

Phone: 888-529-5929

Web: <https://www.citiprogram.org>

Appendix I Data Dictionary

Sex		Age Range		Employment Status	
Male	1	20-30	1	Full Time	1
Female	2	31-40	2	Part Time	2
		41-50	3	PRN	3
		51-60	4		
		61+	5	Years of Experience	
Generation				Less Than 1 Year	1
Baby Boomer	1			2-5 Years	2
Generation X	2	Shift		6-10 Years	3
Millennials	3	Days	1	11-20 Years	4
Generation Z	4	Nights	2	20+	5
Tenure with Organization		Glnt		Turnover	
30-60 Days	1	Overall Engagement	1	Total Turnover	1
90 Days	2			Less Than 1 YR	2
180 Days	3			Involuntary	3
1 Year	4			Voluntary	4
2-5 Years	5				
6-10 Years	6				
11-20 Years	7				
20+ Years	8				
HAPI		Race			
Stage 2	1	White/Caucasian	1		
Stage 3	2	African American	2		
Stage 4	3	Hispanic	3		
Deep Tissue	4	Asian	4		
Unstageable	5	Other	5		

Variable	Description	Data Source
Sex	Sex of Staff Completing Survey	Glnt Database
Years of Tenure	Years employed by hospital at time of survey	Glnt Database
Age Range	Age of staff member at time of survey	Glnt Database
Employment Status	Status of staff member at time of survey	Glnt Database
Years of Experience	Experience of staff member at time of survey	Glnt Database
Generation	Generation of staff member taking the survey	Glnt Database
Shift	Identified working shift of staff member at time of survey	Glnt Database
Turnover	Registered nurse turnover on a rolling 12 month calendar	Human Resources
Glnt	Engagement survey	Glnt Database
HAPI	Hospital Acquired pressure injuries prevalence for the hospital	NDNQI Survey
Race	Identified race of staff member taking survey	Glnt Database

Appendix J

Letter of Intent

DNP Project Letter of Intent

To: _____ Chief Nursing Officer

From: Rachel Miles

Subject: Implementation of an Electronic Scheduling Platform

Date: July 9, 2021

I am writing to obtain permission to conduct a quality improvement (QI) pilot project in your facility with the purpose of implementing an electronic scheduling platform by September, 2021. This project will be done to fulfill requirements for completion of the Doctor of Nursing Practice degree at Regis University, Denver, CO.

The following information will review the study:

This project will employ a **Population-Intervention-Comparative-Outcome (PICO)** format for development of the study question to be investigated:

Population: Nurses on a medical-surgical/trauma inpatient department

Intervention: Workforce Dimension Advanced Scheduler

Comparative: Pre/post nursing staff turnover, nursing engagement, and hospital acquired pressure injuries

Outcome: Improved staffing and nurse engagement, decreased hospital acquired pressure injuries and nursing staff turnover

Project Question: Will the implementation of a standardized electronic scheduling and staffing platform for a medical surgical unit at _____ improve staffing and affect nursing engagement, 12-month rolling nursing turnover, and hospital acquired pressure injuries?

Project Significance: This project is important to clinical practice to ensure the right staffing and workload volume to provide appropriate care to the patient population.

Type of Study: Quality improvement initiative with a quantitative design and quasi-experimental design.

Participant Requirement: Use of the Workforce Dimensions Advanced Scheduler will be required as it has been adopted by the organization for this pilot. Participant participation is completely voluntary and confidential by completing the Glint Employee Engagement Survey. I will meet in person with department nursing leadership as well as the nursing associates during staff meetings and shift huddles to provide a QI information sheet. A follow up email will be sent after meetings.

Risks, Cost, and Benefits: At this time there are no identified risks to the participants or the organization. Cost is minimal to _____. Necessary training time for leadership, staffers, and nursing associates are the only costs covered by _____ during the QI pilot project. _____ Health has access to the Workforce Dimensions Advanced Scheduler and will ensure an upgrade and build for the pilot unit. Leadership, nursing staff, and staffers will attend a 1-hour class. Nursing leadership and charge nurses will attend a 4-hour class on position control and staffing plan. There are benefits to the organization as well as the participants. Participants will have access to a self-scheduling platform that provides transparency into their department's schedule. Staffing will be balanced to support the work of nurses and ability to provide appropriate patient care.

I will obtain approval from the _____ Research Council and Regis University IRB prior to conducting this QI project.

Project Goals and Objectives:

The main goal of this project is to implement Workforce Dimensions Advanced Scheduler on a medical-surgical inpatient unit at _____. A secondary goal for this DNP project is to compare results of nursing engagement survey questions, nursing turnover, and HAPI rates pre-post intervention.

Objectives:

1. Nursing engagement will be improved by reported scores on the Glint Survey.
2. Nursing turnover rates will be reduced by 10% after the implementation of ClairVia Scheduling Platform.
3. Hospital acquired pressure injury rates per NDNQI will improve by 10%.

Permission is requested to conduct this quality improvement project at _____

I have included a template for the brief site approval letter that is required on letterhead from you.

Thank you for your assistance with completing my DNP Project.

Sincerely,

Rachel Miles, DNP Student