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The Impact of An Electronic Handoff Tool on Transfer Times from the Emergency Department to the Observation Unit

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The Impact of an Electronic Handoff Tool on Transfer Times from the Emergency Department to the Observation Unit

A DNP Project Title

Presented to the Faculty of the Department of Nursing West Chester University West Chester, Pennsylvania

In Partial Fulfillment of the Requirements for the Degree of Doctor of Nursing Practice

By Lorie Fosbenner

May 2023

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Abstract

This quality improvement project was implemented to assess the impact a standardized handoff tool has on transfer times from the Emergency Department (ED) to the Observation Unit (OU). Literature has shown that the longer a patient is in the incorrect level of care; they are at increased risk of poor outcomes. The use of a standardized handoff tool has a positive impact on patient outcomes. The electronic Situation, Background, Assessment, and Recommendation (eSBAR) Tool was implemented to assess the impact on transfer times from the ED to the OU. Data was collected for six weeks’ pre-implementation and 11-weeks post-implementation to determine the impact of handoff standardization. The implementation of the eSBAR tool did not have a statically significant impact on transfer times from the ED to the OU.

Key words: handoff, throughput, length of stay, patient safety, standardized
Table of Contents

List of Figures .............................................................................................................. vi

Chapter One: Introduction and Background .................................................................. 1
  Background ................................................................................................................. 1
  Significance ................................................................................................................. 2
  Clinical Question ........................................................................................................ 2
  Project Goal ................................................................................................................. 2
  Quality Improvement Model ....................................................................................... 3
  Summary ...................................................................................................................... 3

Chapter Two: Literature Review ..................................................................................... 4
  Introduction ................................................................................................................ 4
  Terms, Concepts, and Definitions ............................................................................. 4
  Literature Review ...................................................................................................... 5
  Gaps in Literature ...................................................................................................... 10
  Summary .................................................................................................................... 11

Chapter Three: Methodology ......................................................................................... 12
  Introduction ................................................................................................................. 12
  Evidence - Based Framework ................................................................................... 12
  Setting ......................................................................................................................... 12
  Population/Sample .................................................................................................... 13
Instrument ........................................................................................................................................... 13

Data Collection and Analysis .................................................................................................................. 14

Protection of Human Subjects/IRB .......................................................................................................... 14

Resources, Personnel, and Technology .................................................................................................. 15

Summary .................................................................................................................................................. 15

Chapter 4: Results .................................................................................................................................. 16

Introduction ............................................................................................................................................. 16

Data Collection ........................................................................................................................................ 16

Statistical Results ..................................................................................................................................... 16

Summary .................................................................................................................................................. 17

Chapter 5: Discussion .............................................................................................................................. 19

Review of the Problem ............................................................................................................................. 19

Analysis of Results ................................................................................................................................. 19

Limitations of the Project .......................................................................................................................... 20

Implications for Nursing Practice, Education, and Research ................................................................. 20

Conclusion ................................................................................................................................................. 22

References ............................................................................................................................................... 23

Appendices .............................................................................................................................................. 30
List of Figures

1. PDSA Cycle ........................................................................................................... 26

2. Statistical Analysis All Days of the Week 12:00 am-11:59 pm .......................... 27

3. Statistical Analysis Monday-Friday 12:00 pm-5:59 pm ......................................... 28
The Impact of an Electronic Handoff Tool on Transfer Times from the Emergency Department to the Observation Unit

Chapter One: Introduction and Background

Background

In 2006, The Joint Commission (TJC) implemented a National Patient Safety Goal that required all hospitals to ensure the handoff process between caregivers was conducted in a standardized format (The Joint Commission [TJC], 2017). Hospitals implemented handoff tools that were appropriate at that time. Since then, healthcare has changed, and so has the need to adapt the handoff processes that were put into place. The handoff process between the emergency department (ED) and the inpatient units at Pennsylvania Hospital (PAH) needs to be more effective. The current process places limitations on the transitions of care from the ED to the inpatient units. Ineffective handoffs can also contribute to patients experiencing adverse events.

The number of patient visits in the PAH ED has increased by 30% since the beginning of Covid-19 (Penn Medicine, 2022). The nurse and physician workflows have yet to adjust to the increased patient volume. This increase in the census is causing significant delays with patient throughput and is impacting the patient’s length of stay (LOS) in the PAH ED. A patient’s LOS in the ED directly correlates with their outcomes (Bakon & Millichamp, 2017; Galatzan & Carrington, 2018; Starmer et al., 2017; Tortosa-Alted et al., 2021; Walker et al., 2016). The longer a patient remains at the incorrect level of care, increases the risk of poor outcomes. The PAH benchmark for the time of an inpatient room assignment to the time the patient is admitted to their room is 45 minutes (Penn Medicine, 2022). The average time from bed assigned for a patient in the ED to a patient admitted to the observation unit (OU) room for the fiscal year 2022 is 73 minutes (Penn Medicine, 2022). This metric is 28 minutes over the benchmark set by PAH.
Significance

At PAH, handoff from the ED to the OU requires the sending nurse to call the OU to facilitate handoff. Handoff is called to the receiving unit once a bed is assigned in the electronic medical record (EMR). The OU nurse may not be available to receive a handoff from the ED nurse, requiring multiple phone calls and increasing the time it takes to transfer a patient from the ED to the OU. The information that is shared during the current handoff process varies by the nurse providing handoff. There needs to be a standardized format for the current handoff process. Not providing patient information in a standardized format can cause crucial patient information to be omitted, which can lead to an increase in patient errors (Bakon & Millichamp, 2017; Galatzan & Carrington, 2018; Starmer et al., 2017; Tortosa-Alted et al., 2021; Walker et al., 2016). Eliminating variations in the handoff process between the ED and the OU can positively impact patient throughput.

Clinical Question

After a thorough literature review, it was determined that standardization of nursing handoff increases patient safety, decreases time spent in the ED, and improves nursing satisfaction (Dahlquist et al., 2018; Hart & Gormley, 2020; Hendrickson et al., 2019; Potts et al., 2018; Sanchez et al., 2017; Sermersheim et al., 2020; Sorrentino et al., 2016; Tasi et al., 2020; Wolak et al., 2020). The problem under investigation is, in emergency department patients, how does using an electronic handoff tool, compared to not using a handoff tool, affect patient throughput to the OU?

Project Goal

The goal of this evidence-based practice (EBP) quality improvement (QI) project was to implement a standardized electronic situation, background, assessment, and recommendation (eSBAR) handoff tool. The primary objective for implementing the eSBAR tool was to decrease
the length of time patients spend in the ED once their bed is assigned and they are admitted to the OU. The goal was to decrease this time by 28 minutes.

**Quality Improvement Model**

The Plan Do Study Act (PDSA) cycle was the theoretical framework used to guide the work for this project. The PDSA cycle allowed for continuous evaluation of the new handoff process implemented and the ability to adapt and change as needed (PDSA Cycle, n.d.). Using the PDSA cycle to implement the new handoff process allowed ED and OU staff members to provide input and feedback relevant to their workflows. In addition, pre and post-intervention data will be evaluated to assess the impact the eSBAR handoff tool had on impacting transfer times from the ED to the OU.

**Summary**

Handoffs between caregivers are an integral part of patient care. After a review of the literature and data, it was determined that there was a need to change the current handoff process. The PDSA cycle will be the theoretical framework for implementing a standardized nurse-to-nurse handoff process.
Chapter Two: Literature Review

Introduction

The purpose of this literature review was to find supporting evidence for this quality improvement project to answer the question: in emergency room patients, how does the use of a standardized electronic handoff tool, as compared to not using a handoff tool, affect patient throughput to the inpatient care unit? CINAHL, PubMed, and Scopus were the databases searched for this literature review. The keywords or phrases used for the literature search were nurses, emergency room patients, standardized, electronic handoff tool, throughput, length of stay, critical care, intensive care, handoff, and handover. The Boolean connectors "and" and "or" were used to differentiate between search terms. The search initially generated over 3,000 results in CINHAL. Then, filters were applied to include the English language, peer-reviewed articles, and the years 2014-2022. This narrowed the search to 52 articles. In addition, the number of articles that included nurse handoff was limited; therefore, the literature review included physician handoff.

Additionally, these restrictions generated a limited number of articles that included throughput from the ED to the ICU. For this reason, throughput from the ED to the inpatient and observation units was also included. As a result, these articles could also be critically appraised for this review of the literature.

Terms, Concepts, and Definitions

Nursing handoffs that occur between the emergency department (ED) and the inpatient unit (IPU) impact throughput, ED length of stay (LOS), nurse satisfaction, and patient safety. The Joint Commission (The Joint Commission [TJC], 2017) defines handoff as the transfer of patient care by giving and receiving patient information. Nurse handoffs can occur multiple times during a
patient's hospitalization. Rutherford et al. (2020) defines throughput as a patient transitioning through the healthcare facility, with the patient receiving the right level of care at the right time. The delay in nurse-to-nurse handoff increases ED LOS and prolongs the patient from receiving the right level of care (Sermersheim et al., 2020). Length of stay is defined as the time a patient remains at a defined level of care (Rutherford et al., 2020).

Patient safety is defined as preventing patient harm while under medical professionals' care (Agency for Healthcare Research and Quality [AHRQ], n.d.). Misinformation or incomplete provider handoff is an adverse event that impacts patient safety (TJC, 2017). In 2006, TJC introduced handoff communication as a National Patient Safety Goal as a standard of care to decrease the occurrence of adverse events. In 2010, TJC recommended the standardization of handoffs to reduce variation in communication between caregivers (TJC, 2017). Standardized nurse-to-nurse handoff increases throughput from the ED to the IPU and decreases the risk of misinformation that can lead to adverse events (Dahlquist et al., 2018; Hart & Gormley, 2020; Potts et al., 2018; Sermersheim et al., 2020; Wolak et al., 2019).

**Literature Review**

The literature search for this project was narrowed down to include 15 studies for which standardized handoff was evaluated. These articles used evidence-based quality improvement, qualitative analysis, and cohort studies to evaluate the implementation of standardized handoff. The impact that standardized handoff has on patient throughput and reducing ED LOS was analyzed in nine articles (Dahlquist et al., 2018; Hart & Gormley, 2020; Hendrickson et al., 2019; Potts et al., 2018; Sanchez et al., 2017; Sermersheim et al., 2020; Sorrentino et al., 2016; Tasi et al., 2020; Wolak et al., 2020). Implementation of a standardized tool for nurse-to-nurse handoff to improve patient throughput for patients transferring from the ED was evaluated in
four articles (Hart & Gormley, 2020; Potts et al., 2018; Sermersheim et al., 2020; Wolak et al., 2020). Two articles evaluated physician-to-physician handoff between the ED and IPU (Dahlquist et al., 2018; Sanchez et al., 2017). The physician-to-physician and nurse-to-nurse handoff was evaluated in two articles (Hendrickson et al., 2019; Tasi et al., 2020). Three articles evaluated electronic standardized handoff tools (Gonzalo et al., 2014; Potts et al., 2014; Sermersheim et al., 2020). Three articles analyzed the current state of nursing handoff (Galatzan & Carrington, 2018; Sorrentino, 2016; Torsata-Alted et al., 2021).

Two articles analyzed the relationship of patient safety to the implementation of a standardized nurse-to-nurse handoff tool (Bakon & Millichamp, 2017; Starmer et al., 2017). Two articles evaluated patient safety that implemented standardized physician-to-physician handoff (Gonzalo et al., 2014; Sanchez et al., 2017). In addition, Walker et al. (2016) conducted a systematic review of the literature on patient safety related to throughput strategies. Patient populations varied across the studies reviewed. The populations evaluated were: one pediatric hospital, one foreign (Australian) hospital, one suburban hospital, one trauma hospital, and seven urban academic medical centers.

**Throughput**

*Nurse-to-Nurse Handoff.* Standardization of nurse-to-nurse handoff positively impacts patient throughput from the ED to the IPU and ICU to decrease overall LOS in the ED (Hart & Gormley, 2020; Potts et al., 2018; Sermersheim et al., 2020; Wolak et al., 2020). Three studies implemented the situation, background, assessment, and recommendation (SBAR) tool (Hart & Gormley, 2020; Potts et al., 2018; Sermersheim et al., 2020). The SBAR tool is a validated tool that standardizes the handoff format. Implementation and evaluation of the SBAR tool's impact on decreasing ED LOS were done by a quality improvement (QI) project for all these studies.
ED LOS decreased by 19.3% after the implementation of the SBAR tool (Hart & Gormley, 2020). Potts et al. (2018) implemented the SBAR tool handoff and decreased ED LOS by 41.7%, while Sermersheim et al. (2020) decreased ED LOS by 43% after implementing an electronic SBAR tool. Statistical significance was not analyzed in the three QI projects, but all reported increased efficiency, quality, and throughput (Hart & Gormley, 2020; Potts et al., 2018; Sermersheim et al., 2020). Wolak et al. (2020) used lean methodology to develop and implement two standardized handoff tools to improve flow by creating an original tool using components of validated tools. After implementation, LOS decreased by 18 minutes (p=.66). Using the analysis of variance test (ANOVA), results were deemed not statistically different post-implementation (Wolak et al., 2020). Additionally, transfer time decreased by 8.2 minutes (p= <.01).

**Physician-to-Physician Handoff.** Physician-to-physician handoff also contributes to patient throughput delays that impact the ED LOS. Dahlquist et al. (2018) and Sanchez et al. (2017) evaluated throughput related to physician-to-physician handoff. Both reported statistically significant results after implementing a standardized handoff that decreased ED LOS (Dahlquist et al., 2018; Sanchez et al., 2017). According to Dahlquist et al. (2018), ED LOS decreased by 19 minutes (P=<.001) after the implementation of the SBAR tool. Statistical significance was analyzed by using the Chi-square test to confirm that the result occurred because of the intervention and not by chance (Dahlquist et al., 2018). Sanchez et al. (2017) reported a statistically significant improvement of nine minutes (P=<.001) from when the bed was assigned to when the orders were released for patient care on the IPU. This improvement was after the implementation of an asynchronous standardized handoff tool. Kaplan Maier curves were used to perform statistical significance to analyze the sustainability of the process over time (Sanchez et al., 2017).
**Nurse and Physician Handoff.** Two articles evaluated the use of asynchronous standardized handoff tools concurrently for nurse-to-nurse and physician-to-physician (Hendrickson et al., 2019; Tasi et al., 2020). Hendrickson et al. (2018) implemented an admission conference call (ACC). The patient placement coordinator generated a page for the identified patient providers to schedule one call for handoff (Hendrickson et al., 2019). The ACC decreased the number of calls needed for physicians and nurses to handoff from three to one. A cross-sectional survey using the Likert scale was conducted pre-and post-implementation of the ACC. Wilcoxon rank was used to determine that there was no statistical significance of the provider's perceptions that the ACC has on throughput. Survey respondents were neutral (p=.45) on the impact of the ACC on ED throughput (Hendrickson et al., 2019).

Tasi et al. (2020) evaluated physician asynchronous handoff from the ED to the observation unit through a retrospective observational study. The asynchronous tool gave the ED physicians 30 minutes to read the standardized note before the patient was transferred to the emergency department observation unit. The ED nurse had 15 minutes to read the patient's chart and initiate verbal handoff if they had questions about the information in the electronic health record. Nurse and physician asynchronous handoff decreased ED LOS by 10.1 minutes (p<.0001). This improvement in ED LOS was shown to have statistical significance by Multivariable Linear Regression (Tasi et al., 2020). Across both studies, the implementation of a standardized handoff process had a positive effect on reducing ED LOS.

**Patient Safety**

Patient safety is at risk with every handoff during an inpatient admission. Misinformation can result in missed care and adverse events (TJC, 2017). An evaluation of the current state of the impact standardized handoff has on patient safety was evaluated in two of the articles.
Both articles concluded that standardized handoff tools are not the usual practice but increase patient safety (Gazaltan & Carrington, 2018; Tortosa-Alted et al., 2020). Gazaltan and Carrington (2018) conducted a thematic analysis that summarized that variation of standardized tools is necessary to meet the needs of the nurse and the patient population. Tortosa-Alted et al. (2018) identified that the current nurse handoff process in the ED is not safe or effective, and standardization is necessary by performing a systematic review of the literature.

**Nurse Handoff.** Two articles in this literature search evaluated the implementation of a nurse-to-nurse standardized handoff and its effect on patient safety (Bakon & Millichamp, 2017; Starmer et al., 2017). Bakon and Millichamp (2017) conducted a mixed-method study by designing and implementing an original, non-validated, standardized handoff tool. Paper-based surveys evaluated nurses' perceptions of patient safety. Sixty-four percent of survey respondents agreed that the new tool maintained patient safety (Bakon & Millichamp, 2017). Second, Starmer et al. (2017) implemented the standardized handoff tool: illness severity, patient summary, action list, situational awareness, contingency planning, and synthesis by the receiver (I-PASS). Pre- and post-surveys were completed to evaluate the quality of the IPASS handoff tool by using a Likert survey. There was an increase from 68% to 96% in data shared during handoff. In addition, interruptions decreased from 67% to 40% (Starmer et al., 2017). Results for improving the quality of information shared using the IPASS tool were shown to be statistically significant using the Chi-squared and Poisson tests.

Walker et al. (2016) conducted a systematic review of the literature to evaluate effective strategies that are in practice to improve patient safety with throughput from the ED to the IPU. Overall findings concluded three operational strategies that can increase patient safety related to
throughput: system entry, care coordination, and the admission and discharge process (Walker et al., 2016). Standardization of provider handoff was not discussed in this article. Sorrentino (2016) conducted a Failure, Modes, and Effect Analysis (FMEA) after receiving multiple patient safety event reports related to misinformation during the nurse-to-nurse handoff from the ED to the IPU. As a result, the FMEA identified the need to improve communication processes, ED LOS, and patient safety by standardizing nurse-to-nurse handoff (Sorrentino, 2016).

**Physician Handoff.** The impact of physician-to-physician standardized handoff on patients' safety was evaluated in one article in this literature search (Gonzalo et al., 2014). Gonzalo et al. (2014) implemented a standardized electronic handoff tool for physician-to-physician handoff. A Likert survey was used to evaluate the perceptions of patient safety and near-miss events. Physicians surveyed believed electronic handoff was efficient and allowed for safe patient transfers increased from 61% to 93% (Gonzalo et al., 2014). Statistical significance was not evaluated.

**Gaps in Literature**

This literature search focused on the use of a standardized electronic tool for nurse-to-nurse handoff to decrease ED LOS for ICU patients. The use of electronic standardized handoff tools to improve ED throughput to the ICU or the IPU is not prevalent in the literature. There is an identified gap in the literature for the use of an electronic standardized handoff tool to decrease ED LOS. There is a robust body of literature related to the use of standardized tools for nurse-to-nurse handoffs. The literature review identified that the use of standardized handoff tools improves ED throughput, nurse satisfaction, and patient safety and decreases ED LOS. Evidence-based quality improvement outcomes revealed that the decrease in ED LOS was
achieved by implementing a standardized handoff tool for transfer from the ED to the IPU (Hart & Gormley, 2020; Potts et al., 2018; Sermersheim et al., 2020; Wolak et al., 2020). More research needs to be conducted to evaluate the impact that an electronic standardized handoff tool has on decreasing ED LOS.

**Summary**

Nursing handoff is a fundamental stage of the patient's care continuum. Throughput from the ED to the ICU, IPU, and the emergency observation units are all impacted by the standardization of nursing handoff. Electronic medical records are part of the nurse's daily work. There is an opportunity to integrate the electronic medical record into the standardization of nursing handoff. Standardization of nursing handoff is vital to impacting ED LOS and patient safety. Decreasing the ED LOS may allow for faster throughput and increase the number of patients that can be seen daily. The literature review reported that using an electronic standardized handoff tool would also decrease variations in nurse handoffs and improve patient safety.
Chapter Three: Methodology

Introduction

This chapter will discuss the methodology used for this QI project. Also discussed in this chapter, is an overview of the setting, population, instrument, data collection, analysis, and Institutional Review Board (IRB) approval.

Evidence - Based Framework

The PDSA cycle was the theoretical framework used to guide this QI project. The PDSA cycle consists of four steps: plan, do, act, and study (PDSA Cycle, n.d.) (see Figure 1). The PDSA cycle allows for continual assessment of the QI project process. This design allowed for the evaluation of the current handoff process, adaptation, and implementation of the eSBAR tool, and the ability to adapt the eSBAR tool and handoff process as needed. After a thorough literature review, the "plan" phase began. First, the project team was created and defined the project's purpose. The purpose was to create, implement, and analyze the impact an eSBAR tool has on the length of time patients being admitted to the OU spend in the ED from when the bed is assigned. Next, during the "do" phase, the staff were educated on the completion of the eSBAR tool and handoff process. During the “study” phase data was gathered and analyzed. Finally, the "act" phase allowed the team to reflect on the new process and adapt eSBAR tool and handoff as needed.

Setting

The setting for this QI project was a 515-bed non-profit, acute care academic hospital located in Philadelphia, Pennsylvania. This hospital holds a Magnet designation for nursing excellence and is the recipient of the Emergency Nurses Association (ENA) Lantern Award. The ENA Lantern Award is presented to EDs that successfully demonstrate exceptional and
innovative performance in leadership operations and practice, education, patient advocacy, and search (Emergency Nurse Association, n.d.).

**Population/Sample**

The population utilized for this QI project were all patients admitted from the ED to the OU between November 8, 2022, and January 23, 2023. For continuity, the OU was chosen as the pilot unit because the nurse manager has oversight for both the ED and OU. The PAH ED treats approximately 54,000 patients annually (Penn Medicine, 2022). PAH is located in the Society Hill section of Center City Philadelphia. The community PAH serves comprises people of varying races and socioeconomic backgrounds, from those who experience homelessness to those with extreme wealth. The average age of patients who visit the PAH ED is 65 years old and ranges from 18-100. The patients that are admitted to the OU do not meet the criteria for inpatient admissions per insurance company reimbursement. The average LOS for a patient admitted to the OU is 24-48 hours.

**Instrument**

The ED and OU nursing staff evaluated a variety of handoff tools to determine which would best meet their needs. The SBAR tool was the agreed-upon format to use for standardized handoff. Implementing an electronic SBAR (eSBAR) was the primary intervention for this project (Appendix A). The SBAR tool is available on the IHI website and does not require permission for use. The SBAR technique was developed in 2002 by physicians Michael Leonard, Doug Bonacum, and Suzanne Graham at Kaiser Permanente in Colorado (Institute for Healthcare Improvement [IHI], n.d.). This tool provides healthcare personnel support in transferring information between healthcare providers to improve patient safety (IHI, n.d.). The steps in creating an SBAR handoff are as follows:
Situation (S) provides a statement related to the patient's chief complaint.

Background (B) provides brief information related to the patient’s situation.

Assessment (A) analyzes the situation specific to the patient's condition.

Recommendations (R) provide considerations for the next steps in the patient's care provided by the health care team.

In order to create an eSBAR tool, the paper SBAR was converted into an electronic document. The eSBAR tool provides the handoff recipient with standardized information about the patient. In order to tailor the eSBAR to meet their needs, nurses from the ED and the OU met to discuss what patient information was necessary to include in handoff. As a result, the final eSBAR tool included patient-specific information for patients admitted to the observation unit.

**Data Collection and Analysis**

The data collected for this QI project measured the time from the bed assigned to a patient being admitted from the ED to the time the patient arrived in the OU. The patient progression report provides this data. The report is generated via the EMR (EPIC©) from the time a bed is assigned to the patient in the ED to the time the patient arrives at the OU. The data was collected for six weeks pre-implementation and ten weeks post-implementation of the eSBAR tool for this QI project. A T-Test was used to evaluate time to determine if the implementation of the eSBAR had a statistically significant impact on reducing the length of time a patient being admitted to the OU spends in the ED once a bed is assigned.

**Protection of Human Subjects/IRB**

IRB approval was obtained from Penn Medicine (Appendix B) and West Chester University (Appendix C). Both IRBs determined the QI project to be exempt. There were no human subjects used for this QI project; therefore, informed consent was not necessary.
Resources, Personnel, and Technology

The personnel used to implement this project included: a performance improvement advisor, statistician, the ED nurse manager, ED and OU nursing staff, and ED transporters. The ED and OU staff agreed on the process for attaching the eSBAR to the Cureatr message. Cureatr is a privacy-protected application used by our health system for provider communication. Cureatr is an application that providers access from single sign-on desktop computers. The eSBAR tool template was saved to all single sign-on ED desktop computers. ED nursing staff completed the eSBAR tool for every patient transferred to the OU during the data collection phase. Next, the eSBAR tool was attached to a Cureatr message and sent to the OU receiving nurse. The OU receiving nurse had 10 minutes to read the eSBAR handoff. Cureatr marks the message as read by the recipient for the sender to view. If the recipient nurse has yet to view the eSBAR within 10 minutes, a call was made to the OU to notify them that the patient was on their way. Patients were then transported to the OU by ED transport staff. EPIC © was the EMR used to generate the reports required for data collection. A statistician was consulted for data analysis.

Summary

In order to standardize handoff from the ED to the OU, it was determined that the SBAR format would be utilized. The PDSA cycle was the methodology used to guide the implementation of the eSBAR tool for this QI project. Data collection was completed using the patient progression report generated by EPIC © and analyzed using the T-Test to evaluate statistical significance.
Chapter 4: Results

Introduction

This chapter discusses the results of the data analysis of the patient progression report for the time an ED patient's bed is assigned to the time a patient arrives at the OU. The statistical analysis for this QI project was performed using a T-Test in Microsoft Excel© and Minitab© (2019). The purpose of this quality improvement project was to determine if implementing a standardized electronic handoff tool impacted the length of time it took from the bed assigned to an ED patient to the arrival of the patient at the OU.

Data Collection

This quality improvement project collected 17-weeks of data via the Patient Progression EPIC© report. Retrospective data was collected from September 18, 2022, through November 6, 2022. Prospective data was collected from November 7, 2022, through January 21, 2023. Data was collected for 24 hours a day, seven days per week, pre and post eSBAR tool implementation. The Patient Progression EPIC© report was programmed to generate the total number of patients transferred from the ED to the OU, indicating the time from bed assigned to floor arrival. The total number of patients admitted to the OU from the ED during the retrospective timeframe was n=221. The total number of patients admitted while using the eSBAR tool was n=380.

Statistical Results

Data was collected for 17-weeks for this quality improvement project: six weeks’ pre-implementation and 11-weeks post implementation. The week of implementation was excluded because the remainder of staff were being educated on the handoff process. Data analysis was categorized by time of day and day of the week. There was an N=601 admissions from the ED to the OU during the 17-weeks. Of the N = 601, pre-implementation there was an n = 221 admissions
and post-implementation was an n = 380 admissions. A T-Test was performed to determine if the implementation of the eSBAR handoff tool had a statistically significant impact on the time the bed was assigned to a patient in the ED, to the time a patient arrived at the OU. For this quality improvement project, a p value of < .005 was statistically significant. The Anderson–Darling Normality Test was performed to determine if the data had a normal distribution without having set parameters. The null hypothesis was rejected by the Anderson–Darling Normality Test (see Figures 2 and 3).

Retrospective data collection revealed the average time from bed assigned to floor arrival for all days of the week for admittances from 12:00 am – 11:59 pm was 70.9 minutes. After the implementation of the eSBAR tool, the average time from bed assigned to floor arrival for all days of the week for admits from 12:00 am -11:59 pm was minutes 67.32 (p= 0.247) (see Figure 2). Prior to the implementation of the eSBAR tool, the average time from bed assigned to floor arrival for Monday through Friday, from 12 pm-5:59 pm was 81.47 minutes. After the implementation of the eSBAR tool, the average time from bed assigned to floor arrival for all days of the week for admits from 12 pm-5:59 pm was 71.17 minutes (p=0.181) (see Figure 3). Analysis of the raw data indicated a delta of 3.6 minutes in the time from a bed assigned to a patient in the ED to the time of patient arrival to the OU and resulted in an overall improvement of time of 10.3 minutes. However, the implementation of the eSBAR tool did not have a statistically significant impact on the length of time from bed assigned to floor arrive.

Summary

The data collection for this QI project was 17-weeks in length, analyzing retrospective and prospective data. A T-Test determined that the eSBAR tool did not have a statistically
significant impact on transfer times from the ED to the OU. Although, analysis of raw data showed a 10.3-minute improvement.
Chapter 5: Discussion

Review of the Problem

The information that is provided during nurse-to-nurse handoff is the foundation of the patient’s care. When information is missed, a patient’s care can be affected and place the patient’s safety at risk (Bakon & Millichamp, 2017; Galatzan & Carrington, 2018; Starmer et al., 2017; Tortosa-Alted et al., 2021; Walker et al., 2016). The TJC mandated standardization of caregiver handoff in 2006 (TJC, 2017). A standardized handoff tool was not utilized for handoff from the ED to the OU. Patients visits in the PAH ED have increased 30 percent since the beginning of the Covid-19 Pandemic (Penn Medicine, 2022). The workflow of the nurse and physicians did not adapt with the increase in patient volume, therefore impacting the patients LOS in the ED. The length of time a patient remains in the wrong level on care also negatively impacts patient safety (Galatzan & Carrington, 2018; Torsata-Alted et al., 2021). The purpose of this quality improvement project was to implement an eSBAR tool to standardize handoff and impact the length of time the patient waits in the ED after a bed is assigned.

Analysis of Results

Implementation of the eSBAR tool was the process decided on for this QI project during the plan phase of the PDSA Cycle. Nurses from the ED and the OU collaborated to create an eSBAR template suited for this patient population. All of the ED and OU nursing staff were educated on the new handoff process and eSBAR tool during the “do” phase. Data collection occurred during the “study” phase. The T-Test results revealed that the implementation of the eSBAR tool did not have a statistically significant impact on the time from bed assignment of the patient in the ED to arrival on the OU. The initial goal to reduce the time by 28 minutes from bed assigned to floor arrive was not achieved. The raw data did result in a 10.3-minute improvement
when the ED experiences the highest volumes. When nurses were asked their perception of the impact of the new tool had on time, they stated that the smallest improvement in time has a positive impact on their workflow.

**Limitations of the Project**

There were limitations encountered with the implementation of the eSBAR tool. During the time of this quality improvement project staffing challenges were encountered. ED transport staff experienced unexpected resignations in the department. Not having the budgeted number of patient transporters available negatively impacted the time of transfer from the ED to the OU.

To evaluate the barriers, huddles were conducted to elicit feedback from the nursing staff perceived on the use of the eSBAR tool. Overall, the nursing staff liked the concept of the eSBAR tool, saw improvement in their workflow but found the tool cumbersome to complete, particularly during busy times. A contributing factor was the availability of a single sign on computers to complete the eSBAR tool. The decreased availability of single sign on computers increased the length of time to complete the eSBAR tool, therefore negatively impacting the length of transfer time from the ED to the OU. A formal nurse satisfaction survey on the implementation of eSBAR tool was unable to be performed at this time. The Cureatr communication platform will no longer be available for staff use in May 2023. The absence of the communication platform has prohibited continued work using the process implemented for this QI project. However, the PDSA Cycle will allow the project team to continue working on improving the standardized handoff process.

**Implications for Nursing Practice, Education, and Research**

_Nursing Practice._ The literature review for this QI project indicated the need for further QI projects on the impact standardized nursing handoff has on transfer times from the ED to the
inpatient units. The length of time a patient spends in the ED directly impacts outcomes (Bakon & Millichamp, 2017; Galatzan & Carrington, 2018; Starmer et al., 2017; Tortosa-Alted et al., 2021; Walker et al., 2016). Nursing handoff was not standardized in the PAH ED prior to the implementation of this QI project. Standardizing handoff allowed for continuity in handoff for all patients being transferred from the ED to the ICU. Handoff standardization is not limited to the ED and OU. Nurses that provide handoff from other inpatient and specialty areas will benefit from using this technique.

**Nursing Education.** Nurse-to-nurse handoff is embedded in all scopes of nursing practice. Education on the significance of standardized handoff is essential to providing safe patient care. Nursing education on the importance of standardized handoff will be integrated into nursing orientation at PAH. Additionally, ED nurses are providing education to all current staff. This education will provide nurses with enhanced assessment and communication skills.

**Nursing Research.** In order to continue this project, a new secure communication method is necessary. After further investigation of EPIC capabilities, a “smartform” can be created that has the ability of extracting data directly from the patients’ medical record. Nursing informatics experts, specifically at PAH, have the ability to create the new handoff tool that will populate with the assessment documented by the nurse. This tool can be tailored for patient specific populations which further individualizes care, and will allow for a handoff document to be generated with minimal nursing effort. While this is different than the eSBAR tool, the “smartform” would be a standardized format. Once the new handoff tool is created, this QI project will then be replicated in the ED. Future work will extend the use of the “smartform” for nurse-to-nurse handoff from the ED to other inpatient nursing units.
**Conclusion**

The impact standardization of handoffs has on patient outcomes is vital to providing safe care. The outcome of the implementation of the eSBAR tool at PAH was clinically significant. The staff perceived an improvement in their workflow in the ED. Although the results were not statistically significant, the decrease in time spent in the ED allowed for the beds to be available sooner by 10.3 minutes. This QI project was limited in scope and therefore future projects are needed to evaluate how standardization of handoff impacts transfer times from the ED to the OU. Future projects will assess the financial impact the eSBAR tool has on decreasing length of stay in the ED. Standardizing handoff will continue to be the focus of nurse leaders at PAH. Nurse leaders have the capability to evaluate processes through QI projects that positively impact hospital operations and improve patient outcomes.
References


https://doi.org/10.1016/j.jcjq.2019.02.008


https://doi.org/10.1097/nna.0000000000000645


Figure 1

PDSA Cycle

- Reflect and adapt new process
- Define QI project process
- Data analysis and collection
- Staff education on QI project and process
Figure 2

Statistical Analysis All Days of the Week 12:00 am-11:59 pm

2-Sample t Test for Bed Assign to Admit by Before/After

Summary Report

Mean Test
Is After less than Before?

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>0.05</th>
<th>0.1</th>
<th>&gt; 0.5</th>
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<tr>
<td>Yes</td>
<td>No</td>
<td>P = 0.0247</td>
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The mean of After is not significantly less than the mean of Before (p > 0.05).

95% Upper Bound for the Difference
Is the entire interval below zero?

Individual Samples

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<thead>
<tr>
<th>Statistics</th>
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<tr>
<td>Sample size</td>
<td>300</td>
<td>221</td>
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<tr>
<td>Mean</td>
<td>91.318</td>
<td>70.314</td>
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<tr>
<td>95% Upper bound</td>
<td>78.800</td>
<td>79.585</td>
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<td>Standard deviation</td>
<td>22.140</td>
<td>21.985</td>
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Difference Between Samples

<table>
<thead>
<tr>
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<th>*Difference &amp; After - Before</th>
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<tbody>
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<tr>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

*Difference & After - Before

Comments

- Test: There is not enough evidence to conclude that the mean of After is less than Before at the 0.05 level of significance.
- CI: Quantifies the uncertainty associated with estimating the difference in means from sample data. You can be 95% confident that the true difference is less than 0.0813.
- Distribution of Data: Compare the location and means of samples. Look for unusual data before interpreting the results of the test.

Anderson-Darling Normality Test

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<td>&lt; 0.005</td>
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95% Confidence Interval for Mean

62.262 - 71.474

95% Confidence Interval for Median

55,000 - 60,000

95% Confidence Interval for StDev

38.459 - 44.352
Figure 3

Statistical Analysis Monday-Friday 12:00 pm - 5:59 pm

2-Sample t Test for Bed Assign to Admit by Before/After

Summary Report

| Sample size | 130 | 82 |
| Mean | 79.169 | 81.475 |
| 95% Upper bound | 77.34 | 81.152 |
| Standard deviation | 40.492 | 10.22 |

Difference Between Samples

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<tr>
<td>95% Upper bound</td>
<td>5.3238</td>
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Comments

- Test: There is not enough evidence to conclude that the mean of After is less than Before at the 0.05 level of significance.
- CV: Quantifies the uncertainty associated with estimating the difference in means from sample data. You can be 95% confident that the true difference is less than 3.1606.
- Distribution of Data: Compare the location and means of samples. Look for unusual data before interpreting the results of the test.

Anderson-Darling Normality Test

A-Squared | 3.37 |
P-Value | <0.005 |
Mean | 71.169 |
StdDev | 42.492 |
Variance | 1805.533 |
Skewness | 1.21623 |
Kurtosis | 1.74093 |
N | 130 |
Minimum | 1.000 |
1st Quartile | 42.000 |
Median | 60.000 |
3rd Quartile | 89.250 |
Maximum | 244.000 |
95% Confidence Interval for Mean | 63.796 | 78.543 |
95% Confidence Interval for Median | 54.000 | 67.625 |
95% Confidence Interval for StdDev | 37.879 | 48.394 |
Appendix A

eBSAR Handoff Tool

| Situation          | Patient Name: Click or tap here to enter text.  
|--------------------|-------------------------------------------------  
|                    | Admit Room: Choose an item.  
|                    | Diagnosis: Click or tap here to enter text.  
|                    | Status: Observation  
|                    | Pain Scale: Choose an item.  
|                    | Pain Med Given: □ YES □ NO  
|                    | Time: Click or tap here to enter text.  
| Background         | Reason of admit: Click or tap here to enter text.  
| Assessment         | Click or tap here to enter text.  
|                    | IVg: □18 □20 □22  
|                    | Site: □R □L □H □W □FA □AC □UE  
|                    | Limb restriction: □ R □L  
|                    | Ambulation status: Click or tap here to enter text.  
|                    | Behavior: Click or tap here to enter text.  
|                    | Psychosocial: Click or tap here to enter text.  
|                    | Anything else I should know:  
|                    | Click or tap here to enter text.  
| Recommendation     | See Physician Orders  
|                    | Immediate Needs: Click or tap here to enter text.  
|                    | Next Labs due: Click or tap here to enter text.  
|                    | Antibiotics given: □ Yes □ No  
| ED Nurse/ Phone    | Click or tap here to enter text.  
| Observation Unit Nurse | Click or tap here to enter text.  

rendi
Appendix B

Health Care Institution IRB Approval

From: IRB Quality Initiative <PROVOST-IRB-QUALITY@pobox.upenn.edu>
Sent: Wednesday, June 22, 2022 9:38 AM
To: Fosbenner, Lorie <Lorie.Fosbenner@pennmedicine.upenn.edu>; IRB Quality Initiative <PROVOST-IRB-QUALITY@pobox.upenn.edu>
Cc: Craig, Elizabeth J <Elizabeth.Craig@Pennmedicine.upenn.edu>; Clark, Rebecca R <Rebecca.Clark1@Pennmedicine.upenn.edu>
Subject: RE: QI Project Approval - Fosbenner

Hello Lorie,

It was determined that this project does not meet the definition of human subjects' research and therefore, further IRB review is not required.

This email should suffice as your documentation. Please save a copy of it for your records.

NOTE: Changes to the purpose, methods, or design of this project may alter the QI status and may require re-review.

Thank you,

Human Research Protections Program
Office of the Institutional Review Board
University of Pennsylvania
3600 Civic Center Blvd., 9th Floor
Philadelphia, PA 19104
www.upenn.edu/IRB
Appendix C

University IRB Approval

IRB #: IRB-FY2023-68
Title: Standardizing Handoff from the ED to the Observation Unit using eSBAR tool
Creation Date: 9-16-2022
End Date:
Status: Approved
Principal Investigator: Lorie Fosbenner
Review Board: West Chester University Institutional Review Board
Sponsor:

Study History

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Key Study Contacts

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<tbody>
<tr>
<td>Veronica Wilbur</td>
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<td><a href="mailto:lf159614@wcupa.edu">lf159614@wcupa.edu</a></td>
</tr>
<tr>
<td>Lorie Fosbenner</td>
<td>Primary Contact</td>
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