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Reducing the Number of Patients Leaving Before Evaluation From the Emergency Department

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by

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Abstract

Boarding patients in the emergency department (ED) can lead to several adverse events and errors that can prolong the patient's hospitalization and delay discharges from the inpatient floors. These excessively long hospital stays decrease the number of bed available to patients being admitted from the ED, creating a bottleneck effect of patients backflowing in the ED. When this occurs, there are less available beds and resources for new ED patients, creating long wait times, and eventually an increase in the number of patients leaving before provider evaluation. This MSN project serves to create a new job role in the ED for an inpatient charge nurse to monitor the plan of care for each boarding patient in an attempt to reduce the number of adverse events occurring in the ED. The goal of this project is to decrease hospital length of stay, decrease the number of adverse events, and decrease the number of patients leaving before provider evaluation. The evaluation plan for this project is to compare the data prior to and following project initiation to ensure determine if the number of patients leaving before provider evaluation, number of adverse events, and wait times improve.

Keywords: boarding patients, patients leaving before provider evaluation

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CHAPTER I

Introduction

In light of the current COVID-19 pandemic affecting the nation on a spectrum of high and low volumes of patients, many hospitals have found themselves in an unfortunate quandary for the past 2 years. The continuous influx of high acuity patients, combined with less-than-ideal levels of staffing throughout hospitals across our nation has left acute care facilities bursting at the seams with high census levels and very sick patients. With the increase in patients necessitating admission to acute care units and with facilities being over-capacitated with patients, emergency departments (ED) have suffered greatly with high volumes of patients awaiting room assignments to an inpatient unit that might not arise for multiple days. One explanation for ED boarding is that 50%-75% of patients are admitted through the ED (Yarmohammadian et al., 2017). For each patient residing in the ED for hours, or even days, after their disposition has been set to admission, there is one less room available for the treatment of new patients presenting to the department for care.

Almost every unit in each hospital can restrict the number of patients arriving in the area based on the number of available rooms and level of staffing, but the ED does not have the same ability. The doors to the ED will never close, and the number of patients arriving by Emergency Medical Services (EMS) will never slow, even when there are no other rooms available for patients to be treated. Thus, many hospitals have experienced outrageously long wait times for patients seeking care in the ED, and even more, patients leaving without being seen by a provider.

As the volume in the ED grows, the number of patients each nurse is required to care for also increases. Prioritization by acuity and severity of the illness of each patient is one of the first skills stressed to nurses working in the ED. While the boarding patient will receive care, the nurse might not be able to closely monitor the patient's plan of care to advocate for expedited testing and timely discharges, and care prioritization may differ from that of an inpatient nurse (Nouri et al., 2020). Inpatient routines and workups for patients are typically foreign for ED nurses, who are more familiar with initial stabilization and pre-admission care for patients. An increase in the number of patients boarding in a hospital's ED often leads to prolonged discharge times and an increase in the length of stay in the hospital for these patients, leading then to longer wait times for new ED patients and inadequate patient flow for the whole hospital system, and vice versa. Delayed discharge times and prolonged length of stay cause the number of patients boarding within the ED to increase (Nouri et al., 2020).

Significance

Boarding patients within the ED while awaiting a room assignment on an inpatient unit is not just an ED problem. It is, however, a system-wide hospital problem involving inappropriate allocation of resources, inefficient use of space, untimely discharges, low staffing rates, and several other factors. Nouri et al. (2020), state in their article "boarding increases the overcrowding in the ED which leads to the inability of staff to adhere to the guidelines- recommended treatment, reduces the quality of medical care, and further results in a higher mortality rate." This hospital-wide problem should be addressed by all levels of staff, especially those in hospital leadership, and all responsibility should not fall on the ED to develop solutions to care for these patients.

Other researchers have proposed ideas such as the implementation of chest pain observation units, clinical decision units, and utilizing lean thinking to create new strategies to manage overcrowding, however, none have proven effective in improving patient flow through the ED (Yarmohammadian et al., 2017).

When patients begin boarding in the ED, the hospital system will see a loss in the amount of revenue generated daily as the number of patients being seen and treated by an emergency physician decrease. There is also a decrease in the efficiency of resource allocation. ED resources such as time, space, and labor are being consumed by patients boarding within the department leaving the remaining resources to be dispersed scarcely amongst those waiting for evaluation and care. When wait times increase, an increase in the number of patients leaving before evaluation is also seen, which is a disservice to communities (Smalley et al., 2021). This can in turn lead to a distrust of the healthcare system when emergencies go untreated for several hours.

One research team did an analysis of the opportunities lost by each patient boarding in an ED and found that in one hospital that averages 222 patients per day, 66% of those patients who were admitted experienced a boarding time greater than two hours. That same hospital could have seen 21 additional patients, should they not have wasted resources onboarding 10% of their patient population. They concluded that the opportunity lost with boarding patients equaled the time needed to care for about 5-13% of each hospital's ED population. (Lucas et al., 2009). While this study did not mention the rate of patients leaving before being seen by a provider, another study notes patients who leave the ED without treatment present a "medicolegal risk and lost revenue" (Smalley et al., 2021). The same research team was also able to quantify the potential

revenue lost with the patient leaving before provider evaluations and calculated the combined professional and technical charges to equal a loss of $5.6 million for the studied hospitals for the year 2019. The hospital system also had a 35.6% rate of return within 30-days for those patients leaving before being seen by a provider (Smalley et al., 2021).

Purpose

The purpose of this MSN Project is to develop a solution for ED overcrowding related to boarding patients within the department for extended periods of time, leading to a decrease in the number of patients leaving before they are evaluated by a provider.

Conceptual Framework

The conceptual framework that will guide this project will be the Systems Model created by Betty Neuman. The main components of the Systems Model can be applied to the project presented in this paper. The ED will be utilized in the patient role within the model. The health paradigm will be defined as the functioning level of the ED. The nursing portion of the model will focus on the prevention strategies that will help propose solutions to the identified problems, and the environment paradigm will be fulfilled with the identification of the stressors acting on the department that weakens the ability to function at its highest efficiency (da Silva Papi Diniz et al., 2019).

Basic components of the System Model include a holistic assessment of the variables involved within the department as it functions at its baseline, and identifying the lines of resistance and defense, which are the department's ways of maintaining its normal level of functioning ("Occupational stress in the context of COVID-19", 2021). This model will allow the project leader to identify stressors within the environment

surrounding the department working against those normal lines of defense, disrupting the normal, and impacting its ability to function at maximum efficiency such as holding large volumes of patients in the ED. After stressors have been determined, the nursing role within the conceptual model will allow for the development of three levels of a prevention strategy, or solutions to the problem, to help the department return to and maintain an optimal level of functioning (Beckman & Fawcett, 2020). An example would be adding a circulating inpatient charge nurse to monitor the plan of care for each boarding patient.

Definition of Terms

To ensure understanding of all concepts used in this project, terms used frequently throughout the project need to be defined. Boarding, as described in this project, can be defined as the holding of patients within the emergency department longer than two hours after the patient's disposition has been set to admission by the attending emergency physician, until an inpatient unit room has been assigned to that patient.

Leaving before provider evaluation is a disposition selected by the ED team for patients who present to the ED seeking care but decide to leave from the waiting or treatment room without being evaluated by an ED provider. This can occur for numerous reasons, and it is often statistically tracked by hospitals for an evaluation of department efficiency and improvement measures.

Additionally, the term charge nurse is used in this context as a nurse that manages the unit for each shift. The nurse will circulate among the other staff nurses to ensure problems are resolved without conflict and patients are receiving the expected level of care.

Summary

In summary, EDs have suffered over the past few years with overcrowding and an increase in patients boarding within the department awaiting room assignments. Time, supplies, and adequate staffing become inadequate when the ED is expected to carry sometimes double its volume to care for those in need. Boarding patients might experience a lower level of care while in the ED due to the need to prioritize unstable patients that just arrived over those who are stable and simply awaiting a bed assignment. Pertinent aspects of a patient's plan of care could be overlooked and errors could be made due to a lack of experience caring for admitted patients (Nouri et al., 2020). This could also lead to prolonged length of stays and extended discharges for patients, which increases the backflow into the ED. When the flow is interrupted, the department sees a buildup of patients in the lobby waiting to be seen, and the number of patients leaving before provider evaluation increases, creating distrust within the community (Yarmohammadian et al., 2017). While not just an ED problem, hospital systems have pushed interdepartmental cooperation to solve this system-wide problem, and many have developed creative momentary solutions, though none have proved to be an appropriate, long-term resolution (Yarmohammadian et al., 2017).

CHAPTER II

Literature Review

Hospitals nationwide suffered greatly during the COVID-19 pandemic that surged through the country in 2020. Patient volumes increased, as did acuity levels, leaving hospitals stretched thin with staffing and resources available to care for those in need. Already scarce resources became even more scarce, and staffing numbers surged even lower as staff faced burnout, left for new travel nursing opportunities, and even left the profession completely due to poor working conditions. With volumes increasing and hospitals at maximum capacity, boarding times began to increase for those patients admitted to the hospital, forcing patients to reside in the emergency department (ED) for extended periods of time awaiting the availability of a room in the appropriate inpatient unit. This bottleneck effect leads to ED overcrowding, prolonged stays in the hospital, and an increase in the number of patients leaving the ED before being evaluated by a primary healthcare provider in the ED. While not just a problem for the ED, boarding proves to be a system-wide problem related to an imbalance between the supply and demand of scarce resources within the system (Wong, 2010). Despite numerous proposals for potential solutions to ED overcrowding, hospitals are still struggling to cope with the rising population of boarding patients. Despite the lack of a one-size-fits-all solution to this expanding problem, researchers have been able to agree on several aspects of the problems associated with boarding patients within the ED.

This literature review was conducted to help further develop the problem presented in this project, and to help demonstrate how boarding patients in the ED can affect the hospital system. To conduct this research on current literature, the project

leader used the Cumulative Index for Nursing and Allied Health Literature (CINAHL) database. Keywords used were “boarding patients within the ED”, “managing ED holds”, “utilizing hallway beds”, and “Neuman’s system model related to nursing practice” to further narrow the search within the database.

Review of the Literature

While there is much controversy on how to solve the issue of boarding patients within the ED, both providers and nurses agree boarding patients in the ED while awaiting an inpatient room assignment might not always be in the patient’s best interest. The American College of Emergency Physicians (ACEP) (2017) noted several adverse occurrences associated with patients held in the ED for more than 2 hours after their disposition has been set to admission. The ACEP noted a decrease in patient safety, reduced timeliness of care, and a lower quality of care provided for patients boarding in the ED (American College of Emergency Physicians [ACEP], 2017). One explanation for this occurrence is the idea that boarding primarily affects the nurses’ workloads, as the nurses in the ED are primarily responsible for assuming care for this population of patients, while also trying to balance their obligation to care for the active ED patients in their area (Hodgins et al., 2010).

Some hospitals have decided to have an inpatient hospitalist team of providers to assume care of the boarding patients after their ED disposition has been set to admission. The ED provider will pass the responsibility of care to the hospitalist team who is better trained to care for these patients long-term, as ED providers typically specialize in initial treatment and stabilization. This helps to reduce the burden on ED physicians, allowing

them to care for more active ED patients as they continue to present to the department. This does not, however, reduce the burden on the ED nursing staff (Liu et al., 2012).

ED nurses prioritize their highest acuity patients to receive the most of their time and resources. Often, after initial stabilization, those patients who are awaiting room placement do not fall high on that list and can be placed on the backburner of prioritization due to other sicker and unstable patients. Unfortunately, this can cause delays in medication administration, misses in home medications, and a lack of comfort care measures for those patients boarding in the ED (Hodgins et al., 2010). Hodgins et al. (2010) mentioned many of the same complications associated with boarding as the ACEP, seconding the idea that boarding patients often receive a lower quality of care and lack of timeliness with medication administrations from ED nurses caring for those boarding patients. Lack of timeliness with home medication administration and antibiotic administration can lead to complications throughout the admission for these patients, possibly causing an increase in the length of stay while admitted to the hospital (Hodgins et al., 2010). However, in another study, there was insufficient data available to relate any adverse events occurring in the first 24 hours of admission to boarding patients in the ED (Lord et al., 2018).

Along with delays in medication administration, there are also records of an increase in medical errors for those patients boarding in the ED. These medical errors can lead to an increase in the patient's length of stay while admitted to the hospital, leading to prolonged discharge times. With delayed discharges from the hospital, there are fewer available beds for these admitted patients, which will eventually increase the number of boarding patients in the ED awaiting room assignments. The patients boarding in the ED

will consume vast amounts of already scarce resources, taking away from the new patients seeking help for their emergent issues. With resources depleted, staffing preoccupied, and rooms unavailable, more patients begin to leave the ED without being seen by a provider, representing a loss of opportunity for the ED (McNaughton et al., 2012).

Researchers agree boarding is a system-wide problem that should include all levels of administrative involvement (Wong, 2010). Hospitals should have a mobilization plan in place when patients begin boarding in the ED, with plans to open temporary units and mobilize on-call staff to accommodate the increase in patients. If no other unit space is available, the administration could consider sending their on-call inpatient nursing staff to the ED to help care for the boarding patients, allowing the ED staff to focus on stabilizing and treating their active ED patients (ACEP, 2017).

If possible, providers could consider transferring patients to other hospitals within the same system if other locations have open inpatient beds (McNaughton et al., 2012). Another option could be to utilize ambulance diversion, sending incoming medics to other local hospitals that might not be experiencing the same high volumes of patients (ACEP, 2017).

A common strategy employed by many EDs is the utilization of non-traditional treatment areas. With the goal being to increase the number of ED patients being seen and treated by a provider, it also helps to decrease the number of patients leaving the department before being seen by a provider. However, it has also led to a decrease in patient satisfaction (Kim et al., 2020). Non-traditional areas can include placing stretchers for treatment in ED hallways for patients to receive treatment. Utilizing non-medical

rooms, such as the waiting room or consult rooms to treat patients is also not uncommon (McNaughton et al., 2012). McNaughton et al. (2012) seconded the idea that non-traditional treatment areas lead to lower patient and staff satisfaction scores, citing the idea that lack of privacy and an increase in treatment times contributed to lower scores (McNaughton et al., 2012).

In addition to the utilization of non-traditional treatment areas, some hospitals resorted to placing admitted patients in hallway beds in the prospective inpatient units rather than forcing the patients to remain in the ED until an open bed presented itself. While this was favored by patients and ED staff, inpatient nurses were not as open to the idea of boarding patients in their hallways. Concerns from inpatient nurses regarding boarding on their units involved lack of patient privacy, possible fire hazards, inadequate staffing, decreases in patient comfort and satisfaction, and a threat to patient safety (Pulliman et al., 2013)

Many of the solutions focus on changes within the ED, but by scrutinizing the root of the problem, Wong (2010) concluded focus should be placed on expediting discharges and shortening the length of stay for patients admitted to the hospital. This proved difficult because there are many factors surrounding admission times and discharges. With many hospital beds occupied by patients unable to return home and awaiting placement at long-term facilities or having social holds for placement, discharge of these patients is extended many days, and is out of the hospital's control. There was also an increase in readmission for the given study that could have been contributed to overly-aggressive discharges from the hospital (Wong, 2010)

Literature Related to Theoretical Framework

Betty Neuman's systems theory was applied to a study discussing nursing interventions. The study utilized the model to target potential stressors patients could be facing while presenting to the hospital. The study noted nurses can prevent ad lessen the effects looming stressors have on the patient Intrapersonal stressors faced by the patient could include anxiety and nervousness about their pending plan of care, regret of their life choices, sickness, hunger, concerns about family still at home, worries about who will care for pets at home, and confusion about their care and reasons for being in the hospital. Interpersonal stressors can include stress from being far from family, anger with others for inability to care for themselves, stress with having no privacy from others and having to rely on others for basic activities of daily life. Extra-personal stressors are fewer and can include concerns about taking personal time off and missing work, worries about not being paid for work and looming medical bills, and impatiently awaiting surgical procedures (da Silva Papi Diniz et al., 2019). The hospital, especially the ED, can be perceived as a cold, painful place full of suffering. The department and staff can appear de-humanized and jaded. When given the appropriate resources, nurses and staff can help resolve these issues by giving patients the attention they need and desire. However, in the ED, this is often impossible for staff to do due to a lack of time, space, and resources (da Silva Papi Diniz et al., 2019).

Another article utilizing Neuman's system model presented the idea that individual patients can be compared to open systems with interactions within the surrounding environment, where they are continuously seeking physical and mental stability. The article demonstrated the importance of creating strategies to help decrease

the stress on each patient and staff member after the stressors have been identified (Almino et al., 2022).

Strengths and Limitations of Literature

After reviewing the literature surrounding the topic, boarding patients in the ED poses several problems. Most articles agree there can be lapses in care, misses with medication administrations, possible adverse effects that could lead to prolonged hospitalization, and a decrease in patient satisfaction. Many suggested the bottleneck effect caused by hospitals being at maximum capacity leads to congestion and decreased throughput through the ED, causing patients to board for extended periods of time and increasing the number of patients leaving before provider evaluation. Many solutions were proposed, with the most widely used being the utilization of non-traditional treatment areas to decrease the number of ED patients leaving the department before being seen by a provider.

The literature surrounding Neuman's theory as applied to nursing research was minimal in relation to subjects like this project. The article cited in this project demonstrated stressors faced by patients being admitted to the hospital and can directly apply to the topic of patient satisfaction. It demonstrates ways nurses can help ease the stress faced by each patient but fails to mention the difficulty faced by ED staff in relation to the lack of time and resources available to provide the necessary care to those in need of emotional support. The article provides a way for readers to gauge how the lack of timeliness and availability of ED nursing staff can affect the patients boarding in the ED, and also the article can serve as a way to further develop the problems that can

arise for the population of patients forced to board in the ED awaiting a room assignment after admission.

No literature was found to support the possible solution presented in this project, as it is a unique, creative idea. No literature was found to propose a solution that proved effective at all facilities. Limitations can be cited as each facility is different in size and available resources, and not every solution is feasible for every system. Limited literature was readily available surrounding the prolonged length of stay associated with adverse events tagged to lower quality of care provided in the ED. One article researching the relation between adverse events within the first 24 hours of admission and boarding in the ED was inconclusive. Many articles also failed to provide statistical data to support the ideas that were presented.

Summary

Hospitals have worked to develop solutions to the expanding problem of boarding patients, many of which were able to decrease some of the burdens on the ED staff, but none have proved effective in eliminating the topic altogether. The articles presented demonstrate the need for this project as further examples of undesirable events surrounding boarding patients in the ED were discovered. This literature relates to this MSN project because it further develops the problem being discussed, and it provides specific examples of events that can be associated with ED boarding. By developing the problem, the literature guides understanding of the need for developing alternative solutions to be used in conjunction with the current literature to help make an impact in reducing the burden boarding can be placed on the ED and staff.

CHAPTER III

Needs Assessment

As populations continue to grow across the region, many of the hospital systems within the Southeast have been fortunate enough to continue to expand their practice to accommodate the increasing number of patients from their communities. When the COVID-19 pandemic surged throughout the region, however, many facilities found themselves bursting with patient populations greater than they could manage, especially with the staffing shortages and isolation requirements. While the inpatient units might have reached capacity, the influx of patients into the emergency department (ED) never slowed, leaving the ED to care for the overabundance of patients residing in the department for an undesirable amount of time. With the number of boarding patients increasing, hospitals across the country were forced to find creative solutions to manage the rising patient volume within the ED.

Target Population

Involved within this project is a subset of data ranging from January 1, 2019, to December 31, 2019. The population of patient metrics studied included those patients who met the criteria for "boarding", meaning those who had their disposition set to admission from the ED and remained in the ED for greater than 120 minutes after that disposition was selected. A comparison study was done to evaluate the same metrics for the dates ranging from January 1, 2021, to December 31, 2021, to determine any positive correlation between wait times with the pandemic. The number of patients leaving before provider evaluation was also reviewed for the selected time frames.

Setting

This project is being designed for a 541-bed community hospital with a 75-bed ED in an urban area in the Southeast United States. This ED is a level one trauma center, certified chest pain center, and primary stroke certified. This facility has four smaller additional acute care hospitals within the healthcare system located throughout the county, which feeds into the main ED when care exceeds available resources at that given facility. On average, this ED is prepared to see and treat around 265 patients daily, with enough staffing and resources to accommodate 200-320 patients daily. Patient volumes fluctuate throughout the week, with the highest census being on Monday and Tuesday, and the lowest being Friday and Saturday.

Sponsors and Stakeholders

The manager of staff development for the ED will be the leader's project partner, as this person is most familiar with the department and is able to run the metric data surrounding the project areas of interest. Included in this project will be the Director of Nursing for the ED and a member of the human resources department to assist the Project Leader in the creation of this position.

Stakeholders associated with this project are the remaining staff in the department caring for this patient population. With the implementation of this idea, these staff members will have an additional resource to help them provide optimal care for these patients and maximize the use of these scarce resources. Also affected by the implementation of this project will be the boarding patient population within the ED, as these patients will have an additional team member that will oversee care to ensure the patients remain on schedule for timely discharge and are receiving the best care possible

to lessen the chances of a prolonged length of stay in the hospital after room assignment. Those also affected by this project will be the population of patients that will decide to leave before provider evaluation, as they may have decreased wait times, encouraging them to stay to be treated.

Desired Outcomes

With the implementation of this project, the goal is to create one full-time equivalent (FTE) for a charge nurse role, specifically for an inpatient-trained registered nurse (RN). For this specific facility, one FTE equals 2,080 hours worked per year (93% productive time and 7% non-productive time) (R. Camp, Personal Communication, October 18, 2020). The goal would be for the RN to circulate throughout the ED and assist with monitoring each boarding patient's progression through the desired plan of care and overseeing the general care of the boarding population residing within the ED. With the creation of this position, the goal is to decrease the number of patients leaving the ED before being seen by a provider, and also to prevent an increase in the length of stay for this population of patients related to any adverse events or missed care resulting from boarding in the ED for extended periods of time. This new role could also help bridge the gap between the ED and inpatient units where conflict typically occurs by ensuring there are no lingering lapses in patient care.

From an inpatient RN perspective, if the proposed solution is effective, patients would achieve timely discharges from the unit after admission for the appropriate number of days. Length of stay would not be prolonged, and scarce resources would be conserved. The ED would experience more efficient throughput for patients, decreased

wait times for ED patients, and a decrease in patients leaving without being seen by a provider.

SWOT Analysis

The creation of this new role for the ED has been evaluated using the SWOT analysis, and a corresponding table is attached following this section. The main strength associated with this project is the relatively low cost of implementation. There are many other ideas being considered in hospitals across the nation about potential solutions to the problem at hand. None have been proven to be effective against all complications associated with boarding, and most are costly, proving to be unfeasible with the nationwide crisis the COVID-19 pandemic has placed on healthcare systems. There have also been increases in pay for all nursing staff in light of the current pandemic as well which could be appealing to those willing to apply for the position.

The weaknesses of this project reflect the hospital-wide problems, including scarce resources. The systems are experiencing shortages of supplies, many requiring new products to be purchased, leading to a need for increased education on using the new products. This can be frustrating to staff, especially when the materials are not consistent and can differ between units. There is a system-wide staffing shortage as well, which could lead to a lack of acceptable applicants for the position. It might also mean another unit suffers a loss should a nurse choose to pursue this new role. There could be difficulty in finding a team member willing to join the ED team, as the unit is often intimidating to those who are new to the specialty of emergency medicine. The ED can be a stressful, fast-paced environment to work in due to high patient volumes, high patient-to-staff

ratios, and high acuity of patients. Low morale among staff leads to high turnover rates, and lower patient satisfaction rates as well.

The opportunities that could arise from the implementation of this project exceed the weaknesses, with the greatest one being better patient care. A goal of the facility is to serve the community and provide the necessary care for each patient, and by executing the plan, the resource could provide the additional support staff needed to increase the level of patient care and ensure patients efficiently progress through the plan of care. By providing an additional resource for the team and patients, the staff and patient satisfaction rates can rise. ED nursing staff will have more guidance on caring for admitted patients which can boost confidence and job satisfaction. The additional guidance can help prevent adverse events from occurring due to errors or lack of knowledge and can lead to a higher quality of care. Ultimately, the length of stay will not be prolonged if the patient is adequately cared for and the plan of care progresses as projected, so the patients will have timely discharges from the hospital. As the plan comes full circle, the wait times in the ED will be decreased for those seeking care related to adequate patient flow through the hospital, and there will also be a decrease in patients leaving before being seen.

Threats to the enaction of the project would be the fluctuations in patient volumes as the pandemic surges and recedes. Should the volumes decrease and the number of patients boarding in the department decrease, there may not be a need for this position as the staff will return to focusing on providing care to active ED patients. Other threats to this project include budgeting. While implementation of this project is not costly, the staffing budget may be stretched to the max at any given time due to the need for

additional staff and agency workers. These factors could mean there is not enough flexibility to add an additional position.

Figure 1

SWOT Analysis for Role Creation

Strengths	**Weaknesses**
- Recent increases in pay for nursing staff - Relatively low cost of implementation - Provides an additional resource for staff - Bridging the gap between ED and inpatient nursing to prevent a lapse in care - Understanding the unique needs of this patient population - Full-time employee benefits	- Inadequate staffing throughout the company - Limited resources throughout the healthcare system (time, space, materials) - Low morale among staff within the department due to working conditions - Stressful work environment
Opportunities	**Threats**
- Emergent need for additional resources - Increased patient satisfaction rates - Increased staff satisfaction due to an increase in resources - Decreased length of stay and timely discharges from inpatient units - Decrease in adverse events related to boarding - Decrease in missed care related to boarding - Decreased wait times for new patients presenting to the department	- Changing patient volumes - Waves of pandemic surges followed by normalization of volumes - Department being overbudget - High number of agency nurses (higher wages/less money available in the budget)

Resources

For the implementation of this project, a new position will need to be created for the ED and added to the department's staffing budget. The need for the hours for this new employee will be dependent on the number of patients or the likelihood of patients boarding within the department for that day. Since this is simply a creation of an additional nursing position, after approval by the recruiting department and the chief nursing officer (CNO) of the hospital, the only resource needed for the achievement of this project will be additional funding incorporated into the staffing budget to encompass the hours for each potential shift worked by this new RN position.

Team Members

To implement this project, an assembled team would be beneficial for the creation and monitoring of the need and outcomes. Along with the Project Leader, an advisor from the facility's quality department would be essential for monitoring the outcomes throughout the patient stay to determine the effectiveness of the new role. The department's manager of staff development, or anyone involved with monitoring the statistics and metrics surrounding the ED, would also be essential to the project in order to determine the need for the role, based on the current patient volumes of the department.

Cost-Benefit Analysis

To better explain the need for change, data has been presented in the tabular form listed throughout this section. The data collected in 2019 serves to represent a normally functioning ED before the COVID-19 pandemic began. Data collected from the year

2021 allows the reader to see the changes that could be related to the pandemic surges throughout the year. Both years are listed in the same chart for easy comparison.

Table 1

Comparison of Average Time (Minutes) from Triage Completion to ED Room

Month	2019	2021
January	36.98	41.65
February	41.60	30.00
March	29.96	30.89
April	41.98	41.04
May	38.87	42.72
June	34.51	41.35
July	37.45	44.51
August	35.44	80.76
September	29.65	70.34
October	27.05	26.28
November	14.69	33.76
December	20.58	64.45
Total (Average in Minutes)	31.12	46.90

This data set lists the average time it takes for the patient to have their triage completed until they are placed in an ED room for provider evaluation. This ED has multiple areas throughout the department equipped for different acuities of patients. For example, patients with a lower acuity level are typically immediately placed in a “Fast

Track" area to be seen by a midlevel provider immediately, allowing for a very low "triage to room" time. Patients with high acuities will need more resources, lower nurse-to-patient ratios, and rooms equipped with telemetry monitoring (L Miller, personal communication, March 29, 2022). Other outliers include patients arriving by Emergency Medical Services (EMS) and being placed in a treatment room directly without visiting the triage area in the main lobby. This population will also have a very low "triage to room" time.

Without these outliers being removed, the wait times do not appear outrageous, but the reader can see the average time for the patient being placed in an ED room increased in 2021.

Table 2

Comparison of Median Lengths of Stay (Minutes) for Boarding Patients

Month	Year 2019	Year 2021
January	567	688
February	589	488
March	515	498
April	531	545
May	524	522
June	494	576
July	471	582
August	453	818
September	450	993
October	454	548

Month	Year 2019	Year 2021
November	434	523
December	474	1016
Median Total (Minutes)	503	664

This table represents the median time spent in the ED for each patient marked as a "boarder". Medians were used in this table for a better representation of this data to remove most outlying times. The median time this population of patients resided in the ED increased by 161 minutes in 2021, and one explanation could be the increase in volume into the ED related to the COVID-19 surge. In 2021, the ED saw an average of 337 patients per day, which is a significantly large increase from the average of 265 patients quoted before the pandemic began. As mentioned previously, this ED is prepared with enough staffing to treat up to 320 patients per day. Being understaffed frequently can lead to staff burnout, loss of staff, and patient dissatisfaction. It can also lead to misses in care, delays in care, and adverse events that might not have occurred should the patient/staff ratio have been lower.

This volume of patients proved difficult for the ED to manage when the department was experiencing high volumes of patients boarding within the department (L. Miller, personal communication, March 29, 2022). The highest number of patients boarding in the ED at the peak of the COVID-19 pandemic reached as high as 70. In a 75-bed ED, 70 holds can prove to be a serious problem when discussing the allocation of scarce resources. For this specific department, resources and staffing are only budgeted

for the first 3.3 hours of the patient's stay in the ED. Any length of stay greater than three hours is costly to the department and a waste of ED resources.

Table 3

Comparison of the Number of Patients Leaving Before Provider Evaluation

Month	Year 2019	Year 2021
January	253	252
February	259	149
March	169	206
April	310	325
May	333	412
June	210	382
July	204	396
August	251	939
September	344	678
October	271	165
November	110	238
December	225	569
Total Number of Patients	2,939	4,711

This table presents the total number of patients who left the ED each month before being seen by a provider. Patients can leave the ED for several reasons, but the most common reason is dissatisfaction with lobby wait times. The number of patients leaving before provider evaluation almost doubled from the year 2019 to the year 2021,

and this represents a large loss of revenue and a disservice to the surrounding community when patients leave without treatment (L. Miller, personal communication, March 29, 2022).

On average, the loss of revenue totals between $400-$500 per patient who decides to leave before being seen by a provider (R. Camp, personal communication, April 25, 2022). That loss is only assuming those patients would be discharged from the ED after their appropriate treatment. For the year 2021, the total loss equals approximately $2.3 million for that patient population alone. This does not take into consideration the opportunity loss for the rate of return for those patients who decide to seek treatment later or those who would have been admitted to the hospital after their evaluation in the ED.

When comparing the cost of creating a new FTE, RN position within the department to the opportunity loss presented with the patients leaving before provider evaluation, the new position has a relatively low implementation cost. A competitive average salary for this RN position would total $45,000-$50,000 annually (R. Camp, personal communication, April 25, 2022). Should the creation of this position prove to be effective in its desired outcomes, and the position grows to full coverage for twenty-four hours every day, totaling no more than six full-time employees, the total of $300,000 annually is still remarkably lower than the cost associated with the opportunity loss.

As the information presented can have an uncountable number of influences that can skew the data in any direction, it can prove impossible to relate the changes in data to one specific cause. This data is shown with the consideration of the possibility that patient volumes were impacted by the surges of the COVID-19 pandemic but without consideration of any other factors that could have impacted the patient populations at the

given dates. The data serves to display a positive correlation between an increase in boarding times with an increase in patients leaving before provider evaluation from the ED. This project proposes creating an FTE RN position in the ED for an inpatient-trained charge RN to circulate within the department monitoring the plan of care for each boarding patient. The goal is to ensure there are no misses in care, decreasing the chances of adverse events, which will ultimately prevent any delays in discharge from the floor. If the throughput on the floors improves with timely discharges, more patients will be moved out of the ED, creating more space for new patients to be treated in the ED. Ideally, the benefits would backflow, decreasing the number of patients leaving before provider evaluation and decreasing ED lobby wait times.

CHAPTER IV

Project Design

Boarding patients in the Emergency Department (ED) has proven to be a system-wide problem faced by many hospitals throughout America. This population of patients, defined as patients residing in the ED for greater than 2 hours after the patient disposition has been set to admission to the hospital, places a burden on ED staff as already scarce resources are depleted. This causes burnout with staff and unsatisfied clients as wait times exceed well beyond the average time for an ED visit. Boarding is caused by an imbalance of supply and demand of hospital resources and a lack of available hospital beds, causing the bottleneck effect to take place and backflowing the admitted patients in the ED causing congestion and decreased throughput. Patients presenting to the department for medical care are unable to be treated due to a lack of space and staffing, leading to many patients leaving the ED before being evaluated by a primary healthcare provider. This then creates much opportunity loss for the system and a disservice to the surrounding community as members are unable to receive needed medical care. Patients who are boarding also do not receive proper care due to a lack of appropriate resources, causing delays and errors that could lead to prolonged hospitalization and delayed discharges from inpatient units. Many solutions have been explored, but no one solution has proven effective in eliminating the problem.

Goals

This project has two measurable goals. The first is to decrease the number of patients leaving the ED before provider evaluation. The projected goal is for the number of patients leaving the ED before provider evaluation to decrease by at least 7% in the

year following the implementation of the project. The second goal is to decrease the number of adverse events related to patients boarding in the ED. The projected goal is for the number of adverse events related to boarding in the ED to decrease by 50% for the year following the implementation of this project.

Plan and Material Development

The problems associated with boarding patients in the ED for extended amounts of time (greater than 2 hours) are not a new topic of discussion. When hospitals are at maximum capacity for patients residing in inpatient units, patients with dispositions set to admission in the ED are forced to remain in the department until an appropriate room becomes available. When patients are forced to board in the ED, the waiting room begins to back up, creating longer wait times for ED patients as there are no resources or treatment rooms available, leading to an increased number of patients leaving the ED before provider evaluation.

There are numerous proposed solutions to help relieve the stress placed on the ED when boarding patients, but none have proven to be completely effective. The solution proposed within this project suggests creating a new full-time employee (FTE) position for a charge nurse role within the ED. This nurse should have inpatient bedside experience and should be familiar with the hospital's admission order sets and hospital processes and procedures. This nurse will circulate throughout the ED, monitoring each boarding patient's plan of care to ensure omissions and mistakes in care are minimalized, leading to a decrease in adverse events that could prolong the length of stay in the hospital and promote timely discharges.

To begin the process, quantified data should be recorded showing the monetary loss associated with the number of patients leaving before provider evaluation. Then the data should be analyzed in comparison to the number of boarding patients residing in the department that day. Data should span over 6 months to 1 year to show trends in seasons and accommodate waves of the ensuing COVID-19 pandemic. Data could also be collected on the number of adverse events associated with boarding in the ED during that same time frame.

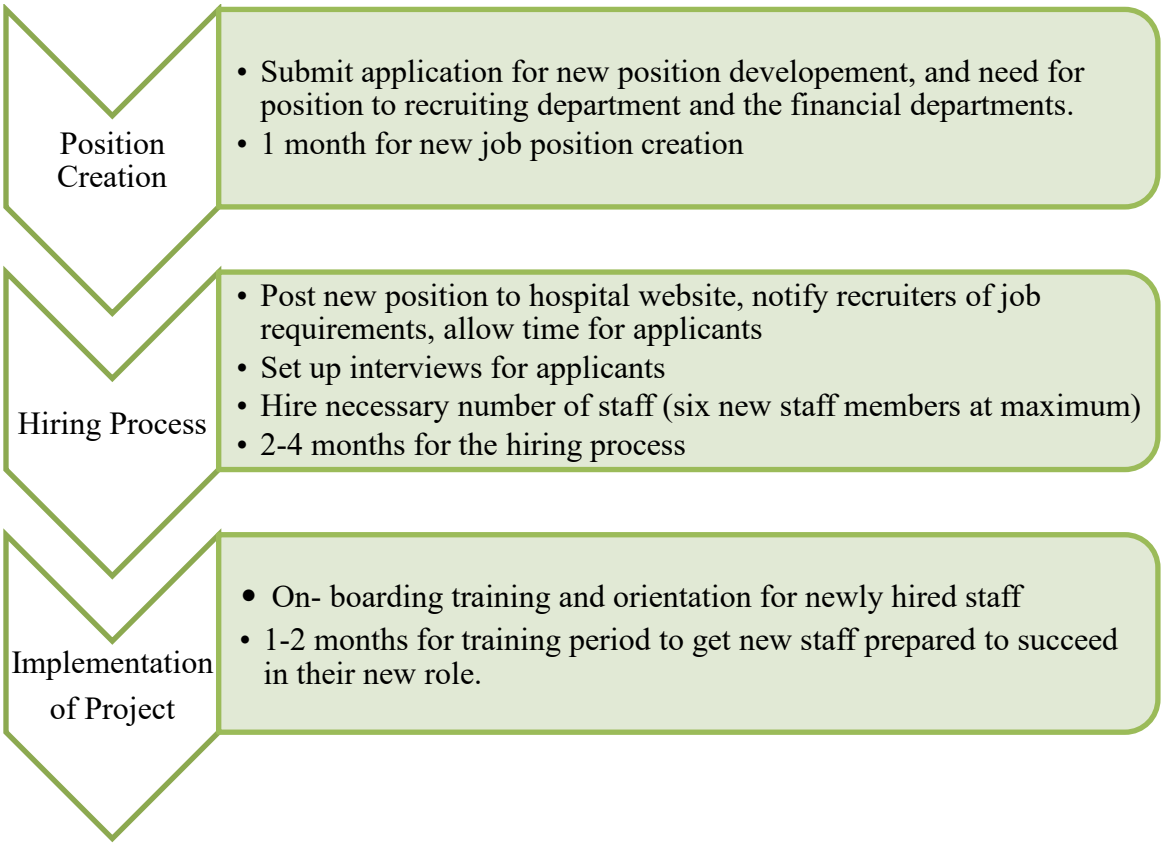
Once data has been collected, a report should be made and submitted to the Chief Nursing Officer (CNO), along with a proposal of this project as a potential solution to the problem. With approval from the CNO to progress to the next stage, the director of nursing for the ED should then submit the financial data to the finance department, along with a cost-benefit analysis to show the financial feasibility of the project. After receiving clearance from the finance department, the leadership team in the ED should work to create a document showing the specific job requirements and preferences and then submit that document to the human resources department and recruitment to get the official job posting created.

Once the job has been officially posted to the hospital's recruiting page, the hiring process will begin, and after hiring the desired number of staff for this position, the onboarding process will start to get the new hires trained and, on the floor, to help complete the projects goals.

Timeline

Figure 2

Timeline for Project Initiation



With the implementation of this project being relatively simple, the schedule for completing this project spans between four to seven months, depending on the time required to hire and train the nurses accepting the position. Since data has been collected to determine a need for this new position, the applications and paperwork can be sent by the director of the ED to the financial offices, the CNO, and the recruitment department which oversees the creation of new job positions at the hospital. The financial department will most likely require an explanation of the cost-benefit analysis to determine financial feasibility. After a need is determined, and approval is gained by the supporting

departments, the position can be created. One month is estimated as an appropriate amount of time for the completion of this stage of the project.

After gaining approval for the created job position, the job will be posted on the hospital website by the recruiting department. Two to 4 months have been allotted for this phase to allow time for those interested to apply, and for the applications to be processed by the human resources department and recruitment. Ideally, the team would strive to hire enough staff members to maintain daily 24-hour coverage for the emergency department, but should the posting receive less than six applicants, those interested should still be considered and shifts divided to cover the days the ED experiences a greater number of patients boarding. Once applications have been processed, the manager of the ED should arrange interview times with the applicants in a timely manner. After completion of the interviews, offers need to be made promptly to those chosen by the leadership team in the ED, and those who accept the proposed offers will again be contacted by the recruiting office for further information regarding the onboarding process.

Once the applicants receive approval and clearance to start working in the ED, one to two months have been allotted in the project timeline for departmental training. Ideally, training would be completed within the first month because the nurses hired would have previous bedside nursing experience. The extra month is noted in case there are any unexpected delays in the process.

Budget

Table 4

Sample Monthly Operational Budget (Based on ED Budget for August 2020)

Expense Type	Actual	Baseline Target
Salary Expense	$820,078	$775,946
Supply Expense	$238,881	$190,132
Benefits Expense	$220,834	$220,834
Total Other Expense	$79,833	$94,467
Total Operating Expense	$1,359,626	$1,281,379
Added Project Expense	$25,000 (Salary)	$25,000
	$7,000 (Approximate benefits)	$7,000
Total Expense with Added Project Expenses	$1,391,626	X

A sample of a monthly operating budget for an ED shows data from August 2020. The total operating expenses are the monthly total, including expenses for salaries, employee benefits, supplies, and miscellaneous other expenses that could arise. This ED ran over budget in both salary and supply expenses. At this time, many staff members of the department were working overtime shifts to accommodate low staffing, and the ED employed a few agency nurses that were originally not budgeted.

Implementation of this project would increase the total operating expenses by approximately $31,000 per month after including the costs of the salary and benefits for

newly hired staff members, depending on how many are hired. The cost-benefit analysis presented earlier in this project demonstrated the opportunity loss associated with the volume of patients leaving the ED before provider evaluation to be greater than $2,000,000 in 2021 as each walkout costs the ED $400-$500. Given the relatively low implementation cost of the project, and the long-term costs associated with the new staff's salaries, this project could potentially prove beneficial in eliminating the opportunity lost from the patients leaving the ED before provider evaluation.

Evaluation Plan

With the implementation of this project, the desired outcome would be to create a new job position for a circulating charge nurse with inpatient bedside experience to monitor the plan of care for each boarding patient to ensure there are no misses or lapses in the care of these patients that could lead to adverse events and prolonged length of stay in the hospital after admission. The goal is to ensure timely discharges from the inpatient units, and in turn, reduce the number of patients leaving the ED before provider evaluation due to long wait times caused by lack of available beds due to high volumes of patients boarding in the ED.

To evaluate the effectiveness of this project, the same quantitative data collected prior to the initiation of the project should be collected again to determine any improvements. Data should be collected over a span of 4-6 months after the hired nurses have started in the role to monitor the number of adverse events associated with boarding in the ED, the number of patients leaving before provider evaluation, and data of the patients leaving before evaluation in comparison to the number of patients boarding in the department at that time. The length of stay for the patients who met the "boarder"

criteria after being transferred to the inpatient unit should be measured and compared to the average length of stay for the same unit population of patients before the project was initiated.

Quantitative data that is re-collected after the implementation of the project is projected to show a decreasing trend in the hospital length of stay for the patients boarding in the ED. It is also projected to show a decrease in the number of adverse events associated with boarding in the ED as well as a decrease in the number of patients leaving before provider evaluation. If the data shows decreases in these three areas, the project is proven effective in accomplishing the desired goals and outcomes.

Should the quantitative data collected after the implementation of this project show no change or if the length of stay, number of adverse events, and number of patients leaving before provider evaluation increase, the project can be proven ineffective at accomplishing the desired goals and outcomes.

Patient satisfaction scores can also be measured using a survey. The survey should be provided to patients who were required to board in the ED to assess their satisfaction levels with the care that was provided to them. Surveys should be given before project initiation, and then should be given again to the boarding population of patients after the project has been implemented. Satisfaction ratings should then be compared, and if scores are higher after project implementation, the project can be concluded to be successful in raising boarding patient satisfaction scores for the ED.

Summary

In summary, this project serves as a potential solution to decreasing the number of patients leaving before provider evaluation due to long ED wait times, which can be

caused by high volumes of boarding patients in the ED. By creating a job position for a charge nurse with inpatient bedside experience to work with the ED nurses to monitor the plan of care for the population of patients boarding in the ED, with hopes of preventing misses in care that could lead to an increase in the length of hospital stay for these patients. By ensuring the proper progression of care, discharges should be timely, keeping adequate throughput of patients throughout the hospital system and preventing patients from overflowing in the ED. To complete the project, 7 months have been allotted for job posting, hiring, and training of the new employees. Data should be collected before project initiation and after completion to compare the data to ensure the quantitative data is trending in the appropriate direction to ensure the goals are being accomplished.

CHAPTER V

Dissemination

Boarding patients in the Emergency Department (ED) is a system-wide problem caused by an imbalance of supply and demand of hospital resources including staffing and availability of space. When patients are forced to remain in the ED awaiting a room assignment for admission, fewer rooms are available for active ED patients to be seen and treated. Patients forced to board in the ED often experience prolonged hospitalization and delayed discharges associated with problems that arose while residing in the ED. With wait times increasing in the ED, more patients are leaving before being seen by a provider, and present a large financial loss for the ED.

To help combat the problems associated with boarding, this project considered the idea of employing a charge nurse with inpatient training in the ED to help oversee the progression of care for each boarding patient in an effort to help prevent adverse patient events. By preventing these problems, the project leader hopes to promote shorter hospitalizations and timely discharges, leading to more available beds throughout the hospital. With less patients boarding in the ED, the number of patients leaving the ED before provider evaluation should also decrease.

Dissemination Activity

The ideas developed within this project were presented to the manager of a local ED, selected as a stakeholder, in the form of a PowerPoint presentation. The information presented began with the purpose and identification of the problem. The literature cited within this project was discussed in depth with the manager in a discussion format. After demonstrating the need for intervention related to the problems identified, the developed

solution was shared with the manager. A separate attachment was created to provide additional details for the job description. The cost-benefit analysis was discussed in detail using the information presented within this project and the tables created for visualization. Discussion ensued about monetary feasibility in relation to the manager's department. The discussion concluded with a summary of the project, and time was allocated for feedback from the stakeholder.

Patients leaving the ED prior to provider evaluation is a well-discussed topic among ED leadership. While presenting this project, the stakeholder verbalized agreement with the idea that boarding patients within the ED are one of the main causes of patients leaving without treatment. The stakeholder also agreed boarding patients present a system-wide problem and not one the ED should feel the burden to solve alone. The stakeholder believes this project is monetarily feasible based on budgeting and financial opportunity lost with each patient leaving without treatment; however, the stakeholder is unsure if implementation would be effective. Both parties agreed having a nurse in a position to oversee the plan of care for the boarding patients would ensure misses in care that could lead to prolonged hospitalization, but the stakeholder's opposition to the idea is the thought that boarding patients ultimately will still receive lower quality care due to the nature of the ED and the lack of adequate resources and staffing.

The stakeholder also expressed concern about what the new charge nurses would do when volumes have low boarding populations. After a discussion about potential solutions, it was decided, that should the project be implemented, additional job requirements would need to be added to the job description to include training the nurse

as an ED nurse to join the staffing numbers when there are no boarding patients in the ED.

Limitations

Limitations impacting the development of this MSN project relate to the lack of access to data after patients leave the ED. For the sake of this project, the literature supports the problem development demonstrating the need for creating a solution to problems associated with boarding patients. Another limitation is time constraints. Should this project be implemented with the next wave of a pandemic, after the allotted time frame for hiring and training is completed, the pandemic wave might have passed, and censuses might have already dropped back to normal standards. This was not addressed because there could be various reasons a hospital could choose to implement this idea, not just a rise or drop in census related to a pandemic.

Implications for Nursing

Boarding patients in the ED consume vast amounts of already scarce resources and patient space, leading to an increase in the number of patients leaving the ED before provider evaluation. This is a problem exacerbated by the COVID-19 pandemic as patient volumes increased. This project could be utilized in any hospital with a problem of boarding patients in the ED and high numbers of patients leaving before provider evaluation, as the cost-benefit analysis supports hiring additional staff. This project could also be implemented for hospitals in fast-growing communities to increase the number of patients utilizing services.

Recommendations

After researching the topics within this project, it became clear that boarding patients is an ongoing, nationwide problem with no clear solution. There is not much information available with specific statistics on problems associated with boarding patients in the ED. To obtain these statistics, each boarding patient should be tracked throughout their hospitalization to identify any adverse events that can be traced back to boarding within the ED. By obtaining these statistics, changes in practice can be made, and a platform could be created to encourage system-wide involvement in solving the problem.

Conclusion

Boarding patients poses a problem for the ED, as well as the rest of the hospital system as many adverse events, can be related to the excess time this patient population spent residing in the ED awaiting a bed assignment. Boarding has been associated with medication errors, lapses in care, patient safety concerns, privacy issues, and a lower level of care for this population. All the listed events can cause the patient to have prolonged hospitalizations and delayed discharges from inpatient floors, leading to a decrease in available beds for patients waiting in the ED for a bed assignment. With a "bottleneck effect" contributing to the backflow of patients in the ED, fewer resources are available to effectively treat the new patients presenting to the ED for care. This increases the wait times for these patients, and it also increases the number of patients leaving before provider evaluation. With the increasing number of patients leaving, there is a large financial loss for the ED.

With the implementation of this MSN project, the ED would employ an inpatient-trained charge nurse with ample bedside experience within the given hospital system to oversee and monitor each boarding patient's progression through the plan of care while the patient resides in the ED. The goal of this project is to reduce the number of errors and adverse events related to boarding patients in the ED, with the result of decreasing the time each patient spends in the hospital and expediting discharges. This ultimately would lead to a more efficient flow for the ED and a decrease in the number of patients leaving the ED before provider evaluation.

This project appears to be monetarily feasible, but perhaps not ideal for full-time implementation as the volumes of the ED can change drastically from day to day. This project would be ideal to employ during periods of the high census, such as the times during the past 2 years with the surges of the different COVID-19 pandemic waves.

References

Almino, R. H. S. C., da Costa Prado, N. C., & da Silva, R. A. R. (2022). Occupational stress in frontline health professionals in combating COVID-19. *Acta Paulista de Enfermagem*. https://pressreleases.scielo.org/en/2022/01/03/occupational-stress-in-frontline-health-professionals-in-combating-covid-19/

American College of Emergency Physicians (ACEP). (2017). Boarding of admitted and intensive care patients in the emergency department. https://www.acep.org/patient-care/policy-statements/boarding-of-admitted-and-intensive-care-patients-in-the-emergency-department/

Beckman, S. & Fawcett, J. (2020) Betty Neuman's systems model. In M.C. Smith (Ed.), Nursing theories and nursing practice (5th ed., pp.165-181). F. A. Davis.

da Silva Papi Diniz, J., de Melo Batista, K., do Santos Luciano, L., Fioresi, M., Costa Amorim, M. H., & de Oliveira Bringuente, M. E. (2019). Nursing intervention based on Neuman's theory and mediated by an educational game. *Acta Paulista de Enfermagem, 32*(6), 600–607. https://doi.org/10.1590/1982-0194201900084

Hodgins, M. J., Moore, N., & Legere, L. (2010). Full house: The incidence and impact of boarding admitted patients in the emergency department. *NENA Outlook*, *33*(1), 13–15.

Kim, D. A., Sanchez, L. D., Chiu, D., & Brown, I. P. (2020). Social Determinants of Hallway Bed Use. *Western Journal of Emergency Medicine: Integrating Emergency Care with Population Health*, *21*(4), 949–958. https://doi.org/10.5811/westjem.2020.4.45976

Liu, S. W., Chang, Y., Camargo Jr., C. A., Weissman, J. S., Walsh, K., Schuur, J. D., Deal, J., & Singer, S. J. (2012). A mixed-methods study of the quality of care provided to patients boarding in the emergency department: Comparing emergency department and inpatient responsibility models. *Medical Care Research & Review*, *69*(6), 679–698. https://doi.org/10.1177/1077558712457426

Lord, K., Parwani, V., Ulrich, A., Finn, E. B., Rothenberg, C., Emerson, B., Rosenberg, A., & Venkatesh, A. K. (2018). Emergency department boarding and adverse hospitalization outcomes among patients admitted to a general medical service. *The American Journal of Emergency Medicine, 36*(7), 1246-1248. https://dx.doi.org/10.1016/j.ajem.2018.03.043

Lucas, R., Farley, H., Twanmoh, J., Urumov, A., Evans, B., & Olsen, N. (2009). Measuring the opportunity loss of time spent boarding admitted patients in the emergency department: A multihospital analysis. *Journal of Healthcare Management, 54*(2), 117–124. https://doi.org/10.1097/00115514-200903000-00009

McNaughton, C., Self, W. H., Jones, I. D., Arbogast, P. G., Chen, N., Dittus, R. S., & Russ, S. (2012). ED crowding and the use of nontraditional beds. *The American Journal of Emergency Medicine, 30*(8), 1474-80. https://doi.org/10.1016/j.ajem.2011.12.007

Nouri, Y., Gholipour, C., Aghazadeh, J., Khanahmadi, S., Beygzadeh, T., Nouri, D., Nahaei, M., Karimi, R., & Hosseinalipour, E., (2020). Evaluation of the risk factors associated with emergency department boarding: A retrospective cross-sectional study. *Chinese Journal of Traumatology, 23(*6), 346-350. https://doi.org/10.1016/j.cjtee.2020.09.002.

Occupational stress in the context of COVID-19: Analysis based on Neuman's theory. (2021). *Acta Paulista de Enfermagem, 34*(4), 1–11. https://doi.org/10.37689/actaape/2021AR02655

Pulliam, B. C., Liao, M. Y., Geissler, T. M., & Richards, J. R. (2013). Comparison between emergency department and inpatient nurses' perceptions of boarding of admitted patients. *Western Journal of Emergency Medicine: Integrating Emergency Care with Population Health*, *14*(2), 90–95. https://doi.org/10.5811/westjem.2012.12.12830

Smalley, C. M., Meldon, S. W., Simon, E. L., Muir, M. R., Delgado, F., & Fertel, B. S. (2021). Emergency department patients who leave before treatment is complete. *The Western Journal of Emergency Medicine, 22*(2), 148–155. https://doi.org/10.5811/westjem.2020.11.48427

Wong, H. J. (2010). *Emergent inpatient admissions and delayed hospital discharges* (Order No. NR97187). Available from ProQuest Central. (1346187818). https://ezproxy.gardner-webb.edu/login?url=https://www.proquest.com/dissertations-theses/emergent-inpatient-admissions-delayed-hospital/docview/1346187818/se-2?accountid=11041

Yarmohammadian, M. H., Rezaei, F., Haghshenas, A., & Tavakoli, N. (2017). Overcrowding in emergency departments: A review of strategies to decrease future challenges. *Journal of Research In Medical Sciences: The Official Journal of Isfahan University of Medical Sciences*, 22, 23. https://doi.org/10.4103/1735-1995.200277