Can an Emergency Department Triage Protocol Initiative Reduce the Length of Stay in Low-Acuity Patients?

An Evidence-Based Practice Capstone Project submitted to the St. David's School of Nursing at Texas State University in partial fulfillment of the requirements for the degree of Master of Science in Nursing

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Executive Summary

The purpose of this quality improvement project was to decrease emergency department (ED) length of stay (LOS) for low acuity patients. Overcrowded hospital Emergency Departments (ED) and long length of stays (LOS) can result in decreased quality of care and increased mortality. In addition, ED patients with long wait times and length of stays can negatively impact patient satisfaction scores, increase the likelihood for patient safety incidents, and increase overall cost of care. A patient's LOS is the amount of time that is spent in total number of minutes from their arrival to their discharge from the ED. A patient's wait time and LOS can be affected by several factors such as the number of patients in the department, ED admission holds, and staffing census. Triage is the area where most patients seeking ED care are screened and the nurse determines where the patient will be assigned. While often the ED cannot control holds or staffing, the triage time can be shortened using approved triage protocols to improve flow and decrease the number of patients in the department. This quality improvement project implemented an educational initiative to increase use of existing triage protocols and LOS for low acuity patients in a Level II trauma facility in Central Texas. The 12month pre-intervention average LOS for patients seen in 2022 was 115 minutes and the average percentage of nurses using and documenting a triage protocol was 4.5%.

Project Implementation

Triage protocols had already been approved and implemented in the ED, but use of the protocols was inconsistent. Nurse and ED leadership turnover contributed to the inconsistent usage of existing protocols. The first step of the project was to calculate a baseline LOS prior to beginning the educational initiative. We chose a start date and conducted a retrospective chart review to determine the mean LOS for low acuity patients seen six months prior to the start date.

Education focused on re-educating staff regarding the purpose of triage protocols and how to document when a protocol was started. An education huddle card was developed as the primary means of communication. A huddle card is a one-page information sheet about a topic that often includes both imagery and a condensed explanation. This format allows an educator, leader, or charge nurse to quickly review the material with staff nurses during shift huddles. ED triage protocol scenarios were developed and then given to the staff as additional examples of when to use a protocol. These short scenarios were also posted in high traffic staff areas of the ED. This allowed the nurses the opportunity to clarify the process and ask questions in a safe learning environment. Measurement of the post-education LOS occurred weekly following the educational initiative and will continue to be evaluated for the next 3 months.

Results

The LOS of 115 minutes pre-education decreased over the 3-week period post education down to 112 minutes in week 1, 104 minutes in week 2, and up to 112 minutes in week 3. The use of ED protocols for week 1 was 4.5%, week 2, 4.5% and 0% in week 3 after the education intervention.

Impact

Going forward, quarterly LOS audits and nurse protocol usage percentages will be performed by the ED director and given as updates to the staff. Time audit reports are an easy and quick way to determine the quality improvement project success. The expected targeted goals would be 80% usage of triage protocols by nursing staff, and 80 or less LOS for low acuity patients, decreasing overall LOS for all ED patients, decreasing the risk of patient safety events in triage, and potentially improving patient satisfaction scores. The success of this project can be used to model triage protocol creation and implementation throughout the hospital partnership.

Can an Emergency Department Triage Protocol Initiative Reduce the Length of Stay in Low-Acuity Patients?

Emergency Department (ED) overcrowding has been linked to a 45% increase in mortality, a 75% increase in poor quality of patient care, and 100% of patients reporting their condition was much worse (Badr et al., 2022). The triage area of an ED is generally the first contact a hospital has with a patient (Wolf et al., 2018), thus it should be a positive experience. There are multiple factors that can negatively affect the flow of patients through triage like patient census, hospital bed capacity, and staffing ratios. According to Chimielewski et al. (2021), ED sentinel events are quite common and often related to inefficient processes leading to long wait times and care delays. Since the ED is a high flow patient entry area and at risk for potential sentinel events, focusing on efficient and accurate triage processes can help to reduce harmful events, and improve patient safety, and patient satisfaction. The purpose of this quality improvement project was to decrease the LOS for Emergency Severity Index (ESI) level IV & V patients in this Level II 48 bed trauma facility by implementing an educational initiative for ED nurses to increase the use of existing triage protocols.

Background

A patient's LOS is defined as the total number of minutes from their arrival to the emergency department until they are discharged from the ED. A patient's ESI level is a scoring system that is used to assign a level of severity and provide guidance on how quickly the patient should be evaluated by a medical provider The ESI number is assigned to the patient presenting to the ED based on vital signs, patient complaint, rapid clinical assessment, number of resources anticipated for the patient, and pertinent patient history. The scoring uses a 1-5 scale with 5 being the least number of resources and not requiring immediate evaluation of the patient and 1 being the most critical patient requiring life saving interventions and rapid physician assessment. A triage protocol is a set of orders that have been approved by the ED medical director and physician team for nurses to start on patients based on the chief complaint and that do not require a physician evaluation prior to starting the order.

Review of the Literature

Causes for increased LOS can be multifactorial. When a patient stays in the ED for prolonged periods of time, the likelihood of a patient safety event goes up as well as the mortality rate. A retrospective review of approximately 5000 medical records performed by Beczek et al. (2022), found that a prolonged LOS in the ED resulted in increased medication errors, hospitalizations, pressure injuries, and mortality. Lee et al, (2022) conducted a retrospective cohort study to determine how ED LOS affected critical care patients who were presented to the ED and stayed over 6 hours waiting or holding. They found longer LOS were associated with an increased mortality rate (AOR=1.18 [95% CI: 1.16-1.20]) (Lee et al., 2022).

Increased adverse events, care delays, and inability to meet expected arrival to greet times for ED patients highlighted the need for a change. Long patient wait times increases the likelihood of the condition worsening and requiring more interventions which can be correlated to increased medical costs (Woodworth & Holmes 2020). In a study performed on trauma activation patients, the average length of stay was approximately 2-4 hours for evaluation and for every additional hour spent in the ED mortality increased and those patients staying between 4-5 hours resulted in death (Mowry et., 2011). Gruber et al, (2018) highlights also that decreased wait times can result in a decrease in mortality. Triage protocol implementation is useful in decreasing ED LOS. Patients with a lower acuity score or patients expected to be discharged can benefit the most from these triage protocols. Protocols can reduce the time spent in a bed and help the provider reach a diagnosis and disposition more quickly. This then allows for higher acuity patients to be seen faster and facilitates discharge of the lower acuity patients through the ED. In a retrospective study measuring length of stay in low acuity patients where blood was drawn using a nursing protocol, there was a decrease in LOS by over 20 minutes (Zaboli et al., 2020). In a cross-sectional descriptive study evaluating the triage and treat model, minor injuries like wound care complaints, is a safe and effective model that can reduce LOS (Van Donk et al., 2017). The triage and treat model is a method to evaluate low acuity patients and provide treatment or refer them to an outside primary provider. This method is one way to reduce LOS for ED low acuity patients.

Description of the Problem

The hospital expectation and corporate benchmark for LOS in low acuity patients who are assigned an ESI level IV or V is less than 80 minutes from arrival to disposition of the patient. Figure 2 shows the hospital facility's last 12 months of arrival to disposition data. The average arrival to disposition time for the low acuity patient was 122 minutes over the 12-month period.

The facility's current overall length of stay for level IV & V patients had not met the expected division goal time of 80 minutes. The failure to meet this goal brought attention to what could be done to improve throughput and decrease potential adverse patient events. The overall LOS for ED patients in this hospital was 32 minutes above the benchmark. We believed consistent use of triage protocols with the lower acuity patients would help drive down LOS for

this group of patients. If the ED could reduce these wait times, we knew that other critical patients could get to bed quicker and be seen faster, thus reducing the likelihood of a patient safety event occurring in triage or in the waiting room.

Theoretical Framework

Edward Deming's modified Plan, Do, Study, Act (PDSA) framework was used and continues to be used to guide this quality improvement project (Shaw, 2019 p. 25). The concepts of this tool are to plan to test a question, the question for this project was whether triage protocols can indeed improve LOS for low acuity patients. The re-education of existing triage protocols to clinical staff members was identified as what needed to be done for this project. The LOS of low acuity patients and protocol usage percentages were studied and because of this data the project will be reviewed and modified.

Purpose and Project Aims

The purpose of this evidence-based quality improvement project was to decrease LOS for low acuity ED patients rated as a level IV or V on their ESI by providing an educational intervention for ED nurses to increase the use of approved triage protocols in an urban Level II trauma facility. The clinical practice question that guided this project was: *Can an educational initiative for ED nurses on triage protocols increase the use of protocols and reduce the LOS in low acuity patients in the ED*? This quality improvement project had three major project aims.

 Reduce the current LOS for low acuity patients seen in the ED to 80 minutes or less. The arrival to departure time for level IV & V patients collected following the education intervention. This data will continue to be collected weekly for three months.

- 2. Increase the triage protocol usage to 80% by ED nurses. The data for the usage report will be collected by running a 48-hour triage report from Sunday-Monday for ESI level IV & V triage charts. The triage reports will be conducted weekly for 3 consecutive weeks following the education intervention and will continue to be collected weekly for three months.
- If the above goals are reached, sustain LOS and triage protocol use percentage measuring these same outcomes quarterly for one year. If they are not reached, continued monthly monitoring and measurement for needed changes to meet goals.

Methods

Project Design

A before and after design was used to conduct this quality improvement project. This design was the most feasible for our facility and unit due to flow of the ED and to determine if this education intervention changed protocol usage and LOS. A SWOT analysis was used to identify strengths, weaknesses, opportunities, and potential threats to our process plan to increase the chances of our project's success. The SWOT analysis revealed that ED strengths included full-time equivalents (FTE) dedicated to triage, the full support of the assistant chief nursing officer (ACNO), and ED nursing staff who were open and adaptive. The identified weaknesses included lack of strong support from medical providers, lack of an ED director and experienced leaders, a poor history of follow through with change, a large number of inexperienced nurses, and a history of lack of documentation of protocol usage. The potential threats include a loss of FTE's if not used, high ED nurse turnover, and burnout of the staff. Our identified opportunities were identifying what education platform could be used to re-educate nurses on approved triage protocols and documentation of protocol started, current assignment of a provider triage during

peak times to facilitate throughput of the lower acuity patients and administrative focus on nursing retention efforts for better consistency of staff and education.

Participants and Recruitment

ED patients assigned ESI level IV or V by the triage nurse and ED nurses assigned to triage who entered the ESI levels for patients were eligible for the project. ED leaders were encouraged to engage their nursing team to participate in the education. Only aggregate, non-identifiable data was collected from patients charts and from staff members.

Intervention

The project team included the project director, ACNO, and a clinical informatics nurse. The ACNO's role was to pull ED dashboard metric data like LOS for ED low acuity patients pre and post intervention. The nursing informatics team member pulled ESI Level IV & V triage patient reports. The first step of the educational intervention was to explain the baseline data findings to the ED leadership to obtain their buy-in to the project. Next, we developed education huddle cards (Figure 4) describing the triage protocols and how to document when one was started. The protocol order list (Figure 1) was provided to the nursing team via email and posted on the unit. Examples of documentation screen shots (Figure 5) were also taken to show the nursing staff what screens to use to document a protocol order. The education was presented over ten days to ensure all clinical team members on days, nights, evenings, and weekend shifts received the information.

Measurement Tools

I performed an electronic ED chart review for the triage protocol documentation. The ED clinical summary, treatments, and nursing note sections were used to verify if the protocol was documented. The arrival to discharge LOS data was pulled from the corporate ED metric

dashboard. The ESI level IV and V electronic report was retrieved from Meditech by using the ED reports tab menu. There was a question during the data collection of triage protocol usage whether the nurse was in triage versus in the main ED. The improvement project is focused on the implementation of protocols in the triage area. As I was analyzing the data, one way that I ensured the data was from triage was to assess the method of arrival to the ED. In the documentation, there is a field that requires the nurse to document method of transportation to the ED, so this field was also reviewed during data collection to ensure walk-in patients were collected for the data sample.

Data Collection

To collect data for Aim 1, I worked with the ACNO of the hospital facility to do a retrospective review of the arrival to discharge times for low acuity patients to determine the mean pre-education LOS in minutes. The data collection was done over a 7-day period by the ACNO for the years 2022-2023 and showed the average arrival to leave for each month from the ED metrics dashboard. The pre-implementation LOS was calculated using the total number of minutes from arrival to departure of all level IV & V patients seen in the ED from March 1, 2022 through February 28th, 2023. The post education data collection occurred over the next 3 weeks for the months of March-April. Aim 3 will be met by continuing to collect this data weekly through the month of May and then quarterly for the next year to monitor progress and determine sustainability.

For Aim 2, we used weekly 2-day spot checks to determine the percentage of nurses using the triage protocols. A clinical informatics team member collected the pre-implementation nurse protocol usage report for ESI level IV & V patients seen from February 19th, 2023-February 20th, 2023, as a representation of pre-education protocol usage. The electronic report was pulled from the Meditech documentation reports tab of ESI triage levels documented by an ED nurse. The report had the patients' name, nurse's name, chief complaint, and ESI level. I then reviewed the Meditech charts by using the patient identifiers in the patient inquiry in Meditech and compared them to the approved triage protocol orders to see which charts qualified to start a protocol order. The ED patient summary, ED treatments, and nursing notes sections were used for the protocol documentation verification for the selected charts. Collection of post education included 2-day spot checks each week over the next 3 weeks. Aim 3 will be met by continuing to collect this data weekly through the month of May and then quarterly for the next year to monitor progress and determine sustainability.

Data Analysis

Microsoft Excel was used to analyze the data. A run chart was selected to represent the LOS data before and after the education intervention. According to the Institute for Healthcare Improvement (2019), the run chart is a helpful tool to determine whether process change that was implemented was indeed effective.

Aim 1 was to reduce the current LOS for low acuity patients to 80 minutes or less. The weekly post-intervention mean LOS was compared to the 12-month pre-education mean LOS identified in the retrospective review. The change in LOS data is displayed in a run chart (Figure 3) to show changes in LOS over time.

Aim 2 was to increase the triage protocol usage to 80% by ED nurses. Weekly reports were run over a 48-hour period from Sunday-Monday of Level IV & V triage charts. These charts were audited for ED nurse protocol documentation and then the percentage was calculated and compared over the 3-week period.

Results

Implementation

After the data was collected on LOS and triage protocol usage, the next step was to build education for the clinical team. The ordering of triage protocols is primarily nurse driven and so education was focused on nursing. Huddle cards were made to address the purpose, process, and documentation of a triage protocol. One of the ways to improve usage and understanding of the education is through the teach back method. According to Klingbeil et al., (2018) the use of the teach back method as a form of communication with patients and in staff education can help to solidify changes and be sustained for the future. The low percentage of usage was evidence that re-education and emphasis needed to occur.

At the start of the improvement project, the ED did not have a full-time director. There was an interim director who initially approved the project, but then was reassigned out of the ED. The hospital was expecting a Joint Commission and Stroke Survey, so the unit's primary focus was to ensure all outstanding education items had been completed. The ED leaders also communicated hesitancy in the education and that was attributed to no ED director, lack of support from the ED medical director, and high staff turnover. During the first week of the project, the ED nurse was observed asking the medical provider in fast track to put in orders for the low acuity patients. The proximity made it easy for the nursing staff to just ask for orders rather than order a protocol. Also, due to the high census, it made it difficult to remediate and educate in real time about triage protocols.

The ED leadership also communicated the provider in triage was not consistently used, and so leaders placed emphasis on nursing to start protocols rather than rely on a provider in triage despite the lack of support from the medical director. Also, current nursing retention efforts from administrative leaders were in place and consisted of rounding with new employees by ED leadership, administrative rounding, and clinical education support.

Outcomes

The 12-month pre-intervention average LOS for patients seen for 2022 was 115 minutes. See Table 1 for intervention and data collection timeline. The post implementation mean LOS for week 1 was 112 minutes, 104 minutes for week 2, and 112 minutes for week 3. See Figure 2 for Run chart showing changes in LOS over time.

Of the 25 patients who qualified for a low-acuity triage protocol pre-intervention, 1 chart, or 4% reflected use of a triage protocol. Post-intervention, weekly reviews showed 4.5 % of eligible patients received a protocol in week 1, 4.5 % in week 2, and 0 % in week 3.

Discussion

The purpose of this evidence-based quality improvement project was to decrease LOS to less than 80 minutes for low acuity patients by consistently using approved triage protocols in this urban Level II trauma facility. The three project aims were to reduce the current length of stay to 80 minutes or less for level IV and V patients, increase the usage of triage protocols by nurses to at least 80%, and continue to audit and collect LOS and triage protocol usage for three consecutive months following the education intervention and then quarterly for a full year to monitor sustainability.

The key successes of this project were the collaboration between the facility's informatics specialists and the ACNO to provide the needed data metrics and ED triage protocol accessibility to the nurses. ACNO engagement was demonstrated by the meeting with ED managers about the intervention, educational scenarios, and current LOS data. The major difficulties were the delay in the education intervention due to the Joint Commission visit activities and the Stroke Surveys, lack of support due to ED leadership vacancy, and lack of full support from the medical director.

The care delivery processes changed slightly for the use of triage protocol and the patient outcome change was difficult to determine. The LOS for acuity patients did show a downward trend in minutes, but there are some additional factors to consider. The patient level of acuity, patient census, nursing staff available, admit hold hours, and inpatient bed availability are all additional elements to consider that could contribute to the overall low acuity LOS. The education intervention will need to be revisited as well as have buy-in from medical providers. This will need to be completed first prior to performing any more data collection.

Triage protocols are one method to decrease patient length of stay and help with overall throughput. While we did not find a decrease in patient LOS through the increased use of protocols following an ED nurse education intervention, other studies have proven otherwise. The hospital's protocol does indicate for nurses to order 3 view x-rays for extremity injuries. In a quasi-experiment study, ED nurses were trained to use a triage protocol for ankle injuries and the results showed the ED wait time and length of stay was reduced by 42.6% and patient satisfaction with care was significantly better when the protocol was used (Al Abri et al., 2020). In a quality improvement project to improve neonatal antibiotic times, triage standing orders were used and were found to reduce the time it took for the patient to receive antibiotics from 192 to 99 minutes (Reynolds et al., 2020). While this quality improvement project reviews standing orders to antibiotic time, the use of a triage order helped to get the patient the treatment and disposition much faster.

Limitations

High turnover with nursing staff, changes in leadership, and high patient volume were limitations for this project and hindered the ability to assess the data. The unit leaders will continue to encourage nursing staff to use the protocols and will continue monitoring the outcomes of this education initiative for the next year. The buy-in for this process will have to be further promoted by the leaders to the clinical and medical staff. LOS metrics can help support and drive this buy-in process for the whole team.

Interpretation

The PDSA framework guided this quality improvement project and will continue to guide this change in process. It was discussed with the ACNO that the number of admit hold hours and high patient census could skew the results of the number of triage protocols used. The admit holds affect the number of staff members available to be in triage and could limit the ability to start a protocol and the census per day can affect the sample size. Despite the limited data, one financial implication that could help with variables like admit holds, would be to have a dedicated full-time employee assigned to triage during peak hours and peak days to start protocols. Another financial implication would be to have a dedicated provider in triage to assess and assist with ordering of protocols during peak times in the ED.

Conclusions and Implications

The triage process in place prior to this project was ineffective at ensuring patients were seen and discharged in a timely manner, increasing the risk of harm to the patient. The process improvement plan had the potential to help redesign the triage flow to decrease patient safety incidents and improve quality of care for this hospital population. In the ED, decreasing LOS and ensuring patient safety are always major goals, thus the success of this project could be applicable to other ED's within the facility's partnership. This project only addresses low acuity patients, but protocols could also be used for higher acuity patients. There is potential for overall LOS to improve for all ED patients if our sustainability data continues to support the use of these protocols in low acuity patients.

Further improvement projects and or changes to this project will be necessary to ensure continued practice change for the ED. Additional considerations like admit hold hours, census, staffing matrix are additional data factors that can be collected and assessed about the negative impact they have on the protocol usage success rates. The use of additional personnel in triage during peak days and times is something else that could be manipulated as well. The sustainability of the project will rely on the unit leaders and clinical staff to be invested and committed to this process change. If both parties can be enthusiastic stakeholders in this project, we will be able to continuously build upon this project's findings to improve the quality of care for ED patients in our facility. Al Abri, F., Muliira, J., & Al Awaisi, H. (2020). Effect of triage nurse-led application of the ottawa ankle rules on pain and patient satisfaction with emergency department care. *Clinical Epidemiology and Global Health*, 8(4), 1402–1407.

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Table 1

Timeline for Implementation

Action Item	Start Date	Date of Completion
Retrospective data review	2/19/23	2/28/23
Education for clinical team	3/20/23	3/25/23
Implementation of project plan	3/26/23	4/15/23
Weekly length of stay data collection	3/26/23	4/15/23
Final length of stay/protocol data presentation	5/1/23	5/1/23

ED Triage Protocols

ED Triage Protocols ****If ordering a UA, also order a Urine Pregnancy on every female patient unless post-hysterectomy, post-menopausal, or premenarchal****					
Abdominal Pain, N/V or Diarrhea	IV, NPO, EKG if diabetic or elderly	CBC, CMP, Lipase, UA	Zofran 4mg ODT for N/V		
Pedi Abdominal Pain, N/V or Diarrhea	NPO Document last m	nodified: 52m ago ned)	Zofran 2mg ODT if 8 kg to 15 kg Zofran 4 mg ODT if >15 kg		
Allergic Reaction	IV		Benadryl 50mg IV Decadron 10mg IV		
Altered Mental Status	IV, D-stick	CBC, CMP, ETOH, UA, UDS			
Chest Pain (ACS concern)	EKG, IV	CBC, BMP, Troponin	ASA 325mg PO	1 view CXR	
Pedi Chest Pain	EKG		5.45	1 view CXR	
Dyspnea	EKG, IV, O2 if sat <92%	CBC, BMP, Troponin, BNP		1 view CXR	
Dysuria		UA			
Extremity Injury	Ice pack on injury IV (or EMLA) if deformity		Ibuprofen 400mg PO (or 10 mg/kg)	3 view X-ray of injured joint/extremity	
Fever (sepsis concern or	IV	CBC, CMP, Lactate, UA, BC X2, urine	APAP 1000mg PO if none in past 4	1 view CXR	
immunocompromised)		culture	hours	5	
Pedi Fever (temp > 100.4)			Ibuprofen 10 mg/mg (age >6 mo) APAP 15 mg/kg		
Flank Pain	IV	CBC, BMP, UA			
GI Bleed	IV	Type & Screen, CBC, CMP, PT if on Warfarin			
Hyperglycemia	IV, D-stick	CBC, BMP, Acetone, VBG, UA			
Hypoglycemia	IV, D-stick	CBC, BMP, UA	D-50 25gm IV for BS <60		
Laceration	LETS Gel to wound		Ibuprofen 400mg PO (or 10 mg/kg)		
Needs Dialysis	EKG, IV	BMP		1 view CXR	
1 st Trimester Pregnancy (with	IV	CBC, Type and RH, Serum Pregnancy		1 st trimester pelvic US	
abd pain or vaginal bleeding)		& Quant HCG		8	
Psychiatric	IV	CBC, CMP, ETOH, UA, UDS			
Seizure	EKG, IV, D-stick	CBC, BMP			
Syncope/Presyncope	EKG, IV, D-stick	CBC, BMP, Troponin, UA			

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Emergency Department Length of Stay

	2022 Arrival to Discharge		2023 Arrival to Discharge	
Month	& 5	Month	& 5	
January	131	January	112	
February	117	February	105	
March	123	March	120	
April	108	April	122	
May	119			
June	117			
July	105			
August	105			
September	111			
October	122			
November	119			
December	104			







ED Triage Protocol Huddle Card



Protocol Documentation Education

Documentation of a Triage Protocol

Steps to documentation:		Order Sets Orders					
steps to documentation.							
1. Make sure to enter the	order ir	n Med	itech	Me	ds/Fluids		
Once you select your order you need to hit the submit button for the order to process.							
- Category Orders Pr	Date/Time	Status	Stop	My			
- New Orders (1) Submit							
Urinalysis with Microscopic (LAB) 03/01 N		New		*		onne	

2. Document that you completed the intervention in the nursing notes Make sure to document order complete per triage protocol

