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A Provider in Triage to Decrease “Left Without Being Seen”: A Benchmark Project

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The University of Texas at Tyler, School of Nursing

For NURS 5382: Capstone

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Acknowledgments

I would like to express my deepest appreciation to the nursing professors at the University of Texas at Tyler MSN- Administration Program. Your guidance and feedback have helped develop my professional knowledge and growth. I will carry this experience with me through the rest of my career. In addition, I would like to give big thanks to William Weathers, Ginger Reuland, and Kristi Weathers. This endeavor would not have been possible without your support and commitment to helping me achieve my scholarly goals.

Executive Summary

As Emergency Departments (ED) continue to fill and become crowded, the attention to care of each patient can be delayed or missed. Back flow into the ED can cause a bottleneck effect for patients coming in, which can lead to an increase in the number of patients who leave without being seen (LWBS). In order to combat the challenges of patient throughput that result in patients leaving prior to care, I am proposing the implementation of a provider in triage (PIT). By placing a provider, either physician or mid-level practitioner, in the triage area will allow patients to be seen and assessed faster. Once a patient is seen and orders are placed, care can be initiated. In addition, seeing patients at a faster rate will also help with the identification of the critically ill. Not only will the PIT be able to start orders, but a rapid assessment of patients will help acutely ill patients get out of the lobby. The goal is to see patients and have care started faster in order to avoid patients leaving without care, as well as provide better patient outcomes. Patients who leave before care can be initiated, increase both their risk for morbidity and mortality (Shah et al., 2020; Sember et al., 2021). Jesionowski et al., (2019) describes a statistic suggesting the LWBS rate for all ED visits in 2014 equated to 1.2%, which is equivalent to about 2.68 million patients. This not only increases the risk to the patient, but it can be detrimental to hospital revenue as well. These patients who leave, are missed opportunities.

This process will be implemented on higher volume day during times of peak arrivals. During the initial triage of the patient, the provider will also come in for assessment and order placement. As the PIT is implemented, data will be collected with a daily evaluation of results. Trends of arrivals, door to provider times, as well as LWBS rate will be tracked. If the

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implementation of a PIT is successful, patients will start to receive the medical care they were seeking and outcomes will improve.

A Provider in Triage to Decrease Left Without Being Seen

Emergency rooms (ER) are faced with the challenge of high volumes and increased wait times which has consequently boosted the rate of patients who leave without seeing a provider or receiving care. Patients present to Emergency Departments with an expectation of prompt care that will address their emergent needs. Currently, wait times have increased which has created overflow in waiting rooms, amplified left without being seen (LWBS) rates, and increased the amount of return visits (Roby et al., 2021). In many countries these rates can range from 1% - 15% (Hittiet al., 2020).

Rationale for the Project

Should this challenge not be amended, patients will continue to depart emergency care centers without seeing a medical provider or receiving emergent care. Losing these patients can pose many health risks to the patient as well as cause the hospital to lose revenue (Smalley et al., 2021). Not meeting this need will result in loss of credibility and community trust for the Emergency Department. My PICOT question: In the Emergency Department (P), how does implementing a provider in triage (I) compared to no provider in triage (C) decrease left without being seen rate (O) in a three-month period (T)?

Literature Synthesis

Longer wait times have attributed to crowded Emergency Department waiting rooms. Overcrowding has been tied to adverse effects such as longer wait time and higher LWBS rates. As volumes increase and wait times lengthen, patients are more likely to leave and seek care elsewhere or attempt at another time. This can be a result of high influxes of patient arrivals as well as increased admit patients holding over in the ED until inpatient beds become available (Napoli et al., 2020). Patients who leave before care can be initiated, increase both their risk for

morbidity and mortality (Shah et al., 2020; Sember et al., 2021). A retrospective study conducted by Moe & Belsky (2016) demonstrated that in population of 100, 962 patients, 2646 (2.62%) patients left prior to medical evaluation. If patients could get seen by a provider at an acceptable rate, they may not leave prior to care. A way to combat this challenge would be to test placing a provider in triage who rapidly assesses patients and kick starts their care. Success had been demonstrated by making a provider easily accessible at the front end to decrease the amount of time it takes for a patient to see a physician or advanced practice provider (Vashi et al., 2019). This can be done in the existing departmental layout, or a space can be created for rapid assessment that flows patients into another section for evaluation. A quality improvement study was implemented by Faber et al., (2023) where a rapid assessment zone was created for the PIT, which yielded successful results in the decrease of LWBS. Patients who depart prior to care are likely to seek care somewhere else or return to the ED. A study conducted in Garland suggested that patients who had initially LWBS, were triaged with a higher acuity on their return visit due to the delay in attention (Sember, Donley, & Eggleston, 2021). Jesionowski et al., (2019) describes a statistic suggesting the LWBS rate for all ED visits in 2014 equated to 1.2%, which is equivalent to about 2.68 million patients. This means that 2.68 million people who present with an emergency did not receive care at their initial visit.

By implementing a PIT, assessments and workups can be expedited at a faster rate. This is expressed in the data previously mentioned. In addition, having the provider serve as a triage liaison can help identify patients of higher acuity compared to patients with lower acuity that may not need the use of treatment space (Weston et al., 2017). Having a provider passively evaluate patients in the initial arrival phase can help actively manage patients who need fewer resources, or identify those with higher acuity who need to be placed into the department

(DeFlitch et al., 2015). This can help improve the efficiency of ED throughput. Decreasing the door to provider time and initiating care sooner will encourage patients to stay and complete their visit. A study conducted by Spencer (2019), demonstrated a decreased in LWBS from a high of 12% to a low of 1.62% after implementing a provider in the triage process. Additional data to support of a PIT is evident in the process improvement study conducted at a large urban hospital where a nurse practitioner was placed in the triage. Outcomes suggested the new addition improved ED metrics, including the decrease of LWBS (Gardner et al., 2017). The benefits of a PIT will be evident by a decrease in LWBS rate as well as patient satisfaction (Benabbas et al., 2020). (See Appendix A)

Project Stakeholders

Stake holders include the Emergency Department Director and staff, the Emergency Department Medical Director, Senior Hospital Leadership, Chief Financial Officer, and patients and their families. There will be a need for interprofessional collaboration between nursing administration, nursing staff, physician administration, data analysts, process improvement department, and information technology. The implementation of a PIT will affect these groups and will benefit those involved either by an improvement in care, improved patient flow, or an increase in profits.

Implementation Plan

In order to determine if implementing a provider in triage will decrease the number of patients who leave without being seen (LWBS), the process will be monitored and measure for 3 months. The required parties will include triage nurses, a nursing director, phlebotomist, and medical providers (either mid-level practitioner or physician).

A provider will be placed in the front end in or near triage on Monday- Friday at the peak hours of 1000-1900. The provider will see patients with an Emergency Severity Index (ESI) level of 1-5. An ESI level is assigned to patients by the triage nurse based off of required resources and acuity. If the provider is a mid-level then they should request oversight from a physician on patients who are an ESI level of 1, 2, or 3 but they can initiate order placement. This process will take place when the ER rooms are at capacity. Until beds are full, direct bedding will be utilized. The provider in triage (PIT) will be run out of one or two triage booths depending on nurse staffing.

The process will follow these steps. The patient will register at the front desk and the triage nurse will pull the patient into the triage booth to begin triage, at this time it is appropriate for the provider to enter the room to hear about the chief complaint. The goal for the provider will be to see the patient in at least 5 minutes once they have been placed in the triage booth. Once the provider assesses the patient and determines level of care, they will place orders and communicate with the triage nurse the plan of care. The patient will either have labs started at this time, or they will be released back to the lobby for the phlebotomist to call them in for labs. Radiology can access the patient in the lobby to take them for scans. The patient should not be in the triage booth for longer than 15 minutes. If no room available, the patient will return to the lobby and be pulled to the next open room depending on acuity and wait time. If the patient is still in the waiting room once labs are back, the provider can communicate to the triage nurse that the patient will need to be brought back in for reevaluation, placement into a room, or discharge. Should the patient be roomed in an ER room, then a provider in the back will assume care from that point.

Timetable/Flowchart

Major phases include planning, implementation, and evaluation. The planning phase will include determining the logistics of personnel, location, cost, and staff education. Implementation will include trialing the new process for 10-12 weeks with daily huddles for feedback. The evaluation phase will consist of daily huddles, then tri-weekly evaluations, and a formal evaluation after the 12-week period. This evaluation will be comprised of data collection including both subjective and objective. A report for LWBS will be provided as well as door to provider times, triage times, and daily census of patients. Refer to Appendix B.

Data Collection Methods

To capture trends and results, data will be pulled from the existing electronic health record system. In this case, EPIC Systems is the platform used. Data analysts from the organization will pull data from this platform and compile it into a daily scorecard. A scorecard is a condensed report analyzing the previous day where each hour is broken down and dissected. The key elements of this report will be the total number of arrivals (walk-ins versus EMS), waiting room times, door to provider times, length of stay, and left without being seen rate. Each key element will be broken down by the hour to better depict timing of events. Having this information will improve the analysis of patient through-put when providers are present in triage.

Once the data is collected and compiled into a scorecard, the information will then be tracked in an Excel sheet for simple data entry and comparison. The information from the Excel sheet will then be transformed into a line graph to show trends over time. This trend will depict the number of patients who had left without being seen by calculating the percentage of the total arrivals for that day.

Evaluation

Daily scorecard will be generated through EPIC Systems at the end of each 24 hours. From hours midnight to midnight the following day. The scorecard will collect data on total amount of patients seen, waiting room times, length of stay, door to provider, and LWBS. Each hour will present data to make it easier to determine arrival curves and times that LWBS occur. This data will be represented in the previously mentioned line graph that is generated from the Excel data. A comparison between a PIT present and not present will be shown. Evaluation will also include weekly feedback from triage nurses, providers, and ED nursing leadership.

Cost/Benefit Analysis

Should a patient arrive to the Emergency Department seeking care, and leave prior to assessment the hospital is not only putting that patient at higher risk but also increases lost revenue. Each patient that walks out is a lost opportunity. This can be a result of high waiting room times secondary to poor patient flow, increased boarding patients in the ED, or low staff/resources. By implementing a provider in triage, the cost of staffing changes should not change much. The providers are already accounted for in staff, but will be relocated to the front of the department. This is true with nursing staff as well. Triage nurses are already in place, it will just be a change to the workflow. The cost associated with this process change is minimal, but the revenue increase will be significant. When the percentage of LWBS patients decreases, those patients will receive care and their visits will be chargeable.

Discussion of Results

This project was conducted as a benchmark study. The change project was unable to be implemented as determined by the Chief Medical Director of Emergency Medicine. The Chief decided that the hospital's current data reflected a low number of LWBS (less than 1%) and that the process does not need to be changed at this time. However, the idea of adding a PIT may be beneficial to other campuses with higher LWBS rates.

Should this change be implemented at another campus, it would be appropriate to anticipate the challenge of getting buy-in from staff members. Change is often unwelcomed. If this challenge were to occur, it is important to approach the situation with a leadership style that will be accepted. A democratic leader may be beneficial in this case because they will welcome the input from the staff. By welcoming input and explaining the "why" behind the change will go a long way when proposing the process change.

Conclusions/Recommendations

Overall, adding a provider in triage would be recommended to improve patient flow and decrease LWBS. To implement this change, or even trial it, would require minimal set up or extra costs. The staff and equipment required for a PIT is typically already in place and would just need to be relocated to the front of the department. It is also relatively easy to only implement this on higher volume days where it is needed. Should the new process not end up being a good fit for the department, it is easy to reverse it back to the previous way.

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Appendix A

Clinical Question (PICOT): In the Emergency Department (P), how does implementing a provider in triage (I) compared to no provider in triage (C) decrease left without being seen rate (O) in a three-month period (T)?

Citation: author(s), date of publication & title	Purpose of Study	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables Studied and Their Definitions	Measurement of Major Variables	Data Analyses	Study Findings	Appraisal of Worth to Practice Strength of the Evidence (i.e., level of evidence + quality [study strengths and weaknesses]) RECOMMENDATIONS
1. Benabbas et al., 2020 Impact of triage liaison provider on emergency department	To investigate the impact of triage liaison provider s (TLP) in ED through put	Data analysis is to address ED overcrowding	Systematic review and meta-analysis PubMed, EMBASE, and Web of Science databases	Twelve studies with 329,340 patients were included	IV- implementing a provider in triage DV- LWBS rate and door to provider time	Percentage of LWBS	Quality assessment of studies	Implementatio n of TLP can decrease the rate of LWBS Implementatio n of TLP decreased from 0.62%	LVL I evidence Evidence supporting LWBS rates, weakness is lacking information on door to provider

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Citation: author(s), date of publication & title	Purpose of Study	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables Studied and Their Definitions	Measurement of Major Variables	Data Analyses	Study Findings	Appraisal of Worth to Practice Strength of the Evidence (i.e., level of evidence + quality [study strengths and weaknesses]) RECOMMENDATIONS
t throughput: A systematic review and meta- analysis									
2. DeFlitch et al., 2015 Reinventing Emergency Department Flow	examine s an overcrowded academic health center ED with increasing patient volumes and	Identify outcomes of addressing patient and staffing flows and reinve	Case Study	Suburban, tertiary care, academic DED, with pediatric and adult level I trauma	IV- PDQ (physician directed queuing- expanding provider in triage DV- DTP, LWBS, median door to	National Quality Forum, 2009. Efficiency measures were pulled from EDIS (see page 108 in journal for details)	DTP, LWBS, door to bed time, median wait time, median length of stay	One year of implementation, LWBS reduced 5.7% to 0.6%. Door to provider improved by 62% to 20 min. Door to bed time reduced by 91% to 19 min, median	Weakness- only one site surveyed Strength- length of time studied LVL II

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Citation: author(s), date of publication & title	Purpose of Study	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables Studied and Their Definitions	Measurement of Major Variables	Data Analysis	Study Findings	Appraisal of Worth to Practice Strength of the Evidence (i.e., level of evidence + quality [study strengths and weaknesses]) RECOMMENDATIONS
via Healthcare Delivery Science	limited physical space for expansion	testing the delivery model of care and provided services		Census compared pre- and post-implementation - July 2005-June 2006 & July 2009-June 2010	bed time, median wait time, median length of stay			wait reduced by 83% to 12 min.	Yielded great results- all numbers improved after implementation

Citation: author(s), date of publication & title	Purpose of Study	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables Studied and Their Definitions	Measurement of Major Variables	Data Analyses	Study Findings	Appraisal of Worth to Practice Strength of the Evidence (i.e., level of evidence + quality [study strengths and weaknesses]) RECOMMENDATIONS
3. Faber et al., 2023 Creating a rapid assessment zone with limited emergency department capacity decreases patients leaving	Implementing a rapid assessment zone can increase patient throughput and decrease LWBS	Decrease the number of patients who leave the ED without being seen by a provider This increasing risk to patient and also results	Pre- and post-quality improvement process Single site quality improvement initiative	Single site ED, 40,000 annual visits, 23 treatment rooms with 8 fast track	IV- rapid assessment zone (8 rooms) DV- LWBS rate	Percentage of LWBS rate compared to total volume Hospital goal for LWBS <2%	LWBS percentage, arrival to provider time (minutes), median discharge length of stay (minutes)	By implementing a rapid assessment zone, all metrics improved over the 6-month period (LWBS, arrival to provider, median discharge length of stay)	Study lasted 6 months- results compared from pre-implementation to post-implementation

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Citation: author(s), date of publication & title	Purpose of Study	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables Studied and Their Definitions	Measurement of Major Variables	Data Analyses	Study Findings	Appraisal of Worth to Practice Strength of the Evidence (i.e., level of evidence + quality [study strengths and weaknesses]) RECOMMENDATIONS
without being seen: a quality improvement initiative		in loss revenue to the hospital system							
4. Gardner et al., 2017 Impact of revised triage to improve throughput in an ED with limited	To measure the impact of a revised triage process on ED throughput.	ED crowding is associated with patient safety concerns, increasing LWBS	Systematic study	Urban university-affiliated, adult ED with an annual census of 70,000 and admissions	IV- PIT DV- Door to provider time, ED length of stay, and LWBS	Medians measured in minutes	Door to provider ED length of stay LWBS rate	Of 120 patients seen by nurse practitioner, all metrics previously listed improved including a reduction in LWBS	Trialed on weekdays from 1100-2300 PIT implemented, also focused on quickly identifying patients with low acuity who could see mid-level Single site study

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Citation: author(s), date of publication & title	Purpose of Study	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables Studied and Their Definitions	Measurement of Major Variables	Data Analyses	Study Findings	Appraisal of Worth to Practice Strength of the Evidence (i.e., level of evidence + quality [study strengths and weaknesses]) RECOMMENDATIONS
traditional fast track population		, low patient satisfaction, lost ED revenue		on rate of 34%					
5. Jesionowski, Riordan, & Quatrara, 2019 Does a provider	Perform ance improvement project was to explore how these interventions affect crowding metrics	2 group comparison, with and without a PIT	Prospective 2- group design	Setting: 41 bed emergency department Apx. 61,000 annual visits Ample: all	IV- PIT DV- LWBS, LOS, and door to disposition	Measured in percentages for LWBS LOS- minutes Door to disposition- minutes	Door to disposition (w/ and w/o) RME with and without PIT	Door to disposition was shorted for w/ PIT Decrease in LWBS	Mental health chief complaint excluded Limitation- the year separating the pre- and post- RME samples created a historical threat to internal validity related to time

Citation: author(s), date of publication & title	Purpose of Study	Conce ptual Fram ework	Design/ Metho d	Sample/ Setting	Major Variables Studied and Their Definition s	Measureme nt of Major Variables	Data Analysi s	Study Findings	Appraisal of Worth to Practice Strength of the Evidence (i.e., level of evidence + quality [study strengths and weaknesses]) RECOMMENDATIONS
in triage and rapid medical evaluation help with left without being seen rates and ed crowding?	of door- to- dispositi on times, LOS, and LWBS rates			patients registeri ng in ED on a Monday during the PI period					
6. Moe & Belsky, 2016 Comparin g patients who leave the ED premature	To compare patient, hospital, and visit characte ristics of patients who leave before	AMA vs LWBS	Retrospe ctive cross- section al analysis	probabil ity sample survey that generate s a nation- ally represen tative	IV- AMA visits and LWBS visits DV- patient acuity, age,	A survey format measured in percentages of patients documented	LWBS, AMA	EMS, higher acuity patients were most likely to leave AMA over LWBS. The LWBS population was primarily made of	Population and sample setting unclear Informative in information about LWBS vs AMA, does not talk heavily on PIT.

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ly, before vs after medical evaluation : a National Hospital Ambulatory Medical Care Survey analysis	completing medical care to patients who leave before ED evaluation			sample of ED visits	hospital, and visit characteristics			younger lower acuity patients	

Citation: author(s), date of publication & title	Purpose of Study	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables Studied and Their Definitions	Measurement of Major Variables	Data Analyses	Study Findings	Appraisal of Worth to Practice Strength of the Evidence (i.e., level of evidence + quality [study strengths and weaknesses]) RECOMMENDATIONS
7. Napoli et al., 2020 Boarding is Associated with Reduced Emergency Department Efficiency that is not Mitigated by a Provider in Triage	Looks at boarding patients in the ECC along with adding a provider in triage. Looking for possible effects	Improve patient throughput in EDs by using a provider in triage, and also analyzing the effects that is has on boarders	Multi-site retrospective review	Tertiary care academic and high-volume community ED Analyzed 955 days	IV-provider in triage DV-boarded patients in the ED, patient throughput	Medians measured in minutes	DTP time, length of stay of discharged patients, and boarding time	ED operational efficiency was improved with a PIT, but worsened with boarding Results showed PIT improved ED flow, but was not able to improve boarding process	Talks about implementing a PIT and the benefits it has on patient throughput, however does not talk much about LWBS rates. Looks heavily on the boarding of patients in ED

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Citation: author(s), date of publication & title	Purpose of Study	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables Studied and Their Definitions	Measurement of Major Variables	Data Analyses	Study Findings	Appraisal of Worth to Practice Strength of the Evidence (i.e., level of evidence + quality [study strengths and weaknesses]) RECOMMENDATIONS
8. Sember, Donley, & Eggleston, 2021 Implementation of a provider in triage	Increase d LWBS rates leading to delayed diagnoses, delayed treatment, and increased	Each study month was analyzed and compared for the 4 consecutive years	Retrospective chart review Oct-Jan from 2013-2017 Goal: analyze	Setting: Mercy Health St. Elizabeth Youngstown Hospital Sample: 2162 patient	IV- provider in triage DV- LWBS rate %	Rate of LWBS prior to triage, after triage, and elopement	Rate of LWBS prior to triage Rate of elopement Rate of LWBS after triage	After implementation of PIT, there was 39% decrease in AMA, 69% decrease in LWBS Initial rate was 5%	Level IV- single qualitative study Limitation- 2162 patients (smaller population) Variability between how fast providers can see patients

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and its effect on left without being seen rate at a community trauma center	morbidity and mortality		higher volume months	LWBS charts				LWSB, is now 1%	

Citation: author(s), date of publication & title	Purpose of Study	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables Studied and Their Definitions	Measurement of Major Variables	Data Analyses	Study Findings	Appraisal of Worth to Practice Strength of the Evidence (i.e., level of evidence + quality [study strengths and weaknesses]) RECOMMENDATIONS
9. Shah, Leno, & Sinert 2020 Impact of provider- in-triage in a safety-net hospital	ED overcrowding has led to longer LOS, LWBS, and higher morbidity and mortality	Implemented 3 days a week on ambulatory patient	Before- and- after study analyzing PIT before and after	setting: urban safety- net hospital sample: ambulatory patients	IV- PIT DV- LOS and LWBS rates	LWBS measured in percentages Door to doctor- measured in minutes LOS- measured in minutes	PIT intervention LOS Door to provider LWBS LWOT	Significantly lower LWBS rates, shorter LOS, and shorter door to doc times after PIT implementation Significant lower rates of LWBS in Group 1 compared to group 2 Door to doc lower for group 1 than group 2	LVL III- quasi- experimental Performed at a large, urban teaching hospital. May be challenging to repeat results Limited patient population- focused on ambulatory ESI 3 patients

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								<p>Los shorted in group1 than group2</p> <p>Group 1 (PIT) Group 2 (no PIT)</p>	

Citation: author(s), date of publication & title	Purpose of Study	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables Studied and Their Definitions	Measurement of Major Variables	Data Analyses	Study Findings	Appraisal of Worth to Practice Strength of the Evidence (i.e., level of evidence + quality [study strengths and weaknesses]) RECOMMENDATIONS
10. Spencer et al., 2019 Health care provider in triage to improve outcomes	To implement and measure the impact of a combined split-flow model and provider in triage model on throughput	Establishment of an interdisciplinary team of nurses, APPs, and physicians collaborated to have patients seen in triage	Literature review PICOT- in the ED what are the evidence based best practices for implementing patient throughput?	Sample: LVL I trauma center-58,000 visits annually	IV- Provider in triage DV- LWBS rate Baseline data 6 month prior to implementation	Numerical percentages per patient volume	Door to provider Door to dispositions (admit or d/c) LOS (median) LWBS	Provider in triage showed improvements in throughput for patients who were treated in ED Door to provider decreased from a high of 56 minutes to a low of 13 minutes. Percentage of LWBS decreased from a high of	Change of practice with results from one clinical site Some data skewed from boarding patients (long holds)

PROVIDER IN TRIAGE TO DECREASE LEFT WITHOUT BEING SEEN

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Citation: author(s), date of publication & title	Purpose of Study	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables Studied and Their Definitions	Measurement of Major Variables	Data Analyses	Study Findings	Appraisal of Worth to Practice Strength of the Evidence (i.e., level of evidence + quality [study strengths and weaknesses]) RECOMMENDATIONS
								12% to a low of 1.62%	

Citation: author(s), date of publication & title	Purpose of Study	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables Studied and Their Definitions	Measurement of Major Variables	Data Analyses	Study Findings	Appraisal of Worth to Practice Strength of the Evidence (i.e., level of evidence + quality [study strengths and weaknesses]) RECOMMENDATIONS
11. Vashi et al., 2019 Applying Lean Principles to Reduce Wait Times in a VA Emergency Department	Comparison of “door to doctor” time after implementing their RPIW (rapid process improvement workshop)	Primary outcome- change “door to doctor” time Secondary outcome- change door to triage time	Pre- and post-quality improvement process Single site quality improvement initiative	Veteran hospital, serves population of 85,000 patients ED has 12 acute beds, 4 fast track, & 2 treatment rooms	IV- RPIW DV- door to doctor time, door to triage time, LWBS rate	Measured in median times in minutes, comparison between pre- and post-intervention	Door to doctor Door to triage LWBS	Door to doctor time improved by 12.6 minutes, door to triage decreased by 6.3 minutes, LWBS rate did not significantly change	This study focuses more on multiple small front-end changes to a veteran hospital. Goals were being compared to control sites LWBS is a measurement being tracked, but did not show significant change/improvement

PROVIDER IN TRIAGE TO DECREASE LEFT WITHOUT BEING SEEN

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Citation: author(s), date of publication & title	Purpose of Study	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables Studied and Their Definitions	Measurement of Major Variables	Data Analyses	Study Findings	Appraisal of Worth to Practice Strength of the Evidence (i.e., level of evidence + quality [study strengths and weaknesses]) RECOMMENDATIONS
		and LWBS							

Citation: author(s), date of publicatio n& title	Purpose of Study	Conce ptual Fram ework	Design/ Metho d	Sample/ Setting	Major Variables Studied and Their Definitio n s	Measureme nt of Major Variables	Data Analysi s	Study Findings	Appraisal of Worth to Practice Strength of the Evidence (i.e., level of evidence + quality [study strengths and weaknesses]) RECOMMENDATIONS
12. Weston et al., 2017 Effectiven ess of resident physicians as triage liaison providers in an academic emergenc y departmen t	Compar es operatio nal perform ance outcome between resident and attending physicia n as PIT	Comp arison betwe en pre- and post- PIT period s	Retrospe ctive cohort study	Single urban academi c ED associat es with a residenc y program Apx. 88,000 annual visits	IV- provider in triage (resident PIT and attending PIT) DV- annual profit generate, LWBS rates, and patient satisfactio n	Analysis in USD \$ for profit measuremen t and LWBS in percentage. Door to provider measured in minutes	Door to doc LWBS Patient satisfact ion LOS Return on investm ent	Resident and attending PIT improved door to provider time, patient satisfaction, and LWBS rates. LWBS equated to gain for resident and loss for attendings. LWBS rates improved	LVL IV Limitation- single center study Study performed over 4- month period

Legend:

LWBS- left without being seen

POS- point of service

WR- waiting room

PIT- provider in triage

D/C- discharge

SPSS 22- Statistical Package for Social Sciences

LVL- level

TLP- triage liaison provider

LOS- length of stay

ESI- emergency severity index

LWOT- left without treatment

RME- rapid medical examination

DTP- door-to-provider

RPIW- rapid process improvement workshop

AMA- against medical advice

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Appendix B**Stages of Implementation**

Weeks	Coverage	Daily Evaluations	Tri -Evaluations
Week 1-4	Monday-Friday 9am-11pm	8am next day about previous day	End of week 4
Week 5-8	Monday- Sunday 9a-11pm	8am next day about previous day	End of week 8
Week 9-12	Determined by need	8am next day about previous day	End of week 13