

## **Evaluation of Patient Wait Time and Flow in the Emergency Department**

Amelia Jones

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Doctor of Nursing Practice Department, The College of St. Scholastica

Melissa Skoff, DNP, APRN, FNP-BC

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Patient wait time in the Emergency Department setting is not only dangerous for patients with life threatening illnesses, but it also effects the quality of patient care and patient satisfaction. In order to decrease patient wait time in U.S. emergency departments (ED), hospitals are creating protocols and implementing strategies with support of evidence based practice. This paper will address a Quality Improvement (QI) project performed at Somewhere Hospital in Northern Minnesota. In addition, this paper will address the nursing scopes and standards, utilize national context, and discuss evaluation and methods for improvement. The purpose of this QI project is to evaluate and determine if previously implemented strategies at Somewhere Hospital, aimed to reduce patient wait times, are being adhered to by staff. This project is also evaluating if the previously implemented strategies are successfully decreasing overall patient wait times for initial physician contact. For the purpose of this paper, the ED encompasses both Emergency rooms (ER) and Urgent Care rooms (UC). In addition, patient movement to different rooms in the ED is considered patient flow.

### **National Context**

Patient safety, positive patient outcomes, and quality patient care are of utmost importance in healthcare systems nationwide. Often times in hospital EDs, patients have a negative outcome result, which is frequently related to patient wait times. Healthy People 2020 (n.d.) has addressed timeliness of healthcare in their goal of creating access to health services. Healthy People 2020 (2016) further discussed that an increase in patient wait time in EDs can

result in decreased overall patient satisfaction, large numbers of patients who leave unseen and untreated, and a delay in patient care.

Patient safety and satisfaction are currently being addressed by healthcare policies and systematic implementations, which are continually changing in order to provide the highest quality of safe patient centered care. The Institute for Healthcare Improvement (IHI, 2017) emphasized the importance of reliable systems and processes which are put into place in nationwide healthcare systems. The IHI (2017) stated that reliable systems and processes help to reduce systematic problems, which in turn helps to influence safe patient care and creates more positive patient outcomes.

### **Scopes and Standards**

The importance of patient flow and the time a patient spends waiting for physician contact negatively effects the patient perspective of quality care. Evaluating systematic implementations and the overall outcome of patient flow and wait time is directly related to the American Nursing Association's (ANA) scope and standard of resource utilization (ANA, 2015, p. 82). The scope and standard of resource utilization is further broken down into 13 competencies. The primary competency related to this QI project is to "assesses healthcare consumer care needs and resources available to achieve desired outcomes" (ANA, 2015, p. 82).

### **Background Information**

Healthcare systems are continually implementing evidence based strategies and protocols in order to increase overall patient outcomes, patient delivery systems, as well as patient satisfaction. The article, "Impact of Rapid Entry and Accelerated Care at Triage on Reducing

Emergency Department Patient Wait Times, Lengths of Stay, and Rate of Left Without Being Seen,” discusses the impact of implemented strategies to improve patient wait times and decrease rates of patients who leave without being seen by the physician (Chan et al., 2015). In this article, outcomes of implemented strategies were evaluated, such as utilizing an interfaced computer system in order to create a faster registration and triage processes, as well as utilizing open rooms immediately for patient care (Chan et al., 2005). Data collection for this study was measured before and after the implementation of these strategies. The study found that the number of overall patient wait times, as well as patients leaving without being seen significantly decreased, even in spite of an increasing patient census (Chan et al., 2005).

Certain healthcare systems choose to use Lean principles, as well as implemented strategies to reduce patient wait times and overall patient satisfaction. Lean principles have the ability to be applied to most business systems, including healthcare systems (Murrell et al., 2011). “Lean principles seek to increase efficiency, decrease waste, and promote flow through the system” (Murrell et al., 2011, p. 184). The article, “Applying Lean: Implementation of a Rapid Triage and Treatment System,” analyzed the overall implementation and outcomes of the Lean process, while including implementation of a Rapid Triage and Treatment system (Murrell et al., 2011). The study evaluated patient data 6 months prior and 6 months after strategy implementation to reduce patient wait times, length of stay, and number of patients who leave without being seen by the physician. The study found that after the implementation of these strategies there was a significant decrease in patient wait times, a decrease in overall length of stay, and a decrease in patients who left without being seen (Murrell et al., 2011). The application of the Lean process, as well as utilizing evidence based strategies, have proved to be effective

measures to increase patient delivery systems by decreasing wait times, which in turn increases patient outcomes and overall patient satisfaction.

Somewhere Hospital in Northern Minnesota implemented a Lean process and evidence based improvement strategies in order to improve their patient delivery system and patient satisfaction in their ED. The mission of Somewhere Hospital encompasses overall patient importance. This Lean project was initiated by an informal QI team on May 25, 2016. The QI team consists of the nurse manager in charge of the overall project and ensuring staff compliance, two informational technologists in charge of data collection and interpretation, and the nutritional manager who is overall in charge of Lean processes at Somewhere Hospital. The QI team scheduled meetings to discuss the main issues of patient feedback, high levels of patient movement, high wait times, and repetitive questions being asked by multiple staff members. Two Post Baccalaureate students from The College of St. Scholastica performed an initial evaluation of patient flow and wait time from the entrance of the ED to initial physician contact in June 2016. Discussion of barriers, which have an overall negative effect on patient wait times and flow, as well as discussion of potential evidence based strategies occurred in subsequent QI team meetings. The most important barriers identified that negatively affected patient wait time and flow at Somewhere Hospital were length of time of the full registration process, over-use of the triage room rather than utilizing one open room to decrease patient movement, and lack of available staff communication.

The QI team decided on implementation of staff walkie talkie use, initiation of fast track registration, and decreasing patient movement by putting patients in a treatment room for triage, registration, and care, rather than the triage room. “Fast track” registration in this instance is used

by all healthcare team members when entering the patient into the computer system for labs, testing, and charting. Once the patient is quickly entered into the computer system, they are triaged and assessed by the nurse, and then subsequently assessed by the physician. The full registration process is then completed when there is down time in patient care.

The ED staff were then mandated to wear and use the walkie talkies starting January 26, 2017. Education on the additional implementations to the staff was completed in February 2017 and put into action in March 2017 to improve the overall goal of having the shortest possible wait time from patient arrival to initial physician contact.

In preparation to evaluate the effectiveness of the implementations, the needed materials and data must be available. Needed materials included a computer with Excel spreadsheet and Microsoft Word, internet access, available space for observational data collection, pen, paper, colored markers, and copies of ED floor plan. Needed information and data included description of the Lean project, information from the QI team about what pertinent information they would like documented, notes from quality improvement meetings, start dates of implementations, patient wait time and flow data before the systematic implementations, patient wait time and flow data after the systematic implementations, patient wait time data for the month of April in the years 2016 and 2017, and patient wait time data for the month of May in the years 2016 and 2017. Charted data of patient arrival and initial physician contact was obtained and compared to observed patient data for this project to determine accuracy of chart data. For this project, it was also pertinent that there were patients to observe in order to determine the effectiveness of the systematic implementations in the ED.

## **Plan**

### **Aim/Purpose**

To improve the patient delivery system in the ED at Somewhere hospital in Northern Minnesota.

### **Outcome Measure**

The preceptor will be provided with graphs, a spread sheet, and patient flow diagrams for the ED at Somewhere Hospital by Friday, June 16, 2017.

### **Process Measures**

1. Create graph comparing data of patient wait time from entrance of ED to initial physician contact from December 2016-May 2017.
2. Create graphs comparing wait times from entrance of ED to initial physician contact for April 2016 and 2017, and May 2016 and 2017.
3. Create a spread sheet of qualitative and quantitative data collection.
4. Create diagrams of patient movement through ED and total wait time before initial physician contact in the ED.

### **Specific Interventions**

1. Preceptor provides QI project to student via email communication prior to clinical start date.

2. The student meets with the preceptor and QI team at Somewhere Hospital in Northern Minnesota to discuss details of previously implemented strategies to reduce patient wait time and flow in the ED.
  - a. Discussion includes date of implementation, strategies implemented, trending data since implementation, and areas of difficulty.
3. The student will discuss with the preceptor and QI team what data the student will be collecting in regards to patient wait time and patient flow in the ED.
4. The student will create an Excel spreadsheet to document qualitative and quantitative data of ED patient wait times and flow (See Appendix A).
  - a. The spreadsheet will include: whether the patient was treated in the ER or UC, arrival time in the ED, area of movement after arrival time and what time this occurred, subsequent room movements and time of occurrence, where the patient was triaged and what time, whether registration was “full” or “fast track” and what time it was done, time of wrist band application, doctor arrival time to the room, relevant circumstances, staff utilization of radios when needed, total time from arrival to face time with doctor, and total room movements.
5. The student will use the Excel spreadsheet while observing wait times and flow of 10 patients in the ED and document data to provide to preceptor.
6. The student will discuss the accuracy of the observed patient arrival time and doctor arrival time with QI team.
  - a. The QI team will provide the student with patient arrival time and initial physician contact data from computer chart documentation, and compare it with

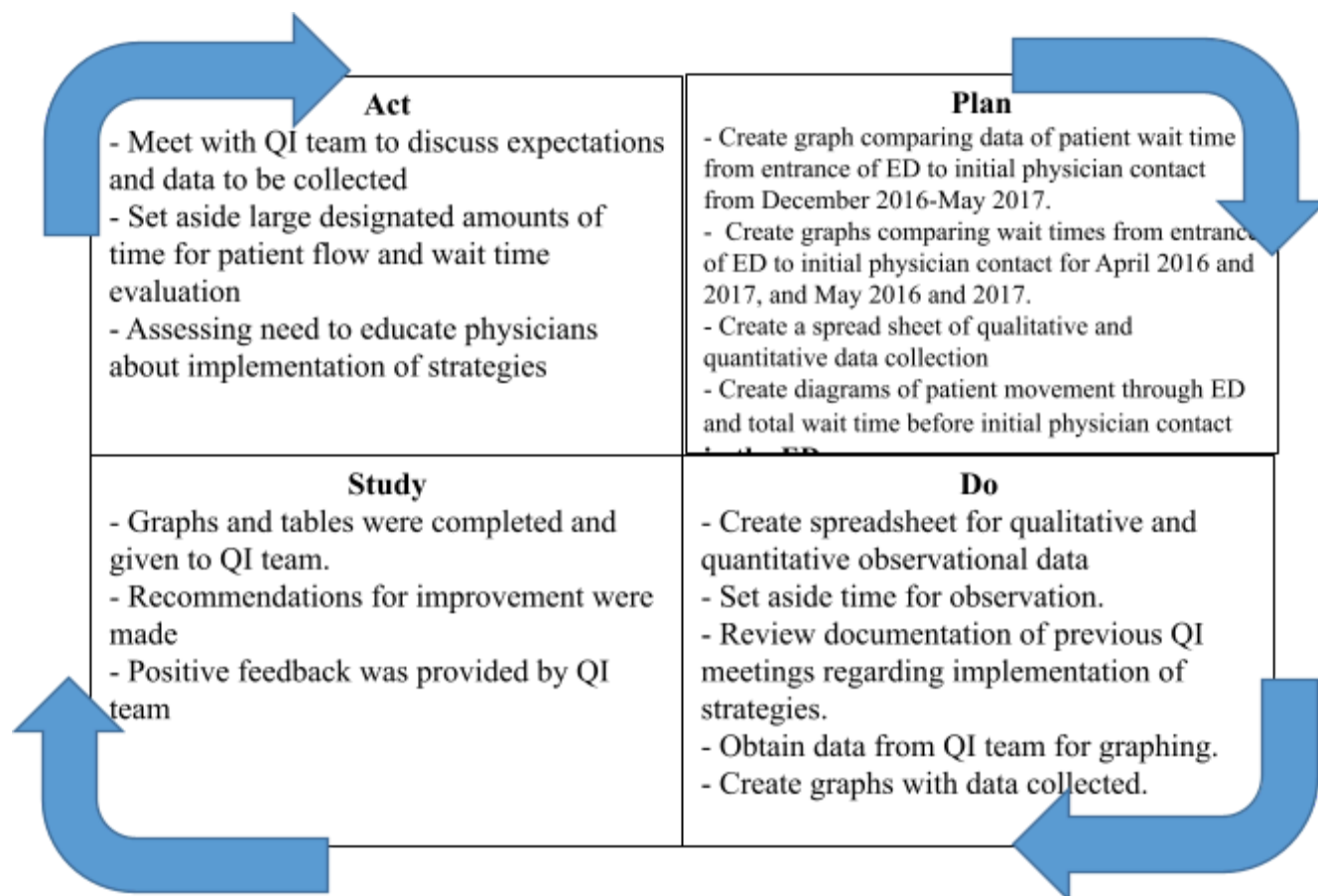
student observed patient arrival time and initial physician contact to determine if charted data is reliable for data collection.

7. The student will create graphs from the chart data provided by the QI team.
  - a. The student will collect data for wait time from patient entrance to the ED until initial physician contact for the months of December 2016- May 2017.
    - i. The student will create a line graph to compare the wait times for these 6 months.
  - b. The student will collect computer charted data for the average patient wait times for patient entrance to the ED to initial physician contact for the month of April, in the years 2016 and 2017.
    - i. The student will create a bar graph to compare the average wait times for April 2016 and April 2017.
  - c. The student will collect computer charted data for the average patient wait times for patient entrance to the ED to initial physician contact for the month of May in the years 2016 and 2017.
    - i. The student will create a bar graph to compare the average wait times between May 2016 and May 2017.
    - ii. The student will use the data collected in parts “b” and “c” to create a bar graph of side by side data of the months of April and May in the years 2016 and 2017.
8. The student will obtain a floor plan of the Somewhere Hospital ED from preceptor and make 11 copies.

9. The student will create individual patient diagrams having each patient assigned a specific color showing flow through the ED by using data collected on the Excel spreadsheet.
  - a. The data needed for the diagrams are the total number of room movements, where the movement is, what order the movement happens, and total time from entrance to the ED to initial physician contact.
10. The student will create a diagram including movement of all 10 patients observed by using each patient's specific color in order to individualize data if needed.
  - a. The data needed for the diagrams are the total number of room movements, where the movement is, what order the movement happens, and total time from entrance to the ED to initial physician contact.
11. The student will provide graphs, diagrams, and spreadsheet to the preceptor and QI team via email. These can be seen in Figures 2, 3, 4, 5 and Appendices A, B, C, D, E, F, G, and H.
12. The student will provide feedback and recommendations to preceptor and QI team via email.
  - a. Figure 1: PDSA Cycle: Evaluation of Patient Wait Time and Flow in the Emergency Department shows the student's recommendations to plan, do, study, and act in regards to the evaluation of information for the quality improvement project at Somewhere Hospital. (See Figure 1)

**Figure 1**

*PDSA Cycle: Evaluation of Patient Wait Time and Flow in the Emergency Department*



*Note.* Student recommendations for plan, do, study, and act for the evaluation of information for the quality improvement project at Somewhere Hospital.

### **Assumptions and Ethical Considerations**

When evaluating previously implemented strategies to improve patient wait times and decrease patient flow, it is assumed that the ED staff at Somewhere Hospital have been previously educated about these implemented strategies. This includes why strategies were

implemented. It is assumed that all ED staff adhere to the implemented strategies and communicate appropriately if a patient's condition is time sensitive. It is assumed that physicians are treating multiple patients simultaneously to prevent further delay in patient wait time. Lastly, it is assumed that there will be patients needing medical treatment in order to provide observational opportunities for data collection.

Ethical considerations in this QI project that may exist include: if the registration process were to delay initial physician contact, it is considered a violation in delay of care according to the Emergency Medical Treatment and Labor Act (EMTALA), and should be addressed immediately. Also, quality patient centered care is sacrificed with increased wait times and frequent movement in the ED due to patient confusion, agitation, discomfort, repeatedly answering the same questions to different staff members, and feeling as though their health issue is not of importance (B. Alm, personal communication, June 12, 2017). Lastly, increased wait time to see the physician may cause patient health deterioration and exacerbation of health issues. These health issues may even be overlooked until adequate diagnostics are ordered and evaluated by the physician.

## **Evaluation**

### **Results from the Plan**

The purpose of this QI project was to evaluate the Lean process and implementation of improvement strategies to improve wait time from patient entrance to the ED to initial physician contact, and decrease patient flow prior to being seen. The goal for this project was to observe and determine if the implemented strategies would show a decrease in patient wait time and

movement since the lean process and strategies were implemented and provide data to the QI team at Somewhere Hospital.

According to Figure 2, the patient wait time from entrance to the ED to initial physician contact decreased from approximately 38 minutes, to 30 minutes once the strategies were implemented in May of 2017. However, the wait time increased in April to 38.57 minutes, and increased in May to 48.79 minutes. Figure 2 shows an overall increase in wait time from patient entrance to the ED to initial physician contact. The data for this figure was retrieved from patient charts and provided to the student by the QI team.

According to Figures 3, 4, and 5, which compare patient wait times in the months of April and May in the years 2016 and 2017, show an overall increase in patient wait time from entrance to the ED to initial physician contact. Figure 3 shows there is an overall increase in patient wait time in April from the year 2016 with a 34.46-minute patient wait average, to 2017 with a 38.57-minute patient wait average. Figure 4 shows there is also an increase in the overall wait time in May for the year 2016 with a 28.89-minute patient wait average, to 2017 with a 48.79-minute patient wait average. Figure 5 shows there was a decrease in overall wait time from April to May in the year 2016 from 34.46-minute patient wait average in April, to a 28.89-minute patient wait average in May, but there is an increase in overall patient wait time from April to May in the year 2017 from a 38.57-minute patient wait average in April, to a 48.69-minute patient wait average in May.

The table in Appendix A shows the qualitative and quantitative data collection results on six ED patients. These results verify that there is an accurate comparison from observed data to charted data, and that the charted data would be eligible for use of future data analysis. The

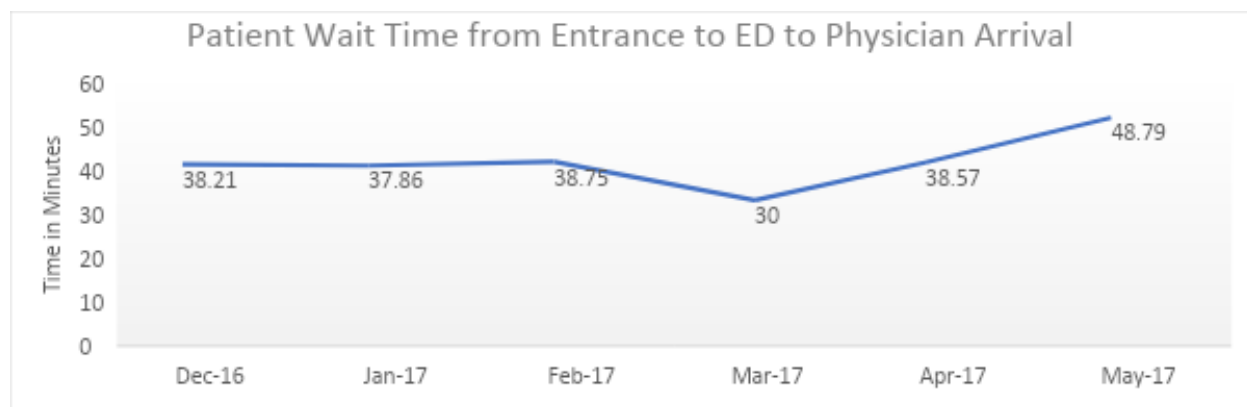
results in this appendix show that the fast track registration method, and utilization of walkie talkies are being adhered to by staff. This table also shows that there is an adherence to attempting to keep room movements minimal. However, wait times fluctuate significantly and relevant circumstances and the physician on duty are both recorded in order to obtain accurate data.

Appendix B, C, D, E, F, G, and H show maps of patient flow through the ED, as well as times of arrival in rooms and initial physician contact. Appendix B shows the average wait time for the six observed patients to be 41.67 minutes, with an average of 1.5 room movements. Appendices C-H show individualized patient movement through the ED as well as time of arrival to each room and initial physician contact.

Overall, the goal of gathering observed data from 10 patients was not met, due to the fact that there were only 6 observable patients. The goal of collecting data in regards to Lean process and strategy implementation was met. The goal of gathering patient data from the QI team to create graphs was met, as well as the goal of creating the graphs and providing them to the QI team. However, the overall goal of the Lean project, to decrease patient wait time from entrance to the ED to initial physician contact was not met. Total room movements remained low.

**Figure 2**

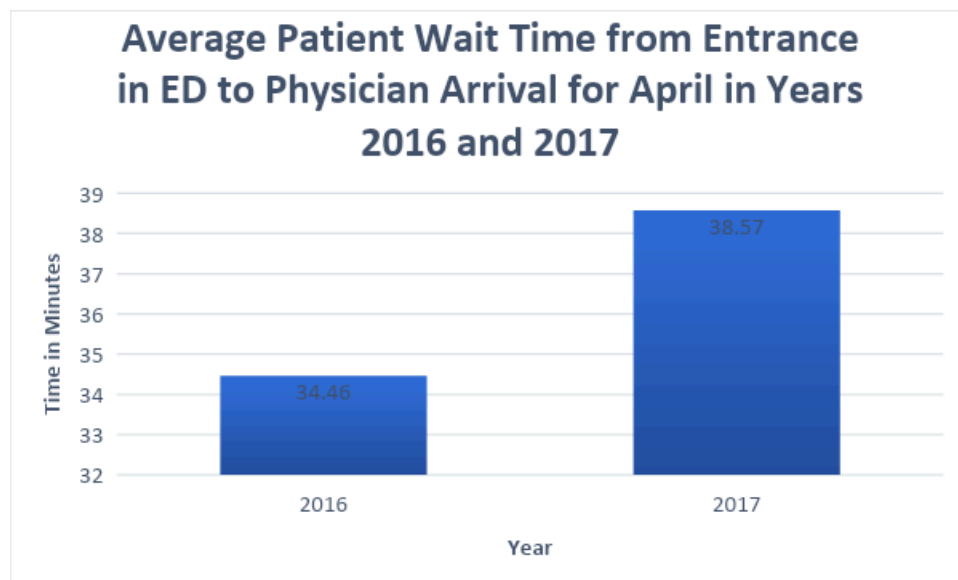
*Patient Wait Time From Entrance to ED to Physician Arrival*



*Note.* Patient wait time lapse from the time the patient enters the ED until the time of first contact with the physician.

**Figure 3**

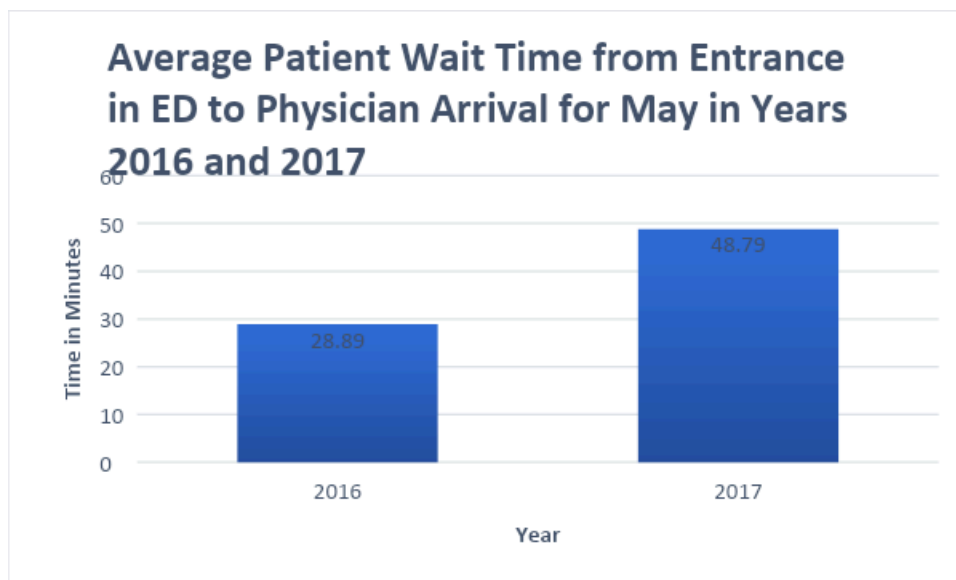
*Average Patient Wait Time from Entrance in ED to Physician Arrival for April in Years 2016 and 2017*



*Note.* This bar graph shows the wait time from patient entrance in the ED to the time of first contact with the physician in the month of April in the years 2016 and 2017.

**Figure 4**

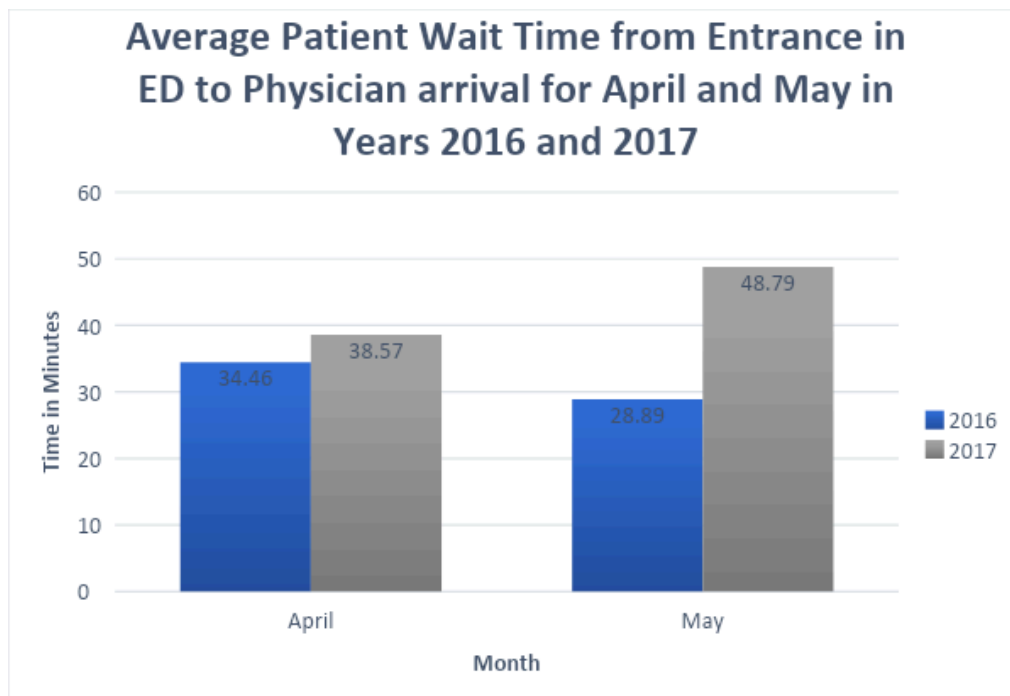
*Average Patient Wait Time from Entrance in ED to Physician Arrival for May in Years 2016 and 2017*



*Note.* This bar graph shows the wait time from patient entrance in the ED to the time of first contact with the physician in the month of May in years 2016 and 2017.

**Figure 5**

*Average Patient Wait Time from Entrance in ED to Physician Arrival for April and May in Years 2016 and 2017*



*Note.* This bar graph shows the wait time from patient entrance in the ED to the time of first contact with the physician in the months of April and May in years 2016 and 2017.

### **Discussion and Improvement**

While conducting this QI project, it was found certain aspects went very well, while others did not. The aspects of this project that went well include that the expectations were clearly discussed by the QI team and complete background of the Lean process and implementations were provided in a folder for use. In addition, the QI team was always available for questions and data collection when needed. The QI team allowed significant time to observe and document findings, as well as provided a quiet work space. It was also documented,

according to the data that the overall results reflected in staff adherence to the implemented strategies of utilizing fast track registration, use of walkie talkies, and minimizing room movement.

Areas that did not go well include the aspect that there was little demand for treatment, as only six patients arrived for care in the ED during total observation hours. An event resulting in a patient's death occurred during the time at Somewhere Hospital as well. The patient had a life-threatening condition and was not seen in a timely manner. The delay in patient care may not have been the root cause of the patient's death, but it is possible the circumstances would have differed had the patient received prompt care from the physician. Lastly, overall patient wait time from entrance to the ED to initial physician contact did not improve. At times, this was due to the physicians themselves not multitasking or not caring for more than one patient at a time. This could be a contributing factor to the elevation seen in wait times, even though the Lean process and strategies were being implemented by staff.

### **Next Steps**

The qualitative and quantitative data, in regards to effectiveness of Lean process and strategy implementation, have been gathered and presented to the QI team. Since the data shows the improvement strategies are being implemented a majority of the time, it can be concluded that there is a barrier elsewhere. During observation and data collection, it was observed that physicians were not always eager to go see patients. This was due to treating other patients, one at a time. Discussion with the QI team lead to the conclusion that not all of the physicians have been educated about the Lean process and implementations and the importance of decreasing wait times and patient flow. It was recommended to the QI team that physician education be

implemented, ensuring that all physicians are following this process. It was also recommended that a team triage be implemented where the nurse and physician simultaneously enter a patient's room to do fast track registration, triage, and additional assessments. This could result in the reduction of repetitive questions significantly decreasing the wait time for initial physician contact.

### **Conclusion**

Overall patient quality of care and satisfaction are of utmost importance in the field of healthcare. Somewhere Hospital in Northern Minnesota, implemented a Lean process, and strategies aimed at decreasing the time a patient waits from entrance to the ED to the initial contact with the physician. These strategies also focused on decreasing overall movement in the ED before treatment begins. The Lean processes and strategies were implemented in March of 2017. The strategies implemented were use of fast track registration, use of walkie talkies, and decreased use of the ED triage room by initiating admittance to the ED in a treatment room.

In June of 2017, observational data, such as staff compliance with walkie talkie use, use of fast track registration, and patient movement were documented. Comparison data was also collected to determine if the implementations were successful. It was determined that patient wait time was increasing despite the use of walkie talkies and fast track triage. This could be due to relevant circumstances which could delay a physician, or a physician who cares for only one patient at a time. It was suggested that the physicians be educated on the Lean process and implementations in order to better care for their patients. In addition, it was suggested that a team triage be implemented.

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## Appendix A

### Qualitative and Quantitative Observational Data

Date	6/13/17	6/13/17	6/14/17	6/15/17	6/15/17	6/15/17
Patient Number-Area Treated	1- UC	2- ED	3- UC	4-ED	5-ED	6-ED
Arrival time to ED	1604	1708	1605	0842	1240	1342
Area of movement after arrival/Time	Triage Room/1604	T1/1708	UC 1/1605	Triage room/0843	Triage room/1240	UC 1/1344
Subsequent movement/Time's	Move to T3/1622	None	none	move from triage to T4/ 0844	move from triage to T4/1253	Move to waiting room/1343, then UC 1/1344
Where patient completed triage and vitals/Time	Triage room/1616	T1/ 1711	UC 1/1612	T4/ 0902	Triage/1250	Triage/1357
Registration: full or fast track/Time	Fast track/1628	Fast track/ 1721	Fast track/1616	Full/ 0855	Fast track/1250	Fast track/1401
Time of wrist band application	1627	1821	1620	855	1255	1417
Time of doctor	1721:Dr. Marble	1815: Dr. Marble	1623: Dr. Rignsred	0918: Dr. Brown	1304: Dr. Brown	1359: Dr. Brown. MD left - HUC

arrival to room						registering patient returned at 1402
Relevant circumstances	Potentially combative patient triage in UC2, patients also in UC1, T4 (acute patient), and T2	potentially combative patient triage in UC2, patients also in UC1, T4 (acute patient), and T2	None	Patients in rooms UC1, UC2, and T3	none	Physician facetime prolonged due to registration process/triaging
Are staff utilizing radio's when needed	Yes	Yes	Yes	NA	NA	Yes
Total time from arrival to initial physician contact	77 Minutes	68 Minutes	15 Minutes	36 Minutes	24 Minutes	30 Minutes
How many room movements, where, and what order	Two total room movements. Triage room to T3	One total movement to room. Side entrance to T1	One total movement to room. Front entrance to UC1	Two total movements to room. From entrance to triage to T4	Two total room movements. From entrance, to triage room to T4	Two total room movements. From entrance to waiting room to UC1
Comparison with charted data	Meditech time: Arrival 1608, MD with patient 1721	Meditech time: Arrival 1712, MD with patient 1821	Meditech time: Arrival 1608, MD with patient 1623	Meditech time: Arrival 0843, MD with patient 0902	Meditech time: Arrival 1242, MD with patient 1300	Meditech time: Arrival 1348, MD with patient 1410

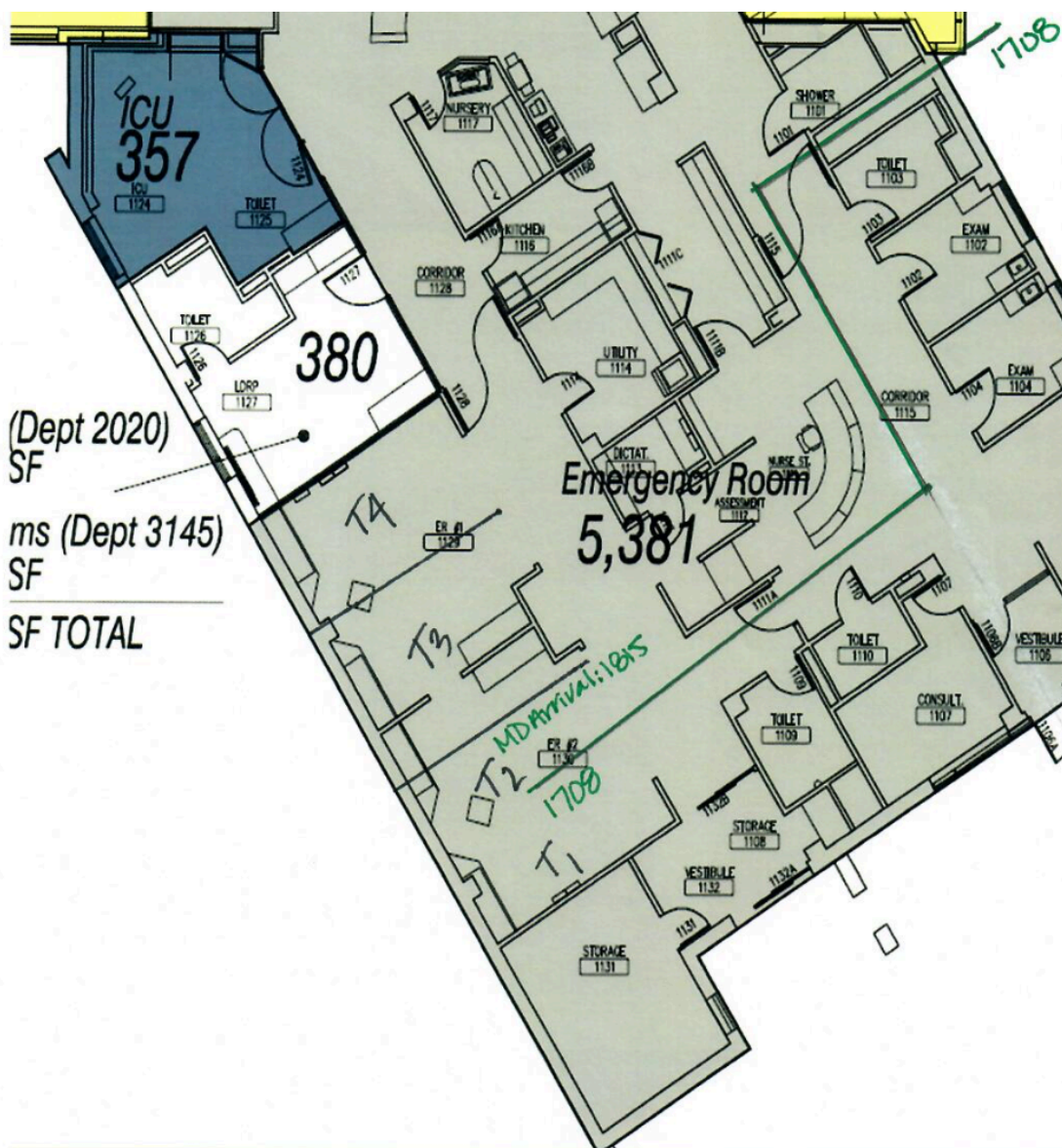
*Note.* Qualitative and quantitative data of observed ED patient wait times and flow at Somewhere Hospital in Northern Minnesota.





## Appendix D

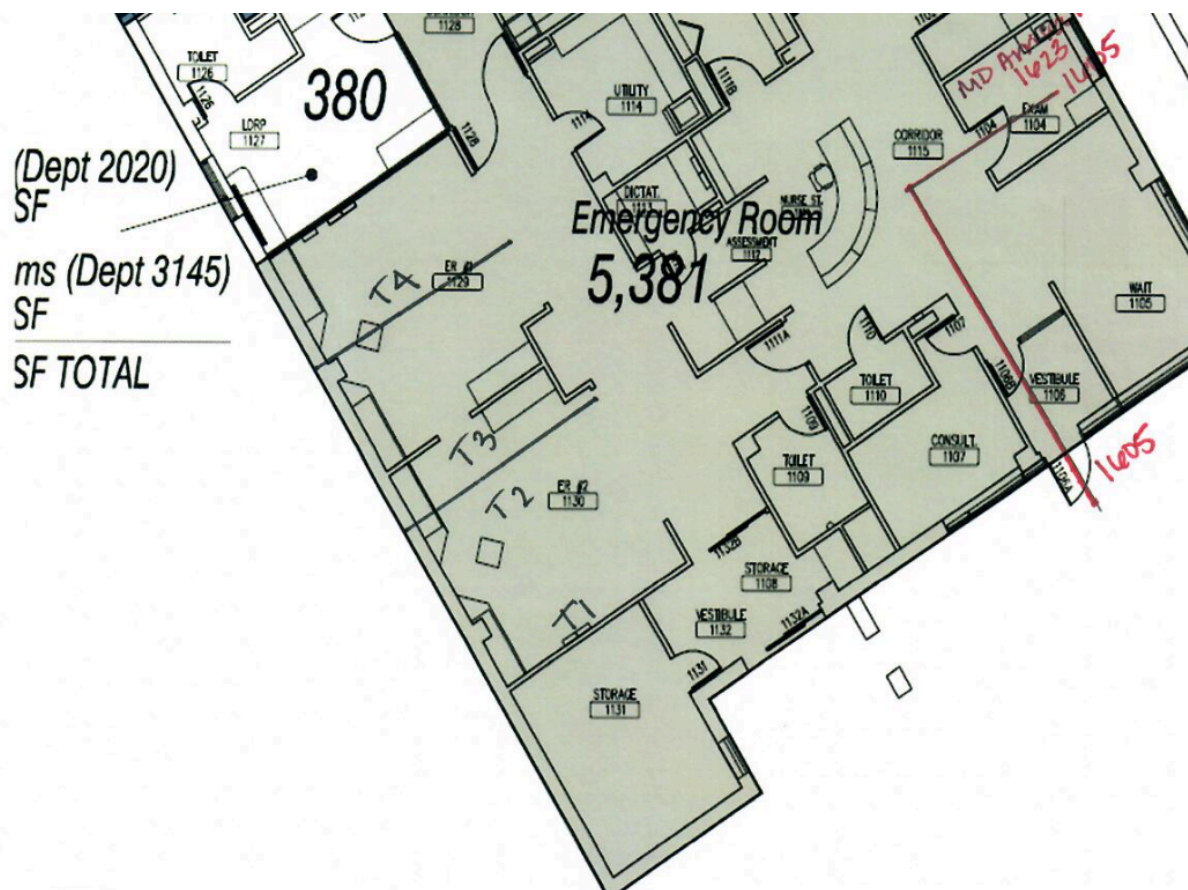
## Flow of Patient Two Through the ED at Somewhere Hospital



Patient 2: numbers indicate time of arrival at each location  
 Arrival to ED/UC 1708  
 MD Arrival time: 1815  
 total time waiting for MD contact 108 minutes

## Appendix E

## Flow of Patient Three at Somewhere Hospital



Patient 3: numbers indicate time of arrival at each location  
 Arrival to ED/UC: 11:05  
 MD Arrival: 11:23  
 total time waiting for MD contact: 15 minutes



## Appendix G

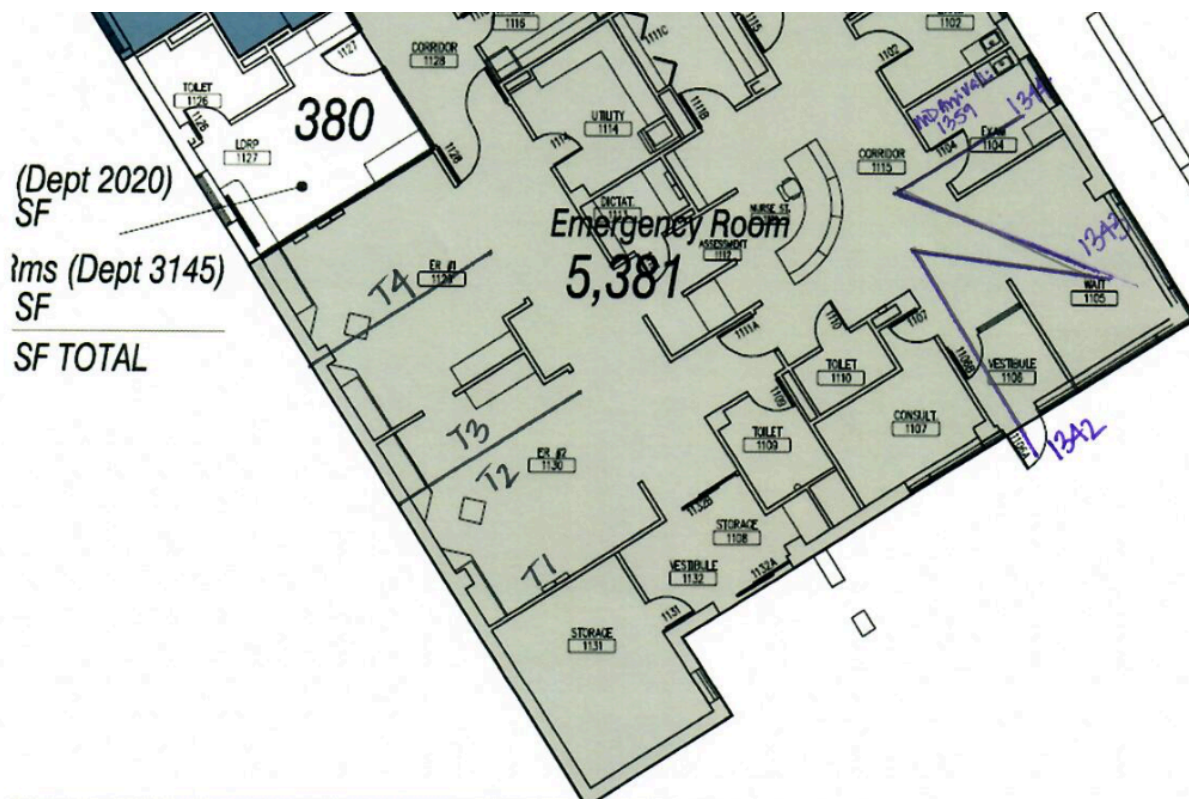
### Flow of Patient Five at Somewhere Hospital



Patient 5: numbers indicate time of arrival at each location  
 Arrival to ED/UC: 1240  
 MD Arrival time: 1304  
 total time waiting for MD contact: 24 minutes

## Appendix H

### Flow of Patient Six Through the ED at Somewhere Hospital



Patient 6: numbers indicate time of arrival at each location  
 Arrival to ED/UC: 1342  
 MD Arrival time: 1359  
 total wait time for MD contact: 30 minutes