University of Michigan Emergency Department

Efficient Patient Placement in the Emergency Department

Final Report

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Executive Summary
The Adult Emergency Department (ED) is located in the University of Michigan Health System (UMHS). Due to a construction project in the ED during the Fall of 2014, the ED lost 13 beds to an internal Intensive Care Unit (ICU). Due to the loss of beds, the ED nursing leadership team has reported that at certain times of the day, patient volumes exceed the department capacity and patients are spending longer in the waiting room. The IOE 481 team was asked to observe and analyze the process from when a patient is discharged from the bed until a new patient enters the bed, including the triaging process. After observing the current state of the ED and determining the key issues facing the department, the team has identified and developed conclusions, and has made recommendations to improve the current workflow from when a patient is discharged from the bed until a new patient enters the bed.

Background
In the Adult ED, new patients are placed into beds for nursing and physician evaluation as rapidly as possible to limit time spent in the waiting room. When a patient enters the ED, the patient is registered by a clerk and seen by a screener nurse. When a triage nurse is available, the patient will obtain a set of vital signs, a chief complaint, past medical history, and a list of current medications. From that information, the nurse will assign a triage score from 1 to 5: 1 is the most ill, and 5 is the least ill. Only a patient who is severely ill is taken to a bed in the ED immediately.

A tracking board in the ED is used to display each patient’s name, bed assignment, triage classification, and arrival time. The tracking board also shows if a bed is open and whether the bed is dirty or clean. The tracking board is displayed in every area of the ED and is the main tool for flow and patient assignment in the ED.

Reported by the Nurse Manager of the ED, bed shortages begin on weekdays between 11am and 11pm when patient volume has the potential to exceed department capacity because of an influx of arriving patients. To increase efficiency and facilitate patient throughput, the ED nursing leadership team asked an IOE 481 student team to recommend improvements to the current workflow, which includes the process from when a patient gets discharged from the bed until a new patient enters a bed.

Methods
The team performed four data collection methods to evaluate the current state of the ED workflow from the point a patient is discharged until a new patient enters the bed.

- **Time Study Data Collection.** The student team was present in the ED for 4 hours/week for 6 weeks to observe and collect data. The team collected data for all steps in the process from when a patient is discharged until a new patient enters a bed.

- **Act Team Leader, Charge Nurse, and Environmental Services Interviews.** A formal interview was held with approximately 15 ATLs and Charge Nurses. During observations in the ED, the student team also informally interviewed ED employees including Nurses, Environmental Services (EVS), and the ATL to provide qualitative data. Interviews with
ED staff during observations were ongoing and done informally when the team needed clarifying information.

- **Act Team Leader and Charge Nurse Surveys.** The student team surveyed 6 ATLs and 7 Charge Nurses in the ED from November 1st through 4th. These surveys aimed to understand if the ATL:
  - Is holding beds open for reasons that may or may not be valid
  - Is too busy to assign patients to beds as they become available

  The ATL surveys dove into these two hypotheses. Also, both the ATL and Charge Nurse surveys tried to understand how well the ATL communicates and works with the Charge Nurse. Working and communicating with the charge nurse is important because the Charge Nurse has knowledge of expected patients and flow in the ED.

- **Act Team Leader and Charge Nurse Beeper Study Data Collection.** The student team conducted a beeper study on November 1st through 4th to determine the location and action of the ATL and Charge Nurse during shifts in the ED. The Charge Nurse or ATL marked down the task each respective nurse was performing, on average, every 20 minutes when the beeper sounded.

**Findings and Conclusions**

The results from the observational time study concluded that the average room turnover (time between a patient being labeled ready for discharge and a new patient arrival) was approximately one hour. The time limiting processes included the time between the patient being labeled ready for discharge and the patient leaving the room (approximately 20 minutes) and the time between the room being labeled clean and a new patient arriving at the room (approximately 18 minutes).

The interviews with the ED staff concluded that the staff believes EVS should be given access to the tracking board to free up the time it takes the EVS to ask a nurse to update the board, when the nurses are busy performing other tasks. ATLs also expressed their opinion that the ATL or other nurses clean and make the beds at least 75% of the time, which takes away from their task of assigning patients to a bed.

The surveys found that ATLs hold 1-2 beds open for urgent patients at any given time. Also, ATLs are busy and have many barriers to completing their tasks. The surveys also found that ATL and Charge RN communication is important but inconsistent.

The Charge Nurse beeper study revealed that the three most time consuming tasks for shifts 7am-3pm and 3pm-11pm are making ED staff assignments (10%-14%), talking with the ED staff regarding patients (13%-23%), and performing “other” tasks (9%-27%). During the shift between 11pm and 7am, rounding on the unit occurred 17% of the time and was one of the three most time consuming tasks performed during the shift, which occurred 8% more than the other two shifts. This finding shows that the time spent doing tasks are inconsistent amongst shifts, and the ED doesn’t have a standard for tasks performed during a shift. Having so many parallel tasks throughout the shift and not having a consistent standard for tasks could alter how effectively the Charge Nurse works with the ATL during the shift to place patients to a bed.
The top two ATL tasks from the beeper study for all of the shifts revealed by the beeper study were assigning patients to beds (18%-26%) and physically escorting patients to beds (9%-13%). The data showed that the two main tasks of the ATLs are only being performed between 27% and 39% of the day. Since the other 61%-73% of the day, the ATLs are performing tasks other than assigning patients or escorting patients to beds, this could impact how efficiently patients are being placed to beds.

**Recommendations**
The student team developed 5 concrete recommendations that, if implemented, should result in:

- Reduced bed turnover time
- Full utilization of ED beds during peak hours (Less instances of open beds when the waiting room is full)
- Decreased average patient waiting time for a bed

The 5 recommendations are detailed below.

*Increased ATL and Charge Nurse Communication*
The team recommends a deeper evaluation of the ATL and Charge Nurse roles and specifically the communication between the two. This communication is vital to maintaining flow in the ED and making informed patient placement decisions. The ATL and Charge RN surveys showed that this communication is inconsistent.

*Decrease Time until Bed Cleaning Begins*
After a patient leaves a bed, it currently takes an average of 9 minutes and 41 seconds for EVS or a nurse to begin cleaning the bed. The team recommends standardizing the signal of a dirty bed to EVS. This signal could be using pagers, the tracking board, or any other method as long as it is consistent and quick. A dirty bed list on the tracking board could also decrease this time.

*Standardize Bed Making Responsibilities*
Currently, it takes an average of 7 minutes and 30 seconds between beds being clean and the nurse arriving to make the bed. The team recommends reducing this time by standardizing the bed making responsibilities so that whoever cleans the bed also makes the bed.

*Decrease Time from Bed Labeled Clean to Patient Arrival*
Currently, an average of 18 minutes and 19 seconds passes from the point a bed is labeled as clean to the point a patient arrives at this bed. To reduce this time, the team recommends standardizing the signal of a clean bed to the ATL, as well as making the ATL more available for patient transportation. This may mean more patient transportation delegation and investigation into additional triage staff during peak hours.

*Decrease Time from Patient Ready for Discharge to Patient Leaving*
Currently, an average of 20 minutes and 14 seconds passes from the point a patient is labeled ready for discharge to the point the patient physically leaves their room. The team recommends further investigation into the discharge process, as this is out of the scope of the project.
Introduction
The Adult Emergency Department (ED) is located in the University of Michigan Health System (UMHS). During the fall of 2014, a construction project eliminated 13 beds from the ED to be replaced with 9 critical care beds, a new lab, and a bathroom by spring of 2015. The total number of beds in the ED will decrease from 89 to 76 during the 5-month construction period.

Due to the decrease of beds, the ED nursing leadership team has reported that at certain times of the day, patient volumes exceed the department capacity. As a result, patients spend longer in the waiting room and ACT Team Leaders (ATL), who assign patients to their beds in the ED, experience additional stress.

The ED nursing leadership team asked an IOE 481 student team from the University of Michigan to observe and analyze the current workflow from the point a patient is discharged from the ED and leaves the bed until a new patient enters that bed and to recommend improvements to the current workflow.

This report discusses the key issues in the ED, the methodology for data collection, the findings and conclusions from the data, and recommendations to the ED.

Background
In the Adult ED, new patients are placed into beds for nursing and physician evaluation as rapidly as possible to limit time spent in the waiting room. Patients are distributed between appropriate care areas and teams to ensure a balanced workload across nurses and providers.

The process of triaging a patient determines how fast a patient will get to a bed in the ED. When a patient enters the ED, the patient is registered by a clerk and seen by a screener nurse. When a triage nurse is available, as is seen in Figure 1, the patient will obtain a set of vital signs, a chief complaint, past medical history, and a list of current medications. From that information, the nurse will assign a triage score from 1 to 5: 1 is the most ill, and 5 is the least ill. The triage nurse also determines if the patient needs immediate attention. Only a patient who is severely ill will be taken to a bed in the ED immediately. Reported by the Nurse Manager of the ED, the majority of patients who come into the ED receive a triage score of a 2 or 3, which adds to the complexity of placing patients evenly throughout the different areas of the ED.
A tracking board in the ED is used to display each patient’s name, bed assignment, triage classification, and arrival time. The tracking board also shows if a bed is open and whether the bed is dirty or clean. On the tracking board, each patient is color coded, which specifies the type of treatment. The tracking board is displayed in every area of the ED, and is the main source of tracking flow in the ED. An example of the tracking board with fictitious patient names can be seen in Figure 2.
According to the Nurse Manager in the ED, bed shortages begin on weekdays between 11am and 11pm when patient volume has the potential to exceed department capacity because of an influx of arriving patients. The ATL tries to leave one bed open in case a critically ill patient arrives, but if all of the ED beds are full, and a critically ill patient arrives, a less severe patient will be moved to the hallway. A patient sitting in the hallway presents safety risks, privacy issues, and a lack of comfort and satisfaction of that patient.

The triage score of the patient determines how fast a patient will get to a bed in the ED. The patients with a triage score of a 4 or 5 tend to wait the longest in the waiting room due to the non-severity of their illness. Patients with a lower triage score will be given priority to get the bed, and patients with a higher triage score continuously get less priority. To increase efficiency and facilitate patient throughput, the ED nursing leadership team has asked an IOE 481 student team to recommend improvements to the current workflow, which includes the process from when a patient gets discharged from the bed until a new patient enters the bed.

**Key Issues**
The following issues are driving the need for this project:

- 13 of the 89 beds in the Adult ED are currently unavailable due to construction
- During the hours of 11am-11pm, patient volume exceeds department capacity
- There is concern that the current process of placing patients into beds is not optimal
- The Adult ED’s capacity may not be being utilized to its full potential, which leads to the perception that beds are open with patients waiting in the waiting room

As seen in Figure 3 below, there are times during the day where both the average beds available and the average wait room occupancy is between 10 and 15 beds and people, respectively. Also, there are always at least 5 available rooms throughout the entire day, showing that the ED capacity is not being used to the full potential.

![Figure 3: Average open beds in Main, East, and South vs. average wait room occupancy](image)

Source: MiChart System Data, 11/3/14-11/5/14, Sample Size N/A
Goals and Objectives
The goal of the project was to determine why beds are open when patients are in the waiting room and to develop recommendations based on those findings. The student team’s original hypotheses of why beds are open when patients are in the waiting room at the beginning of the project were that:

1. The ATL is not available to place patients when beds open up
2. The ATL is keeping beds open for a reason

The team investigated improvement opportunities in the bed turnover process. To reach these goals, the IOE 481 student team achieved the following tasks:

- Interviewed the ED nurses and staff to understand the current workflow and process of admitting patients
- Observed the admittance process and identified sources of disorganization and wasted work
- Surveyed the ATL and Charge nurse to determine how they work together
- Collected data related to:
  - the percentage of time spent on common tasks for the ATL and Charge Nurse to determine where their time is spent in each respective role
  - the time spent during each process of discharging a patient until a new patient enters the bed

Project Scope
This project included only the process of placing patients into beds in the Adult ED. The patient placement process begins when a bed is empty, and finishes when a patient is placed in that bed. This includes the triage process, room cleaning process, patient assignment to bed, and patient transportation process from the waiting room to a bed.

Any tasks not connected to the patient placement process were not included in this project. Specifically, this project did not include patient treatment processes. Also, this project did not consider the reconfiguration of rooms. Lastly, this project did not consider holidays and special occasions where the patient inflow is greater than normal.

Methods
To recommend improvements in the process from when a patient is discharged until a new patient enters a bed, the student team collected data using four methods: (1) On-site time study observations of the ED; (2) ATL, Charge Nurse, and Environmental Services interviews; (3) ATL and Charge Nurse Surveys; and (4) an ATL and Charge Nurse beeper study.

Time Study
The student team observed and collected data in the ED for 4 hours/week for 6 weeks. The number of patients in the waiting room at the end of the cycle was recorded along with all steps in the process from when a patient is discharged until a new patient enters a bed, as listed below:

- The time a patient is removed from the bed after being discharged by a Physician
The student team developed a data collection sheet, as seen in Appendix A, to collect data in the ED. This process involved recording times on the data collection sheet when each step was viewed, as well as recording disparities observed between what the ED patient tracking board showed and what the team saw occurring in the ED.

**Act Team Leader, Charge Nurse, and Environmental Services Interviews**

A formal interview was held with approximately 15 ATLs and Charge Nurses to gain an understanding of their opinion on the issues in the ED from when a patient is discharged until a new patient enters the ED. The questions that were asked to the Charge Nurses and ATLs are seen in Appendix B. During observations in the ED, the student team also informally interviewed ED employees including nurses, Environmental Services (EVS), and the ATL to provide qualitative data. Interviews with ED staff during observations were ongoing and done informally when the team needed clarifying information.

**Act Team Leader and Charge Nurse Surveys**

ATL and Charge Nurse surveys were administered with the primary goal of understanding why open beds aren’t being filled quickly even though there are many patients waiting for a bed. The hypotheses for open beds are that the ATL:

1. Is holding beds open for reasons that may or may not be valid
2. Is too busy to assign patients to beds as they become available

The ATL surveys dove into these two hypotheses. Both the ATL and Charge Nurse surveys tried to understand how well the ATL communicates and works with the Charge Nurse. Working and communicating with the charge nurse is important because the Charge Nurse has knowledge of expected patients and flow in the ED.

Surveys were administered to ATLs and Charge Nurses along with the beeper study, from November 1st through 4th. Six ATLs and seven Charge Nurses completed the survey. The average experience of the ATLs surveyed was 2 years. The average experience of the Charge Nurses surveyed was 6 years. The ATL Survey and Charge Nurse survey can be seen in Appendix C and Appendix D, respectively.

**Act Team Leader and Charge Nurse Beeper Study**

The student team conducted a beeper study on November 1st through 4th to determine the percentage of time the ATL and Charge Nurse spend performing certain tasks during shifts in the ED. The ATL and Charge Nurse carried beepers that sounded, on average, every 20 minutes. At that point in time, the nurses marked one of fourteen common tasks on their card that was being performed at that moment. This process continued for an entire shift and then the beeper was passed to the next ATL and Charge Nurse on shift. The ATLs and Charge Nurses were provided
with a data sheet developed by the team to record the results, which is seen in Appendix E. The team monitored the beeper study to ensure that data collection was collected consistently by talking to the Nurse Supervisors daily.

**Findings and Conclusions**
The findings for the time study; ATL, Charge Nurse, and EVS interviews; ATL and Charge Nurse surveys; and the ATL and Charge Nurse beeper study can be seen below.

*Time Study: Discharge and new patient arrival processes provide opportunities for improvement*
The team conducted an observational time study of the ED. The average room turnover (time between a bed being labeled discharge and new patient arrival) was approximately one hour. 75% of the time the complete room turnover process took over 40 minutes and around 38% of the time it took over 60 minutes. This is shown in Figure 4 below.

![Figure 4: Time from the tracking board signaling the patient is ready for discharge to a new patient arrives](source: Time Study Survey Data, 10/1/14-11/4/14, Sample Size 24)

At the end of the process, when a new patient arrives to the bed, data was collected on how many patients were in the waiting room. It was observed that there were at least 10 patients in the waiting room at the end of each bed turnover during our observations (3pm-7pm shift), as seen in Figure 5. This shows that there are patients in the waiting room and proves the necessity for open beds.
The time limiting processes included the time between the patient being labeled ready for discharge and the patient leaving the room (approximately 20 minutes) and the time between the room being labeled clean and a new patient arriving at the room (approximately 18 minutes). These two processes account for over 60% of the average room turnover time and provide the most opportunity for process improvement, as seen in Table 1. The team also observed that EVS cleans the bed 80% of the time, while nurses clean the bed 20% of the time. A value stream map with kaizen bursts can be seen in Appendix F.

<table>
<thead>
<tr>
<th>Time Study Process Time</th>
<th>Mean (Minutes)</th>
<th>Median (Minutes)</th>
<th>N</th>
<th>Std. Dev. (Minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time between patient labeled ready for discharge and patient leaving bed</td>
<td>20.23</td>
<td>14</td>
<td>30</td>
<td>22.66</td>
</tr>
<tr>
<td>Time between patient leaving and bed marked dirty</td>
<td>6.46</td>
<td>5.5</td>
<td>28</td>
<td>5.16</td>
</tr>
<tr>
<td>Time between bed marked dirty and staff arrival to clean</td>
<td>3.61</td>
<td>2</td>
<td>28</td>
<td>5.27</td>
</tr>
<tr>
<td>Time to clean bed (80% EVS and 20% RN)</td>
<td>9.06</td>
<td>9</td>
<td>36</td>
<td>5.92</td>
</tr>
<tr>
<td>Time between bed clean and bed made</td>
<td>7.50</td>
<td>3</td>
<td>30</td>
<td>12.76</td>
</tr>
<tr>
<td>Time between bed made and bed labeled clean</td>
<td>1.92</td>
<td>1</td>
<td>26</td>
<td>4.64</td>
</tr>
<tr>
<td>Time between bed labeled clean and new patient arrival at bed</td>
<td>18.39</td>
<td>12</td>
<td>31</td>
<td>17.34</td>
</tr>
<tr>
<td>Average bed turnover (time between ready for discharge and new patient)</td>
<td>59.83</td>
<td>54</td>
<td>24</td>
<td>28.85</td>
</tr>
</tbody>
</table>

Table 1: Time study process times
Source: Observational Time Studies, 10/1/14-11/4/14, Sample size = 53
Some of the observed disparities in the process were inconsistent notification of a dirty bed and inconsistent room cleaning and bed making assignments. It was observed 7 times that EVS arrived to the room before the tracking board was updated. After asking EVS, it was concluded this was the result of paging, word of mouth, or a phone call. EVS did not have access to the tracking board. Also, regardless of whom cleans the bed (EVS or nurse); the nurse still has to make the bed.

*Act Team Leader, Charge Nurse, and Environmental Services Interviews: EVS should have access to the tracking board and ATL should not have to make/clean the beds*

The team conducted interviews with the charge nurses, ATLS, EVS, and other nurses around the ED. These interviews include responses that are subjective and not necessarily true facts. The following responses are shown by question from the formal interviews with the ATLS:

Question 1: What prevents you from updating the tracking board when a patient gets discharged, when a room is dirty, when the room is clean, etc.?
- Forget/lazy
- Don’t want a new patient yet
- Want the ability to update it anywhere to make it easier
- The ATL usually has to check the status of rooms

Question 2: Does someone have to notify Environmental Services/Nurse when a room is ready to be cleaned?
- Page the EVS or look at the board
- Nurse can also clean if it’s an easy clean
- Agreed with the team’s idea that EVS should be given access to the tracking board

Question 3: How often do you clean the room yourself as a nurse? And what makes you decide to do this? Does this take away from taking care of your other patients?
- There is a belief from ATL’s that they end up cleaning around 75% of rooms (25% EVS)
- Takes away from ATL’s duties

Question 4: As an ATL how do you decide which patient goes to which room and which patient to send back first when a bed opens up?
- Vitals
- Priority
- Wait time is very important
- Equal spread of patients to each area within the ED

Question 5: As an ATL, how do you get notified when a bed opens up?
- Some cases the ATL cleans room so they know
- Tracking board

Question 6: As an ATL, do you purposefully keep a certain number of beds available? How do you decide this?
- One at the max
- Need at least one bed open in case of resuscitation or critical patient (Triage score of 1)
From the responses the team concluded the following:
- The ED staff believe that EVS should be given access to the tracking board
- The ED staff believe that the ATL should not have to clean beds
- The ED staff keep one bed open at all times in case of emergency

**Act Team Leader Surveys: The ATL and Charge Nurse are over-utilized, The ATL and Charge Nurse could communicate with each other more effectively**

ATL survey responses for each question are shown below. For question 1, findings are in paragraph form, while findings for all other questions are in bar graph form. For each question, a short summary of the question asked and conclusions relating to the primary goal will be included.

**Question 1** asked “How does your patient placement decision making change when the waiting room is full (>= 20 patients) vs. nearly empty (<= 5 patients)?” There were 3 responses to this question. ATLs mentioned that when the waiting room is full, they try to:
- Rotate patients to decrease wait times
- Place patients into rooms as they open
- Hold 1-2 rooms open
- Consider stability & acuity of patients
- See patients in triage or waiting room

ATLs mentioned that when the waiting room is empty, they try to:
- Rotate patients throughout department
- Go off ESI (triage score)

These results are important because it shows that at least one ATL holds 1-2 rooms open when the waiting room is full. The results also shows the team some strategies currently used by ATLs to increase efficiency in the ED when the waiting room is full.

**Question 2** asked ATLs “How often do you hold beds open?” Responses can be seen in Figure 6 below:
Figure 6: Majority of ATLs hold beds open occasionally
Source: ATL Survey Data, 11/1/14-11/4/14, Sample Size 6

Question 2 results show some variability between ATL decisions. There should be standardization amongst ATLs in how many beds they hold open and for what reasons. Question 2a follows up with the same topic and asks “What are the main reasons behind holding beds open?” The results are shown below in Figure 7:

Figure 7: Many ATLs Hold Beds Open Because of Expected Patients
Source: ATL Survey Data, 11/1/14-11/4/14, Sample Size 5

The underlying reason behind Question 2a is that beds are held open for urgent patients that need a bed right away. In order to know when these patients will arrive, the ATL needs to be in frequent communication with the Charge Nurse. The analysis of this communication between ATL and Charge Nurse can be found in later questions as well as in the Charge Nurse surveys.
Through interviews and observations, the team discovered that the ATL is often the staff member that physically transports patients from the waiting room to their assigned bed. The ATL is not available to assign more patients to beds while transporting patients. This becomes a concern when multiple beds become available in a short period of time and results in beds being empty even though the waiting room may be full of patients. Sometimes, the ATL will delegate other staff to transport patients. To understand this delegation, Question 3 asks “How often do you delegate staff to transport patients from waiting room to bed?” The results are shown in Figure 8 below. Also, Question 3a states “Please explain who you delegate to, and when/why you decide to delegate”. The results for this question can be seen below in Figure 9.

![Figure 8: Most ATLs Occasionally Delegate Staff to Transport Patients](image)

Source: ATL Survey Data, 11/1/14-11/4/14, Sample Size 6 (1 responder chose two answers)

![Figure 9: ATL Delegates Transportation to Various Staff](image)

Source: ATL Survey Data, 11/1/14-11/4/14, Sample Size 6
Question 3 results show that most ATLs occasionally delegate staff to transport patients. Delegating staff to transport patients may help the ATL become more available to place patients as beds become available during **full** waiting room periods. However, Question 3a results show that half of ATLs surveyed delegate transportation duties to a Triage RN when the waiting room is **empty**. It can be inferred that during full waiting room periods, Triage Nurses are too busy triaging to assist in the transportation process. This means that the waiting room volume is increasing, while it can only decrease by one patient at a time because the ATL is the only staff member transporting patients to beds. Some ATLs also use medics, technicians, and other nurses to assist in the transportation process. This could be helpful to make the ATL more available.

The ATL may not be available due to reasons other than transporting patients as well. During observations and interviews, it was clear that the ATL had many tasks and was very busy. The team wanted to understand how the ATL deals with this stress and uses other staff members to assist them. To understand this assistance, Question 4 asks “How often do you ask for assistance in your ATL role/responsibilities?” The results are shown below in Figure 10. Question 4a follows up and states “Please explain who assists you and when/why you ask for assistance”. The results for when the ATL asks for assistance can be found in Figure 11, while the results for who assists the ATL can be found in Figure 12.

![Figure 10: Many ATLs Almost Never Ask for Assistance in their Responsibilities](source: ATL Survey Data, 11/1/14-11/4/14, Sample Size 6)
Figure 11: ATLs Ask for Assistance with Various Tasks, Mostly for Transporting Patients
Source: ATL Survey Data, 11/1/14-11/4/14, Sample Size 6

Figure 12: ATLs Ask for Assistance from Various Staff Members
Source: ATL Survey Data, 11/1/14-11/4/14, Sample Size 6

Question 4 results show that half of ATLs surveyed “almost never” ask for assistance in their responsibilities. Since the ATL has many tasks, and needs to be available for patients to be assigned to a bed, they should ask for assistance more than “almost never”. Question 4a results show that the main task ATLs said they ask for assistance doing is transporting patients. We know from Question 3 results that this only happens “occasionally”. Question 4a results also show that ATLs ask for assistance from many different staff members, but it isn’t consistent across different ATLs which staff members they ask for assistance from. In order to yield consistent results, ATLs should require assistance from consistent staff members.

The team wanted to dive further into the ATL role and reasons behind open beds. Question 5 asked ATLs “What do you consider barriers to completing your tasks?” The results are shown below in Figure 13.
Question 5 results show that many barriers were listed. Inconsistencies stand out, such as “Rooms not being cleaned, Inaccurate Tracking Board, Staff being aware of waiting room”. As stated previously, inconsistent processes yield inconsistent results. Time study analyses also address the issues with room cleaning and the inaccurate tracking board. Question 5 results also show that a lack of staff is a barrier for the ATL to complete their tasks. Categories “Stuck triaging patients and Lack of staff” point to this issue.

Question 5a asked “Do you have thoughts for improvements? The lone ATL that responded thought an extra Triage Nurse would result in improvement. This extra Triage Nurse could often be available to assist the ATL in patient transportation as well as other tasks.

As stated previously, it is important for the ATL to maintain frequent communication with the Charge Nurse. This communication is important because the Charge Nurse has knowledge of expected patients and flow in the ED. Question 6 asked ATls “Do you utilize the charge nurse when placing patients?” The results are shown in Figure 14 below. Question 6a follows up and asks “How often do you utilize the Charge Nurse?” The results are shown below in Figure 15.
Question 6 results show that 2 of 6 ATLs don’t utilize the Charge Nurse when placing patients. It is possible that the responder misunderstood the question, but all ATLs should utilize the Charge Nurse when placing patients. Question 6a results show that 5 of 6 ATLs surveyed utilize the Charge Nurse either “Occasionally or not often”. These results point towards a need for analyzing the roles of both the Charge Nurse and the ATL, and creating a standard for how they should communicate and which items to communicate.
Charge Nurse Surveys: ATL and Charge Nurse are Over-Utilized, ATL and Charge Nurse Could Work Together More Effectively

Charge Nurse survey responses for each question are shown below. Findings for all questions are in bar graph form. For each question, a short summary of the question asked and conclusions relating to the primary goal will be included.

Question 1 asked Charge Nurses “How often do you communicate or work with the ATL?” Results are shown below in Figure 16.

![Figure 16: Charge Nurse Almost Always Communicates with the ATL](source)

Source: Charge Nurse Survey Data, 11/1/14−11/4/14, Sample Size 7

Question 1 results show that the Charge Nurses communicate or work with the ATL “almost always” or “always”. However, ATLs stated in the ATL surveys that they rarely utilize the Charge Nurse. This is an interesting disparity, and also points to the need to evaluate the two roles and how they should work alongside each other. Question 1a follows up and asks Charge Nurses “Which items of information do you need to communicate to the ATL?” The results are shown below in Figure 17.
Question 1a results show that there are many important items of information that the Charge Nurse needs to communicate to the ATL. These items listed are all vital to consider in patient placement decision making for the ATL, showing that the two need to communicate frequently.

Question 2 asks “How does your communication with the ATL change when the waiting room is full (>= 20 patients) vs. nearly empty (<= 5 patients)?” The results are shown below in Figure 18. Figure 19 shows which tasks increases when the waiting room is full.
Question 2 results show that when the waiting room is full, some Charge Nurses perform two tasks that help increase patient throughput. Those 2 tasks are communicating with the ATL about which rooms are clean and helping the ATL transport patients.

Question 3 asks “What do you consider barriers to staying in communication with the ATL?” The results are shown below in Figure 20.

Question 3 results show that a variety of reasons prevent the Charge Nurse from staying in communication with the ATL. The most common response is that the ATL is busy. Not only is it
important for the ATL to be available, but it is also important for the Charge Nurse to be available. Question 4 asks Charge Nurses “What do you consider barriers to completing your Charge Nurse tasks?” The results are shown below in Figure 21.

![Bar Chart: Charge Nurses Face Many Barriers to Completing their Tasks](image)

**Source:** Charge Nurse Survey Data, 11/1/14-11/4/14, Sample Size 7

Question 4 results show that there are many different barriers to completing the Charge Nurse tasks. An interesting follow-up with the Charge Nurses would be asking about phone calls for non-ED issues. What phone calls are Charge Nurses receiving and could they be directed elsewhere to free up the Charge Nurse to do other tasks? Question 4a asked Charge Nurses “Do you have thoughts for improvements?” The 2 responses were “Take the Charge Nurse out of admission problems & have them talk to the MD” and “Continue to put the Charge Nurse as a float for help.”

Question 5 asked Charge Nurses “Do you ever aid the ATL in deciding which beds to place patients in or which beds to leave open?” The results are shown below in Figure 22.
Question 5 results show inconsistency between Charge Nurses. Just over half of the Charge Nurses surveyed aid ATLs in patient placement decisions, while the rest don’t. Again, this is an issue because you can’t expect consistent results from an inconsistent process. Question 5a followed up with “If yes, please explain. What input do you give the ATL in helping decide which beds to place patients in or which beds to leave open?”

- Help moving patients
- Help cleaning rooms
- Help in triage
- Resuscitation bay overflow
- Expected ambulance
- Expected admissions
- Movement of patients to accommodate patients in waiting room

**ATL and Charge Nurse Beeper Study:** *ATL has many parallel tasks/Charge Nurse Time spent performing tasks is inconsistent amongst shifts*

The beeper study data from the ATLs and the Charge Nurses reveals the proportion of time spent on each common task during a 4 day, 24-hour period. This data was used to better understand how the ATLs and Charge Nurses spend the majority of their time during the day. Below, the distributions for the Charge Nurses can be seen for each shift of the day in Figures 23-25. The distribution of the cumulative, 24-hour distribution for Charge Nurse can be seen in figure 26.
Figure 23: Percentage of time spent at each task for the Charge Nurse between 7am and 3pm
Source: Beeper study data, 11/1/14-11/4/14, Sample Size 116

Figure 24: Percentage of time spent at each task for the Charge Nurse between 3pm and 11pm
Source: Beeper study data, 11/1/14-11/4/14, Sample Size 79
Figure 25: Percentage of time spent at each task for the Charge Nurse between 11pm and 7am
Source: Beeper study data, 11/1/14-11/4/14, Sample Size 106

Figure 26: Percentage of time spent at each task for the Charge Nurse during the entire day
Source: Beeper study data, 11/1/14-11/4/14, Sample Size 301
The three most time consuming Charge Nurse tasks for shifts 7am-3pm and 3pm-11pm were making ED staff assignments, talking with the ED staff regarding patients, and performing “other” tasks. The staff was asked to provide what they were doing if they selected “other” on their time card. “Other” tasks ranged from talking to the security team or talking to another unit of the hospital about admitting a patient. Since the list of tasks was formulated by the ED staff, and “other” tasks ranged from 9%-27% of every shift, this data shows that the Charge Nurses have a wider range of tasks that they perform than what the ED staff perceives. Having too many parallel tasks could take away from the Charge Nurse effectively working collaboratively with the ATL to place patients to a bed.

During the shift between 11pm and 7am, rounding on the unit occurred 17% of the time and was one of the three most time consuming tasks performed during the shift, which was performed 8% more than the other two shifts. This finding shows that the time spent doing tasks are inconsistent amongst shifts, and the ED doesn’t have a standard. Not having a consistent standard could alter how effectively the Charge Nurse works with the ATL during the shift to place patients to a bed.

Below, the distributions for the Charge Nurses can be seen for each shift of the day in Figures 27-29. The distribution of the cumulative, 24-hour distribution for Charge Nurse can be seen in Figure 30.
Figure 28: Percentage of time spent at each task for the ATL between 3pm and 11pm
Source: Beeper study data, 11/1/14-11/4/14, Sample Size 136
Figure 29: Percentage of time spent at each task for the ATL between 11pm and 7am Source: Beeper study data, 11/1/14-11/4/14, Sample Size 161
The two most time consuming ATL tasks for all of the shifts were assigning patients to beds and physically escorting patients to beds, in that order. Assigning patients to beds ranged from 18%-26% of the time spent during a shift and escorting patients to beds ranged from 9%-13% of the time spent during a shift. Although assigning patients and escorting patients to beds are the two main duties of the ATL, they are only being performed 27%-39% of the day. Since the other 61%-73% of the day, the ATLs are performing tasks other than assigning patients or escorting patients to beds, this could impact how efficiently patients are being placed to beds.

**Recommendations**

The team has formed the following recommendations based on the findings and conclusions discussed.

*Increase the ATL and Charge RN Communication*

Communication between the Charge Nurse and ATL is important because the Charge Nurse has knowledge of expected patients and flow in the ED, and this information is vital to the ATL
when making patient placement decisions. The survey results showed that the communication between the Charge Nurse and the ATL is inconsistent. Some ATLs communicate frequently with the Charge Nurse, but some ATLs never communicate the Charge Nurse during their shift. The student team recommends performing a deeper evaluation of both the ATL and Charge Nurse roles, which could possibly include training and standardization of interactions. The ED staff could inform both the Charge Nurses and ATLs of how communication will improve the flow of the ED throughout the day.

*Decrease Time until Cleaning Begins*

When a patient leaves the bed after being discharged, the time it takes for the cleaning process to begin takes, on average, 9 minutes and 41 seconds. To decrease this time, our team recommends standardizing the signal from a nurse to EVS for a dirty bed. This signal could include a page to EVS for every dirty bed or a dirty bed list on the tracking board that can be accessed easily by EVS. Currently, the beds are labeled as dirty on the tracking board, but there isn’t one list that shows all of the dirty beds in one place, so nurses or EVS have to scroll through the different sections on the board to find which ones are dirty. If a list is used on the tracking board to signal dirty beds, the list should show which beds have been dirty the longest, so a bed doesn’t sit dirty for an extended amount of time without being cleaned by either a nurse or EVS.

Also, EVS should be trained to use and update the tracking board, which will allow them to update the tracking board after they clean a room, so time isn’t wasted waiting for EVS to tell a nurse to in turn update the tracking board.

Lastly, there should be an increased awareness of the waiting room state at all times of the day. Although most nurses know when the peak hours are, they aren’t aware of how busy the waiting room is, which results in a lack of urgency to update the tracking board. A signal could be placed on the tracking board, whenever the waiting room count exceeds 15 people.

*Standardize the Bed Making Responsibilities*

The time between a bed is finished cleaning and the bed being made takes, on average, 7 minutes and 30 seconds. The team recommends standardizing the bed cleaning tasks. Whoever cleaned the bed, whether it is a nurse or EVS, should also make the bed to eliminate a portion of the time between tasks and handoffs. If a bed requires a “deep clean”, EVS should clean the bed and make the bed, since they are the only ones who have the resources to “deep clean” a bed. If a bed does not require a “deep clean”, a nurse or EVS can clean and make the bed. After the bed is made, the tracking board should be updated immediately by the same person who cleaned and made the bed. This will eliminate handoffs and the time it takes to find a nurse and have the nurse update the tracking board.

*Decrease the Time between Bed Labeled Clean to Patient Arrival*

The time between a bed being labeled clean on the tracking board until a patient arrives takes, on average, 18 minutes and 19 seconds. The team recommends standardizing the signal of a clean bed to the ATL, who are responsible for placing patients to bed. This signal could include an automated page to the ATL when a bed becomes available or an automatically updating list of all the clean beds in the ED that the ATL can easily access. This would save the ATL time from
having to look through all the sections of the ED and trying to mentally keep track of which beds have been clean for the longest.

Since the ATL is the one placing patients to beds, they need to be more available to place the patients when beds become available. This could include more frequent ATL to nurse or technician delegation for transporting patients back to a bed. When the ATLS are transporting patients back to beds, they are not able to place patients at the same time, so beds are opening up with no one to assign patients to them. Also, since the beeper study showed that ATLS are performing tasks other than assigning patients and escorting patients to beds between 61% and 73% of the day, the team recommends additional investigation of the ATL role.

*Decrease the Time between the Patient being ready for Discharge to the Patient Leaving*

The time between a patient is labeled for discharge on the tracking board and the patient actually leaving the bed takes, on average, 20 minutes and 14 seconds. Although the discharge process was out of the scope, the team recommends looking into the discharge process individually in the future since it is taking one-third of the total turnover process. The ED staff could analyze the paperwork process, prescription process, and the follow-up process.

**Expected Impact**

From the recommendations that the team has proposed, the University of Michigan Adult ED should expect the following impact:

- Reduced patient turnover time from the point a patient is discharged until a new patient arrives to the bed
- Full utilization of ED beds during peak hours, which will result in less instances of beds open while the waiting room is full
- Decreased average patient waiting time for a bed and better overall patient flow
## Appendix A: Time Study Form

<table>
<thead>
<tr>
<th>Observation Time</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Time Stamp</strong></td>
<td><strong>1</strong></td>
</tr>
<tr>
<td><strong>Bed Number</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Patient Triage Level</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Ready for Discharge (Green)</strong></td>
<td>Ready for discharge (bed turns green)</td>
</tr>
<tr>
<td><strong>Patient Leaves Room</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Nurse updates tracking board to signal dirty bed (Gold)</strong></td>
<td>Bed labeled as dirty</td>
</tr>
<tr>
<td><strong>Nurse or environmental services (ES) arrives to clean the bed</strong></td>
<td>Nurse or ES arrives</td>
</tr>
<tr>
<td><strong>Nurse or environmental services (ES) finishes cleaning bed</strong></td>
<td>Nurse or ES finishes cleaning</td>
</tr>
<tr>
<td><strong>Nurse or ES finishes making bed</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Bed labeled Clean/ Ready (White)</strong></td>
<td>Track board shows clean bed</td>
</tr>
<tr>
<td><strong>New patient arrives at bed</strong></td>
<td>Patient arrival</td>
</tr>
<tr>
<td><strong>Time</strong></td>
<td></td>
</tr>
<tr>
<td><strong># of Patients in the Waiting Room</strong></td>
<td></td>
</tr>
<tr>
<td><strong># of Open Beds</strong></td>
<td></td>
</tr>
<tr>
<td><strong># of Dirty Beds</strong></td>
<td></td>
</tr>
</tbody>
</table>
Appendix B: ATL/Charge Nurse Interview Question

1. What prevents you from updating the tracking board when a patient gets discharged, when a room is dirty, when the room is clean, etc.?

2. Does someone have to notify Environmental Services/Nurse when a room is ready to be cleaned?

3. How often do you clean the room yourself as a nurse? And what makes you decide to do this? Does this take away from taking care of your other patients?

4. As an ATL, how do you decide which patient goes to which room and which patient to send back first when a bed opens up?

5. As an ATL, how do you get notified when a bed opens up?

6. As an ATL, do you purposefully keep a certain number of beds available? How do you decide this?
Appendix C: ATL Survey

IOE 481 Survey: Act Team Leader (ATL) Role

Years experience as ATL: ____________

How does your patient placement decision making change when the waiting room is full (>= 20 patients) vs. nearly empty (<= 5 patients)?

For all questions, assume the waiting room is full (>= 20 patients)

How often do you hold beds open? (Please circle your answer)  
Never  Almost Never  Occasionally  Often  Always

What are the main reasons behind holding beds open? Please rank them according to their importance (1 = Most important, 6 = Least important).

1. _____________________________________________
2. _____________________________________________
3. _____________________________________________
4. _____________________________________________
5. _____________________________________________

How often do you delegate staff to transport patients from waiting room to bed?  
Never  Almost Never  Occasionally  Often  Always

Please explain who you delegate to, and when/why you decide to delegate:

How often do you ask for assistance in your ATL role/responsibilities?  
Never  Almost Never  Occasionally  Often  Always

Please explain who assists you and when/why you ask for assistance:

What do you consider barriers to completing your tasks? Do you have thoughts for improvements?

Do you utilize the charge nurse when placing patients?  
Yes  No

How often do you utilize the charge nurse?
Appendix D: Charge Nurse Survey

IOE 481 Survey: Charge Nurse Role

Years experience as Charge Nurse: ____________

How often do you communicate or work with the ATL? (Please circle your answer)
Never         Almost Never        Occasionally       Often        Always

Which items of information do you need to communicate to the ATL?

How does your communication with the ATL change when the waiting room is full (>= 20 patients) vs. nearly empty (<= 5 patients)?

What do you consider barriers to staying in communication with the ATL? Do you have thoughts for improvements?

What do you consider barriers to completing your charge nurse tasks? Do you have thoughts for improvements?

For below questions, assume the waiting room is full (>= 20 patients)

Do you ever aid the ATL in deciding which beds to place patients in or which beds to leave open?
Yes         No

If yes, please explain. What input do you give the ATL in helping decide which beds to place patients in or which beds to leave open??
Appendix E: Beeper Study Time Cards

<table>
<thead>
<tr>
<th>Task Description</th>
<th>11 PM - 12 AM</th>
<th>12 AM - 1 AM</th>
<th>1 AM - 2 AM</th>
<th>2 AM - 3 AM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Follow-up call</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Taking report on expected patient</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>3. Rounding on unit</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Cleaning room</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Making staff assignments</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. On phone with ATL/Providers discussing expected patient</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Talking with staff regarding patients</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Assisting in Triage</td>
<td></td>
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<tr>
<td>9. Assisting in Resus</td>
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</tr>
<tr>
<td>10. Reviewing charts</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>11. Attending Safety Huddle</td>
<td></td>
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<tr>
<td>12. Providing patient care</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>13. Break</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Other*</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Instructions:
- Turn on beeper at the beginning of your shift or at the top of the hour
- Beeper will go off about 3 times per hour
- Whenever the beeper goes off, place a tally in the box corresponding to whichever type of task you are currently performing. You can place multiple tallies per beeper occurrence if what you are doing could be categorized as multiple task types
- Turn in beeper and tally sheets at the end of your shift

Comments:
*Describe what you were doing if you selected other.

Name: 
Date: 
# of Triage Nurses (Including Screener RN): 
Shift Start / End: 

Thanks!
# Emergency Department Time Study

**ATL**

<table>
<thead>
<tr>
<th>Task</th>
<th>11 PM - 12 AM</th>
<th>12 AM - 1 AM</th>
<th>1 AM - 2 AM</th>
<th>2 AM - 3 AM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Assigning patient to bed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Physically escorting patient to bed</td>
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</tr>
<tr>
<td>3. Delegating other staff to direct patients to room</td>
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</tr>
<tr>
<td>4. Directing Triage Team to tasks</td>
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</tr>
<tr>
<td>5. On phone with staff (notifying RN of patient)</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>6. On phone with CN or providers about expected patients</td>
<td></td>
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<tr>
<td>7. Rounding unit for bed availability and evaluating staff assignment/acuity</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>8. Cleaning room</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Making bed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Reviewing charts of patients in waiting room</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. On phone with staff regarding patients</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Evaluating patients that need to be moved around</td>
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<td></td>
</tr>
<tr>
<td>13. Assisting at triage desk/answering questions/directing traffic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Break</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Other*</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Instructions:**
- Turn on beeper at the beginning of your shift or at the top of the hour.
- Beeper will go off about 3 times per hour.
- Whenever the beeper goes off, place a tally in the box corresponding to whichever type of task you are currently performing. You can place multiple tallies per beeper occurrence if what you are doing could be categorized as multiple task types.
- Turn in beeper and tally sheets at the end of your shift.

**Comments:**
*Describe what you were doing if you selected other.*

**Name:**
**Date:**
**# of Triage Nurses (Including Screener RN):**
**Shift Start / End:**

**Thanks!**
Appendix F: Value Stream Map of the ED Patient Placement Process