Analysis of Patient Admissions to the Adult Medical Observation Unit

Final Report

To: Jason Ham, MD
Medical Director
Adult Medical Observation Unit

Ann Kohler-Kaiser, RN
Nurse Manager
Adult Medical Observation Unit

Brendon Weil
Lean Coach, Michigan Quality System
University of Michigan Health System

Ian Perry
Management Engineer Fellow, Michigan Quality System
University of Michigan Health System

Mary Duck
IOE 481 Instructor
Industrial and Operations Engineering Department, Univ. of Mich.
Program and Operations Analysis, UMHS

From: IOE 481 Project Team 10, University of Michigan
Bill Lin
Justina Nagorka
Jon Smith
Laura Yee

Date: April 23, 2013
Table of Contents

EXECUTIVE SUMMARY .......................................................................................................... 1
  Background ................................................................................................................................. 1
  Methodology ............................................................................................................................... 1
    Data Collection .......................................................................................................................... 1
    Observation .............................................................................................................................. 2
    Literature Search ...................................................................................................................... 2
  Findings and Conclusions ........................................................................................................... 2
    Patient Transfer Process Flowchart ......................................................................................... 2
    Value Stream Map ................................................................................................................... 2
    Process Variations and Inefficiencies ...................................................................................... 3
  Recommendations .................................................................................................................... 3
  Future Work ................................................................................................................................ 3

INTRODUCTION ......................................................................................................................... 4

BACKGROUND ........................................................................................................................... 4

KEY ISSUES ................................................................................................................................. 5

GOALS AND OBJECTIVES ...................................................................................................... 5

PROJECT SCOPE ........................................................................................................................ 5

METHODS .................................................................................................................................... 5
  Literature Search ......................................................................................................................... 5
  AMOU Charge Nurse Time Logs ............................................................................................... 6
  AMOU and ED MiChart ............................................................................................................. 6
  AMOU Clerk Patient Care Time Log ......................................................................................... 6
  AMOU and ED Observation ....................................................................................................... 7

FINDINGS AND CONCLUSIONS ............................................................................................. 8
  Patient Transfer Process Flowchart .......................................................................................... 8
  Value Stream Map ...................................................................................................................... 8
  Observations: Process Variations ............................................................................................... 10
  Observations: Inefficiencies ......................................................................................................... 11

RECOMMENDATIONS ............................................................................................................. 12
  Reduced Variations: ED Nurse to AMOU Nurse Patient Update Communication Method .... 12
  Increased Efficiency: AMOU Observation Doctor Patient Admissions Process ...................... 12
  Increased Efficiency: AMOU Charge Nurse Bed/Nurse Assignment Protocol ......................... 12
  Increased Efficiency: Housekeeping Staff Protocol .................................................................. 13
FUTURE WORK........................................................................................................................ 13

AMOU Notification of Potential Patients................................................................. 13
AMOU doctor ED patient visits ........................................................................... 13

EXPECTED IMPACT....................................................................................................... 14

APPENDIX....................................................................................................................... 15

Appendix A: Patient Transfer Process Flowchart.............................................. 15
Appendix B: Value Stream Map of Patient Transfer Process............................. 17

Figures and Tables

Figure 1: ED Handoff to AMOU by Hour 7/1/2012 - 2/28/2013.............................. 7
Figure 2: AMOU Admissions by Hour 7/1/2012 - 2/28/2013................................. 8
Table 1: Results of December 2012 - February 2013 Charge Nurse Time Log Analysis........ 9
Figure 3: Value Stream Map of Patient Transfer Process.................................. 9
EXECUTIVE SUMMARY

The Adult Medical Observation Unit (AMOU) at the University of Michigan Health System (UMHS) is an 18-bed outpatient unit that primarily admits patients from the Emergency Department (ED) who need short stay medical attention. As reported by the Medical Director at the AMOU, high variability exists in the lead-time of patients scheduled to leave the ED and arrive in the AMOU. Furthermore, according to the AMOU nurses, a lack of or delay in communication occurs between the AMOU, Admission Triage Associates (ATA), and ED staff. The ATA is the liaison between the ED and AMOU departments. Therefore, the Medical Director and Nurse Manager of the AMOU wanted to know the underlying causes of the transfer process variability and communication issues and requested recommendations to reduce these issues. To address these issues, the AMOU asked an IOE 481 student team from the University of Michigan, Team 10, to conduct a series of observations to create a value stream map of the current state of the patient transfer process, conduct a root cause analysis, and recommend process improvements.

Background

The AMOU at the University of Michigan Health System allows for the observation of patients who need short stay medical attention. These patients do not qualify for inpatient status, but require further observation before being discharged. The ED is the main source from which these observation patients arrive. According to the AMOU observation doctors and nurses, the transfer process from the ED to the AMOU has variable lead-time, ranging from a few minutes to a few hours. Furthermore, the lead-times tend to be an hour or longer, which is not optimal for patient throughput. The AMOU Medical Director reported that the lengthy lead-times are causing frustration for the doctors, nurses, and patients within the ED and the AMOU. Additionally, according to the AMOU nurses, a lack of or delay in communication occurs between the AMOU, ATA, and ED staff. The Medical Director and Nurse Manager of the AMOU wanted to know the underlying causes of this variability and communication problems and requested recommendations to reduce these issues.

Methodology

Team 10 utilized three methods of data collection: (1) quantitative data collection of process checkpoint timestamps, (2) qualitative observations, and (3) literature search for projects similar to the ED to AMOU patient transfer process.

Data Collection

Quantitative data was collected in three forms for the project. These forms include (1) the AMOU charge nurse time logs of the current checkpoints utilized by the AMOU staff from December 2012 to February 2013, (2) MiChart ED Patient Care Timeline of the ATA and the ED portions of the patient transfer process from January 2013 to February 2013, and (3) AMOU clerk patient care time log of patients transferred to the AMOU from July 2012 to February 2013. The combination of these three forms of quantitative data allowed Team 10 to perform a statistical analysis to determine the average lengths of time and standard deviations for each checkpoint.
**Observation**
Team 10 completed eight observations of the ED to AMOU transfer process. The observation included team members shadowing several key personnel, including the AMOU observation doctor, the AMOU charge nurse, the ED observation doctor, the ED charge nurse, and the ATA staff. The observations allowed Team 10 to observe the transfer process from multiple perspectives without bias from one department. Observations took place from February 20th through April 7th 2013 during the following timeframes: 9:00 a.m. to 1:00 p.m., 2:00 p.m. to 6:00 p.m., 6:00 p.m. to 10:00 p.m., and 10:00 p.m. to 2:00 a.m.

**Literature Search**
Team 10 conducted a literature search for past IOE 481 projects and currently utilized processes relevant to the ED to AMOU patient transfer process. The literature search concluded that the processes utilized during past IOE 481 project timelines were no longer relevant to the current ED to AMOU patient transfer process due to the implementation of the MiChart system. The literature search also revealed that the AMOU is a unique unit to UMHS. Therefore, the literature search findings were not utilized within the project.

**Findings and Conclusions**
To improve the efficiency of the patient transfer process and decrease communication issues between the AMOU and ED staff, the following findings were determined through data analysis regarding the following topics:

**Patient Transfer Process Flowchart**
After completing observations of the AMOU, ATA, and ED Team 10 developed a patient transfer process flowchart including 22 checkpoints observed. This flowchart includes all of the process variations observed throughout observation sessions. The patient transfer process involves many variations that are dependent upon the staff’s personal method or experience. The checkpoints from the patient transfer process flowchart were used to create a value stream map.

**Value Stream Map**
Team 10 created a value stream map (VSM) of the patient transfer process, which depicts the patient transfer process from a broad perspective and the mean and standard deviations between checkpoints. This broad perspective creates a clear presentation of steps within the process. Therefore, the VSM excludes possible variations in steps that depend upon staff experience.

Team 10 concluded that standardized methods of the patient transfer process would decrease the lead-time and improve the communication between the AMOU, ATA, and ED staff. From the findings, Team 10 was able to make the following conclusions:

- The standard deviations of the following times are quite close to their respective means, therefore there are opportunities for process optimization
- Process variations cause an increased lead-time in the patient transfer process
**Process Variations and Inefficiencies**

Team 10 identified one area with a varying process and three areas with process inefficiencies within the patient transfer process. The variation in the process occurs within the protocol the ED nurse follows to communicate with the AMOU nurse regarding a patient information update within 15 minutes of the AMOU nurse receiving an ED callback number from the AMOU charge nurse. The variations in process are as follows:

- ED nurse calls the AMOU clerk prior to the 15 minute window’s conclusion
- AMOU nurse calls the ED nurse within the 15 minute window

The three areas of inefficiency Team 10 identified do not include variations in the steps performed however they include differences in the amount of time it takes to complete the given steps. The three inefficiencies are as follows:

- Protocol the AMOU doctor follows for patient acceptance communication
- Protocol the AMOU charge nurse follows for bed assignment
- Protocol the housekeeping staff follows to update the bed status

**Recommendations**

To reduce patient transfer lead-times; improve communication between the AMOU, ATA, and ED staff; increase patient and staff satisfaction; and increase patient throughput, Team 10 recommends the following:

- The AMOU charge nurse be notified of a patient’s acceptance into the unit by the AMOU doctor as soon as possible
- The ATA be notified by the AMOU charge nurse of bed assignment information prior to the charge nurse handing off patient information to the patient’s assigned AMOU nurse
- The ATA auto admissions page be modified in the following manner:
  - The AMOU charge nurse and nurse who has been assigned the given patient are included when the ED is paged with the bed assignment
  - The respective patient’s ED nurse’s phone number is appended to the page
- Housekeeping staff be required to update bed status from the phone located in the patient room

**Future Work**

Team 10 has identified two additional areas with process variations in the patient transfer process. However, these areas were outside the scope of this project. Therefore, Team 10 recommends that investigation into these variations be pursued by UMHS. The two areas with process variations are as follows:

- Method of initial contact from the ED doctor to the AMOU doctor
- Method of AMOU doctor ED patient visits
INTRODUCTION

The Adult Medical Observation Unit (AMOU) at the University of Michigan Health System (UMHS) is an 18-bed outpatient unit that primarily admits patients from the Emergency Department (ED) who need short stay medical attention. As reported by the Medical Director at the AMOU, high variability exists in the lead-time of patients scheduled to leave the ED and arrive in the AMOU. Furthermore, according to the AMOU nurses, lack of or delayed communication occurs between the AMOU, Admission Triage Associates (ATA), and ED staff. The ATA is the liaison between the ED and AMOU departments. Therefore, the Medical Director and Nurse Manager of the AMOU wanted to know the underlying causes of the transfer process variability and communication issues and requested recommendations to reduce these issues. To address these issues, the AMOU asked an IOE 481 student team from the University of Michigan, Team 10, to conduct a series of observations to create a value stream map of the current state of the patient transfer process, conduct a root cause analysis, and recommend process improvements. This final report describes the project methods, findings, conclusions, and recommendations.

BACKGROUND

The AMOU at the University of Michigan Health System allows for the observation of patients that need short stay medical attention. These patients do not qualify for inpatient status, but require further observation before being discharged. The ED is the main source from which these observation patients arrive. According to the AMOU observation doctors and nurses, the transfer process from the ED to the AMOU has variable lead-time, ranging from a few minutes to a few hours. Furthermore, the lead-times tend to be an hour or longer, which is not optimal for patient throughput. The AMOU Medical Director reported that the lengthy lead-times are causing frustration for the doctors, nurses, and patients within the ED and the AMOU.

According to the AMOU nurses, a lack of or delay in communication occurs between the AMOU, ATA, and ED staff. The AMOU charge nurse is not always informed by the ED that additional medical treatment will be performed, e.g. taking a patient for an MRI, before the patient is transferred to the AMOU, which delays the transfer process and can be frustrating to the AMOU staff. Communication issues also occur within the AMOU department and between the ATA and ED departments. For example, if an AMOU nurse underestimates the length of time required to discharge a patient and does not notify the AMOU charge nurse, that charge nurse could notify the ATA that a bed will soon be available even though all beds are currently occupied and will be utilized for longer than anticipated. Additionally, the ATA can forget to notify the ED that a patient has been accepted into the AMOU and has been assigned to a certain bed. Without that admission information, the ED cannot transfer the patient to the AMOU, even though the AMOU is ready and waiting for the patient. These delays can lead to patient and staff frustration.

The Medical Director and Nurse Manager of the AMOU wanted to know the underlying causes of this variability and these communication problems and requested recommendations to reduce these issues.
KEY ISSUES

The following key issues drove the need for this project.

- Variable lead times of patient transfers from the ED to AMOU
- Internal and cross departmental lack of or delay in communication

GOALS AND OBJECTIVES

The primary goal of this project was to provide recommendations that would improve the efficiency of the patient transfer process and decrease communication issues between the departments’ staff. Team 10 performed a root cause analysis for the variable lead-time and communication issues between the AMOU, ATA, and ED. The results of the root cause analysis allowed Team 10 to provide the desired recommendations. Team 10 pursued these goals by addressing the following objectives.

- Reduce patient transfer lead times
- Improve communication between the AMOU, ATA, and ED staff
- Increase patient and staff satisfaction
- Increase patient throughput

PROJECT SCOPE

The scope of this project included examination of the patient transfer process that occurs once the patient is accepted into the AMOU. This process begins when the observation doctor has accepted a patient into the AMOU and the charge nurse has been notified. The documentation of the patient’s arrival by the AMOU clerk is the final step of the patient transfer process that was included within the scope of the project.

This project did not include patients who have been denied from the AMOU either by the observation doctor or the Admission Triage Coordinator (ATC), nor did it include patients who arrived at the AMOU from units other than the ED.

METHODS

Data collection included a literature search for projects similar to the ED to AMOU patient transfer process, quantitative checkpoint data analysis, and qualitative observations. The quantitative data was collected in three forms for the project. These forms include (1) the AMOU charge nurse time logs from the current checkpoints utilized by the AMOU staff; (2) MiChart ED Patient Care Timeline of the ATA and the ED portions of the patient transfer process, and (3) AMOU clerk patient care time log of patients transferred to the AMOU.

Literature Search

Team 10 conducted a literature search for past IOE 481 projects and currently utilized processes relevant to the ED to AMOU patient transfer process. One past IOE 481 student project
specifically examined by Team 10 was an ED Admissions Process Analysis project conducted in the winter of 2012. This paper contained information that was pertinent to the AMOU department, however the processes utilized during this project’s timeline were no longer relevant to the current ED to AMOU patient transfer process due to the implementation of the MiChart system. The literature search also revealed that the AMOU is a unique unit to UMHS. Therefore, the literature search findings were not utilized within the project.

AMOU Charge Nurse Time Logs

The AMOU Nurse Manager provided Team 10 with the AMOU charge nurse time log data for the months of December 2012, January 2013, and February 2013. The logs include the following checkpoints in the patient transfer process.

- The time the ED pages the observation doctor for patient analysis
- The time the observation doctor notifies the charge nurse
- The time the charge nurse notifies the ATA
- The time the patient arrives at the AMOU
- The result of whether the patient was accepted or denied by the AMOU

Team 10 manually entered the AMOU charge nurse time logs into an Excel spreadsheet for data analysis. Any entries that were incomplete were removed from the analysis. The remaining logs contained 441 patients.

AMOU and ED MiChart

Team 10 obtained MiChart ED Patient Care Timeline patient data from a UMHS Program Operations Analyst to determine the average duration of each key checkpoint. The data contained patient admittance information from January 2013 to February 2013. The data was sorted to only include the key checkpoints in the patient transfer process.

- The time the ED confirms the patient is ready for transfer to the AMOU
- The time the AMOU has an available bed
- The time the ATA electronically inputs the patient bed assignment in MiChart
- The time the ATA sends out a page to the ED with the given patient’s bed assignment
- The time the patient arrives in the AMOU

AMOU Clerk Patient Care Time Log

The AMOU Medical Director provided Team 10 with the AMOU clerk patient care time log for July 2012 to February 2013. The AMOU clerk electronically updates this document once the patient arrives into the unit. Team 10 cross-referenced each timestamp of patient arrivals to the AMOU with the AMOU charge nurse time log and the MiChart ED Patient Care Timeline to ensure that there were no discrepancies in the data.
AMOU and ED Observation

Team 10 completed an initial observation of the ED to AMOU transfer process. The observation included team members shadowing several key personnel, including the AMOU observation doctor, the AMOU charge nurse, the ED observation doctor, the ED charge nurse, and the ATA staff, allowing Team 10 to observe the transfer process from multiple perspectives without bias from one department. The initial observation was conducted for four hours. Furthermore, the initial observation session gave Team 10 the opportunity to view the process, observing the process flow and adding any checkpoints not included in the charge nurse time logs.

Team 10 subsequently performed five additional observations of the patient transfer process with team members located in the AMOU, ATA, and ED to ensure all checkpoints were documented within the patient transfer process flowchart. Observations took place from February 20th through April 7th 2013 during the following timeframes: 9:00 a.m. to 1:00 p.m., 2:00 p.m. to 6:00 p.m., 6:00 p.m. to 10:00 p.m., and 10:00 p.m. to 2:00 a.m. These observation timeframes were derived from data analysis of the AMOU clerk patient care time logs. The data is graphically represented in Figure 1 and Figure 2, p. 8, below. Figure 1 displays the distribution of ED to AMOU patient handoffs by hour of day. Figure 2, p. 8, displays the distribution of patient arrivals into the AMOU from the ED by hour of day.

Figure 1: ED Handoff to AMOU by Hour 7/1/2012 - 2/28/2013

The figure above displays the patient handoffs from the ED to the AMOU throughout the day. The most frequent handoffs occur between 5 p.m. and 3 a.m. Team 10 scheduled 6 observations after 6 p.m. during the highest rates of patient handoffs.

(Source: AMOU Clerk Patient Care Time Logs; Data Collection Period: 7/1/2012 – 2/28/2013; Sample Size: 2814)
Figure 2 depicts the distribution in hours throughout the day in which patients arrive from the ED to the AMOU. Most patient arrivals occur after 11 a.m. and decline thereafter. Team 10 subsequently observed within the timeframes listed above to cover the fluctuations in patient acceptance and patient admittance to the AMOU.

FINDINGS AND CONCLUSIONS

This section discusses the findings from the data collection and observations. The findings include (1) a patient transfer process flowchart, (2) a patient transfer process value stream map, (3) observed patient transfer process variations, and (4) observed patient transfer process inefficiencies.

Patient Transfer Process Flowchart

After completing observations of the AMOU, ATA, and ED, Team 10 developed a patient transfer process flowchart. This flowchart includes all of the steps observed by Team 10 and any observed process variations. As seen in the patient transfer process flowchart in Appendix A, there are many variations in the processes that depend on the staff’s personal method or experience. Therefore, Team 10 has concluded that the patient transfer process would benefit from standardization of these process variations. To determine the effect these process variations had on the patient transfer process, Team 10 removed the variations and created a value stream map depicting an overview of the patient transfer process.

Value Stream Map

After creating the patient transfer process flowchart, Team 10 combined the AMOU charge nurse time logs, MiChart ED Patient Care Timeline, and AMOU clerk patient care time logs to cross
reference timestamps of patient transfer process. The three sources of data were combined using the patient’s name and registration number as a common reference. After analyzing this data, average times and variation of times were calculated for four checkpoints in the patient transfer process. The combined data including the following four steps, which were used to determine a timeline for the patient transfer process:

- The time when the ED pages the AMOU observation doctor
- The time when the AMOU observation doctor notifies the charge nurse of patient acceptance into the AMOU
- The time when the charge nurse notifies the ATA of patient acceptance
- The time when the patient arrives in AMOU

Three transition times were calculated from the four steps based on the timestamps of the charge nurse time logs. The mean and standard deviation of the transition times are shown in Table 1.

Table 1: Results of December 2012 - February 2013 Charge Nurse Time Log Analysis

<table>
<thead>
<tr>
<th></th>
<th>Mean (hh:mm:ss)</th>
<th>Standard Deviation (hh:mm:ss)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transition 1</td>
<td>00:56:18</td>
<td>00:42:36</td>
</tr>
<tr>
<td>Transition 2</td>
<td>00:31:55</td>
<td>00:31:34</td>
</tr>
<tr>
<td>Transition 3</td>
<td>00:51:07</td>
<td>00:33:35</td>
</tr>
<tr>
<td>Total</td>
<td>02:18:20</td>
<td>01:47:45</td>
</tr>
</tbody>
</table>

(Source: AMOU Charge Nurse Time Logs; Sample Size: 337)

Utilizing the transition times from Table 1, Team 10 created a value stream map, depicting the patient transfer process by removing any variations from the patient transfer process flowchart. The value stream map allowed Team 10 to view the process from a broader yet more standardized perspective. Figure 3 depicts the value stream map of the patient transfer process.

Figure 3: Value Stream Map of Patient Transfer Process

As shown in the value stream map, the transition times have standard deviations that are all at least 65% of their respective means. Therefore, Team 10 concluded once again that the patient transfer process would benefit from standardization.
Observations: Process Variations

Team 10 identified three areas with varying processes that are conducted by the AMOU and ED staff. The variations are as follows in order of occurrence in the patient transfer process:

- The first variation in the patient transfer process occurs when the ED doctor contacts the AMOU doctor regarding a potential patient. Team 10 observed four different approaches dependent upon the ED doctors personal experience: (1) the ED doctor directly calls the AMOU doctor to discuss patient information, (2) the ED doctor pages the AMOU doctor asking said doctor to call the ED doctor back to discuss patient information, (3) the ED doctor verbally asks the AMOU doctor to visit a patient if he or she is already in the ED, or (4) the ED doctor completes steps 1 and 2 in the MiChart Patient Transfer Form, which relays the information to the ATA who will then send an automatic page to the AMOU doctor and charge nurse.

- Another variation in the patient transfer process occurs when the ED clerk contacts the AMOU nurse to transfer patient information, after receiving the patient’s AMOU bed assignment. The current procedure starts when the ATA bed assignment page is sent out to the ED clerk with the AMOU bed assignment, which is only sent once the bed status has been electronically updated to clean by housekeeping staff. The ED clerk then sends out a page to both the ED charge nurse and the ED nurse caring for the patient with the AMOU bed assignment. Additionally, the ED clerk pages the AMOU charge nurse the ED nurse’s name and callback number. The AMOU charge nurse will relay the ED nurse’s phone number to the AMOU nurse who will be caring for that patient upon arrival in the AMOU. The AMOU nurse then has 15 minutes to call the ED nurse back. If the nurse fails to contact the ED nurse within the 15-minute timeframe, the ED nurse will contact the AMOU charge nurse again. However, if the ED nurse would like to expedite the process, he or she may contact the AMOU nurse prior to the 15-minute window. In this situation, the ED nurse will contact the AMOU clerk who then transfers the ED nurse to the AMOU nurse.

- The final variation occurs in the process that the AMOU doctor utilizes to interact with the patient in the ED. This interaction occurs during the process when the AMOU doctor determines if the patient’s condition meets the criteria for the AMOU or for further medical treatment upon entrance to the AMOU. The AMOU doctor either (1) visits the patient in the ED prior to accepting the patient, (2) visits the patient after bed assignment and prior to transfer to the AMOU to determine additional medical diagnosis and treatment methods, (3) visits the patient at both opportunities, or (4) does not visit the patient until he or she arrives in the AMOU.

These variations in processes increase the lead-time in the patient transfer process. A lack of or delay in communication also occurs due to the variations in methods and protocol. Therefore, Team 10 concluded that a standardized patient transfer process would decrease the lead-time and improve the communication between the ED and AMOU staff.
Observations: Inefficiencies

Team 10 identified three areas with processes inefficiencies. The inefficiencies are as follows in order of occurrence in the patient transfer process:

- Process inefficiency occurs in the procedure the AMOU doctors follow to accept a patient. When the AMOU doctor determines the patient’s condition meets the criteria for the unit and will be accepted, the rate at which the AMOU doctor communicates this acceptance to the AMOU charge nurse is inconsistent. This inconsistency is due to one of the following occurrences: (1) the AMOU doctor is already in the AMOU when accepting the patient and communicates the acceptance to the charge nurse as soon as possible, (2) the AMOU doctor walks to the ED to speak with the patient and communicates acceptance to the charge nurse upon return to the AMOU, and (3) the AMOU doctor evaluates multiple patients in the ED and communicates all acceptances to the AMOU charge nurse upon return to the AMOU.

- Another inefficiency in the patient transfer process is the procedure the AMOU charge nurse follows when assigning a bed to an incoming patient. Currently, the process is as follows:

  1) Determine which bed/nurse the incoming patient will be assigned to
  2) Gather and write down the incoming patient information
  3) Convey the patient’s information to the receiving AMOU nurse
  4) Call the ATA to inform them of the patient’s bed assignment

  Additionally, there have been instances where the AMOU charge nurse has assigned a dirty bed to an incoming patient when a clean bed was available. Instances such as this increased the lead-time for the patient transfer process because the patient could not be transferred to the AMOU until the bed was cleaned and electronically updated as “clean” by the housekeeping staff.

- The final process inefficiency occurs in the procedure the housekeeping staff follows when cleaning AMOU rooms. When a bed in the AMOU is dirty, a housekeeping staff will enter the AMOU and call an automated service, using any available phone. After reaching this service, the housekeeping staff will then update the status of the bed from “dirty” to “in-progress.” This automated service then electronically updates the bed status in the bed status tracking system. Once the housekeeping staff has completed cleaning the room, he or she will then dial the automated service again, and change the status of the bed from “in-progress” to “clean.” Once the bed status is updated as “clean,” any pending bed assignment information for the given bed will be sent from the ATA to the ED clerk. The variation in this step occurs whenever a housekeeping staff member dials the automated service. The location of the phone used varies from the AMOU nurse station, to the AMOU bedroom, to the housekeeping office. Therefore, there are varying time gaps from when the bed is actually clean and when the bed status has been updated as “clean.”
RECOMMENDATIONS

Team 10 developed four recommendations that will reduce the patient transfer process lead-time. The two underlying themes within the recommendations are: (1) increased efficiency of protocol and (2) increased protocol standardization. The recommendations are discussed in chronological order in reference to the patient transfer process from the ED to the AMOU.

Reduced Variations: ED Nurse to AMOU Nurse Patient Update Communication Method

The ED nurse to AMOU nurse communication process contains unnecessary steps that lengthen the amount of time the process takes. Therefore, Team 10 recommends that the bed assignment page sent from the ATA to the ED clerk be amended in the following ways:

- The page no longer be sent to the ED clerk. Instead, the page be sent directly to the ED charge nurse and the ED nurse caring for the patient
- An additional page be sent from the ATA to the AMOU charge nurse with the ED nurse’s name and callback number, which would initiate the 15 minute callback window for the AMOU nurse and ED nurse patient information exchange

By amending the bed assignment page in the ways stated above, unnecessary steps conducted by the ED clerk would be removed, thereby decreasing lead-time in the patient transfer process.

Increased Efficiency: AMOU Observation Doctor Patient Admissions Process

Team 10 recommends that the AMOU observation doctor notify the AMOU charge nurse of a patient’s acceptance into the unit as soon as possible. For example, when the observation doctor visits the ED to examine a potential patient, that doctor should call the AMOU charge nurse as soon as he or she has concluded his or her decision making process. Furthermore, if the observation doctor is evaluating multiple patients for admission during a single trip to the ED, that observation doctor should call the AMOU charge nurse after each admission decision has been made, not after all admission decisions have been made. By informing the AMOU charge as soon as possible of the admission decision, the charge nurse can begin the next step in the patient transfer process quicker, thereby reducing the lead-time of patient transfer process.

Increased Efficiency: AMOU Charge Nurse Bed/Nurse Assignment Protocol

Team 10 recommends reordering the protocol conducted by the AMOU charge nurse when assigning a bed to an incoming patient. If the AMOU charge nurse calls the ATA prior to taking down and handing off patient information, the ATA can notify the ED of the patient’s acceptance into the AMOU and their bed assignment as soon as possible. The new order of steps would be as follows:

1) Determine which bed/nurse the incoming patient will be assigned
2) Call the ATA to inform them of the patient’s bed assignment
3) Gather and write down the incoming patient information
4) Convey the patient’s information to the receiving AMOU nurse
Team 10 also recommends that magnets be utilized on the AMOU bed status whiteboard for any bed that is unoccupied. This recommendation ensures that the AMOU charge nurse does not accidentally assign a dirty bed to an incoming patient.

**Increased Efficiency: Housekeeping Staff Protocol**

Team 10 recommends that the housekeeping staff be required to update the bed status from the phone in the patient room. By updating the bed status from the patient room, the housekeeping lead-time can be reduced, which also reduces delays in the patient transfer process caused by varying time gaps from when the bed is actually clean and when the bed status has been updated as “clean” in the bed status tracking system.

**FUTURE WORK**

Team 10 has also identified two areas in the patient transfer process, which should be further studied for possible improvements. Standardization of protocol is the underlying theme of the recommended future work. The areas of future work are discussed in chronological order in reference to the patient transfer process from the ED to the AMOU.

**AMOU Notification of Potential Patients**

Variability exists in the manner in which the ED requests the AMOU to admit a patient. This variability causes delays in the patient transfer process and creates opportunities for lack of or delay in communication between the AMOU, ATA, and ED. Therefore, Team 10 recommends that a project team conduct further analysis, including shadowing sessions and time studies focused on the variability in ED communication with the AMOU, to determine a standardized procedure. Standardization of ED communication with the AMOU would guarantee that the AMOU doctor and charge nurse are notified in a consistent manner. Furthermore, this standardization would eliminate instances of the charge nurse being unaware of an incoming patient.

**AMOU doctor ED patient visits**

Currently, the AMOU doctor visits patients in the ED anywhere from zero to two times during the patient transfer process. Therefore, Team 10 recommends that a project team conduct further analysis, including shadowing sessions and time studies focused on the variability of AMOU doctor ED patient visits, to determine a standardized procedure. Standardization of AMOU doctor ED patient visits would reduce variability in the patient transfer process, which would then reduce lead-times within the patient transfer process.
EXPECTED IMPACT

Team 10 provided recommendations to improve the efficiency of the patient transfer process and decrease communication issues between the AMOU, ATA, and ED staff. Specifically, the recommendations will result in:

• Reduced patient transfer lead-times
• Improved communication between the AMOU, ATA, and ED staff
• Increased patient and staff satisfaction
• Increased patient throughput
APPENDIX A

Patient Transfer Process Flowchart

| KEY | AMOU | ATA | ED |

Patient Screened at Observation by ED Doctor

Dependent upon ED Doctor

ED pages AMOU Doctor
ED completes MiChart steps, sends auto-page to AMOU
ED calls AMOU Doctor
AMOU Doctor already in ED

Dependent upon AMOU Doctor

AMOU Doctor walks to see patient in ED
AMOU Doctor talks to ED Doctor on phone

AMOU Doctor accepts patient; notifies ED Doctor

ED Doctor completes MiChart step 2 (if necessary)
AMOU Doctor notifies CN of acceptance

ATA notified of patient acceptance
AMOU CN checks unit status, assigns bed/nurse

AMOU CN looks up patient info, writes on sticky note

AMOU CN gives note / verbal explanation of patient to receiving AMOU Nurse

A
APPENDIX B

Value Stream Map of Patient Transfer Process