Analysis of the Admission Process in the Emergency Department
At The University of Michigan Hospital

Delivered to:

Jon Fairchild, RN
Supervisor, Emergency Department

Jennifer Holmes
Director of Operations, UMH Emergency Department

Candice Catanzarite
Clinical RN, UMH Emergency Department

Steve Kronick, MD, PhD
Clinical Assistant Professor

Jeffrey Desmond, MD
Clinical Assistant Professor, Emergency Medicine

Sheri Moore
Senior Industrial Engineer, Lean Coach

Prepared by:

Armando Barrera
Christopher Valle
Eugene Epshteyn
Valerie Heiser
Program in Operations Analysis, The University of Michigan

Date Submitted:
February 4, 2008
Introduction

The University of Michigan’s Emergency Department (ED) provides initial treatment to patients with a broad spectrum of illnesses and injuries. Patients are examined by MPs to determine the severity of their condition at which point the patients requiring admission are moved to their respective hospital units. Of 4,479 adult visits to the ED in December 2007, 1,392 patients were admitted into the hospital. The current process of admitting a patient from the ED to their unit bed, is taking 84 minutes as noted in recent statistics accumulated during December 2007. Our team of Program and Operations Analysis will work on improvements to reduce this time.

The team proposes to examine the current ED to hospital admission process flow to identify ways of eliminating process waste and recommend methods for improving the process from the time the unit bed is ready until the patient leaves the ED. This proposal presents a plan for performing tasks to develop recommendations including a detailed project plan and timeline.

Goals and Objectives

The primary goals of this project are to optimize the current ED admission process time, identify waste, and recommend improvements. Using this gathered information, our team will:

- Create a current state value stream map
- Identify waste in the current process and sub processes
- Identify non-standard procedures
- Develop recommendations for improvement

Background

The process our team is examining starts when the “Bed is Ready” page comes in and ends when the patient starts to be transported to the respective hospital unit bed. This page results after MPs confirm a patient’s need to be admitted to the hospital from the ED and a bed request for a hospital bed within a specific unit is put into the system.

When the requested bed is ready the Charge RN receives a page stating that the hospital unit bed is ready. The Charge RN looks for the “A” icon on the whiteboard for the corresponding patient.

If “A” is not present then the process follows Figure 1.

![Figure 1 Process Flow when the A is Not on the Whiteboard](image-url)
Once the “A” is present, the Charge RN notifies the Primary RN that the unit bed is ready and the MP confirms the patient can go up. If the MP says the patient is not ready to go to their unit bed, care in the ED is continued until complete.

Once the care is completed within the ED, the Primary RN completes the necessary paperwork in Centricity and faxes the paperwork to the respective hospital unit. A Technician is notified to transport the patient out of the ED. When the patient leaves their ED room, their visit at the ED is over, the Primary RN completes the patient’s medical chart and removes the patient from census in Centricity. The bed is cleaned for the next patient.

Project Plan

The Program and Operations Analysis team will be observing and analyzing the admitting process of a patient to the hospital unit from the ED in order to improve current process time. The parties involved in this project include the following ED staffing: Technicians, RNs, MPs, and Clerks.

Key Issues

This project is needed for the Emergency Department because of the following issues:

- The long admission lead time of 84 minutes, needs to be reduced
- Perception of non-standard process of notifying a Technician to prepare and transport patient
- Perception of waste in Primary RN paperwork
- Perception of overall non-standard admission process

Project Scope

This project includes the admission process of a patient within the ED. The process begins when a “Bed is Ready” page is sent to the ED informing them of bed availability. The process ends when the Technician starts transporting the patient from their bed in the ED.

Project Scope includes:

- ED RNs handling admission paperwork and other sub procedures
- ED Clerks handling admission paperwork and other sub procedures
- Prepping procedures of the patient by the Technician to transport patient from the ED
- Only adult ED admitted patients
- “A” notification
- Green “Bed is Clean” icon on whiteboard

Out of Scope:

- Paperwork procedures in the hospital unit
- Transportation once patient leaves ED
- Patient care prior to “Bed is Clean” page
- Pediatric patients
• All other hospital departments outside ED
• Discharged ED patients

**Proposed Approach**

Three phases will be performed in this project: data collection, analysis and recommendations.

**Data Collection:**

*Observations*

The ED admission process and variations/interruptions will be observed. Time studies of procedures will be performed primarily geared towards peak ED shifts. In addition, interviews of the ED Staff will be performed to gain insight from those involved in the process.

*Outside Information Search*

A literature search of possible existing papers and other sources will be performed. Contact with other hospitals (regional and possibly out-of-state) to compare their processes to the University’s Hospital Services will be established. Additionally, the team will utilize any existing data of procedure times within the process to verify our observations.

**Analysis:**

There are three primary facets of the data and process that the team aims to analyze. The team will obtain average and median process times, wait times, and the overall lead time within the flow. With respect to wait times, the team will analyze the effects that specific types of delays have on the overall process lead time. Inter-departmental communication such as paperwork and pages, both procedural and technical, will be analyzed to find redundancies and/or miscommunications. The team will create a current value stream map of the ED admission process based on our collected data, observations, and interviews.

**Recommendations:**

The project team will develop recommendations in order to decrease overall lead times within the process. Recommendations will be based on data analysis, observations, outside research, and interviews.

**Expected Impact**

The team will provide final recommendations to improve the time it takes for a patient to be admitted to the hospital from the ED. Recommendations are expected to result in:

• Decreased lead time of ED admission process
• Improved efficiency and consistency of communication between ED Technicians, ED RNs, ED MPs, and ED Clerks.
• Minimized waste time within the process
• Standardized overall processes

Project Team and Experience

The following team members will be working closely in this project.

Project Client
Jon Fairchild, RN: Supervisor, Emergency Department
Jeffrey Desmond, MD: Clinical Assistant Professor, Department of Emergency Medicine
Michael Valdes: Associate Director of Operations & Ancillary Services
William G. Barsan, MD: Chair, Emergency Department

Project Coordinator
Sheri Moore: Senior Industrial Engineer, Lean Coach

Project Team
Armando Barrera: Senior Industrial and Operation Engineering Student
Christopher Valle: Senior Industrial and Operation Engineering Student
Eugene Epshteyn: Senior Industrial and Operation Engineering Student
Valerie Heiser: Senior Industrial and Operation Engineering Student

Team Resumes have been appended to the document.

Support Required from Operating Entities

The project client has provided the team with the current problem and goals of the project. He has also given details of the current process and introduced the team to contacts within the involved departments. More detailed information of the process will be obtained from ED Technicians, ED RNs, ED MPs, and ED Clerks. The client will also provide the team with existing data.

The project coordinator will assist and guide the team by providing project details and expectations and in helping the team maintain a successful client relationship. She will also provide feedback on the team’s progress.

Schedule
To collect and analyze the data, and to develop recommendations to improve the admittance process from the ED to the hospital, the project will follow the schedule written below.

Key Dates

The following key dates represent important activities in the project.
Perform time studies                             January 25 – March 21, 2008
Interview related personnel                     February 11 – March 14, 2008
Analyze interviews                              February 11 – March 14, 2008
Analyze time study and existing data            February 11 – April 4, 2008
Develop recommendations                         March 21 – April 11, 2008
Deliver final report                            April 18, 2008
Present final presentation                      April 18, 2008

In addition, the project team will meet with the coordinator every Monday at 8:00am and with the client every Wednesday at 7:30am.

**Estimated Team Hours Required**

The team estimates they will spend between 500 and 550 total hours working this project (approximately 13 hours per person per week).
### Gantt Chart

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<thead>
<tr>
<th>Task</th>
<th>February</th>
<th>March</th>
<th>April</th>
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<tr>
<td>No.</td>
<td>4 11 18 25</td>
<td>3 10 17 24 31</td>
<td>7 14 18</td>
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<tr>
<td>Meetings:</td>
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<td>Coordinator</td>
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<td>Team</td>
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<tr>
<td>Collect data &amp; observation</td>
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<td>Interview key staffs about process</td>
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<td>Conduct literature search</td>
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<td>Analyze data</td>
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<td>Interim report:</td>
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<td>Prepare interim report</td>
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<td>Review &amp; revise interim report</td>
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<td>Final report:</td>
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<td>Prepare draft final report</td>
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<td>Review &amp; revise final report</td>
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<td>Final presentation:</td>
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<tr>
<td>Prepare final presentation</td>
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<td>Review &amp; revise presentation</td>
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<td>Final presentations:</td>
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<td>Class presentation</td>
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<tr>
<td>Client presentation</td>
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</tbody>
</table>

- Meetings: Coordinator or Team
- Collect data & observation
- Conduct literature search
- Analyze data
- Interim report
- Final report
- Final presentation

X indicates the task was completed.
Luis Armando Barrera
418 Washington Street Apt. 16 • Ann Arbor, MI 48104 • (734) 972-5600 • barreral@umich.edu

OBJECTIVE
Seeking a full-time position in supply chain management or operations analysis where I can apply my varied technological, leadership and problem-solving skills to help a company improve its operations.

EDUCATION
University of Michigan, Ann Arbor, Michigan
4/2007 B.S.E., Bachelor of Industrial and Operations Engineering, GPA: 2.95/4.0

EXPERIENCE
Maricultura El Dorado S.A.C, Seafood Products Company, Sechura, Peru Summer 2007
Industrial and Operations Intern
• Contributed in the setup of a freezing plant for seafood products in northern Peru.
• Aided in the setup of an aquiculture environment in the selected area.
• Selected location for a laboratory to breed scallops in northern Peru.

Pisco Earthquake Disaster Relief, Pisco, Peru Summer 2007
Donations Collector Volunteer
• Organized a volunteer group to collect food and clothes in the capital, Lima.
• Contributed with supplies. Sent supplies over to the earthquake victims in Pisco.
• Motivated and inspired people to donate goods.

Procesadora Del Campo S.A.C Fishmeal Company, Huacho, Peru Summer 2006
Industrial and Operations Intern
• Optimized fishmeal production.
• Eliminated waste within the production scheme.
• Improved the ergonomic and safety aspects of the workers in the fishmeal plant.
• Implemented new safety methods in the plant to prevent workers from being injured.

ACADEMIC EXPERIENCE
Quality Engineering Principles Projects, Ann Arbor, MI Fall 2007
Team Leader
• Addressed four case studies based on real life situations regarding quality control.
• Implemented the Six Sigma methodology.
• Improved and controlled methods for the problems regarding the quality of the products from the cases.
• Prepared reports using the DMAIC process. Honed my leadership skills.
• Delegated assignments, organized meetings and maintained deadlines to meet the project due date.

Emergency Department Admission Process Analysis, Ann Arbor, MI Jan 2008 - Present
Team Leader
• Conducting a Lean analysis of the process and time from when the Bed is ready until the patient leaves the Emergency Department.
• Using Lean methods to identify waste and creating a new future state.
• Applying Lean manufacturing knowledge, Root cause analysis, Work measurement, interviewing personnel and Flow-chart stream mapping.
• Delegating assignments. Establishing deadlines and meetings with clients.

ACTIVITIES
M-Powered Entrepreneurship – organization that fosters student entrepreneurship in the Univ. of Michigan
Volunteer Work – Taught English to under privileged first grade students.
Soccer - Contributed with the planning and organization of indoor soccer in Winter at the University.

COMPUTER SKILLS
Languages: C++, MATLAB, Visual Basic, Pro Model
Applications: Microsoft Office, Minitab
Environments: Microsoft Windows, some Mac Os experience

LANGUAGES
Fluent in Spanish, English and Proficient French. Basic Italian.
EUGENE EPSHTEYN  
e p s h t e y e @ u m i c h . e d u  
917.415.1485  
Campus Address  
725 Oxford Rd.  
Ann Arbor, MI 48104  
Permanent Address  
69-25 4th Avenue  
Brooklyn, NY 11209

EDUCATION

University of Michigan  Ann Arbor, MI  [9/2004 – Present]
• Industrial and Operations Engineering BSE, 4th year
• Major GPA: 3.33/4.00
• College of Engineering Dean’s List Winter 2007

• SAT: 1470 (800 Math/ 670 Verbal)

WORK EXPERIENCE

Equity Derivatives Trading Summer Analyst
• Worked for the investment banking division of Dresdner Bank AG, a wholly-owned subsidiary of Allianz SE
• Recorded equity option phone quotes from inter-dealer brokerages throughout each trading day and relayed them to traders
• Developed custom VBA applications/SQL databases as per the needs of traders

Intern/Point Clerk
• Worked for a floor brokerage in the No. 2 Cotton market on the New York Board of Trade
• Gave bid/ask quotes for various delivery months and spreads via hand signals
• Entered trades into trading software and analyzed the days transactions post market close

ACTIVITIES

Michigan Interactive Investments  Ann Arbor, MI  [9/2006 – Present]
Energy Sector Leader
• Lead the energy sector in the only student-run real-money portfolio on campus

Undergraduate Research: Electricity Markets  Ann Arbor, MI  [1/2007 – Present]
Research Assistant
• Assist Professor Jussi Keppo in research focused on correlation of electricity prices and weather

Zeta Psi Fraternity of North America, Xi Chapter  Ann Arbor, MI  [1/2005 – Present]

COMPUTER SKILLS

• Languages: Microsoft Visual Basic.NET 2005, Excel VBA, Microsoft SQL Server 2005 (rudimentary) , C++ (rudimentary)
• Applications: Minitab, MS Office Suite, Reuters 3000 Xtra, Bloomberg Professional

LANGUAGES

• Russian (fluent)
• French (rudimentary)
CHRISTOPHER VALLE

Skills Summary

Three internships worth of work experience in programming an enterprise management system for government agencies. Strong background in operations processes and statistical analysis. Experience in major programming languages as well as operating hardware and software.

Education

2004 – Present University of Michigan- College of Engineering Ann Arbor, MI
Major: Industrial & Operations Engineering
Minor: Eastern European History in the 20th Century
Current GPA: 3.00
Graduation Date: April 2008
Relevant Course Work: Linear Modeling, Queuing Theory, Optimization, Economic Decision Making, Statistical Analysis, Decision Analysis, LEAN Manufacturing, Advanced Programming

Experience

May 2007 – August 2007 AT&T Government Solutions Middletown, NJ
Software Developer
- Creating linked application BMC Remedy forms for an enterprise management system.
- Installing and configuring Windows machines to test the management system.
- Interacting with fellow employees to ensure all work met deadlines set by management.

June 2006 – August 2006 AT&T Government Solutions Middletown, NJ
Software Developer
- Maintaining an enterprise management system for classified government customers.
- Designing and developing BMC Remedy forms and workflow for applications.
- Collaborating in a team environment to complete various projects before deadlines.

May 2005 – August 2005 AT&T Government Solutions Middletown, NJ
Software Developer
- Developing workflow algorithms on an enterprise management system.
- Utilizing C, HTML, and SQL to create an autonomously generating data dictionary.
- Working in proximity with senior developers to tune the project to AGMEMS standards.

Systems Proficiency

Languages: C/C++, HTML, XML, SQL, Visual Basic, GPSS/H
Applications: BMC Remedy, AutoCAD, MIMIC, MiniTab, Microsoft Office

Additional Experience

January 2005 – January 2006 University of Michigan Circle K Ann Arbor, MI
Technology Committee Member
- Updating organization’s website using SQL queries to information database
- Applying HTML to create user friendly website
Valerie Heiser  
6443 N. Hillsboro Pl.  
Boise, ID 83703  
208.863.8649  
vheiser@umich.edu

Education

**Industrial and Operations Engineering**, BSE Degree projected for April 2008  
University of Michigan, Ann Arbor, MI
- Currently working on Emergency Department efficiency in the University of Michigan Hospital System
- Optimization Methods and Manufacturing Strategies, Industrial and Operations Engineering courses
- Six Sigma, Lean Manufacturing, and Accounting courses
- Proficient in Microsoft Word, Excel, PowerPoint, Minitab, Visual Basic, ProModel

Work Experience

**JBR Environmental Consultants**, Boise, ID  
Project Assistant  
June 2003-Present
- Worked on emissions reduction project for the Salt Lake City International Airport
- Constructed and edited formal documents for submittal to government agencies

**Martha Cook Building**, Ann Arbor, MI  
Tea Chair (Special Events Coordinator)  
April 2005-April 2006
- Worked with and stayed below yearly budget
- Organized and delegated shifts for workers
- Planned traditional annual Lawyer Tea

**The Prep Department**, Boise, ID  
Secretary/Receptionist  
July 2004-August 2005
- Wrote detailed instructions on how to use specific machines and computer programs
- Gained expertise on my own in several computer programs such as FileMaker Pro and QuickBooks
- Contacted and assisted customers with invoices, FTP site questions, and performed other customer service

Additional Information

- Can perform jobs independently and also work well in teams
- Strong leadership and management skills
- President of Choir in High School, Yearbook Editor, Served on House Board in College Dorm
- Hobbies include downhill skiing, volunteer teaching, sports, and reading