Managing Influx of Critical Patients in Mass Casualty to the Adult Emergency Department

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Client

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Introduction

Mass casualty incident (MCI) occurs → Influx of patients to Emergency Department → Constraint on current capacity in Critical Care Center (EC3) → 10-15 patients in EC3 need to be relocated
Background

Adult Emergency Services
- Open 24/7
- 200 patients per day

Emergency Critical Care Center
- Capacity: nine beds and five resuscitation beds
- Critical patients receive higher levels of care in EC3
  - Demand for emergency care has increased 24% in five years
Background

Where should 10 to 15 patients be relocated?

MSSU Maize

Radiology Department

PACU
Background

- Patient medical state
- Available spaces in each relocation site
- Relocation site’s expected level of care
- Day of week and shift

Capability of Relocation Site
Key Issues

Patients from an MCI need care in the EC3

Material and personnel availability vary by unit and day of week and shift

Utilization of each candidate site varies by time of day/shift

AES and EC3 operate near full capacity most of the time

No plan to manage influx of MCI patient based on day, shift, and patient state
Goals & Objectives

- Conduct interviews with medical directors and nurse managers
- Carry out literature review
- Analyze historical occupancy and patient movement data

To assess the capability of Adult Emergency Services and the candidate surge areas to adjust and respond to an influx of 10 to 15 critical patients resulting from an MCI
## Project Scope

<table>
<thead>
<tr>
<th>In Scope</th>
<th>Radiology Department, MSSU and PACU as patient relocation sites</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Which materials, personnel and logistics to consider in patient movement</td>
</tr>
<tr>
<td></td>
<td>Considering patient care requirements, day of week and time of day into assessment of relocation site’s capabilities to receive patients</td>
</tr>
<tr>
<td>Out of Scope</td>
<td>Locations other than Radiology Department, MSSU and PACU as patient relocation sites</td>
</tr>
<tr>
<td></td>
<td>MCI resulting in more than 15 critical patients</td>
</tr>
<tr>
<td></td>
<td>Emergency planning measures in departments outside AES</td>
</tr>
</tbody>
</table>
Methods

- Interviews
- Literature Review
- Data Analysis
- Capability Assessment

Consult Nurse Managers and Administration Leads
Sample of Questions asked:

- How many staffed spaces per shift do you have?
- Are you able to double bunk patients?
- How many additional spaces could you create if there were a disaster?
- What is your current emergency plan?

People Interviewed:

- Medical Directors and Nurse Managers
  - MSSU
  - PACU
  - Radiology
  - Emergency Department
- Director of Materials Services and Transportation Services Manager
Literature Search

- IOE 481 past project
  - Simulation of Transport Department’s performance with varying staffing levels
- Florida Department of Health - MCI guidelines
  - Set of guidelines to help assist in responding to an MCI
- Disaster Management: Medical Preparedness, Response and Homeland Security
  - Bottlenecks in the patient movement procedures at varying locations in emergency departments
Data Analysis

Data Sources

- Historical Occupancy Data
  - MSSU
  - PACU
- Transport Data

Statistical Summary

- Analysis by Day of Week
- Analysis by Shift
- Mean
- Standard Deviation
- 80th Percentile
- Maximum and Minimum
Findings: Radiology Department Interview

Current Resources
- 29 beds* per shift
- One additional space in emergency situation
- Ability to care for moderate level patients
- 1:4 nurse to patient ratio
- Keep patients on stretchers

* 5 bays belong to PACU

Current Emergency Processes
- Halt scheduled operations
- Stage ED stretchers in hallway
- Surge monitoring equipment and medication
Findings: PACU Interview

Current Resources
● 57 beds per shift
● No additional spaces in emergency situation
● Ability to care for all patient levels
● 1:2 nurse to patient ratio for post-op; 1:3 for pre-op
● Patients stay on stretchers

Current Emergency Processes
● Ad-hoc staffing surge plan
● OR will stop scheduled operations
● Expedite post-op discharge
Findings: Medical Short Stay Unit Interview

Current Resources
● 18 beds per shift
● 4 additional spaces in emergencies
● Ability to care for all patient levels
● 1:3 nurse to patient ratio
● Patients stay on stretchers

Current Emergency Processes
● 1:5 nurse to patient ratio in Code D situation
● Hallway spaces used as last option
## Findings: Emergency Department Interview

### Patient Classification vs. Relocation Site

<table>
<thead>
<tr>
<th>Patient Classification</th>
<th>Relocation Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>Main, West</td>
</tr>
<tr>
<td>Yellow</td>
<td>East</td>
</tr>
<tr>
<td>Red</td>
<td>Stay in AES</td>
</tr>
<tr>
<td>Black</td>
<td>Morgue</td>
</tr>
</tbody>
</table>

### Concerns
- Availability of nurses
- Availability in relocation sites
Findings: Transport Team Interview

Current Resources
- 90 transporters
- 443 wheelchairs
- 125 stretchers
- Beds can act as stretchers

Current Emergency Process
- Send all transporters to B1C111
- Use other hospital employees as transporters
<table>
<thead>
<tr>
<th>Shift</th>
<th>Maximum Occupancy</th>
<th>Average Occupancy</th>
<th>Standard Deviation</th>
<th>80th Percentile</th>
<th>Average Utilization</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>18</td>
<td>14.51</td>
<td>2.86</td>
<td>17</td>
<td>80.61%</td>
</tr>
<tr>
<td>2</td>
<td>18</td>
<td>11.18</td>
<td>3.19</td>
<td>14</td>
<td>62.13%</td>
</tr>
<tr>
<td>3</td>
<td>18</td>
<td>14.32</td>
<td>2.81</td>
<td>17</td>
<td>79.51%</td>
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</table>
Findings: PACU Data Analysis

Utilization of Beds on a Tuesday, n=376

<table>
<thead>
<tr>
<th>Shift</th>
<th>Maximum Occupancy</th>
<th>Average Occupancy</th>
<th>Standard Deviation</th>
<th>80th Percentile</th>
<th>Average Utilization</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>56</td>
<td>34.25</td>
<td>10.29</td>
<td>44</td>
<td>60.09%</td>
</tr>
<tr>
<td>2</td>
<td>51</td>
<td>22.70</td>
<td>12.76</td>
<td>35</td>
<td>39.82%</td>
</tr>
<tr>
<td>3</td>
<td>33</td>
<td>6.67</td>
<td>9.58</td>
<td>16</td>
<td>11.70%</td>
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</tbody>
</table>
Findings: MSSU and PACU Availability

Available beds per shift based on the 80% occupancy (Tuesday)
## Findings: Transport Data Analysis

<table>
<thead>
<tr>
<th>Destination</th>
<th>Minimum Transport Time</th>
<th>Maximum Transport Time</th>
<th>Average Transport Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSSU, n=10</td>
<td>0:47</td>
<td>15:26</td>
<td>8:34</td>
</tr>
<tr>
<td>Radiology, n=9</td>
<td>0:07</td>
<td>11:05</td>
<td>5:03</td>
</tr>
<tr>
<td>PACU, n=3</td>
<td>6:59</td>
<td>18:47</td>
<td>14:40</td>
</tr>
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</table>
## Summary of Findings

<table>
<thead>
<tr>
<th>Department</th>
<th>Spaces</th>
<th>“Flex” Spaces</th>
<th>Peak Occupancy</th>
<th>Capability of Care</th>
<th>Average Transport Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSSU</td>
<td>18</td>
<td>4</td>
<td>Shift 1</td>
<td>Red</td>
<td>8:34</td>
</tr>
<tr>
<td>Radiology</td>
<td>24</td>
<td>1</td>
<td>Shift 1</td>
<td>Yellow</td>
<td>5:03</td>
</tr>
<tr>
<td>PACU</td>
<td>57</td>
<td>0</td>
<td>Shift 1</td>
<td>Red</td>
<td>14:40</td>
</tr>
</tbody>
</table>
Recommendations

- Further studies
  - Staffing levels across departments
  - Communication efforts between departments
  - Assessment of additional relocation sites
- Determine which physicians are responsible for patient care
- Establish how to transfer patient information
Expected Impact

Assess which relocation sites could take on existing EC3 patients based on their condition and the current day and shift.

Increase ability of AES to handle an influx of critical patients due to an MCI.

Improve coordination between hospital departments to aid in smooth patient transfers.
Questions?
Appendix