The Effect of ED Crowding on the Outcomes of Admitted Patients
Angela Lauer, MSN, MHA, RN, CEN; Alice Prochaska, BSN, RN; Katie Harris, BSN, RN; Dawn DeWitte, BSN, RN

Mercy Medical Center, Dubuque, Iowa.

INTRODUCTION

Emergency Department (ED) crowding has become a "national epidemic" with the Institute of Medicine describing ED’s as being "at the breaking point" (2007, p. xiv). In 2010, 130 million visits were made to emergency departments; up 34% since 1995. During that same time frame, the number of EDs dwindled by 11% (CDC, 2012). In 2011 the number of ED visits increased to 136.3 million and is predicted to reach 140 million by the end of 2014 (CDC, 2014).

• ED crowding has been associated with poorer quality of care (Sun et al., 2013; Donatelli, Gregorowicz, & Somes, 2013; Jo et al., 2012).
• Hospital mortality increases for every hour a patient spends in the ED with “8.3% of the patients staying between 4 and 5 hours, ultimately dying.” (Donatelli, Gregorowicz, & Somes, 2013, p. 226). The expected mortality rate for the average admitted patient is 2% (Hall, Levant & DeFrances, 2013).

Asplin’s model of acute care illustrates elements that contribute to higher lengths of stay in the ED and ED crowding.

METHODOLOGY

Using the EDWIN score, which takes into account the number of patients in the ED, their acuity levels as determined by ESI (Emergency Severity Index) criteria, the number of ED physicians on duty, the total number of treatment beds and the number of admitted patients being held in the ED; periods of active (score < 1.5), busy (score 1.5-2) and crowded (score > 2) times were identified.

\[
EDWIN = \sum n_t / N_i (B_t - B_i)
\]

- \( n_t \): number of patients present in the ED with an ESI of \( t \)
- \( B_t \): total number of beds available in the ED
- \( B_i \): number of admitted patients (holds) in the ED

Patients 18 years or older who arrived to the ED on selected days and were subsequently admitted (excluding the psychiatric population) were assigned an average EDWIN score to determine which group they best represented. Outcome data (mortality rate, LOS and variable cost) was then gathered on those patients and compared using the one-way ANOVA. Admission data was gathered on 86 patients: 31 in the active group, 26 in the busy group and 29 in the crowded group.

RESULTS

<table>
<thead>
<tr>
<th></th>
<th>ED LOS</th>
<th>Inpatient LOS</th>
<th>Mortality</th>
<th>Variable Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active – Mean</td>
<td>198 min</td>
<td>2.4 days</td>
<td>0.06%</td>
<td>$558.19</td>
</tr>
<tr>
<td>Busy - Mean</td>
<td>227 mn</td>
<td>3.0 days</td>
<td>0.00%</td>
<td>$721.39</td>
</tr>
<tr>
<td>Crowded - Mean</td>
<td>242 mn</td>
<td>3.7 days</td>
<td>0.00%</td>
<td>$809.00</td>
</tr>
<tr>
<td>Increase from active to crowded</td>
<td>22%</td>
<td>54% (100%)</td>
<td>44.75%</td>
<td></td>
</tr>
</tbody>
</table>

F (1,54) = 2.31, p = 0.18, F (1,54) = 1.83, p = 0.17, F (1,54) = 1.42, p = 0.22

ED length of stay increased 22% from the active group to the crowded group. Inpatient LOS increased 54% and variable cost increased nearly 45%. There were two mortalities in the patient population for a mortality rate of 2.3%, and those were both in the active group.

CONCLUSIONS

Although the percentage increases seem impressive, none of the results were significant. The mortality rate of 2.3% in this population is in line with an expected mortality rate of 2% for the average admitted patient (Hall, Levant & DeFrances, 2013).

The results suggest that there was an increased use of resources when patients presented during crowded times, but the quality of care that the patients received was not affected. Patient outcomes did not suffer as a result of crowding which could arguably be an indicator of the strength of nursing care at Mercy - Dubuque.

BIBLIOGRAPHY


