Hallway Medicine: Hospital Overcrowding and the Impact on Patient Care

Patrick Corey

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Hallway Medicine:
Hospital Overcrowding and the Impact on Patient Care

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Program Director, Emergency Medicine Residency Program, RGH
Disclosures
Goals

• Examine how ED metrics have been affected with overcrowding.

• Discuss how boarding affect patient care outcomes.

• Identify potential solutions
One Rule
What is Causing Crowding?

We need hospitals! → Legislation → Medicare

ROCHESTER REGIONAL HEALTH
96,000,000  ED Visits in 1995

136,000,000  ED Visits in 2011

ROCHESTER REGIONAL HEALTH
Overcrowding Pre COVID

Overcrowding Post COVID
Are Avoidable ED Visits the Problem?

• 2/3rds of ED visits avoidable?
Volume of Low Acuity Patients
Effect of Low Acuity Patients on ED LOS$^{21}$

- Low acuity visits = 50.9% of visits
- ED LOS: Low 1.6hrs, Medium 2.8hrs, High 4.7hrs

- For every 10 low acuity patients, an increase in 5.4 minutes for medium/high
LOS of Low Acuity Now
Are Avoidable ED Visits the Problem?

• 2/3rds of ED visits avoidable?
• Who tends to abuse the ED
  • CHRONIC MEDICAL CONDITIONS
ED Admission Percentage

RGH ED Admission %

ROCHESTER REGIONAL HEALTH
ED Admission Volume

[Graph showing RGH ED Admissions from 2007 to 2021]
Boarding Hours Explode

Monthly Boarding Hours

ROCHESTER REGIONAL HEALTH
Boarding Hours Explode
How Does Boarding Affect Patients?
Increased ED LOS = Increases Hospital LOS

2: Length of stay (LOS) distribution, by presence of access block

4: Mean length of stay (95% CI), by diagnosis and time of arrival on the inpatient ward

<table>
<thead>
<tr>
<th>Subgroup</th>
<th>n</th>
<th>% With access block</th>
<th>No access block</th>
<th>Access block</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED diagnosis (Inclusions)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abdominal pain (abdominal pain, cause not specified)</td>
<td>179</td>
<td>15%</td>
<td>3.65 (3.20–4.11)</td>
<td>4.08 (2.86–5.29)</td>
</tr>
<tr>
<td>Surgical (acute fractures, acute abdomen)</td>
<td>1489</td>
<td>7%</td>
<td>4.15 (3.98–4.33)</td>
<td>4.85 (4.20–5.52)</td>
</tr>
<tr>
<td>Overdose (all overdose/poisoning)</td>
<td>116</td>
<td>13%</td>
<td>2.72 (2.21–3.24)</td>
<td>3.40 (1.66–5.14)</td>
</tr>
<tr>
<td>Cardiac (chest pain, AMI, angina)</td>
<td>513</td>
<td>3%</td>
<td>3.96 (3.69–4.22)</td>
<td>5.64 (3.70–7.59)</td>
</tr>
<tr>
<td>Respiratory (asthma, pneumonia, COAD)</td>
<td>815</td>
<td>6%</td>
<td>4.12 (3.91–4.34)</td>
<td>5.61 (4.63–6.58)</td>
</tr>
<tr>
<td>Renal (renal failure)</td>
<td>51</td>
<td>10%</td>
<td>6.61 (5.58–7.63)</td>
<td>10.00 (NC)</td>
</tr>
</tbody>
</table>

ROCHESTER REGIONAL HEALTH
Overcrowding Increases Walkouts
Who walks out of the ED?

- Harbor-UCLA\(^3\)
  - 186 pts LWOT in 2 weeks
  - 11% of LWOT’s hospitalized IN ONE WEEK

- SF General Hospital\(^4\)
  - 700 patients, 15% LWOT rate
  - 49% of those needed urgent eval
  - 4% were subsequently hospitalized over the next week
Overcrowding Reduces Quality of Care

• Pediatric asthma and fracture Care\textsuperscript{12}:
  • Quality metrics for asthma & pain w/ Fx
  • Significant boarding = \( \frac{1}{2} \) as likely to receive quality measures of care

• Acute abdomen and pain meds\textsuperscript{13}
  • w/in one hour: 21%

• Anything hurts\textsuperscript{14}
  • 54% received ANY pain meds during boarding
Overcrowding and Adverse Events

- Overcrowding and chest pain\textsuperscript{15}

<table>
<thead>
<tr>
<th>ED Crowding Measures</th>
<th>25th-49th</th>
<th>50th-74th</th>
<th>≥75th</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACS Cohort (n = 803)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waiting room number</td>
<td>1.1 (0.4–3.2)</td>
<td>0.9 (0.3–2.9)</td>
<td>3.7 (1.3–11.0)</td>
</tr>
<tr>
<td>Patient care hours</td>
<td>1.3 (0.5–3.5)</td>
<td>1.4 (0.5–4.3)</td>
<td>5.2 (2.0–13.6)</td>
</tr>
<tr>
<td>Number of admitted patients</td>
<td>1.3 (0.6–2.8)</td>
<td>1.3 (0.5–3.3)</td>
<td>1.6 (0.6–4.1)</td>
</tr>
<tr>
<td>Occupancy</td>
<td>0.9 (0.3–2.8)</td>
<td>1.3 (0.4–4.4)</td>
<td>3.1 (1.0–9.3)</td>
</tr>
<tr>
<td>Recent ED LOS for admitted patients*</td>
<td>1.0 (0.5–2.0)</td>
<td>0.6 (0.2–1.4)</td>
<td>1.5 (0.5–4.0)</td>
</tr>
<tr>
<td>Non-ACS cohort (n = 3,371)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waiting room number</td>
<td>1.6 (0.8–3.4)</td>
<td>2.3 (1.1–5.0)</td>
<td>3.5 (1.4–8.4)</td>
</tr>
<tr>
<td>Patient care hours</td>
<td>2.7 (1.5–5.0)</td>
<td>2.2 (1.2–3.9)</td>
<td>4.3 (2.6–7.3)</td>
</tr>
<tr>
<td>Number of admitted patients</td>
<td>0.9 (0.5–1.5)</td>
<td>0.8 (0.4–1.3)</td>
<td>0.6 (0.4–1.1)</td>
</tr>
<tr>
<td>Occupancy</td>
<td>0.9 (0.5–1.6)</td>
<td>1.2 (0.6–2.2)</td>
<td>1.8 (0.9–3.3)</td>
</tr>
<tr>
<td>Recent ED LOS for admitted patients*</td>
<td>0.9 (0.5–1.5)</td>
<td>0.8 (0.5–1.3)</td>
<td>1.2 (0.6–2.0)</td>
</tr>
</tbody>
</table>

Adjusted model included TIMI risk score, a history of heart failure, time of day in three categories, year of service, weekend versus weekday, age, race, and sex and all reported ORs are compared to the lowest quartile, which corresponds to the lowest level of ED crowding. Reported ORs represent a single crowding measure placed in each model. 95% CIs are represented in parentheses.

ACS = acute coronary syndrome; LOS = length of stay; TIMI = Thrombolysis In Myocardial Infarction.

*Refers to other patients in the ED (admitted patients who were transferred to inpatient beds within 6 hours of a patient’s ED triage time).
Time to Antibiotics?

• Antibiotics for CAP\textsuperscript{16}

• ED empty = 31% delayed or no abx
• ED crowded = 72% delayed or no abx
Orders for Boarded Patients?

<table>
<thead>
<tr>
<th>Order Type</th>
<th>On Time (%)</th>
<th>Delayed (%)</th>
<th>Missed (%)</th>
<th>Total orders</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Boarder</td>
<td>Control</td>
<td>Boarder</td>
<td>Control</td>
</tr>
<tr>
<td>Total</td>
<td>1,930 (39)</td>
<td>2,562 (59)</td>
<td>1,042 (21)</td>
<td>739 (17)</td>
</tr>
</tbody>
</table>

• THIS IS NOT A NURSING ISSUE
Boarding Leads to Higher Inpatient Mortality

- Academic Emergency Medicine, 2011

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>All Patients</th>
<th>&lt;2</th>
<th>2–6</th>
<th>6–12</th>
<th>12–24</th>
<th>24+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcomes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median hospital LOS, days (IQR)</td>
<td>3 (2–6)</td>
<td>3 (2–6)</td>
<td>3 (2–7)</td>
<td>4 (2–7)</td>
<td>4 (3–8)</td>
<td>5 (3–9)</td>
</tr>
<tr>
<td>In-hospital mortality, %</td>
<td>2.8</td>
<td>2.5</td>
<td>2.7</td>
<td>3.9</td>
<td>4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>Admitted to ICU, %</td>
<td>12.1</td>
<td>12.4</td>
<td>10.8</td>
<td>14.5</td>
<td>14.6</td>
<td>15.9</td>
</tr>
</tbody>
</table>
Non-ICU Boarders Risk of Mortality

- Longer ED boarding times were associated with a **1.2 fold increased risk of mortality**²
New Arrivals During Overcrowding?

- Medical Journal of Australia, 2006

- If you are sick, the sooner you are seen the better
Effect on Providers?

- Increased risk of violence\(^{19}\)!
- Increased risk of litigation\(^{20}\)!
Financial Costs of Overcrowding

The Opportunity Loss of Boarding Admitted Patients in the Emergency Department

Thomas Fahey, DO, Lance Grove, RT, EMT-P, Ruth Starcher, RN, David Vega, MD, Rose Silke, NEd, Melissa Schlesker, BS, William Zarkin, MD

Abstract

Objectives: Boarding admitted patients in emergency department (ED) treatment beds has been recognized as a major cause of ED overcrowding and ambulance directions. When process delays impede the transfer of admitted patients from the ED to inpatient units, the department's capacity to accept new arrivals and to generate revenue from additional patient services is restricted. The objective of this study was to determine the amount of functional ED treatment capacity that was used to board inpatients during 12 months of operations at a community hospital and to estimate the value of that lost treatment capacity.

Methods: Historical data from 92,508 patient visits to the ED of a 40-bed nonprofit community teaching hospital in south central Pennsylvania between July 2004 and June 2005 were used to determine the amount of treatment bed occupancy lost to inpatient holding and the revenue potential of admitting that blocked production capacity for additional patient visits.

Results: Transferring admitted patients from the ED to an inpatient unit within 30 minutes would have increased the functional treatment capacity of the ED by 12,251 hours during the 12 months of this study. By reducing admission process delays, the hospital could potentially have accommodated another 3,175 patient encounters in its existing treatment space. Providing emergency services to new patients in ED beds formerly used to board inpatients could have generated $19,987,278 in additional net revenue for the hospital.

Conclusions: Significantly higher operational revenues could be generated by reducing output delays that restrict optimal utilization of existing ED treatment capacity.

Keywords: emergency medicine, opportunity loss, revenue, boarding
How About More Chairs?

Table 4A. Length of stay with varying the number of ED beds.

<table>
<thead>
<tr>
<th>Departure Rate/min</th>
<th>23 Beds, min</th>
<th>28 Beds, min</th>
<th>Difference, min</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Patient/20</td>
<td>240 min</td>
<td>247 min</td>
<td>+7</td>
<td>0.8–12.6*</td>
</tr>
<tr>
<td>1 Patient/15</td>
<td>218 min</td>
<td>225 min</td>
<td>+7</td>
<td>2.3–11.3*</td>
</tr>
</tbody>
</table>

*Significant: 95% CI for the pairwise differences does not include 0.

Table 4B. Length of stay with varying the admitted patient departure rate.

<table>
<thead>
<tr>
<th>Departure Rate, No. Beds</th>
<th>1 Patient/20 min</th>
<th>1 Patient/15 min</th>
<th>Difference, min</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>240 min</td>
<td>218 min</td>
<td>–22</td>
<td>16.8–26.2*</td>
</tr>
<tr>
<td>28</td>
<td>247 min</td>
<td>225 min</td>
<td>–22</td>
<td>15.8–27.1*</td>
</tr>
</tbody>
</table>

*Significant: 95% CI for the pairwise differences does not include 0.
A BILL TO BE ENTITLED
AN ACT:

relating to a prohibition on the use of state or local money by certain hospitals to pay for travel nurses.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF TEXAS:

SECTION 1. Subtitle F, Title 4, Health and Safety Code, is amended by adding Chapter 319 to read as follows:

CHAPTER 319. PROHIBITION ON USE OF STATE OR LOCAL MONEY BY CERTAIN HOSPITALS

Sec. 319.0001. DEFINITIONS. In this chapter:
(1) "COVID-19" means the 2019 novel coronavirus disease.
(2) "Hospital" means a public or private facility licensed under Chapter 241.
(3) "Local governmental entity" has the meaning assigned by Section 315.001.

Sec. 319.0002. PROHIBITION ON USE OF STATE OR LOCAL MONEY FOR TRAVEL NURSES. A hospital may not use nonfederal money received by the hospital from this state or a local governmental entity to compensate a travel nurse if the travel nurse is filling a position that is vacant because the hospital terminated a member of the hospital’s nursing staff for refusing to comply with a mandate requiring a COVID-19 vaccination imposed by the hospital or the state or federal government.

SECTION 2. This Act takes effect immediately if it receives...
Solutions?

- ED based strategies had little effect on overcrowding\(^9\)

- Greatest relief in overcrowding focused on *rapid removal of inpatients from ED*\(^9\)
GOMER
Boarding Upstairs

- Patient prefer it\(^{10}\)!
- Mortality is lower\(^{7}\)!
- Patients get a bed sooner\(^{7}\)!

ROCHESTER REGIONAL HEALTH
AM Discharges

- Shifting discharge time 4 hours earlier eliminated ED boarding!11!

<table>
<thead>
<tr>
<th>RRH OCCUPANCY STATUS DASHBOARD</th>
<th>Wed 01/05/2022 08:55</th>
</tr>
</thead>
<tbody>
<tr>
<td>RRH CURRENT STATUS</td>
<td>CURRENT STATUS</td>
</tr>
<tr>
<td>AFFILIATE</td>
<td></td>
</tr>
<tr>
<td>UNITY</td>
<td>CRITICAL</td>
</tr>
<tr>
<td>RGH</td>
<td>CRITICAL</td>
</tr>
<tr>
<td>NWI</td>
<td>ALERT</td>
</tr>
<tr>
<td>CSH</td>
<td>NORMAL</td>
</tr>
<tr>
<td>URMMC</td>
<td>WARNING</td>
</tr>
</tbody>
</table>

- **Discharge patients as early as possible.** Do earlier rounds, arrange schedules and office hours to manage early discharges as necessary and appropriate. Move inpatients to outpatient settings.

- **Strive to manage patients in offices, when appropriate, instead of sending them to ED.**

- **Exercise patience, support, and respect for fellow care team members.** Physicians, nurses, PAs, NPs, and PCTs will take on extra hours and responsibilities for our patients and families during overcapacity.

- Please use the RRH Transfer Center (585-922-7333) for any patient being sent into an RRH facility. The RRH Transfer Center is our System’s link to ensure our patients get the best care at the right hospital at the right time.
More Solutions?
References


References


