Characteristics of repeat emergency department users at a university medical center: frequent emergency department utilization is associated with higher rates of 30-day inpatient readmission

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Introduction

Repeat emergency department (ED) users are increasingly prevalent in academic and community hospitals, alike. Though frequent users are stereotypically perceived as uninsured minorities who are non-acutely ill and misuse ED resources, current research indicates that they are in fact a heterogeneous group who defy many commonly held assumptions. These populations appear to differ significantly according to frequency of ED utilization; however, characteristics relating to this type of sub-categorization are poorly understood at present.

Objective

This study was conducted to characterize repeat ED users at an academic medical center, according to their frequency of repeat encounter.

Methodology

Categorization: A repeat ED user (REDU) was defined as any patient with 2 or more ED visits in 6 months. The following sub-groups were then defined in regards to the specified time period:

- **Non-REDU**: 1 ED visit
- **Low REDU**: 2-3 ED visits
- **Moderate REDU**: 4-9 ED visits
- **High REDU**: 10+ ED visits

Study Design: This was a retrospective analysis of all ED visits in a 6-month time period using a hospital-wide, electronic database. Comparisons were made to identify differences between REDUs and non-REDUs, according to several demographic, medical, and visit-related characteristics.

Setting: Public level I trauma center with > 28,000 inpatient admissions annually; 41 ED with approximately 60,000 visits annually.

Data Analysis: Categorical data were analyzed using Chi Square tests and Fisher’s exact test for small sample sizes. Continuous data were analyzed using a hospital-wide, electronic database. Comparisons were made to identify differences between REDUs and non-REDUs, according to several demographic, medical, and visit-related characteristics.

Results

### Table 1. Population Summary

<table>
<thead>
<tr>
<th>Measurement</th>
<th>All REDUs</th>
<th>Low REDUs</th>
<th>Mod. REDUs</th>
<th>High REDUs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients (n)</td>
<td>18,935</td>
<td>18,935</td>
<td>18,935</td>
<td>18,935</td>
</tr>
<tr>
<td>Proportion of ED Patients (%)</td>
<td>100</td>
<td>80.1</td>
<td>19.9</td>
<td>17.3</td>
</tr>
<tr>
<td>Visits (n)</td>
<td>31,939</td>
<td>26,806</td>
<td>5,033</td>
<td>610</td>
</tr>
<tr>
<td>Proportion of ED Visits (%)</td>
<td>100</td>
<td>60.2</td>
<td>19.6</td>
<td>8.9</td>
</tr>
<tr>
<td>Average Visits/Patient (n)</td>
<td>1.3</td>
<td>1.0</td>
<td>2.7</td>
<td>4.9</td>
</tr>
</tbody>
</table>

### Table 2. Demographics

<table>
<thead>
<tr>
<th>Race</th>
<th>Non-REDUs</th>
<th>Low REDUs</th>
<th>Mod. REDUs</th>
<th>High REDUs</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>45.3</td>
<td>46.4</td>
<td>45.3</td>
<td>46.4</td>
</tr>
<tr>
<td>Black</td>
<td>28.8</td>
<td>22.6</td>
<td>28.8</td>
<td>22.6</td>
</tr>
<tr>
<td>Hispanic</td>
<td>5.3</td>
<td>4.6</td>
<td>5.3</td>
<td>4.6</td>
</tr>
<tr>
<td>Other/Unknown</td>
<td>14.4</td>
<td>18.6</td>
<td>14.4</td>
<td>18.6</td>
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</tbody>
</table>

### Table 3. Severity of Illness

<table>
<thead>
<tr>
<th>Measurement</th>
<th>All REDUs</th>
<th>Low REDUs</th>
<th>Mod. REDUs</th>
<th>High REDUs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inpatient Admissions (%) total visits</td>
<td>14.2</td>
<td>14.9</td>
<td>15.0</td>
<td>14.6</td>
</tr>
<tr>
<td>Avg. Inpatient length of stay (days)</td>
<td>5.0</td>
<td>5.8</td>
<td>5.5</td>
<td>3.6</td>
</tr>
<tr>
<td>30-day readmissions (%) total visits</td>
<td>6.7</td>
<td>25.8</td>
<td>42.1</td>
<td>48.2</td>
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</tbody>
</table>

### Table 4. Hospitalization Trends

<table>
<thead>
<tr>
<th>The Charlson Index</th>
<th>Score (n)</th>
<th>Non-REDUs</th>
<th>Low REDUs</th>
<th>Mod. REDUs</th>
<th>High REDUs</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
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<tr>
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<tr>
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<tr>
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<tr>
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<td>0.0</td>
<td>0.0</td>
<td></td>
</tr>
</tbody>
</table>

**Legend:** Significant to p < 0.01; ** Significant to p < 0.05; *** Significant to p < 0.001

Scope and Domains

- REDUs accounted for 19.7% of ED patients and 39.7% of ED visits.
- REDUs were more likely to be African American, living within close proximity to the hospital, publicly insured, and indigent.
- High REDUs were significantly more likely than any other group to have Medicare coverage.

Severity of Illness

- REDUs had equivalent or higher inpatient severity scores, greater numbers of comorbidities per patient, and higher 2-year mortality rates.

Hospitilization

- Low and moderate REDUs demonstrated no significant difference in the rate of inpatient admission or length of stay relative to that of non-REDUs.
- High REDUs had significantly lower rates of admission and shorter lengths of stay than non-REDUs.
- All REDU populations demonstrated significantly higher rates of 30-day readmission in comparison to non-REDUs.

Conclusions

- REDUs tend to be publically insured and more chronically ill, with greater numbers of comorbidities and higher 2-year mortality rates.
- Comparative admission rates and inpatient severity scores by low and moderate REDUs suggest that ED visits by these populations are justified as necessary.
- High REDUs incur fewer and shorter inpatient admissions but exhibit the highest rates of 30-day readmission. Federal programs designed to penalize providers for 30-day readmissions may be unreasonable for all populations.

Future Directions

- Systematic chart review to analyze factors not included in the electronic database (employment status, social work involvement, utilization of other health resources, etc.)
- Further analysis of data pertaining to inpatient admission and readmission
- Longitudinal studies of high REDU populations to determine influences on long term utilization patterns
- Continued analysis of REDU populations after proposed interventions to curb high utilization at the ED and inpatient levels

References