Developing a New Way to Classify ED Visits
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Background

- CDC urgency classification methods for ED visits
  - Explicit Criteria (CC – resource utilization – diagnosis)
  - Resource Use
  - Diagnosis / ICD-9
  - Nurse Triage Category
Severity of ED visits according to potential savings (Smulowitz, et al. 2012)

- Emergencies (trauma – Stroke)
- Intermediate/complex conditions
  - Complex chronic disease (CHD – COPD)
  - Acute presentations of disease (UTI – Pneumonia – Angina)
- Minor injury/illness (Sore throat – Sprains – Rashes)
Background

- NYU ED Classification Algorithm
  - Non emergency
  - Emergency treatable in an office visit
  - Emergency treatable in the ED (preventable or avoidable)
  - Emergency treatable in the ED (not preventable or avoidable)
Specific aims

- These categorization systems have some limitations
- Our primary focus is on the Billings algorithm
- We want to develop a new classification system that can overcome some of these limitations
In order to classify ED utilization:

- A panel of ED and primary care physicians
- Examined a sample of almost 6000 full ED records
- From 6 hospitals in Bronx and NY
Billings Methodology

1. Classification of cases as
   - Emergent
   - Non-emergent

2. Optimal care setting for emergent cases as
   - ED care needed
   - Primary care treatable
3. Mapping of initial complaints to ED discharge diagnoses

4. Classification of “emergent/ED Care needed” cases as
   - preventable/avoidable
   - not preventable/not avoidable
Billings Methodology

- Billings algorithm exclusions
  - Injury
  - Mental health problems
  - Alcohol, or substance abuse
  - Uncommon Diagnosis
Billings algorithm

Emergent
- ED care needed
  - Not preventable/avoidable
  - Preventable/avoidable
- Primary care treatable

Non-Emergent
- Mental health related
- Alcohol related
- Substance abuse related
- Injury
- Unclassified
Applying Billings algorithm

Emergency Department Use Profile by Type of ED Visit
Nonadmitted Patients
New York City, 1998
Children to Age 17

- Nonemergent: 41.6%
- Emergent, Primary Care Treatable: 36.0%
- Emergent ED Care Needed, Not Preventable/Avoidable: 14.8%
- Emergent ED Care Needed, Preventable/Avoidable: 7.6%
Applying Billings algorithm

Emergency Department Use Profile by Type of ED Visit
Nonadmitted Patients
New York City, 1998
Adults Ages 18-64

- Nonemergent: 41.7%
- Emergent ED Care Needed, Not Preventable/Avoidable: 18.8%
- Emergent ED Care Needed, Preventable/Avoidable: 7.1%
- Emergent, Primary Care Treatable: 32.4%
Billings limitations

- Omitting admitted patients biased the analysis
- The algorithm was unable to classify half of all ED visits
- The list of resources that were felt to be available in a primary care setting has not been published
Billings limitations

- The avoidability or preventability were based on a list of ambulatory care sensitive diagnoses and this list of diagnoses was developed for hospitalized patients.

- Mapping chief complaints to ICD-9 discharge diagnoses may have created error.

- ED algorithm classifies visits based on the primary diagnosis and not chronic diseases.
How Billings is used & misused

- Appropriateness
- Billing purposes / insurance
- Government programs
- Academic papers
Our approach: Rethink Billings

Develop a new classification system for ED/admin data

- New domains of care
  - Severity, Acuity, Urgency, Certainty, Need for Immediate Treatment, Appropriateness of Setting, Resources of Setting

- Small pilot using NHAMCS data (Step 1)

- Consider broad deployment
<table>
<thead>
<tr>
<th>Sample case</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patient age</strong></td>
</tr>
<tr>
<td><strong>Patient sex</strong></td>
</tr>
<tr>
<td><strong>Chief complaint</strong></td>
</tr>
</tbody>
</table>
| **Vital signs** | Pulse: 88  
RR: 20  
BP: 172/87  
Temp: 97.8  
O2 Sat: 99 |
| **GCS** | 15 |
| **Level of pain** | N/A |
| **Past medical History** | HTN  
DM |
| **Diagnostic tests ordered** | CBC – EKG |
| **Imaging ordered** | None |
| **Procedures performed** | IV fluid |
| **Diagnosis** | Unspecified essential hypertension  
Dizziness |
| **Medications** | Antivert  
Zofran |
| **Disposition** | Discharged home |
Our classification concept

<table>
<thead>
<tr>
<th>Severity</th>
<th>Severely Ill</th>
<th>Potentially Severely Ill</th>
<th>Minor Illness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
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<td>7</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>(Certainty of this rating)</td>
<td>Very certain</td>
<td>Less certain</td>
<td></td>
</tr>
</tbody>
</table>
## Our classification concept

**Immediacy**

<table>
<thead>
<tr>
<th>Requires immediate care</th>
<th>Care Today</th>
<th>Care within 72 hours</th>
<th>can wait &gt; 72 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>7</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>9</td>
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</tr>
<tr>
<td>8</td>
<td>7</td>
<td>5</td>
<td>3</td>
</tr>
</tbody>
</table>

(Certainty of this rating)  
Very certain  
Less certain
Our classification concept

- Settings where this case could be treated
  - ED
  - Primary care office
  - Specialty outpatient office
  - Urgent Care Center
  - Retail Clinic
Our classification concept

- Ideal setting for this case (pick one only)
  - ED
  - Primary care office
  - Specialty outpatient office
  - Urgent Care Center
  - Retail Clinic
Thank you