Measuring *C. difficile* Infection Counts and Hospital-onset Status in Hospital Discharge Data and the National Healthcare Safety Network

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Background

- *Clostridium difficile* infection
  - Increasing rates, severity in Illinois, U.S.
- Illinois Department of Public Health required to publish annual reports on *C. difficile* infections
- Hospital discharge data
- Present on admission (POA) variable
- No studies evaluating POA variable for *C. difficile* infections
- Pressure to provide hospital-specific rates
- Access to an additional data source as of March 2010
Methods

• Eleven hospitals reporting *C. difficile* via the National Healthcare Safety Network (NHSN) during March – September 2010
  – LabID Event reporting

• Hospital discharge data (HDD)
  – ICD-9 code 008.45 in first 25 codes

• Hospital-onset *C. difficile* infection
  – NHSN: occurring on 4\(^{\text{th}}\) day after admission or later
  – HDD: no POA code assigned to *C. difficile* code
Methods

• Compare number of cases
• Compare proportion hospital-onset overall and by hospital
  – $\chi^2$ test
• Compare hospital-specific hospital-onset infection rates
  – Rank lowest to highest rates
## Results

<table>
<thead>
<tr>
<th></th>
<th>HDD</th>
<th>NHSN</th>
</tr>
</thead>
<tbody>
<tr>
<td># Infections</td>
<td>1,838</td>
<td>1,286</td>
</tr>
<tr>
<td># Hospital-onset</td>
<td>518</td>
<td>635</td>
</tr>
<tr>
<td>% Hospital-onset*</td>
<td>28</td>
<td>49</td>
</tr>
<tr>
<td># Hospital-onset infections by hospital, range (n=11)</td>
<td>1-135</td>
<td>1-197</td>
</tr>
<tr>
<td>Hospital-onset infection rates by hospital, range (n=11)</td>
<td>0.5-6.8 infections per 1,000 discharges</td>
<td>1.8-18.6 infections per 10,000 patient days</td>
</tr>
</tbody>
</table>

\[ \chi^2 = 145.97, \ p<0.0001 \]
Percent Hospital-onset, by Hospital

NHSN % Hospital-onset

HDD % Hospital-onset

y=x
Hospital Rank, NHSN vs. HDD

The scatter plot shows the relationship between NHSN Rank and HDD Rank. The line y=x indicates that the two ranks are highly correlated, with values generally matching each other.
Conclusions

• More cases of *C. difficile* infection reported in HDD than NHSN
• Higher proportion reported as hospital-onset in NHSN than HDD
• Differences in ranking among hospitals
Limitations

• Limited validation of data submitted to NHSN
• Hospital selection for NHSN reporting not random
• Differences between definitions in systems
Recommendations and Follow Up

• Do not make hospital-specific rates of *C. difficile* infection from HDD publicly available

• Interpret POA variable in HDD with caution

• Evaluate characteristics of cases not reported in both data sources

• Passage of Senate Bill 1805 in Illinois
  – Use of NHSN for collection of *C. difficile* and MRSA data
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