Enhancing Claims Data to Improve Risk Adjustment of Mortality and Patient Safety Indicators

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Outline

- Background
- Summary of study: Adding clinical data elements to administrative data
- Supporting the enhancement of administrative claims data: Next steps
Background

- Hospital administrative claims data
  - Statewide data readily available from most states

- AHRQ Quality Indicators
  - Prevention Quality Indicators
  - Inpatient Quality Indicators (mortality, utilization, volume)
  - Patient Safety Indicators
  - Pediatric Quality Indicators

- Administrative data currently used for public reporting on quality of care
Limitations of Current Data

- Lack clinically important information
  - Limited to ICD-9-CM diagnosis codes
- Do not distinguish between diagnoses present on admission (POA) and those that originate during the hospital stay
- Questions regarding use of only administrative data for hospital-specific reporting
  - Inadequate risk adjustment – additional data needed to predict individual patient’s risk of mortality
  - Concern about penalizing providers with the sickest patients
New York and California provide POA coding for diagnoses – more states adding this

Pennsylvania hospitals provide chart-abstracted clinical detail
  – Hospital concern about costs of medical record abstraction

Electronic medical records not yet poised to provide data efficiently
  – Exception: Lab data
Study Objective

- Assess impact of incrementally adding:
  - POA codes for diagnoses
  - Lab values on admission
  - Increased number of diagnosis fields
  - Improved documentation (ICD-9-CM codes)
  - Vital signs
  - More difficult to obtain clinical data

- Identify cost-effective enhancements to administrative data


Sources of Data

- 188 Pennsylvania hospitals
  - Claims data from July 2000 to June 2003
  - Corresponding Atlas clinical data
  - Hospital day recorded for each data element
- New York and California claims data
  - Distinguish which conditions were comorbidities versus complications
  - Identify potential risk factors
Indicators Studied

Mortality Indicators
- AAA repair
- CABG surgery
- Craniotomy
- AMI
- CHF
- Cerebrovascular accident
- GI hemorrhage
- Pneumonia

Post-operative patient safety events
- Pulmonary embolism/deep vein thrombosis
- Physiologic/metabolic abnormalities
- Respiratory failure
- Sepsis
### Data Used in Incrementally More Complex Models

<table>
<thead>
<tr>
<th>Model</th>
<th>Types of Data Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADM-8</td>
<td>Age, sex, principal diagnosis, up to 8 secondary diagnoses only infrequently acquired during hospitalization, selected surgical procedures</td>
</tr>
<tr>
<td>POA-8</td>
<td>ADM-8 + secondary diagnoses not included in ADM-8, when clinical data establish that they were present on admission</td>
</tr>
<tr>
<td>POA-24</td>
<td>Same as POA-8 with up to 24 secondary diagnoses</td>
</tr>
<tr>
<td>POA-ICD</td>
<td>POA-24 + secondary diagnoses not included in POA-24 because they were underreported in administrative database but were established as present on admission in clinical database</td>
</tr>
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Data Used in Incrementally More Complex Models

<table>
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<tr>
<th>Model</th>
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<tbody>
<tr>
<td>LAB</td>
<td>POA-24 + numerical laboratory data on admission (e.g., creatinine, white blood cell count) generally available in electronic form</td>
</tr>
<tr>
<td>LAB-ICD</td>
<td>LAB + secondary diagnoses not included in POA-24 because they were underreported in administrative database but were established as present on admission in clinical database</td>
</tr>
<tr>
<td>FULL</td>
<td>LAB + vital signs and lab data not in LAB (e.g., blood culture results) + key clinical findings abstracted from medical records (e.g., immunocompromised) + composite clinical scores (i.e., ASA Classification)</td>
</tr>
</tbody>
</table>
C-Statistics for Mortality Models

Average C-Statistic

0.76 0.78 0.80 0.82 0.84 0.86 0.88 0.90

ADM-8  POA-8  POA-24  POA-ICD  LAB  LAB-ICD  FULL
Bias Due to Suboptimal Data

Measured Performance

- **Good**
- **Average**
- **Poor**

- **Problematic**
- **OK**
- **Problematic**

- Bias

- + 2 Std Dev
- - 2 Std Dev

- + 0.5 Std Dev
- - 0.5 Std Dev
Hospital Bias Due to Suboptimal Data – Mortality Models

- Percent Exceeding Upper Threshold

Upper Threshold for Bias in Standard Deviations

- RAW
- ADM-8
- POA-8
- POA-24
- POA-IC
- LAB
- LAB-IC
Hospital Bias Due to Suboptimal Data – Patient Safety Models

Upper Threshold for Bias in Standard Deviations

Percent Exceeding Upper Threshold

- RAW
- ADM
- POA
- LAB
Numerical Lab Data

- Results of 22 lab tests entered at least one model
- Results of 14 of these tests entered four or more models:
  - pH (11)
  - PTT (10)
  - Na (9)
  - WBC (9)
  - BUN (8)
  - pO₂ (8)
  - K (7)
  - SGOT (7)
  - Platelets (7)
  - Albumin (5)
  - pCO₂ (4)
  - Glucose (4)
  - Creatinine (4)
  - CPK-MB (4)
All vital signs entered four or more models
- Pulse (8)
- Temp (6)
- Blood pressure (6)
- Respirations (5)

Ejection fraction and culture results entered two models

Composite scores entered four or more models
- ASA classification (6)
- Glasgow Coma Score (4)
Absracted Key Clinical Findings

- 35 clinical findings entered at least one model
- Only three findings entered more than two models
  - Coma (6)
  - Severe malnutrition (4)
  - Immunosuppressed (4)
- 14 of these clinical findings have corresponding ICD-9-CM codes (e.g., coma, malnutrition)
Marginal Cost of Improved Risk Adjustment

- Bias <0.5 Std Dev (%)
- Added Cost per 10 Cases ($)
- Marginal Cost per Correction ($)
Administrative data can be improved at relatively low cost by:

- Adding POA modifiers
- Adding numerical lab data on admission
- Improved coding
Purpose:
- Expand data capacities for statewide data organizations participating in HCUP

Soliciting proposals for two types of contracts:
1. In-depth pilots
   - To add or link hospital clinical information to administrative data
2. Planning contracts
   - For organizations not yet ready to engage in pilots
   - But seek to enhance their administrative data
Objectives of Pilots

- Establish feasibility of linking clinical and administrative data
- Develop reproducible approach
- Set the stage for integrating clinical and administrative data streams in the future
Specific Activities

- Identify and select clinical data elements to add to administrative data
- Translate clinical data from electronic format
- Electronically transfer data from at least five hospitals to the data organization
- Process data into a multi-hospital database
- Collaborate with stakeholders, e.g.
  - Hospital representatives
  - State government agencies
  - Researchers, quality measurement professionals
  - Regional or state health care quality organizations
  - Regional health information exchange
- Engage in peer-to-peer learning, information sharing, dissemination
Judicious addition of a few clinical data elements can significantly improve ability to do quality assessment using administrative data

- POA
- Labs on admission
- (Potentially) vital signs
- Improved ICD-9-CM coding

Pilots and planning contracts will jumpstart the enhancement of administrative data by statewide data organizations