Creating a Hybrid Database by Adding a POA Modifier and Numerical Laboratory Results to Administrative Claims Data

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Overview

- Alternative databases for performance monitoring
- Comparative performance of alternative databases
- Present-on-admission coding
- Numerical laboratory data
- Vital signs and other clinical data
- The bottom line
Data for Monitoring Clinical Performance

- **Claims Data** – from HCFA Mortality Reports and HealthGrades.com to HCUP Quality and Patient Safety Indicators

- **Clinical Data** – from APACHE, Pennsylvania Health Care Cost Containment Council and Cleveland Health Quality Choice to Specialty Society Registries (e.g., STS, ACC)
Claims Data Versus Clinical Data

- Data serves as the basis for:
  - public reporting
  - reimbursement
  - quality improvement initiatives

- Must balance the need for data to support
  - accurate measurement of risk-adjusted clinical performance
  - ease and cost of data collection
Relative Ease of Data Collection

Data Collection

Manual

Automated

Clinical Data

Claims Data

Standard Claims

Numerical Laboratory

Vital Signs

Other Clinical Data
### Efficient Use of Clinical Data

<table>
<thead>
<tr>
<th>Analytic Power</th>
<th>Cost to Collect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Hemoglobin</td>
</tr>
<tr>
<td></td>
<td>FEV1</td>
</tr>
<tr>
<td>High</td>
<td>Albumin</td>
</tr>
<tr>
<td></td>
<td>Mental Status</td>
</tr>
</tbody>
</table>
Enhancing Claims Data

- Present-on-Admission Coding – from the Mayo Clinic, New York State’s SPARCS database, and California’s OSHPD database to the UB-04 and CMS’s new coding requirements

- Numerical Laboratory Data – from Michael Pine and Associates to the Agency for Healthcare Research and Quality (AHRQ)

- New Hybrid Databases – AHRQ’s Pilot Projects
Creating a Hybrid Database

Clinical Data
- Other Clinical Data
- Vital Signs
- Numerical Laboratory

Claims Data
- Present-on-Admission
- Standard Claims

Hybrid Data
Potential Benefits of Enhancing Claims Data

- Better distinguish between comorbidities and complications
- Add objective findings to more subjective diagnostic designations
- Provide finer definition of progression of disease and underlying pathophysiology than do diagnostic codes alone
Comparative Performance of Alternative Databases
Inpatient Quality Indicators (Mortality)

- Medical Conditions – Acute Myocardial Infarction; Cerebrovascular Accident; Congestive Heart Failure; Gastrointestinal Hemorrhage; Pneumonia

- Surgical Procedures – Abdominal Aortic Aneurysm Repair; Coronary Artery Bypass Graft Surgery; Craniotomy
Patient Safety Indicators (Complications)

- Elective Surgical Procedures

- Complications – Physiologic / Metabolic Abnormalities; Pulmonary Embolus / Deep Vein Thrombosis; Sepsis; Respiratory Failure
Data Used in CLAIMS Models

- Age and sex
- Principal diagnosis
- Secondary diagnoses only infrequently acquired during hospitalization
- Selected surgical procedures
Data Used in HYBRID Models

- All data used in CLAIMS models
- Additional secondary diagnoses when clinical data establish that they were present on admission
- Numerical laboratory data (e.g., creatinine, white blood cell count) generally available in electronic form
Data Used in CLINICAL Models

- All data used in HYBRID models

- Vital signs and laboratory data not in HYBRID models (e.g., blood culture results)

- Key clinical findings abstracted from medical records (e.g., immunocompromised)

- Composite clinical scores (e.g., ASA class)
Bias Due to Suboptimal Risk-Adjustment

Measured Performance

- Good
- Average
- Poor

Bias

- Problematic
- OK
- Problematic

+ 2 Std Dev
- 2 Std Dev
+ 0.5 Std Dev
- 0.5 Std Dev
Bias Due to Suboptimal Data (IQIs)

Percent Exceeding Upper Threshold

Upper Threshold for Bias in Standard Deviations

- RAW
- CLAIMS
- HYBRID

mpa
Bias Due to Suboptimal Data (PSIs)

![Graph showing percent exceeding upper threshold vs. upper threshold for bias in standard deviations for RAW, CLAIMS, and HYBRID]
POA Coding
New Information Derived from POA Coding

- In the past, difficult to determine whether coded secondary diagnoses described:
  - Comorbid conditions present on admission
  - Complications that occurred in hospital.

- Newly mandated POA distinguishes between:
  - Comorbidities that increase the likelihood of adverse outcomes and higher costs
  - Inpatient complications possibly due to suboptimal care.
General Guidelines for POA Coding

- With rare exceptions, a POA modifier must be assigned to each principal and secondary diagnosis code on a hospital claim.

- A diagnosis should be coded as present on admission if it is present at the time the order for inpatient admission occurs.

- All POA coding must be supported by medical record documentation by a qualified healthcare practitioner.
Valid POA Codes

- Blank, 1, or E = diagnosis exempt from POA reporting
- Y = present at time of order to admit
- N = not present at time of order to admit
- W = practitioner unable to determine if Y or N
- U = insufficient information to determine if Y or N after good faith attempt to resolve uncertainty with qualified practitioner
Rules for POA Coding (1)

- Chronic conditions are coded as POA=Y regardless of when they are diagnosed.

- A diagnosis of an acute condition is coded as POA=Y when:
  - documented as present, suspected, or impending at the time of or shortly prior to admission even if the definitive diagnosis is made during hospitalization
  - signs or symptoms of the diagnosis are documented as present on admission.
An acute exacerbations of a chronic condition is coded as POA=Y only when the acute exacerbation is present on admission.

A diagnosis is coded as indeterminate (W) only when a qualified practitioner documents that s/he cannot determine if diagnosis was present on admission.

A diagnosis is coded as unknown (U) only when a coder cannot obtain information needed to assign another POA modifier.
Rules for POA Coding (3)

- For obstetrical codes, POA assignment:
  - based on relation of pregnancy-related diagnoses to admission
  - not affected by whether or not the patient delivers.

- If obstetrical code includes more than one diagnosis, POA=Y only if all diagnoses are present on admission.
For newborns, admission occurs at the time of birth. Therefore, POA=Y for all congenital conditions and anomalies, all *in utero* conditions, and all complications that occur during delivery.

For accidents (i.e., E codes), POA codes are based on the relation of the time of injury to the time of admission. Therefore, POA=Y only when injury occurs prior to admission.
Rationale for POA Quality Screening

- Accurate coding requires expertise and teamwork.
- Inaccurate coding may affect performance assessments and reimbursement.
- Chart reviews to detect coding errors are expensive.
- Well-designed screens can detect problems efficiently.
POA Quality Screens


- Screens high-risk conditions, elective surgical procedures, and inpatient childbirth.

- Employs 12 screens for inconsistent and implausible coding.

- Provides composite scores and performance profiles.
## Distribution of Hospital Scores

<table>
<thead>
<tr>
<th>Score</th>
<th>Hospitals (#)</th>
<th>Hospitals (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 90%</td>
<td>65</td>
<td>39.4%</td>
</tr>
<tr>
<td>&gt;80% to 90%</td>
<td>41</td>
<td>24.8%</td>
</tr>
<tr>
<td>&gt;70% to 80%</td>
<td>26</td>
<td>15.8%</td>
</tr>
<tr>
<td>&gt;60% to 70%</td>
<td>19</td>
<td>11.5%</td>
</tr>
<tr>
<td>60% or lower</td>
<td>14</td>
<td>8.5%</td>
</tr>
<tr>
<td>Total Scored</td>
<td>165</td>
<td>100%</td>
</tr>
<tr>
<td>&gt; 10% Unknown</td>
<td>22</td>
<td>n/a</td>
</tr>
</tbody>
</table>
Screening and Improvement of POA Coding

POA Screening

Intervention in Process

Plan for Improvement

Identification of Opportunities for Improvement

Performance Evaluation

Process Analysis

Plan for Improvement
Numerical Laboratory Data
Types of Data in HYBRID IQI Models

- Numerical Laboratory: 11.1 data elements
- Present-on-Admission: 15.6 data elements
- Standard Claims
- Hybrid Data
Types of Data in HYBRID PSI Models

- **Numerical Laboratory**: 6.5 data elements
- **Present-on-Admission**: 21.8 data elements
- **Standard Claims**: Hybrid Data
Numerical Laboratory Data

◆ 22 Laboratory Tests Enter At Least 1 Model
◆ 14 of These Tests Enter 4 or More Models
  
  - pH (11)
  - Prothrombin Time (10)
  - Sodium (9)
  - White Blood Count (9)
  - Blood Urea Nitrogen (8)
  - pO2 (8)
  - Potassium (7)
  - SGOT (7)
  - Platelet Count (7)
  - Albumin (5)
  - pCO2 (4)
  - Glucose (4)
  - Creatinine (4)
  - CPK-MB (4)
Recommended Chemistry Data

- Aspartate Aminotransferase
- Albumin
- Alkaline Phosphatase
- Amylase
- Bicarbonate
- Bilirubin (Total)
- B Natriuretic Peptide
- Calcium
- C-Reactive Protein
- Creatine Kinase
- Creatine Kinase MB
- Creatinine
- Glucose
- Lactic Acid
- Potassium
- Pro-B Natriuretic Protein
- Sodium
- Troponin I
- Troponin T
- Urea Nitrogen
## Other Recommended Lab Data

<table>
<thead>
<tr>
<th>Blood Gas</th>
<th>Hematology</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Arterial O₂ Saturation</td>
<td>• Hemoglobin</td>
</tr>
<tr>
<td>• Arterial pCO₂</td>
<td>• International Normalized Ratio</td>
</tr>
<tr>
<td>• Arterial pH</td>
<td>• Neutrophil Bands</td>
</tr>
<tr>
<td>• Arterial pO₂</td>
<td>• Partial Thromboplastin Time</td>
</tr>
<tr>
<td>• Base Excess</td>
<td>• Platelet Count</td>
</tr>
<tr>
<td>• Bicarbonate</td>
<td>• Prothrombin Time</td>
</tr>
<tr>
<td>• FIO₂ (if electronic)</td>
<td>• White Blood Count</td>
</tr>
</tbody>
</table>
Vital Signs and Other Clinical Data
Types of Data in CLINICAL IQI Models

- **Vital Signs and Other Clinical Data**: 9.0 data elements
- **Numerical Laboratory**: 11.1 data elements
- **Present-on-Admission**: 15.6 data elements
- **Standard Claims**: 15.6 data elements
Types of Data in CLINICAL PSI Models

- Vital Signs and Other Clinical Data: 6.8 data elements
- Numerical Laboratory: 6.5 data elements
- Present-on-Admission: 21.8 data elements
- Hybrid Data
Vital Signs, Other Lab Data, Scores

◆ All Vital Signs Enter 4 or More Models
  • Pulse (8)
  • Temperature (6)
  • Blood Pressure (6)
  • Respirations (5)

◆ Ejection Fraction and Culture Results Each Enter 2 Models

◆ Both Composite Scores Enter 4 or More Models
  • ASA Classification (6)
  • Glasgow Coma Score (4)
Abstracted Key Clinical Findings

◆ 35 Clinical Findings Enter At Least 1 Model

◆ Only 3 Enter More Than 2 Models
  • Coma (6)
  • Severe Malnutrition (4)
  • Immunosuppressed (4)

◆ 14 Have Corresponding ICD-9-CM Codes
  • Coma
  • Severe Malnutrition
Risk-Adjusted Mortality in CABG Surgery

MORTALITY IN PERCENT

- Hospital 6
- Hospital 7
- Hospital 18
- Hospital 13
- Hospital 1
- Hospital 10
- Hospital 14
- Hospital 5
- Hospital 3
- Hospital 12
- Hospital 11
- Hospital 17
- Hospital 16
- Hospital 15
- Hospital 9
- Hospital 8
- Hospital 2
- Hospital 4

Legend:
- ■ P > 0.05
- □ P = 0.01 to 0.05
- □ P = 0.001 to 0.01
- ● Predicted
- ■ Observed
Bias in Measurement of PSIs

- Observed vs Predicted Rates of True Complications
- Bias Due to Failure to Risk-Adjust True Complication Rates
- Bias Due to Misclassifying Comorbidities As Complications
Carpe Diem!