Data Quality and Case Mix Measurement: A North American Perspective

Jason Sutherland, PhD

THE DARTMOUTH INSTITUTE FOR HEALTH POLICY & CLINICAL PRACTICE

Where Knowledge Informs Change
United States:
- DRG used for prospective payment of acute hospitalizations (publicly insured)
  - Severity levels
  - MS-DRG removes preventable conditions acquired in hospital
- 745 DRG (increased from 538) in 2008

Canada:
- Hospitalizations are publicly insured
  - DRG a small component of hospital funding (grant-based and population based)
Data Quality and Case Mix Measurement

- What does ‘Data Quality’ mean in case mix?
  - Clinical information:
    - Accuracy and Specificity
    - Comprehensiveness
    - Sequencing
    - Clinical Coding Guideline adherence
    - Timeliness

- Why does ‘Data Quality’ matter?
  - Accurately define service contracts between government and hospitals
  - Rationalize / Centralize services
  - Population-based research
  - Resource allocation between hospital departments
  - DRG and reimbursement
How is clinical coding organized?

United States:
- Professionally trained coders, 2-year training program plus on-the-job training

Canada:
- Professionally trained coders, 2- or 4-year training program plus on-the-job training

Traditional set-up
- Coders in separate department which receives completed charts after discharge
- ‘Concurrent coding’, coders are embedded within clinical departments
- Hospitals free to choose how they organize coding
  - Certified coders required
Data Quality and Case Mix Measurement

- Imprecision in hospital case mix measures as a result of data quality
  - Random variation
  - Non-random variation

- International results:
  - Implementation of case mix for hospital funding will induce changes in coding practices
  - Evidence of undercoding and overcoding

- Finding unexplainable coding variation/data quality typically involves two strategies:
  - Statistical analysis of discharge data
  - Reabstraction of patient charts
  - Statistical analysis provides insight, but does not provide ‘smoking gun’ of re-abstraction
Data Quality and Case Mix Measurement

- Statistical analysis of discharge data

- Silverman and Skinner (2000)
  - Time series analysis

  - Number of secondary diagnoses

- Preyra (2004) reported substantial changes in case mix not attributable to random variation
  - Number and type of secondary diagnoses

- Sutherland and Steinum
  - Longitudinal analyses of hospitalizations
Data Quality and Case Mix Measurement

- Reabstraction - DRG mis-assignment rates are well reported:

  - 20% of septicemia cases

- Berthelsen (2000)
  - 16.5% of cases in DRG 143, Chest Pain
  - 9% of cases in DRG 125, Circulatory Disorders
  - 12.7% of cases in DRG 140, Angina Pectoris

- Richards, Brown and Homan (2001) reported 13.4% error rate in most responsible diagnosis

- Canadian Institute for Health Information (2002) estimated 12.8% of cases inaccurately coded most responsible diagnosis

- Preyra, Sutherland and Wardle (2003) approximately 13% of DRG mis-assigned
Data Quality and Case Mix Measurement

- Canadian experience
  - 12 million residents, >160 acute inpatient hospitals
- CMG case mix system (variant of DRG)
  - Secondary conditions that affect hospitalization
  - Level 4: Additional secondary conditions that are deemed ‘life threatening’
Data Quality and Case Mix Measurement

Percent change in deaths and ‘Life-Threatening Conditions’, medical and surgical cases
## Data Quality and Case Mix Measurement

### Audited Charts that Changed DRG After Reabstraction

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Pneumonia and Pleurisy</th>
<th>Nutritional and Misc Metabolic Disorder</th>
<th>Septicemia</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>22%</td>
<td>55%</td>
<td>41%</td>
</tr>
<tr>
<td>B</td>
<td>17%</td>
<td>27%</td>
<td>10%</td>
</tr>
<tr>
<td>C</td>
<td>13%</td>
<td>15%</td>
<td>25%</td>
</tr>
<tr>
<td>D</td>
<td>29%</td>
<td>22%</td>
<td>35%</td>
</tr>
<tr>
<td>E</td>
<td>15%</td>
<td>50%</td>
<td>31%</td>
</tr>
<tr>
<td>F</td>
<td>17%</td>
<td>15%</td>
<td>46%</td>
</tr>
<tr>
<td>G</td>
<td>24%</td>
<td>32%</td>
<td>36%</td>
</tr>
<tr>
<td>H</td>
<td>24%</td>
<td>35%</td>
<td>21%</td>
</tr>
<tr>
<td>I</td>
<td>19%</td>
<td>31%</td>
<td>18%</td>
</tr>
<tr>
<td>J</td>
<td>13%</td>
<td>39%</td>
<td>24%</td>
</tr>
<tr>
<td>All</td>
<td>19%</td>
<td>33%</td>
<td>29%</td>
</tr>
</tbody>
</table>
Data Quality and Case Mix Measurement

- Re-abstraction key observations:
  - Systematic coding of “insignificant” co-morbid diagnoses and symptoms in some hospitals
  - Coding guidelines not well adopted and/or are too subject to interpretation in selected instances
  - Incidental findings on lab reports, x-rays, pathology reports or examinations were found to be considered comorbid.
    - There must be clinical documentation supporting the condition and its relevance
Data Quality and Case Mix Measurement

- Hospital perspective:
  - Changes in coding guidelines
  - Shortage of experienced and qualified coders
  - Feeling that current cost weight does not reflect patient cost or acuity
United States example:

- Outlier payments
  - Each day of stay beyond the trim point is paid as a percentage of reported daily costs
  - Trim points are set such that payments are 1.5% of total

- From 1.5% to >3% of DRG payments
  - Very substantial increase in outlier payments ($9 Billion US)

- Strata:
  - hospital location (urban or rural);
  - hospital education status (teaching or nonteaching)
  - disproportionate share status (disproportionate share or nondisproportionate share); and
  - ownership (proprietary, nonproprietary, or governmental).

- Frame: 362 hospitals
United States example:

- Hospitals were increasing patient charges on days past the LOS trim point
- Reimbursement levels for days past trim point were much greater than cost

Impact: Changing methodology for estimating cost from charges:
- Most recent data only
- Revising cost to charge ratios (inflated charges for outliers)
- Private hospitals experienced 68.6% decrease in outlier payments (largest decrease)

Recovery of over $200 million US from hospitals
Impact of inaccurate coding on cost weights

- Assess the impact of inaccurate coding on cost weights
- Assess the impact of biased weights on hospitals in the Ontario hospital system

Using re-abstraction study results, effect on cost weights:

<table>
<thead>
<tr>
<th>Plx</th>
<th>% Over Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3.86</td>
</tr>
<tr>
<td>2</td>
<td>-6.12</td>
</tr>
<tr>
<td>3</td>
<td>-0.82</td>
</tr>
<tr>
<td>4</td>
<td>-13.46</td>
</tr>
<tr>
<td>9</td>
<td>2.86</td>
</tr>
</tbody>
</table>

- High level weights are under-weighted
  - Due to presence of mis-assigned, lower cost patients
## Data Quality and Case Mix Measurement

<table>
<thead>
<tr>
<th>Hospital</th>
<th>2002/2003 Acute Weighted Cases</th>
<th>Conservative % from Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alliston (596)</td>
<td>2,829</td>
<td>3.60</td>
</tr>
<tr>
<td>Dryden (647)</td>
<td>1,791</td>
<td>5.15</td>
</tr>
<tr>
<td>Sturgeon Falls (881)</td>
<td>1,296</td>
<td>2.83</td>
</tr>
<tr>
<td>Red Lake (896)</td>
<td>494</td>
<td>0.07</td>
</tr>
<tr>
<td>Sioux Lookout (964)</td>
<td>1,824</td>
<td>1.49</td>
</tr>
<tr>
<td>Community</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bracebridge (614)</td>
<td>3,495</td>
<td>-0.37</td>
</tr>
<tr>
<td>Collingwood (640)</td>
<td>4,817</td>
<td>0.69</td>
</tr>
<tr>
<td>North York (632)</td>
<td>33,363</td>
<td>-2.64</td>
</tr>
<tr>
<td>Guelph (665)</td>
<td>14,428</td>
<td>-0.99</td>
</tr>
<tr>
<td>Lindsay (707)</td>
<td>8,057</td>
<td>-1.99</td>
</tr>
<tr>
<td>Stratford (813)</td>
<td>8,138</td>
<td>0.63</td>
</tr>
<tr>
<td>Scarborough (960)</td>
<td>48,049</td>
<td>-3.69</td>
</tr>
<tr>
<td>Teaching</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hamilton (674)</td>
<td>30,111</td>
<td>-2.67</td>
</tr>
<tr>
<td>St. Michael’s (852)</td>
<td>49,829</td>
<td>-4.95</td>
</tr>
<tr>
<td>London (936)</td>
<td>66,315</td>
<td>-6.58</td>
</tr>
<tr>
<td>UHN (947)</td>
<td>69,326</td>
<td>-8.40</td>
</tr>
<tr>
<td>Sunnybrook (953)</td>
<td>53,962</td>
<td>-3.10</td>
</tr>
<tr>
<td>Ottawa (958)</td>
<td>81,716</td>
<td>-5.75</td>
</tr>
</tbody>
</table>
Data Quality and Case Mix Measurement

- Results
  - Complex and highly acute patients are negatively impacted
    - Low acuity patients and normal newborns favorably impacted
  - Differential hospital impact
    - Negatively affects tertiary hospitals
    - Positively affects small, community hospitals
  - Highly specific grouping methodologies are most vulnerable to poor clinical data quality
    - APR-DRG, CMG/Plx
Data Quality and Case Mix Measurement

- Key Canadian initiatives:
  - All health record coders attend Coding Workshop and complete online training.
  - Teach the importance of high quality and timely clinical documentation in student training curriculum.
  - Capture of diagnoses based on documentation from all members of patient’s clinical team.
  - Government to lead development of a data quality strategy, including continued re-abstraction studies.
  - Government to investigate including provisions for data quality in Hospital Service Agreements.
United States initiatives:

The False Claims Act has proven to be one of the most effective tools in fighting Medicare and Medicaid fraud
- Must repay three times the amount of damages suffered by the government

Fraud:
- Billing for services not furnished;
- Misrepresenting the diagnosis to justify payment;
- Unbundling or “exploding” charges

Abuse:
- Providing medically unnecessary services or services that do not meet professionally recognized standards

Since the False Claims Act was amended, the government has recovered more than $3.5 billion
- Results are publicly reported
Data Quality and Case Mix Measurement

- Medicare Integrity Program:
  - Coordination of Benefits Contractor
    - Coordinating Medicare benefits with private insurers
    - Determining costs and reimbursement amounts
  - Statistical Analysis Contractor
    - Comprehensive ongoing analysis of trends, utilization data, and other information which will assist in the detection of abusive and/or fraudulent behavior
  - Program Safeguard Contractor
    - Focused medical review / Cost report audits
    - Identify inappropriate billing for services
    - Identify overutilization, abusive billing, and inappropriate care
Data Quality and Case Mix Measurement

Summary

- Other users of the data need high quality / accurate data!!
- Clear links between financial incentives, DRG, and coding practices
- Data quality is very important to the integrity of the case mix system used for hospital payment
  - Poor data quality most affects teaching hospitals
- Multiple perspectives on how to address
  - Education
  - Monitoring
  - Enforcement
  - Reporting

- Each country is developing its own strategy for improving, or maintaining, data quality for case mix measurement in DRG hospital financing systems
Questions