Activity Based Costing and Case Mix Measurement

Jason Sutherland, PhD
Activity Based Costing and Case Mix Measurement

- What is activity based costing?
  - Linking hospital products to patient care
    - Nursing hours (nursing workload measurement)
    - Laboratory
    - Diagnostic Imaging
    - Etc.
  - Precise knowledge of patient hospitalization costs
• History of activity based costing in Canada

• Broad acceptance that cost weights for DRG did not represent hospital costs

• Established in 1992 as a joint initiative of the Ontario Hospital Association (OHA) and the Ontario government

• Each participating hospital was required to develop and implement the necessary systems and procedures to comply with the activity based costing standards

• Hospitals began collecting case cost data for acute inpatients on July 1, 1993
Mandate of activity based costing program

Collection of case costing data to support the case mix measurement tools

Develop a cost database at the patient level with the ability to link to the patient level clinical information

Maintenance and improvement of case costing methodology

Facilitate the adoption of case costing methodologies and associated management reporting by the health care community
• Linking clinical information with detailed costing information

<table>
<thead>
<tr>
<th>Hip and Knee Primary</th>
<th>Direct Cost</th>
<th>Indirect Cost</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facility A</td>
<td>8,577</td>
<td>2,080</td>
<td>10,657</td>
</tr>
<tr>
<td>Facility B</td>
<td>6,738</td>
<td>2,822</td>
<td>9,560</td>
</tr>
<tr>
<td>Facility C</td>
<td>7,895</td>
<td>1,558</td>
<td>9,454</td>
</tr>
<tr>
<td>Facility D</td>
<td>7,342</td>
<td>2,173</td>
<td>9,514</td>
</tr>
<tr>
<td>Facility E</td>
<td>7,463</td>
<td>1,996</td>
<td>9,459</td>
</tr>
<tr>
<td><strong>Average Cost</strong></td>
<td><strong>7,518</strong></td>
<td><strong>2,075</strong></td>
<td><strong>9,593</strong></td>
</tr>
</tbody>
</table>

*CMG 352, 354 Hip and Knee - Typical Cases only Fiscal 2002/03, 10th and 90th percentiles removed*
Activity Based Costing and Case Mix Measurement

- **Direct Cost**
  - Hands on patient care departments
    - Inpatient Nursing
      - Medical/Surgical, Intensive Care Units, Operating Rooms
    - Diagnostic and Therapeutic
      - Laboratory, Diagnostic Imaging, Pharmacy, Physiotherapy, Social Work
    - Food Service
      - Inpatient Meals

- **Indirect Cost**
  - Support Services
    - Administration - Corporate, Finance Human Resources
    - Education and Research
Activity Based Costing and Case Mix Measurement

- Refining the patient costs:

<table>
<thead>
<tr>
<th>Hip and Knee Primary</th>
<th>Average Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nursing</td>
<td>3,055</td>
</tr>
<tr>
<td>Lab</td>
<td>143</td>
</tr>
<tr>
<td>DI</td>
<td>208</td>
</tr>
<tr>
<td>Pharmacy</td>
<td>465</td>
</tr>
<tr>
<td>Physio</td>
<td>1,074</td>
</tr>
<tr>
<td>Food</td>
<td>293</td>
</tr>
<tr>
<td>All Other</td>
<td>1,696</td>
</tr>
</tbody>
</table>

*CMG 352, 354 Hip and Knee - Typical Cases only Fiscal 2002/03, 10th and 90th percentiles removed*
Methods for patient costing:

- **Top Down**
  - Also known as Yale Cost Model, or Gross Costing
  - Expenditure divided by activity

- **Bottom Up**
  - Also known as Activity Based Costing
  - Individually costing all activities and resources associated with activity
  - Ontario/Canada uses bottom up for acute and ambulatory
Activity Based Costing and Case Mix Measurement

- **Top-down method:**
  - **Advantages:**
    - Straightforward
    - All costs included (complete)
  - **Disadvantages:**
    - Allocating costs of non-measured activities by measured activities
      - Allocating costs appropriately across outputs?
    - Lack of sensitivity
      - Expensive drugs or surgical supplies not fully recognized for some patient types
• **Advantages:**
  – Transparent, flexible
  – Literature consensus: More accurate

• **Disadvantages:**
  – Time consuming
  – Incorporating workload measurement systems into daily activities
  – Expensive relative to Top Down
Activity Based Costing and Case Mix Measurement

- Differences in costing methods:

<table>
<thead>
<tr>
<th></th>
<th>Top Down</th>
<th>Activity Based Costing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level of detail</td>
<td>Less Detail</td>
<td>Higher</td>
</tr>
<tr>
<td>Accuracy for each</td>
<td>Less Precise</td>
<td>Higher</td>
</tr>
<tr>
<td>Proc/Dx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Completeness</td>
<td>Comprehensive</td>
<td>May Exclude Elements</td>
</tr>
<tr>
<td>Cost</td>
<td>Less Expensive</td>
<td>More Expensive</td>
</tr>
<tr>
<td>Time</td>
<td>Easy to implement</td>
<td>Longer</td>
</tr>
</tbody>
</table>
• Methodological Standards:
  – A standard framework for the collection of financial and statistical data
    • Departments are called ‘Functional Centers’
  – National standards for workload measurement
    • Comparability between hospitals
  – Allow for the comparability between health care sectors
### Function Center Level

<table>
<thead>
<tr>
<th></th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Direct</th>
<th>Indirect</th>
</tr>
</thead>
<tbody>
<tr>
<td>71210</td>
<td>71210</td>
<td>71415</td>
<td>71410</td>
<td>71440</td>
<td>71440</td>
</tr>
<tr>
<td></td>
<td>71410</td>
<td>30</td>
<td>25</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>$2,100</td>
<td>$850</td>
<td>$475</td>
<td>$180</td>
<td>$1300</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$500</td>
<td>$320</td>
<td>$95</td>
<td>$500</td>
</tr>
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</table>
Refining the patient costs: Examining Nursing Costs

<table>
<thead>
<tr>
<th>Patient ID</th>
<th>Service Date</th>
<th>the sum, tot_cost</th>
<th>day2</th>
</tr>
</thead>
<tbody>
<tr>
<td>425 20060110</td>
<td>307.06</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>425 20060111</td>
<td>584.65</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>425 20060112</td>
<td>441.24</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>425 20060113</td>
<td>321.96</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>425 20060114</td>
<td>181.83</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>425 20060115</td>
<td>246.21</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>425 20060116</td>
<td>547.82</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>425 20060117</td>
<td>296.86</td>
<td></td>
<td>8</td>
</tr>
</tbody>
</table>

Examples:
- Cost of drugs per day
- Device costs

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Complete Patient Record

No other source links clinical data with cost information
Informed decision making:

- Service contracts (defining outputs)
  - Performance/volume based funding\(^1\)
  - Improved accountability\(^2\)
- Rationalization of services
  - Consolidation of similar services between sites\(^3\)
- Clinical Research
  - Outcome vs. Lower Cost

\(^1\) R. Smith, CEO, Fraser Health Authority, BC
\(^2\) W. McKendrick, ADM, AB Health and Wellness
\(^3\) S. Weatherill, Pres. and CEO, Capital Health
Activity Based Costing and Case Mix Measurement

- Informed decision making:
- Calculating relative cost weights
- Priority funding
- Operational reviews
- Hospital planning and budgeting processes
- Efficiency analysis:
  - Standardization of treatments and protocols
  - Benchmarking
  - Impact of changing case mix
  - Assessing required resources for planned programs and services
Activity Based Costing and Case Mix Measurement

• Activity based costing:
  – Conducted by hospitals
    • Not mandated by government
  – Little direct compensation to hospitals from government for collecting and sharing data
    – Large expansion ongoing
      • Rehabilitation
      • Mental Health
      • Chronic Care

• Activity Based Costing standards:
  Penny.Weeks@ontario.ca