Testing Revisions of the RUG-III System for Non-Therapy Ancillary Cost

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Background

- RUG-III derived to explain directly-measured, staff-related, per diem cost of care
  - Nursing staff
  - Therapy staff
- 1998 – HCFA implements nursing home PPS – incorporating RUG-III
- By 2003, approximately half states have adopted RUG-III for Medicaid payment
- Issue raised: For Medicare patients, how well does RUG-III explain costs of:
  - Staff
  - “Non-therapy ancillary”
Measuring staff costs

- RUG derivations (RUG, RUG-II [NYS], RUG-T18, RUG-III) all used self-reported time, with controls
- Other approaches used Medicare bills (charges converted to costs)
Since derivation: 9 validation studies of RUG-II and RUG-III
- Both domestic and international
- 1986 to 2002

Overall conclusions:
- RUGs explains directly-measured staff costs reasonably well
- Relative relationship of groups consistent, despite range of funding levels
- Across range of venues
Background

- Non-staffing costs have become major policy issue
- Drugs - the BIG issue
- “Non-therapy ancillaries”=
  - Durable medical equipment
  - Respiratory therapy
  - Medical supplies
  - Laboratory, diagnostic testing, x-rays
Three studies

- “ABT” – 1999-2000
- Urban Institute (incl. Fries):
  - “2001”
  - “2003”
Goal

• Adjust RUG-III system to be predictive of all costs, if possible
  • Medicare
  • not reevaluating prediction of staffing costs
  • initially examining ABT recommendations
  • decisions to be made on other approaches

• Cost:
  • Derived from Medicare bills, matched to MDS assessments for same time period
ABT Study

- Results released in 2000
- Sample:
  - 6 states, 1995-1997
  - Medicare
  - N=103,856; Analytic=61,929; Validation=41,927
- MDS (V1) + billed costs (from charges)
Recommendations:

- Add new “Rehab+Extensive” category and groups, at top of “hierarchy”
- Regression-based index drives “add-on” (or many new categories)
- Alternate: count (of indicators in index) drives “add-on” (or many categories)
- Indicators were carefully examined for potential gaming
Fries “2001” Validation

New database
- Nationwide data – 1999
- Medicare
- Matched MDS with billed costs (from charges)
- Each assessment (multiple assessments per resident)
- Complexity in timing made match difficult
- N=270,215
Fries “2001” Validation

Results:
- Rehab+Extensive category still appropriate
- Neither index nor count worked especially well
“2003” Urban Validation Study

- Rederived database
  - Nationwide – 1999 DATAPRO data: cost + MDS
  - Medicare only
  - Admission (5 day) assessment
  - Current work on 10% sample (N=151,569)

- Evaluated:
  - Rehab+Extensive category
  - ABT Index systems
  - Alternative index systems with same variables
Distribution of Costs - Current

Therapy, $72.40, 21%

Other, 67.5, 20%

Routine, $204.40, 60%

Drugs, $39.30, 11%

Respir, $6.00, 2%

Other, $22.20, 6%
## NTA Costs – 3 Studies

<table>
<thead>
<tr>
<th></th>
<th>ABT</th>
<th>2001</th>
<th>2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total NTA</td>
<td>$45.80</td>
<td>$58.14</td>
<td>$67.50</td>
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<tr>
<td>Drugs</td>
<td>23.78</td>
<td>35.81</td>
<td>39.30</td>
</tr>
<tr>
<td>Respiratory</td>
<td>14.27</td>
<td>4.50</td>
<td>6.00</td>
</tr>
<tr>
<td>Other</td>
<td>8.12</td>
<td>17.83</td>
<td>22.20</td>
</tr>
<tr>
<td>Therapy</td>
<td>NA</td>
<td>81.70</td>
<td>72.40</td>
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</table>
### Selected Sample Characteristics

<table>
<thead>
<tr>
<th></th>
<th>ABT</th>
<th>2001</th>
<th>2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>65%</td>
<td>61.0%</td>
<td>65.8%</td>
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<tr>
<td>Mean Age</td>
<td></td>
<td>79.6 (9.9)</td>
<td>80.0 (9.7)</td>
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<tr>
<td>Race: White</td>
<td>84%</td>
<td>85.9%</td>
<td>88.1%</td>
</tr>
<tr>
<td></td>
<td>Black</td>
<td>9%</td>
<td>8.1%</td>
</tr>
</tbody>
</table>
Technical Details

- **Cost variables**
  - Skewed distribution ➔ used log (cost+1)
  - Some high outliers ➔ truncated at: Mean+2*(standard deviation)
  - For total non-therapy ancillary costs, truncation at $444.50 (1.2%)

- **RUG-III groups**
  - “Standard” RUG-III
  - “Medicare” RUG-III including “ordered therapies”
  - Standard did somewhat better
Technical Details

_Caveat emptor:_

Results across studies not totally comparable, as differences in:
- cost centers
- truncation
- logarithm transforms

However: these differences usually affect variance explanation approximately ±2%
RUG-III has 7 clinical categories:

- Heavy Rehabilitation
- Extensive care
- Special care
- Clinically complex
- Impaired cognition
- Behavior problems
- Reduced physical functions

Original research results:

- Worked as hierarchy – qualify for highest group
- Qualification of multiple categories not predictive
- Decreasing average resource cost (staff + therapies)
RUG-III Case-Mix Index
In general, hierarchy approach worked

From beginning, issue with (small numbers of) individuals in both Rehab and Extensive categories

Medicare Grouper has index maximization logic – but issue only with R&E overlap

ABT group found value in adding 8th (highest) category: combined Rehab+Extensive

Also some rationale from original staffing study
Average Costs Breaking Rehabilitation Group by Extensive Services

- Total NTA: $47, $84
- Drug: $28, $46
- Respir: $4, $8
- Other: $15, $29

- Rehab Only
- Rehab+Ext
Results – Rehab+Extensive

- Significant difference in mean total cost
- Develop 8th category (at top)
- Split category by ADL (slightly better than Count of Extensive Services)
## Results – Rehab+Extensive

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cost</th>
<th>Log(Cost)</th>
<th>Log(Cost)</th>
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<tbody>
<tr>
<td>ALL</td>
<td>ALL</td>
<td>ALL</td>
<td>ALL</td>
</tr>
<tr>
<td>RUG-44</td>
<td>4.1%</td>
<td>4.7%</td>
<td>4.1%</td>
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<tr>
<td>RUG-58</td>
<td>8.0%</td>
<td>7.5%</td>
<td>5.9%</td>
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