Titrating Home Care to Patient Risks: A Budgeting Strategy

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Outline

• Project goals
• Approach to improvement
• Results from earlier projects
• Adaptation to Florida DOEA home care
• Estimation techniques
Goals for DOE Home Care Budgeting Project

• Better information for care planning
  – Emphasizing patient specific goals
• Shift care to higher risk patients
  – Patient specific budgets
• Better outcomes
• Rewards for better outcomes
Clearer Outcome Goals

• Goal is nominally avoiding nursing home entry

• But most patients face risks other than nursing home entry
  – Nursing home entry risk prediction methods weak

• So patient specific goals left vague

• Case manager must work them out
  – With very limited information
Effectiveness Information Lacking

• For outcomes:
  – Should know risks and care effectiveness
    – Marginal benefit of additional care
    – And substitution options

• But case managers given only assessment
  – Must assess, weigh risks on her or his own
  – Make own estimates of effectiveness of types and amounts of care
Policy Problems

• Budget caps or limits on new patients
  – Caps bind only on highest cost patients
    • Sometimes shortchanges highest risk patients
    • Or limits new patients: most likely to benefit

• Budget caps not binding for most patients
  – Little effect on low risk patients with little potential to benefit
    • Spending may exceed potential to benefit
    • Even if home care is 100% effective
More Policy Concerns

• Few rewards for successful outcomes
  – Payments don’t rise for avoiding ER or hospital or nursing home or ADL decline
  – Nor fall if outcomes consistently under achieved
  – Even in capitated plans
    – Hospital and nursing home cost risks usually minimal & capped

• Result:
  • Home care dollars not allocated to highest risk patients
Resource allocation is random

Figure 1. Per Capita Spending by Decile of Hospitalization Risk in ALTCS ‘92-97
Figure 2. Per Capita Spending by Decile of Nursing Home Admission Risk in ALTCS ’92-97
Figure 3. Per Capita Spending by Decile of Risk of Death in ALTCS ’92-97
Figure 4. Per Capita Spending by Decile of Functional Decline Risk in ALTCS ’92-97
Effectiveness, Risk, Value (ERV) Budget Model

• Clarifies goals
  – Emphasizes patient-specific outcomes
    • Accommodates broad range of outcomes
      – Any that can be measured

• Improves information
  – Provides better risk assessment methods
  – Employs two-stage needs assessment
  – Implies care plan evaluation criteria

• Creates incentives for marginal benefit-marginal cost trade-offs
  – Sets binding constraint on care plan costs
  – Shifts funds from low risk to high risk patients
  – Rewards improved effectiveness
ERV Example for One Risk

• If...
  – Hospital risk for a given patient = 25%, and,
  – Cost of hospitalization would be = $10,000, and
  – Effectiveness of home care in mitigating hospital risk = 20%,
  – Then, monthly ERV= $500, just for hospital risk
    » (500=.20*.25*10,000)

• Note incentives:
  – Spending reallocated to highest risk-benefit potential
  – Higher effectiveness=more money
  – Process, outcome evaluation criteria implied
Calculating an ERV Budget

- For each patient, effectiveness and risk weighted value defined as ERV:
  \[ ERV_{ij} = E_j \times R_{ij} \times V_j \]

- Where:
  - \( ERV_{ij} \) = The Effectiveness and Risk weighted Value of adverse outcome ‘j’ for patient ‘i’
  - \( E_j \) = Effectiveness, defined as average change in the risk of adverse outcome ‘j’ due to home care
  - \( R_{ij} \) = Risk of adverse outcome ‘j’ for patient ‘i’
  - \( V_j \) = Average value of avoiding adverse outcome ‘j’
## Some Case Examples

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Value</th>
<th>Outcome</th>
<th>Monthly Risk</th>
<th>Risk Percentile</th>
<th>Monthly Target Budget</th>
<th>Budget %</th>
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<tbody>
<tr>
<td>ADL's</td>
<td>4</td>
<td>Death</td>
<td>0.82%</td>
<td>15-20%</td>
<td>$8</td>
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<td>Married</td>
<td>Widow</td>
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<tr>
<td>AGE</td>
<td>87</td>
<td>Functional Decline</td>
<td>1.82%</td>
<td>10-15%</td>
<td>$35</td>
<td>10-15%</td>
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<tr>
<td>SEX</td>
<td>Female</td>
<td>Hospitalization</td>
<td>0.86%</td>
<td>15-20%</td>
<td>$42</td>
<td>15-20%</td>
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<tr>
<td></td>
<td></td>
<td>Nursing home admission</td>
<td>1.71%</td>
<td>0-5%</td>
<td>$64</td>
<td>0-5%</td>
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<tr>
<td></td>
<td></td>
<td>Total</td>
<td></td>
<td></td>
<td>$149</td>
<td>0-5%</td>
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<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Value</th>
<th>Outcome</th>
<th>Monthly Risk</th>
<th>Risk Percentile</th>
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<th>Budget %</th>
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<tbody>
<tr>
<td>ADL's</td>
<td>1</td>
<td>Death</td>
<td>0.72%</td>
<td>10-15%</td>
<td>$7</td>
<td>10-15%</td>
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<td>Widower</td>
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<tr>
<td>AGE</td>
<td>92</td>
<td>Functional Decline</td>
<td>10.97%</td>
<td>95-100%</td>
<td>$212</td>
<td>95-100%</td>
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<tr>
<td>SEX</td>
<td>Male</td>
<td>Hospitalization</td>
<td>0.78%</td>
<td>10-15%</td>
<td>$38</td>
<td>10-15%</td>
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<td></td>
<td></td>
<td>Nursing home admission</td>
<td>4.03%</td>
<td>30-35%</td>
<td>$151</td>
<td>30-35%</td>
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<td></td>
<td></td>
<td>Total</td>
<td></td>
<td></td>
<td>$408</td>
<td>50-55%</td>
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<table>
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<th>Characteristics</th>
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<th>Outcome</th>
<th>Monthly Risk</th>
<th>Risk Percentile</th>
<th>Monthly Target Budget</th>
<th>Budget %</th>
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<tbody>
<tr>
<td>ADL's</td>
<td>4</td>
<td>Death</td>
<td>67.59%</td>
<td>95-100%</td>
<td>$684</td>
<td>95-100%</td>
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<td>Married</td>
<td>Married</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>AGE</td>
<td>82</td>
<td>Functional Decline</td>
<td>2.35%</td>
<td>25-30%</td>
<td>$45</td>
<td>25-30%</td>
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<td>SEX</td>
<td>Female</td>
<td>Hospitalization</td>
<td>7.66%</td>
<td>95-100%</td>
<td>$375</td>
<td>95-100%</td>
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<td></td>
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<td>Nursing home admission</td>
<td>61.86%</td>
<td>95-100%</td>
<td>$2,314</td>
<td>95-100%</td>
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<td></td>
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<td>Total</td>
<td></td>
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<td>$3,419</td>
<td>95-100%</td>
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</table>
Results of Randomized Trial

Figure 1: Average Spending by Case Managers on 25 Cases Each

Control group case managers are 1 – 12. Treatment group=13 – 24.
Figure 2. Case by case spending in relation to risk (treatment vs. control group)

Case by case spending in relation to risk

Nursing home admission risk

Spending
DOEA Project

• Use Florida CIRTS and Medicaid data for 1999-2004 on 50,000 clients
  – 600,000 observations
• Estimate risks of adverse outcomes
• Develop ERV budgets
• Provide budgeting methods to case managers
Our Estimates
Estimate Effectiveness

• Incidence reduction due to home care:
  • Death: 2.5%
  • Functional decline: 5.2%
  • Hospitalization: 18%
  • Nursing home entry: 20%
### Risk: Observed Vs. Predicted

Mean Rate of Hospitalization for Selected Subgroups

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Predicted</th>
<th>Actual</th>
<th>Ratio</th>
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</thead>
<tbody>
<tr>
<td>Male</td>
<td>0.0178</td>
<td>0.0178</td>
<td>1.00</td>
</tr>
<tr>
<td>Age over 80</td>
<td>0.0134</td>
<td>0.0133</td>
<td>1.01</td>
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<tr>
<td>Human help toileting</td>
<td>0.0155</td>
<td>0.0156</td>
<td>0.99</td>
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<tr>
<td>Human help transfer</td>
<td>0.0161</td>
<td>0.0160</td>
<td>1.01</td>
</tr>
<tr>
<td>Human help eating</td>
<td>0.0142</td>
<td>0.0135</td>
<td>1.05</td>
</tr>
<tr>
<td>Human help w/mobil</td>
<td>0.0161</td>
<td>0.0161</td>
<td>1.00</td>
</tr>
<tr>
<td>Mental/Alz. dx</td>
<td>0.0128</td>
<td>0.0128</td>
<td>1.00</td>
</tr>
<tr>
<td>Respiratory dx</td>
<td>0.0207</td>
<td>0.0207</td>
<td>1.00</td>
</tr>
<tr>
<td>Nonhyperten. circ.dx</td>
<td>0.0172</td>
<td>0.0172</td>
<td>1.00</td>
</tr>
</tbody>
</table>
Measuring Utiles

- Utiles are usually measured in QALYs
- QALYs are Quality Adjusted Life Years
  - (1 year of life at full health minus adjusted for reduced quality)
  - e.g., if one year of full health equals 1 QALY
  - and having one ADL dependency reduces the value of life by 20%
  - then prevention of loss of independence in one ADL=0.2QALY
- % reduction is arbitrary, or preference based
  - I used, 5ADL dependency=0 Quality of Life (0 QUALYs)
    - May understate value of 5ADL dependent life
      - and thus overstates value of preventing a single ADL decline
Value of Life

- Usually estimated by either human capital approach (lifetime earnings) but produces discrimination problems, or preferably willingness to pay (also called contingent valuation) – as revealed by extra pay for extra risky jobs, or population cost of life-saving products like air bags divided by lives saved in the population
Estimate Values

• Synthesized 42 estimates

• Regressed QALY on method & setting:
  • United States vs Other countries
  • Methods
    • Contingent valuation (willingness to pay)
    • Revealed preference (risky job premium)
    • Human capital (value of lifetime earnings)

• Results:
  • Death=$112,000
  • Hospitalization=$15,000
  • Nursing home=$10,000
  • Functional decline=$16,000