The Cost-Effectiveness of Improving Cancer Screening Compliance

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Background

- Cancer care spending in the US has increased dramatically over recent decades (from $13.1 billion in 1980 to $104.1 billion in 2005), albeit with much controversy over the sufficiency of the benefit.1-3
- Cancer screening may reduce cancer-related morbidity.4,5 Improving preventive care, including cancer screening, has been proposed by the current administration as a way to reduce costs.4
- The Healthcare Effectiveness Data and Information Set (HEDIS), a group of evidence-based performance measures, are used by over 90% of US managed care health plans. The measures cover over 70% of the most costly conditions in the US, include several cancer screening measures, and are used as the focus of many quality improvement (QI) programs.7,8
- We aimed to determine if money spent improving cancer screening would provide greater benefit than improving other aspects of healthcare.

Methods

- We developed a framework to incorporate both cost of QI and cost-effectiveness of interventions with a single measure, the QI-adjusted incremental cost-effectiveness ratio (QI-adjusted ICER). We used this framework to examine 18 HEDIS 2010 quality measures.

Literature Review

- We reviewed cost-effectiveness analyzses (CEAs) found in PubMed, the Tufts CEA Registry, and bibliographies of key articles.
- We included English research articles published since 1996, that considered the cost-effectiveness of complying versus not complying with a HEDIS measure, and that reported results such that costs and benefits of compliance could be calculated.
- From each accepted CEA, we abstracted total cost, effectiveness, cost-effectiveness, incremental cost-effectiveness, and per-treated-person cost of the intervention.
- In a separate search, we identified the cost of QI initiatives to improve performance on HEDIS measures.

Models

- Using US Census data10 and condition-specific incidence, we calculated total annual costs (2010 USD [$]) and benefits (quality-adjusted life years, QALYs).

Model Inputs for Cancer Screening Measures as an Example

<table>
<thead>
<tr>
<th>Measure</th>
<th>Cost-Effectiveness</th>
<th>Additional Annual Cost</th>
<th>Additional Annual Benefit</th>
<th>QI-adjusted ICER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cervical Cancer Screening</td>
<td>$22,991/QALY</td>
<td>$37,023/QALY</td>
<td>$90,730 QALY</td>
<td>$90,730 - $37,023 = $53,707/QALY</td>
</tr>
<tr>
<td>Breast Cancer Screening</td>
<td>$127.81c/QALY</td>
<td>$127.81c/QALY</td>
<td>$25,119/QALY</td>
<td>$25,119/QALY</td>
</tr>
<tr>
<td>Colon Cancer Screening</td>
<td>$70,890/QALY</td>
<td>$70,890/QALY</td>
<td>$41,267/QALY</td>
<td>$41,267/QALY</td>
</tr>
</tbody>
</table>

Results

- The literature search yielded 1,901 CEAs; 1,629 were excluded, and the remaining 272 were reviewed.
- Reaching 95% compliance with the 3 cancer measures would cost $5.1 billion and add 160,000 QALYs ($32,641/QALY).
- Reaching 95% compliance with all 18 measures would cost $13.4 billion and add 5.6 million QALYs ($2,314/QALY).

Overall Value of Improving HEDIS Compliance

- We used this framework to examine 18 HEDIS 2010 quality measures.

Conclusions

- Published studies of the cost-effectiveness of cancer screening have not considered QI costs—the cost of activities needed to actually change practice—and therefore have provided unrealistically low estimates of cost-effectiveness.
- Accurate assessment of the cost of increasing cancer screening requires integration of both the cost-effectiveness of the screening tests and the cost of the QI programs needed to change practice. We developed a model which allows this assessment.
- QI costs were substantial, resulting in an increase of 50-200% in the ICER for the cancer screening measures. However, even after incorporating QI costs, the mean qI-adjusted ICER for the three measures was $32,641/QALY suggesting that improving cancer screening compliance is cost-effective at a $50,000/QALY willingness-to-pay threshold.
- Our analysis shows that complying with cancer screening measures is cost-effective, even when the resources required to change established practices.
- Other findings:
  - Improving cancer on HEDIS measures overall is very cost-effective with a mean QI-adjusted ICER of $2,314/QALY.
  - Improving compliance with the measures that address overuse of care may save money.
  - The addition of HEDIS measures that address other overserved practices may be an effective approach for reducing healthcare spending.

Limitations

- Our finding that cancer screening is cost-effective is, at least in part, a function of the specific cancer screens included in HEDIS. For example, prostate-specific antigen screening for prostate cancer, which is not included in HEDIS, has an ICER of $262,758 per QALY saved, suggesting that our results could overestimate the true cost-effectiveness of cancer screening.
- Incremental costs and effects of compliance with HEDIS measures are based on a set of simplifying assumptions, the most important one being that costs increase linearly with increasing compliance. We varied this assumption in sensitivity analysis, and found the mean QI-adjusted ICERs among the cancer screening measures ranged from $16,968/QALY to $70,890/QALY.
- Estimates of QI cost were derived from small studies. These costs may vary widely from institution to institution or across regions.

References