Cost Implications of CT Imaging in Lung Cancer Screening

Prevent Cancer, Tysons Corner
Quantitative Imaging Workshop XIV: Lung Cancer, COPD and Cardiovascular Disease

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Disclosures

- The American Academy of Actuaries requires its members to disclosure their qualifications in making actuarial communications. I meet the Academy’s qualification standards for this work.

- Funding for my work on lung cancer screening has come from Prevent Cancer, Lung Cancer Alliance, National Electrical Manufacturers Association, Legacy Foundation, and others (to a lesser extent).

- My employer (Milliman, Inc.) consults to organization in almost all healthcare sectors, with a concentration on the insurance industry.

- I am a Commission on the Medicare Payment Advisory Commission (MedPAC), but I do not speak on behalf of MedPAC.
Recent historically low growth rates of health care spending have begun to gradually increase.

Data are preliminary and subject to change. Source: MedPAC analysis of National Health Expenditure Accounts from CMS, historical data released December 2016, projected data released March 2017.
The Most Important Healthcare Issue of Our Time

Spending on Medicare, other major health programs, Social Security, and net interest is projected to exceed total federal revenues in 22 years (by 2039)

Data are preliminary and subject to change.
Note: GDP (gross domestic product), CHIP (Children’s Health Insurance Program).
Source: Congressional Budget Office 2017.
Inefficient Healthcare Spending: The Elephant in this Conference
(and all other medical conferences)

Understanding Common Concepts in Risk and Risk Sharing

Defining Risk

Risk can be defined as the consequences of uncertain future outcomes. When two or more parties spell out who bears the potential burden of these consequences, such as financial gains or losses, they are risk sharing. Risk-sharing arrangements have many variations and many names, such as:

1. Accountable care
2. Advanced contracts
3. Alternative contracts
4. Outcomes-based contracts
5. Payment reform
6. Population health management programs
7. Risk contracts
8. Shared risk contracts
9. Pay-per-performance contracts
10. Value-based contracts

From a CMR-Milliman eLearning module on Risk Contracting
Fortunately, for Lung Cancer Screening, Studies that Use NLST or I-ELCAP Data All Show Favorable Cost-Benefit Results

<table>
<thead>
<tr>
<th>Component</th>
<th>Black et al. (22) (NLST)</th>
<th>Valenti et al. (1)</th>
<th>Pyenson et al. (23)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographic</td>
<td>Medicare</td>
<td>Commercial</td>
<td>Medicare</td>
</tr>
<tr>
<td>Age (years)</td>
<td>55–74</td>
<td>50–64</td>
<td>50–74</td>
</tr>
<tr>
<td>Stage shift for base case</td>
<td>NLST</td>
<td>I-ELCAP</td>
<td>I-ELCAP</td>
</tr>
<tr>
<td>Pack-years</td>
<td>&gt;30</td>
<td>&gt;30</td>
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<tr>
<td>Discount rates for life-years/cost/inflation</td>
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<td>0%/0%/0%</td>
<td>0%/0%/0%</td>
</tr>
<tr>
<td>Time horizon</td>
<td>Lifetime</td>
<td>Spending to age 65</td>
<td>Lifetime</td>
</tr>
<tr>
<td>Cost per LDCT*</td>
<td>$285</td>
<td>$180</td>
<td>$178</td>
</tr>
<tr>
<td>Utilization for screening follow-up</td>
<td>NLST data</td>
<td>I-ELCAP data</td>
<td>I-ELCAP data</td>
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<tr>
<td>Price of care</td>
<td>Repricing NLST data</td>
<td>Actual commercial data</td>
<td>Actual Medicare data</td>
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<tr>
<td>Indirect cost</td>
<td>Time and travel</td>
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<tr>
<td>Baseline year</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
Fortunately, for Lung Cancer Screening, Studies that Use NLST or I-ELCAP Data All Show Favorable Cost-Benefit Results

1. Huge mortality differences between early and late stage LC
2. A cure for the large majority of early stage cancers
3. Low cost screening with very low potential harms
4. A concentrated risk group
5. Readily available technology

Potential transformational system of care
Favorable cost/benefit implies favorable benefit

Why do the finance / economics people get it right – and the patient decision aid people get it wrong?
Cost-benefit: Each person goes through many years of screening...one year at a time. $ applied to each step.

Year 1: Screen, findings ➔ follow-up, treatment, survival
Year 2: Screen, findings ➔ follow-up, treatment, survival
Year 3: Screen, findings ➔ follow-up, treatment, survival
Year 4: Screen, findings ➔ follow-up, treatment, survival
Year 5: Screen, findings ➔ follow-up, treatment, survival
Year 6: Screen, findings ➔ follow-up, treatment, survival
Year 7: Screen, findings ➔ follow-up, treatment, survival
Year 8: Screen, findings ➔ follow-up, treatment, survival
Year 9: Screen, findings ➔ follow-up, treatment, survival
Year 10: Screen, findings ➔ follow-up, treatment, survival
Year 11: Screen, findings ➔ follow-up, treatment, survival
Year 12: Screen, findings ➔ follow-up, treatment, survival
Etc.
Naïve application of NLST

Year 1: Screen, findings → follow-up, treatment, survival
Year 2: Screen, findings → follow-up, treatment, survival
Year 3: Screen, findings → follow-up, treatment, survival
Year 4: findings → follow-up, treatment, survival

Year 5:
Year 6:
Year 7:
Year 8:
Year 9:
Year 10:
Year 11:
Year 12:
Etc.
Why do the patient decision-aids get it wrong?

- “They” say 80% of people who would die of LC will die with screening
- Recent cost-benefit studies all imply MUCH higher efficacy.
  - ten Haaf found >80% reduction for Ontario
  - Pyenson found >80%
  - Henschke’s observational data was ~80% reduction in LC deaths.

Population health’s unanimity on lung cancer screening: far ahead of medical advice

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Opportunities
1. to improve care?
2. to multiply inefficiency?

My Conjecture
• Integrated screening is not now a scientific issue but a business/system issue
•While multiplying inefficiency worked for healthcare in the past, emphasizing quality and outcomes is the only way integrated screening will see widespread adoption
Population Health Myths

- 80/20 rule ➔ focus on the most expensive
  - Can you predict who will be expensive?
  - Even if you can predict who will be expensive, can you do anything about it?
  - Can you change the course of patients who are already expensive?
  - Bring more inefficient care to the unfortunate patient

- Keep people healthy
  - Behavioral change
  - Psycho-socio-economic drivers
  - A version of blame the patient?
  - Compliance
Is better coordination the solution?