Cost Effectiveness of a Program to Promote Screening for Cervical Cancer in the Vietnamese–American Population

John F. Scoggins, Scott D. Ramsey, Victoria M. Taylor

April 10, 2009
The American Cancer Society recommends a Pap test once every 3 years

Fewer Vietnamese–American women adhere to this regimen than other ethnic groups

Cervical cancer incidence rate among Vietnamese women in the US is over twice the cervical cancer incidence rate among non-Latina white women (16.8 versus 8.1 per 100,000)

Data from Lay Health Worker intervention trial

During 2008, 234 non-compliant Seattle–area Vietnamese women were selected to participate in a randomized trial
## Lay Health Worker Trial Results

<table>
<thead>
<tr>
<th>Ever Screened</th>
<th>Arm</th>
<th></th>
<th>Diff.</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inter</td>
<td>Control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>20.3%</td>
<td>6.3%</td>
<td>14.06%</td>
<td>0.04</td>
</tr>
<tr>
<td>No</td>
<td>9.3%</td>
<td>7.7%</td>
<td>1.57%</td>
<td>1.00</td>
</tr>
<tr>
<td>All</td>
<td>15.3%</td>
<td>6.9%</td>
<td>8.36%</td>
<td>0.07</td>
</tr>
</tbody>
</table>
Objective of Our Study

- To measure the cost effectiveness of the lay health worker intervention
Cost Effectiveness

- Incremental Cost Effectiveness Ratio (ICER)
- Ratio of \( \Delta \text{cost} \) and \( \Delta \text{effectiveness} \)
- Pap ICER:
  \( \Delta \text{PapCost}/\Delta \text{Quality Adjusted Life Year} \)
- Intervention ICER:
  \[
  \frac{\text{cost of intervention} + (\Delta \text{PapFreq} \times \Delta \text{PapCost})}{\Delta \text{PapFreq} \times \Delta \text{QALY}}
  \]
## ICER Component Values

<table>
<thead>
<tr>
<th>ICER Component</th>
<th>Mean</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of intervention</td>
<td>$94.35</td>
<td>$6.00</td>
</tr>
<tr>
<td>ΔPapFreq</td>
<td>8.36%</td>
<td>4.59%</td>
</tr>
<tr>
<td>ΔPapCost</td>
<td>$146.52</td>
<td>?</td>
</tr>
<tr>
<td>ΔQALY</td>
<td>17 days</td>
<td>?</td>
</tr>
</tbody>
</table>
Pap ICER

- $\Delta\text{PapCost}/\Delta\text{QALY} = $3,155 per QALY
- Eddy (1990): $13,300 per Life Year Saved
- Marle (2002): $6,700 per LYS
- Maxwell (2002): $4,017 per LYS
- Goldie (2004): $9,950 per QALY
Intervention ICER

\[ \text{ICER} \equiv \frac{\text{cost of intervention} + (\Delta \text{PapFreq} \times \Delta \text{PapCost})}{\Delta \text{PapFreq} \times \Delta \text{QALY}} \]

\[ = \frac{\$94.35 + 0.0836 \times \$146.52}{0.0836 \times 16.95 \text{ QAL days}} \]

\[ = \frac{\$94.35 + \$12.25}{0.00388 \text{ QALY}} \]

\[ = \$27,457 \text{ per QALY} \]
Comparisons of Lay Health Worker Interventions

- $27,457 per QALY
- Mandelblatt (2004) study of breast cancer screening for AA women: $89,539 per QALY

  Cost of intervention/\Delta\text{PapFreq}  
  = $414.86\text{ vs. } $1,129 \text{ in our study}  
  ($12,088 \text{ vs. } $27,247).
Tornado Diagram

ΔPapFreq
Number of screenings
Discount Rate
Years since last Pap test
Cost of Intervention
Incidence of Cancer*
Utility Weight
Cost of Cancer
Cost of Pap Test
Prob. Abnormal Results*
Cost of Biopsy
Cost of Cautery
Prob. Cautery | Biopsy
Prob. Biopsy
Prob. Cautery | No Biopsy

* +/- 10% from mean
N-way Uncertainty Analysis

\[
\Delta \text{Costs} \quad \Delta \text{QALY}
\]

- \(< $0\)
- \(> $50,000\)
- \(< -$50,000\)

\(\$50,000\)
Conclusion

- Compared to a strategy of no interventions, the incremental cost-effectiveness of a lay-health-worker program to improve adherence to cervical cancer screening in Vietnamese women is $27,457/QALY.

- 80% probability that ICER < $50,000.

- Results are sensitive to patient history and duration of effect.