
What is being compared?

• For children currently aged 6-12 years with a negative or uncertain history of chicken pox:
  – Doing nothing
  – Serological testing
  – Presumptive varicella vaccination

• For adolescents currently aged 13-17 with a negative or uncertain history of chicken pox:
  – Doing nothing
  – Serological testing
  – Presumptive varicella vaccination
  – Presumptive varicella vaccination and then testing all (allows omission of the second vaccination if the adolescent has adequate antibody titres)
Are all of the relevant comparators included?

Are any irrelevant comparators included?

• Authors identify 1 additional strategy for adolescents
• Other options at the time?
  – ???
• Other options now?
  – No

Is it an appropriate clinical question?
Is it an appropriate clinical question?
• Initially had more to do with introduction of vaccine (and the large number of children who could not get the vaccine when they were younger)
• Now has more to do with special populations who were not vaccinated early in life (e.g., immigrants)

What type of analysis is being conducted?
• Cost-effectiveness analysis
  – $/chicken pox case prevented during 30 years of projected follow-up
  – “Best cost effectiveness ratio,” “Worst cost effectiveness ratio,” “Most desirable cost effectiveness ratio”
    • Is a larger or smaller ratio always better?
      – Do we know what we are willing to pay to prevent a case of chicken pox?
• ??? Cost-benefit analysis ???
  – Valuing life by measuring peoples’ livelihoods is a classic method for developing a “human capital” measure of the value of life
What perspective is used?

• Not clearly stated. Inclusion of work loss may suggest societal
• Is the perspective appropriate?
  – Unclear what decision maker the paper is trying to influence, so not sure if it is appropriate

What is the method of analysis?
What is the method of analysis?

• Decision Model

What is the appropriateness of:

The Model structure?

Probabilities and outcome data?

Appropriateness of:

• Model structure?
  – Very gross level of detail, but is more needed?
  – Didn’t know at the time, but now know that the vaccine doesn’t provide 30-year protection; should authors have considered loss of immunity/boosters?
  – Vaccine may protect against other diseases such as shingles

• Probabilities and outcome data?
  – Authors note that many probabilities not well known
    • % negative/uncertain with previous varicella
    • Adherence data borrowed from HBV
    • Protective effect of 1 vs 2 vaccinations
    • Probability of developing varicella over 30 years
What costs are measured?

- Short term
  - Vaccination and testing (vaccine, manufacturer; vaccine administration and venopuncture, labor and materials)
  - Initial physician visit omitted
  - Work loss due to vaccination

- Long term
  - Outpatient visits, ED visits, hospitalizations, drugs associated with future cases
  - Work loss due to chicken pox (parents, adolescents) and lost productivity due to death

What outcomes are measured?
What outcomes are measured?
- Persons with vaccine protection
- Chicken pox cases prevented
- ??? Value or work-loss / (CBA) ???

What is the appropriateness of:
- The categories of costs or outcomes that are included?
- Methods of measuring costs and outcomes?
- Time horizon given the economic question?
- The adjustment for differential timing of costs and effects?

What is the appropriateness of:
- The categories of costs or outcomes that are included
  - ???
- Methods of measuring costs and outcomes
  - Little to no detail on costs, thus hard to evaluate
- Time horizon given the economic question?
  - 30 years captures most of the costs and benefits, particularly given discounting
- The adjustment for differential timing of costs and effects?
  - Costs discounted at 5%/year
  - Health outcomes not discounted ???
### Results: Children ages 6-12

<table>
<thead>
<tr>
<th>Cost Incrm Cost</th>
<th>Cases Chk Px</th>
<th>Incrm Chk Px</th>
<th>ICER</th>
<th>Lieu CER</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Short Term Medical Costs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Int</td>
<td>0</td>
<td>--</td>
<td>0</td>
<td>--</td>
</tr>
<tr>
<td>Test</td>
<td>367,500</td>
<td>367,500</td>
<td>2244</td>
<td>2244</td>
</tr>
<tr>
<td>Vac</td>
<td>397,300</td>
<td>29,800</td>
<td>2396</td>
<td>152</td>
</tr>
<tr>
<td><strong>Long Term Social Costs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Int</td>
<td>573,100</td>
<td>0</td>
<td>--</td>
<td>Dominated</td>
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<tr>
<td>Test</td>
<td>535,700</td>
<td>2244</td>
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<tr>
<td>Vac</td>
<td>419,900</td>
<td>2396</td>
<td>152</td>
<td>Dominates</td>
</tr>
</tbody>
</table>

166 = 397,300/2396

### Lieu conclusions: 6-12

- Lack an established value for WTP makes it difficult to come up with a specific recommendation
  - Presumptively vaccinating all patients with a negative or uncertain history of chicken pox was a relatively cost-effective policy for school-age children
  - Vaccination and routine serotesting were almost equally cost-effective in medical costs alone
    - What data is she using to draw this conclusion?
    - Either policy resulted in savings from the long-term, societal perspective, which included work loss costs
    - Resulted in savings *BECAUSE* of work loss costs; there are cost offsets, but no savings, in health care costs
Sensitivity Analysis, short term medical cost, % with previous varicella

**Cost per Chickenpox Case Prevented, $**

<table>
<thead>
<tr>
<th>Proportion with Previous Varicella among 6 to 12 yoe with a Negative or Uncertain History</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaccinate All</td>
</tr>
<tr>
<td>Test All</td>
</tr>
<tr>
<td>Threshold = 20</td>
</tr>
</tbody>
</table>

- If these were the correct lines, how would we interpret them? Are they the correct lines?

Sensitivity Analysis, short term medical cost, % with previous varicella

**Rate of Adherence to Follow-up Visit**

- How do we interpret this graph? Does the uncertainty change your recommendation?

Do incremental costs and outcomes differ by subgroup?

<table>
<thead>
<tr>
<th></th>
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<td></td>
</tr>
<tr>
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<td>0</td>
<td>--</td>
<td>0</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Test</td>
<td>344,880</td>
<td>344,880</td>
<td>1200</td>
<td>1200</td>
<td>287</td>
<td>287</td>
</tr>
<tr>
<td>Vac+Tst</td>
<td>493,400</td>
<td>148,520</td>
<td>1309</td>
<td>109</td>
<td>1363</td>
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<tr>
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<td>144</td>
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<td>517</td>
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<tr>
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<td>1200</td>
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<td>89</td>
</tr>
<tr>
<td>Vac+Tst</td>
<td>605,800</td>
<td>151,000</td>
<td>1309</td>
<td>109</td>
<td>1385</td>
<td>197</td>
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<tr>
<td>Vac</td>
<td>825,100</td>
<td>219,300</td>
<td>1453</td>
<td>144</td>
<td>1523</td>
<td>329</td>
</tr>
</tbody>
</table>
• Presumptively vaccinating all patients with a negative or uncertain history of chicken pox was not a relatively cost-effective policy for adolescents
• "Policies that used serotesting were most cost-effective"  
  – BECAUSE:
  • Routine serotesting was the least effective policy but had the lowest cost effectiveness ratios
  • Presumptive vaccination followed by serotesting on a follow-up visit had intermediate costs and effectiveness
  • Presumptive vaccination without testing was the most effective but most costly policy, with an incremental cost per additional chicken pox case prevented of more than four times the basic cost per chicken pox case