Pricing in a Pandemic: Options, Debate, a Path Forward

Session Two: Cost-Effectiveness and Value-Based Pricing
## Panel Members

<table>
<thead>
<tr>
<th></th>
<th>Steven Pearson, MD, MSc</th>
<th>Jon Campbell, PhD</th>
<th>Eleanor Perfetto, PhD</th>
<th>Bobby DuBois, MD, PhD</th>
<th>Steve Miller, MD</th>
<th>Craig Garthwaite, PhD</th>
</tr>
</thead>
<tbody>
<tr>
<td>President, ICER</td>
<td>Moderator</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Steven Pearson, MD, MSc
- Jon Campbell, PhD
- Eleanor Perfetto, PhD
- Bobby DuBois, MD, PhD
- Steve Miller, MD
- Craig Garthwaite, PhD

- President, ICER
- Moderator

- Associate Professor, Pharmaceutical Outcomes Research, University of Colorado
- Executive Vice President of Strategic Initiatives, National Health Council
- Chief Science Officer and Executive Vice President, National Pharmaceutical Council
- Chief Clinical Officer, Cigna
- Associate Professor of Strategy, Kellogg School of Management, Northwestern University
Approaches to Pricing Novel COVID-19 Vaccines and Treatments

• Status quo: unrestricted pricing
• Cost-recovery pricing
• Value-based pricing
• Monetary prizes
• Compulsory licensing
• Advanced market commitments
Pricing Approaches

1. **Status quo: Unrestricted pricing.** Private companies develop vaccines and treatments, are rewarded with patent rights, and are allowed to decide how much to charge for the resulting products within a monopoly pricing paradigm.

<table>
<thead>
<tr>
<th>Pricing Approach</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status quo: Unrestricted pricing</td>
<td>• Tried and true approach that has produced truly innovative products with significant clinical benefits for patients</td>
<td>• Prices could be set so high as to create significant affordability problems, leading to access issues and increasing health insurance premiums</td>
</tr>
<tr>
<td></td>
<td>• Existing biopharmaceutical infrastructure positioned to respond to crisis with unrestricted pricing as the incentive</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• High prices in U.S. gives companies the opportunity to offer lower prices in developing nations</td>
<td></td>
</tr>
</tbody>
</table>
### Pricing Approaches

**Value-based pricing.** Private companies develop vaccines and treatments and are rewarded with patent rights, but government and/or private insurers use some form of cost-benefit analysis to set a ceiling price based on the degree of added benefit for patients and society.

<table>
<thead>
<tr>
<th>Pricing Approach</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
</table>
| Value-based pricing    | • Sets a ceiling price for new treatments based on clinical benefit patients receive, a price well-above a cost-recovery price for truly innovative products  
                         • Gives needed incentive to companies to invest in development  
                         • Creates a price ceiling to protect against most egregious excesses of unrestricted pricing | • Uncertainty of clinical benefit when a new treatment is first available can make calculations of value-based prices difficult  
                         • Value-based price calculations do not account for size of potential patient population, thus short-term affordability concerns not addressed |
## Panel Members

<table>
<thead>
<tr>
<th></th>
<th>Steven Pearson, MD, MSc</th>
<th>Jon Campbell, PhD</th>
<th>Eleanor Perfetto, PhD</th>
<th>Bobby DuBois, MD, PhD</th>
<th>Steve Miller, MD</th>
<th>Craig Garthwaite, PhD</th>
</tr>
</thead>
<tbody>
<tr>
<td>President, ICER</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderator</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Associate Professor, Pharmaceutical Outcomes Research, University of Colorado</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Executive Vice President of Strategic Initiatives, National Health Council</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chief Science Officer and Executive Vice President, National Pharmaceutical Council</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chief Clinical Officer Cigna</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Associate Professor of Strategy, Kellogg School of Management, Northwestern University</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

© 2020 Institute for Clinical and Economic Review
Remdesivir Cost-Effectiveness Model Collaborators

• Melanie D. Whittington, PhD
  • University of Kansas Medical Center

• Institute for Clinical and Economic Review (ICER)

• Drs. Whittington and Campbell (and their institutions) did not receive funding for the remdesivir cost-effectiveness analyses
  • No conflicts of interest to disclose related to this research
Alternative Pricing Models for Remdesivir and Other Potential Treatments for COVID-19

Initially Published: May 1, 2020
Last Updated: June 24, 2020

Prepared by:
Institute for Clinical and Economic Review
Melanie D. Whittington, PhD
Jonathan D. Campbell, PhD
Objective

Estimate the cost-effectiveness and corresponding health-based price benchmarks of remdesivir versus standard of care for hospitalized patients with advanced COVID-19 and lung involvement.
Model Characteristics

- Population: hospitalized patients with advanced COVID-19 and lung involvement
- Perspective: health care sector
- Time Horizon: lifetime
- Outcomes: total costs, quality-adjusted life years (QALY), equal value of life years gained (evLYG)
- Scenarios
  - no mortality benefit,
  - dexamethasone as part of standard care,
  - hospital stays paid exclusively through per diem amounts,
  - Mild to moderate subpopulation
Model Structure

Short-term Decision Tree

- Patients hospitalized with COVID
  - Placebo
    - Hospitalization
    - ICU without ventilator [+]
    - ICU with ventilator [+]
    - Remdesivir [+]
  - Remdesivir [+]

Long-term Markov Model

- M1. Alive
- M2. Dead
Model Evidence and Assumptions

• Evidence from the Adaptive COVID-19 Treatment Trial (ACTT-1) and other sources (model inputs in report)

• Treatment costs for remdesivir were in addition to a bundled hospital payment

• Assumed no remdesivir safety-related cost or disutility

• Assumed those who recovered have age-adjusted general population morbidity and mortality risk
## Base-Case Results: Health-based Ceiling Prices

<table>
<thead>
<tr>
<th>Threshold</th>
<th>Base-case (assuming mortality benefit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$50,000 per QALY and per evLYG</td>
<td>$4,580 - $5,080</td>
</tr>
<tr>
<td>$100,000 per QALY and per evLYG</td>
<td>$18,640 - $19,630</td>
</tr>
<tr>
<td>$150,000 per QALY and per evLYG</td>
<td>$32,700 - $34,180</td>
</tr>
</tbody>
</table>

*For all price benchmarks that include a range, the lower value was derived from QALYs and the higher value was derived from evLYGs.*

evLYG = equal value of life years gained
QALY = quality-adjusted life year
Scenarios: Health-based Ceiling Prices

- No mortality benefit
  - $310 to $930
- Dexamethasone as part of standard care
  - $2,520 to $22,590
- Hospital stays paid exclusively through per diem amounts (assumed reduced time to recovery = reduced hospital stay)
  - $11,710 to $39,830
- Mild to moderate subpopulation
  - $2,360 to $15,920

<table>
<thead>
<tr>
<th>Threshold</th>
<th>Base-case (assuming mortality benefit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$50,000 per QALY and per evLYG</td>
<td>$4,580 - $5,080</td>
</tr>
<tr>
<td>$100,000 per QALY and per evLYG</td>
<td>$18,640 - $19,630</td>
</tr>
<tr>
<td>$150,000 per QALY and per evLYG</td>
<td>$32,700 - $34,180</td>
</tr>
</tbody>
</table>
Decision Nodes

• What threshold?

• Why not disseminate an estimate of the broader societal perspective in previous version?

• When to make updates?

• How to involve stakeholder input?
Concluding Remarks

• Cost-effectiveness informed health-based ceiling prices for remdesivir range from hundreds of dollars to tens of thousands of dollars.
  • Gilead set the remdesivir price in the thousands for a treatment course ($2,340 to $3,120 announced on June 29)

• For future COVID-19 Treatments
  • Key Evidence Needs: Mortality rate and age within standard of care, reduction in hospital days, reduction in mortality
  • Decision Nodes and Pandemic Accommodations
    • Signal proper incentives to innovate without overpaying
Thank You

Next ICER Colloquium:

Monetary Prizes, Compulsory Licensing, Advanced Market Commitments

Friday, August 7th 12:00PM EST