Million Dollar Therapies for Rare Conditions: Rethinking Value

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Agenda

• Basic Economics of Drug Development
• Value and Value Frameworks
• Augmented Cost-Effectiveness Analysis for Rare/Health-Catastrophic Conditions
• Challenges for Industry Sustainability
There is no clear upward trend in pharmaceutical manufacturer productivity.

Mullard, A; 2018

What is a “medicine” from an economic perspective?

• One input in a “health production function”:
  • $H = H(\text{physician visits, hospital care, medicines, own time, OTHER})$
  • “OTHER”—the social determinants of population health

• What about an “innovative” drug?
  • Represents new information or knowledge.

• What is unique about new information or knowledge from an economic perspective?
  • It’s a NOT a private good: it’s a “public good.”
  • It’s NOT ONLY a public good, it’s a GLOBAL public good.

• Free markets will tend to undersupply public goods (below what is socially optimal).
  • Therefore, intervene, but how?
  • Patents (intellectual property) and subsidies.
Drug Development: Complex, Risky, and Costly

New Tufts Estimate--$2.6 Billion Per New Medicine

Only about 20-25 percent of drugs tested in humans make it to the market

“... the cost to develop and win marketing approval for a new drug has increased by 145% between the two study periods, or at a compound annual growth rate of 8.5%.”

Rising Real Prices of Oncology Medicines in US

![Graph showing drug price per life year gained versus drug approval date.](image)
Falling Returns in Pharma

Source: Berndt et al., 2015

ISPOR Initiative on US Value Assessment Frameworks
STF Final Report. Feb. 2018
Decision Contexts and Value Frameworks

Working Premise

“. . . it is critical to investigate these value frameworks because of the signals they send to innovators. Value-based approaches can encourage firms to produce more of what is being optimized in the frameworks, and discourage them from bringing to market products that do not produce good value. Ideally, that means society will benefit from medical products and healthcare technologies that efficiently improve the health and welfare of the population according to consistent and well-founded measures of value. Conversely, ill-conceived frameworks could produce long-lasting harms by encouraging innovators to develop treatments that fail to produce real value.” [emphasis added]

Source: STF Final Report [1], ViH, Feb. 2018
What is “Value”?

• From an economic perspective:
  • Value is what someone is (actually) willing to pay or forgo to obtain something (opportunity cost)

• Implications:
  • Varies across individuals, across indications for the same medicine, and dynamically over time (as more evidence becomes available and competitors emerge).
  • Difficult to measure in health care because of insurance
  • In principle, we would ask a plan member about their willingness to pay the incremental insurance premium (or taxes). In practice, the amount is too small to be estimated reliably.

Societal Revealed Preference Example: Cost per Quality-Adjusted Life Year--Hemodialysis (versus No Treatment)

<table>
<thead>
<tr>
<th></th>
<th>1980</th>
<th>TODAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost per Year for Dialysis (in current $)</td>
<td>$50,000</td>
<td>$88,000</td>
</tr>
<tr>
<td>Quality Adjustment Factor for Dialysis [.6 x 1 year]</td>
<td>0.56</td>
<td></td>
</tr>
<tr>
<td>Quality Adjustment Factor for Death</td>
<td>0.0</td>
<td></td>
</tr>
</tbody>
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C-E Ratio = \[ \frac{\text{Incremental Cost}}{\text{Incremental Benefit}} \]

= \[ \frac{$50,000 - 0}{0.56 - 0} \]

= \$89,000/QALY \[ \text{\$157,000/QALY} \]
Two approaches to setting threshold

• Extra-welfarism
  • UK-NHS: maximizing QALYs from fixed budget: implies constant marginal threshold
  • In practice, this is over-ridden with other considerations., e.g., rarity.

• Welfarism
  • US/market-oriented based on individual utility maximization
  • Each citizen has a unique threshold.
  • Or, more generally, each citizen has a number of variable thresholds that depend on the severity of disease, and rarity and catastrophic health impact of a disease.

\[ \text{Value} \]

Green circles: core elements of value
Light blue circles: common but inconsistently used elements of value
Dark blue circles: potential novel elements of value
Blue line: value element in traditional payer perspective
Red line: value element also included in societal perspective

\textit{NOTE: This is an animated slide. Two big petals pop-up.}
Evidence and Uncertainty in Rare Diseases

- Evidentiary challenges in rare diseases:
  - They are often fatal or have severe health consequences.
  - Natural history of disease is often not well understood.
  - Trials are difficult to design, with RCTs facing ethical barriers, resulting in low levels of evidence.

**Implications:**
1) Greater uncertainty about the ultimate value (i.e., cost-effectiveness)
2) Greater need for post-launch RWE and re-assessment of value.

- **“Insurance value”** — accrues to “all premium-paying beneficiaries who are at risk albeit low of developing a given rare disease.” Depends on “its severity and its rarity.”

- **“Value of health equity”** — “individuals may feel significantly greater altruism. . . “ Related to “fair innings”

- **“Large spillover effects to loved ones.”** e.g., caregiver burden and well-being
My Contention

• In a US context (of extra-welfarism), one can argue for a higher WTP threshold based on insurance value for a rare and health-catastrophic disease.

• The questions are:
  1. How much high much higher would this threshold be?
  2. How much is justified by insurance value vs. other factors (e.g., ethical/rule of rescue, family spillovers)?
  3. How do we handle the large number of “million dollar” therapies? Reinsurance could be key.

How to aggregate elements of value?

1. Monetization of elements in addition to cost per QALY
   • Extended CEA—Risk protection and equity impact (used in global health)
   • Augmented CEA—ECEA+other factors
   • Net Monetary Benefit (NMB)—change in QALY x WTP threshold + Net cost

2. Multi-criteria Decision Analysis (MCDA)
   • Analytical Hierarchy Process (AHP)
   • Multi-attribute utility theory (MAUT)
   • Deliberative processes
Thanks!

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