AN ANALYTIC APPROACH TO INCORPORATE PATIENT PREFERENCES INTO VALUE ELEMENTS FOR ECONOMIC EVALUATION

SUSAN DOSREIS, JULIA SLEJKO, DARIUS LAKDAWALLA, RICHARD WILLKE

ISPOR 2019 – NEW ORLEANS, LA
MAY 20, 2019
POLLING AND Q&A

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In your experience with measuring treatment benefits for CEA, the biggest challenge has been:

- Finding instruments that capture treatment-specific areas of benefit
- Adjusting health state utilities for treatment-specific areas of benefit
- Adapting models to include treatment-specific areas of benefit
- All of the above
WORKSHOP OVERVIEW

Goals

• Demonstrate through audience participation how to elicit and prioritize novel patient-driven value elements
• Illustrate how to quantify patient-driven value elements
• Present approaches to incorporate patient-driven values into economic evaluations
• Discuss novel value elements
INTRODUCTION

Selected recommendations from ISPOR’s Special Task Force on Value Assessment Frameworks

Fundamental concepts in conventional value assessment

Benefit measurement challenges
AUDIENCE POLL

Are you familiar with ISPOR’s Special Task Force on Value Assessment?
AUDIENCE POLL

How familiar are you with DCE?
Base health plan coverage and reimbursement decisions on an evaluation of the incremental costs and benefits of healthcare technologies as is provided by cost-effectiveness analysis.

Explore and test novel elements of benefit to improve value measures that reflect the perspectives of both plan members and patients.
QALYs – the most common benefit measure for CEA

Quality-Adjusted Life Years Gained

Without Program

With Program

Death

Death

QUANTITY OF LIFE (Years)

QUALITY OF LIFE (Weights)
VALUING TREATMENT BENEFIT

Key Steps:

• What elements of benefit should be valued?
• Do you try to value these elements all together?
• Or do you value them separately? If so, how do you combine them into a single metric?

And how do you make it as patient-centric as possible?
POTENTIAL ELEMENTS OF VALUE FOR AUGMENTED COST-EFFECTIVENESS ANALYSIS (ACEA)

Valuing elements all together: Standard Gamble approach

CHANCE BOARD

Choice A

100

Perfect Health

0

Death

Choice B

100

For the rest of your life you:
• Think, remember and talk clearly
• Get around with some difficulty
• Perform self care with some difficulty
• Are in severe physical pain or discomfort
EUROQOL QUESTIONNAIRE (EQ-5D)

MOBILITY
- I have no problems in walking about
- I have some problems in walking about
- I am confined to bed

SELF-CARE
- I have no problems with self-care
- I have some problems washing or dressing myself
- I am unable to wash or dress myself

USUAL ACTIVITIES (e.g. work, study, housework family or leisure activities)
- I have no problems with performing my usual activities
- I have some problems with performing my usual activities
- I am unable to perform my usual activities

PAIN/DISCOMFORT
- I have no pain or discomfort
- I have moderate pain or discomfort
- I have extreme pain or discomfort

ANXIETY/DEPRESSION
- I am not anxious or depressed
- I am moderately anxious or depressed
- I am extremely anxious or depressed

Valuing elements all together:
Multi-attribute utility index approach
In some diseases and treatment situations, benefit relies on novel elements or more specific considerations - ways to handle this include:

- Direct utility function estimation
- Discrete choice experiments
- Mapping PROs to utility measures
BENEFIT MEASUREMENT

CHALLENGES

Whose perspective?

- Health plan enrollees
  - May have an a priori perspective – Rawlsian “veil of ignorance”
  - Are making cross-disease choices about their insurance “package”
- Patients with disease
  - Know the disease experience much better than the average enrollee
  - Are making actual treatment decisions

Aggregation of values

- Some benefit elements are difficult to capture with utility measures
- Some benefit elements may apply more to society than to individuals (eg, equity)
- Different stakeholders may need to be included in the decision-making process
  => A flexible, transparent deliberative process such as MCDA may be needed
Patient-Driven Value Elements

Eliciting, Prioritizing, and Estimating Preferences
Patient-Driven Value Element Development: General Approach

• A bottom-up approach using a staged and systematic process to identify patient-driven value elements that are important in healthcare decision-making
  • Engage patients directly to elicit the elements of value
  • Validate the value elements across diverse patient communities
  • Identify value element priorities specific to a health condition
• Use a stated preference method (e.g., discrete choice experiment) to assess trade-offs among a select set of prioritized value elements
• Estimate preference weights that can be used to assess maximum acceptable risk
## Patient-Driven Value Element: Elicitation and Validation

<table>
<thead>
<tr>
<th>Phase 1</th>
<th>Phase 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Elicit Patient-Driven Value Elements by Engaging Key Patient Stakeholders</strong></td>
<td><strong>Validate Patient-Driven Value Elements with Diverse Patient Groups</strong></td>
</tr>
</tbody>
</table>
| A. Review the literature  
1) Elements in existing value frameworks  
2) Patient values in healthcare decision-making  
3) Economic evaluations with patient-driven value elements | A. Assess the relative importance and meaning of individual patient-driven value elements  
1) General rating of importance (high, medium, low)  
2) Define the meaning of the element |
| B. Engage patient stakeholder advisors  
1) Relevance of each element to patients  
2) Added novel patient-driven value elements  
3) Defined the meaning of the element to patients | B. Obtain feedback from an expert panel |
**Example of a Validation Question**

Goal of this exercise is to determine whether to keep this value element or drop it from the list

<table>
<thead>
<tr>
<th>Tolerability</th>
<th>Would you rephrase the element label or the definition?</th>
<th>If yes, how would you rephrase the element label or the definition?</th>
<th>How important to treatment decision-making is this to the patient community?</th>
</tr>
</thead>
<tbody>
<tr>
<td>The ability to endure treatment (side effects, dosing, administration burden, etc.).</td>
<td>Yes</td>
<td>No</td>
<td>High</td>
</tr>
</tbody>
</table>

The ability to endure treatment (side effects, dosing, administration burden, etc.).
Patient-Driven Value Elements Ranked High Importance by Patient Stakeholders

<table>
<thead>
<tr>
<th>Value Element Ranked High Importance by &gt;75%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tolerability</td>
</tr>
<tr>
<td>Side Effects</td>
</tr>
<tr>
<td>Ability to Maintain Relationships with Family Members</td>
</tr>
<tr>
<td>Ability to Work</td>
</tr>
<tr>
<td>Impact on Depression</td>
</tr>
<tr>
<td>Affordability</td>
</tr>
<tr>
<td>Long-term Costs</td>
</tr>
<tr>
<td>Reimbursed Care</td>
</tr>
<tr>
<td>Available Treatment</td>
</tr>
<tr>
<td>Appropriateness of Care</td>
</tr>
<tr>
<td>Provider Willing to Deliver Care</td>
</tr>
<tr>
<td>Explanation of Treatment (Risks &amp; Benefits)</td>
</tr>
</tbody>
</table>
Patient-Driven Value Element: Prioritization

When considering a treatment, which of the following factors do you most value?

Select the 5 most important to you.

<table>
<thead>
<tr>
<th>Treatment Related Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medication Frequency</td>
</tr>
<tr>
<td>New Therapeutic Option</td>
</tr>
<tr>
<td>Available Treatment</td>
</tr>
<tr>
<td>Appropriateness of Care</td>
</tr>
<tr>
<td>Provider Relationship &amp; Trust</td>
</tr>
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<td>Affordability</td>
</tr>
<tr>
<td>Long-Term Costs</td>
</tr>
<tr>
<td>Reimbursed Care</td>
</tr>
<tr>
<td>Fatigue</td>
</tr>
<tr>
<td>Length of Treatment</td>
</tr>
</tbody>
</table>
Patient-Driven Value Element: Prioritization

When considering a treatment, which of the following factors do you most value?

Select the 5 most important to you.

<table>
<thead>
<tr>
<th>Outcome Related Factors</th>
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<tbody>
<tr>
<td>Intermediate/Surrogate Outcomes</td>
</tr>
<tr>
<td>Maintain Social Activities</td>
</tr>
<tr>
<td>Ability to Work</td>
</tr>
<tr>
<td>Physical Abilities</td>
</tr>
<tr>
<td>Emotional Status</td>
</tr>
<tr>
<td>Impact on Career</td>
</tr>
<tr>
<td>Predictable Healthcare Needs</td>
</tr>
<tr>
<td>Ability to Plan</td>
</tr>
<tr>
<td>Life Expectancy</td>
</tr>
<tr>
<td>Autonomy/Dependence</td>
</tr>
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</table>
Identify Patient-Driven Value Element Priorities Among Patients with COPD

• Qualitative Methods
  • Recruit 30 individuals to provide feedback on value element priorities
  • Select the 5-7 value elements to design a discrete choice experiment (DCE) instrument

• Quantitative Methods
  • Engage the patient community in the DCE design
  • Pre-test the DCE
  • Administer to a larger patient sample
  • Obtain utilities and calculate the benefit-to-risk trade-off
Patient-Driven Value Element Priorities Among Patients with COPD

Preliminary Findings

<table>
<thead>
<tr>
<th>Treatment-Related</th>
<th>Number Selecting as a Priority</th>
<th>Outcome-Related</th>
<th>Number Selecting as a Priority</th>
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<tbody>
<tr>
<td>Side Effects</td>
<td>12</td>
<td>Physical Abilities</td>
<td>15</td>
</tr>
<tr>
<td>Medication Frequency</td>
<td>10</td>
<td>Maintain Social Activities</td>
<td>8</td>
</tr>
<tr>
<td>New Therapeutic Option</td>
<td>9</td>
<td>Ability to Plan</td>
<td>7</td>
</tr>
<tr>
<td>Provider Relationship &amp; Trust</td>
<td>9</td>
<td>Relationship with Family</td>
<td>7</td>
</tr>
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Translating Patient-Driven Value Elements to CEA
A Case Study in COPD Modeling
Patient Drive Value Elements ➔ Model Inputs

The approach we’ll discuss today:

- Use prioritization of Value Elements to inform model inputs
- Use results from DCEs to derive or adjust health-state utilities
How do we typically model COPD CEAs?

Among economic evaluations of COPD treatments, frequent modeled outcomes/endpoints are **exacerbations and forced expiratory volume (FEV1)**

- These are important for prescribers in making a treatment decision.
- How do these align with value elements important to patients?


PRS63: (Poster session IV): Identifying COPD Patient-Informed Value Elements in Economic Evaluations- a Systematic Review.
Generic Model of COPD

• Traditional methods require inputs on effectiveness, costs, health state utilities.

Exacerbations are an important endpoint; commonly reported in trials.
## Treatment- and Outcome-Related Value Elements

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Patient Drive Value Elements ➔ Model Inputs

Side effects & Medication Frequency
• Examine model structure and basic assumptions
• Identify model inputs that need modification
• Incorporate DCE results
Model Structure

- If drugs with differential dosing can be compared in a CEA, a number of model elements may reflect differences due to dosage.

There may or may not be evidence about improved efficacy for exacerbations or other endpoints, but other inputs would be affected.
# Medication Frequency: Model Input Changes

<table>
<thead>
<tr>
<th>Component of CEA</th>
<th>Effect of Element</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modeled Treatments (model structure &amp; assumptions)</td>
<td>E.g. Drug A (1x/day) vs. Drug B (2x/day)</td>
</tr>
<tr>
<td>Costs</td>
<td>Is Drug A more expensive? Typically, we model cost per day/week/month, so different dosing would result in different costs if the drug product itself were priced differently.</td>
</tr>
<tr>
<td>Drug Efficacy/Effectiveness (probabilities)</td>
<td>Dosage frequency would be reflected through measures effectiveness. i.e. does Drug A prevent exacerbations/lung function decline better than Drug B?</td>
</tr>
<tr>
<td>QALYs</td>
<td>Health state utilities derived from EQ-5D, if not collected from a specific trial of Drug A vs. Drug B, will be generic for COPD health states.</td>
</tr>
</tbody>
</table>
Health State Utilities

• Models are typically naïve to preferences about dosage.

• COPD health state utilities typically depend on HRQoL outcomes, not on the drug attributes themselves.

Can we use information about preferences to ‘adjust’ the health state utilities used in our model for Drug A vs. Drug B?

Discrete Choice Experiment (DCE)

• Stated preference method that ask respondent to rate, rank or choose from a set of profiles containing attributes/levels.

• Allows us to quantify the impact of changes in attribute levels on choice.

• Regression models estimate interpretable preference weights.

Discrete Choice Experiment Results

For example:


<table>
<thead>
<tr>
<th>Preference-naïve model</th>
<th>Drug A (1x/day)</th>
<th>Drug B (2x/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moderate COPD</td>
<td>.832</td>
<td>.832</td>
</tr>
<tr>
<td>Dosage-adjusted preferences</td>
<td>&gt;.832</td>
<td>&lt;.832</td>
</tr>
</tbody>
</table>

What adjustments can we make given our data on preferences?
Audience Poll

• I would consider eliciting Patient-Driven Value Elements for studies of...
The Frontiers of Healthcare Value Assessment

Darius N. Lakdawalla, PhD
University of Southern California
The Economic Theory of Healthcare Value Assessment Struggles to Value Therapy for Severe and/or Rare Illness

Policymakers often ignore cost-effectiveness criteria when treating severe illnesses.

**NHS England**

**Cancer Drugs Fund**

The Cancer Drugs Fund (CDF) is a source of funding for cancer drugs in England. On 29 July 2016, a new approach to the appraisal and funding of cancer drugs in England began operating.

To see which treatments are currently funded by the CDF, please see the Cancer Drugs Fund list.

This new approach provides:

- Access to promising new treatments, via managed access arrangement, while further evidence is collected to address clinical uncertainty.
- Interim funding for all newly recommended cancer drugs, giving patients access to these treatments many months earlier than before.

The UK’s public health watchdog is pressing ahead with plans to introduce a “dynamic upper limit” to the price new orphan drugs recommended for use in the National Health Service (NHS) can command.

The approach will introduce “a sliding scale, so that the more the medicine costs the greater the health benefit it must provide in order to be approved for routine use.”

The upper limit for orphan drugs will be £300,000 ($370,000) per quality-adjusted life year, triple the amount originally proposed by the National Institute for Health and Care Excellence (NICE).
Conventional Approach to Valuing Healthcare Takes an Incomplete Perspective

**Conventional Question:** How much would sick people pay for technology to treat their illness?

**Relevant Question:** What additional premiums or taxes would healthy people pay for technology?

*Using insurance premia or taxes*
Key Insight: The Healthy Value Medical Technology for Different Reasons than the Sick

- To a healthy person, illness is a risk, not an existing condition

- The healthy value medical innovation because it protects them from risk of falling sick – analogous to an insurance policy that protects against losses to property

- These values are the “insurance value” of medical technology (Lakdawalla, Malani, Reif, *Journal of Public Economics*, 2017)
The more Severe the Illness, the Greater is the Error in Economists’ Conventional Value Estimates

Source: Lakdawalla, Malani, Reif (2015, NBER Working Paper 2015)
Estimating Insurance Value Requires Just One Additional Parameter

Insurance value depends on an individual’s degree of risk-aversion, which is well-estimated in the economics literature.

Risk-aversion, along with the standard set of parameters in a cost-effectiveness analysis, is sufficient to recover insurance value.

Incorporating insurance value leads to more accurate inferences about the value of treating severe conditions.
Focusing on Median or Average Clinical Benefits May Lead to Mistaken Inferences

<table>
<thead>
<tr>
<th>Survival (months)</th>
<th>Ipi</th>
<th>Gp100</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>25%</td>
<td>0%</td>
</tr>
<tr>
<td>24</td>
<td>24%</td>
<td>7%</td>
</tr>
<tr>
<td>36</td>
<td>22%</td>
<td>0%</td>
</tr>
<tr>
<td>48</td>
<td>20%</td>
<td>0%</td>
</tr>
</tbody>
</table>

- **Median Survival**: 10 months (Ipi), 6.4 months (Gp100)
- **Payers and media focus here**
- **Patients may focus here**
71% of Cancer Patients Surveyed Preferred a Therapy with Positively Skewed Outcomes to One with a Sure 24-Month Gain

- 71% of patients preferred to gamble on "Therapy B"
- ...even though it raises the risk of earlier death

All patients gain exactly 24 months on Therapy A

All patients gain +54 months (20%)

<+10 months 50%

Average patient +24 months
Estimating “Value of Hope” Requires One (or Two) More Parameters

Just as risk-aversion measures a patient’s aversion to uncertainty, "prudence" is the parameter measuring a patient’s taste for positively skewed outcomes.

Health technology assessment can leverage a variety of existing estimates of consumer’s degree of “prudence” in the existing literature.

The analyst also needs to know the positive skew in the distribution of clinical outcomes – this is not always estimated in RCTs.
Aligning Health Technology Assessment with the Preferences of Real-world Patients

Analysts have often taken ad hoc approaches to resolving the challenge of valuing treatments for highly severe illnesses.

Theoretical and empirical tools now exist to take a more systematic approach.

Incorporating insurance value and the value of hope into health technology assessments can help bridge the gap between value assessments and the values of patients.
DISCUSSION