Using patient preferences to drive patient-centered innovation in dialysis

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Overview: Patient Preference Information (PPI)

• What is it?

• How does the FDA use it?

• What are the opportunities?
What is PPI?
Patient preference information (PPI)

• Qualitative or quantitative assessments of the relative desirability or acceptability to patients of specified alternatives or choices among outcomes or other attributes that differ among alternative health interventions

• PPI captures the value that patients place on aspects of the medical device in a way that accounts for differing perspectives on benefits and risks that come with using that device or treating the condition

How is PPI different from PRO?

**PPI ≠ PRO (patient-reported outcome)**

- **PRO**: any report of the status of a patient’s health condition that comes directly from the patient, without interpretation of the patient’s response by a clinician or anyone else
  - PRO instruments are designed to measure a patient’s perceptions of health status before, during, and after therapy

- **PPI** studies measure what specified type of therapy or attributes of a given therapeutic or diagnostic strategy a patient might prefer

## PPI methods

<table>
<thead>
<tr>
<th>Group</th>
<th>Method</th>
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</table>
| Structured weighting| • Simple direct weighting  
• Ranking exercises  
• Swing weighting  
• Point allocation  
• Analytic hierarchy process  
• Outranking methods |
| Health-state utility| • Time trade-off  
• Standard gamble                                                          |
| Stated preference   | • Direct assessment questions  
• Threshold technique  
• Conjoint analysis and discrete choice experiments  
• Best-worst scaling exercises |
| Revealed preference | • Patient preference trials  
• Direct questions in clinical trial                                     |
Measuring trade-offs in nephrology: a systematic review of discrete choice experiments and conjoint analysis studies

Michael D. Clark¹, Ala Szczepura², Anil Gumber³, Kirsten Howard⁴, Domenico Moro⁵ and Rachael L Morton⁶


A Discrete Choice Study of Patient Preferences for Dialysis Modalities

Rachael C. Walker,¹,² Rachael L. Morton,³ Suetonia C. Palmer,⁴,⁵ Mark R. Marshall,⁶,⁷,⁸ Allison Tong,¹,⁹ and Kirsten Howard⁹

How does the FDA use PPI?
Patient input in the total product life cycle

- **Patient-Informed Needs**
  - **DISCOVERY + IDEATION**

- **Human-Centered Design**
  - **INVENTION + PROTOTYPING**

- **CLINICAL**
  - Patient-Informed Clinical Trial Design
  - Patient-Reported Outcomes

- **REGULATORY DECISION**
  - Communicating Benefit-Risk Information to Patients

- **PRODUCT LAUNCH**
  - Patient-Informed

- **POST-MARKET MONITORING**
  - Patient-Centered Outcomes

**Benefit-Risk Information**

**Patient-Centered Outcomes**

**Patient-Informed Needs**

Human-Centered Design

Human Factors

Slide Credit - Michelle Tarver, FDA CDRH and KHI.
PPI and Center for Devices and Radiologic Health (CDRH)

**FDA Benefit-Risk Guidance**
Stated the factors to consider in making a benefit-risk assessment, including collecting patient-centric metrics to measure benefit and ways of measuring a patient’s tolerance for risks

**CDRH Public Workshop**
Convened experts in health economics, social sciences, patient advocacy, and the medical device industry to discuss methods and tools for measuring treatment preference as well as gaps in evidence

**CDRH Final Guidance**
How to include patient perspectives in regulatory submissions

**CDRH Patient Preference Initiative**
Gathered patient and stakeholder views on the best way to measure patient risk tolerance and benefit preference


Guidance for Industry, Food and Drug Administration Staff, and Other Stakeholders

Document issued on August 24, 2016. This document will be in effect as of October 23, 2016. The draft of this document was issued on May 18, 2015.

For questions about this document regarding CDRH-regulated devices, contact the Office of the Center Director (CDRH) at 301-796-5900 or Ananita Salas at 301-796-2537. (Ananita.Salas@fda.hhs.gov)

For questions about this document regarding CBER-regulated devices, contact the Office of Communication, Outreach, and Development (OCOD) at 1-800-855-3709 or 240-402-8010.

U.S. Department of Health and Human Services
Food and Drug Administration
Center for Devices and Radiological Health
Center for Biologies Evaluation and Research

PPI Framework Concepts

• Patients vary greatly in the degree to which they will accept risk for a given benefit.

• A patient preference study can assess preferences for a population overall as well as heterogeneity in preference and whether there are distinct subgroups whose preferences would lead them to make different decisions.

• Such studies provide information for whether to consider approving a device for an entire population or only for those patients whose preferences are such that they regard benefits as exceeding risks.

Roles for PPI in regulatory science

1) Framing benefit-risk issues

2) Identifying patient subgroups with decision-relevant differences in preferences

3) Providing information for quantitative benefit-risk modeling
PPI useful when diseases are “preference sensitive”

- Patient decisions regarding treatment options are preference sensitive when:
  - Multiple treatment options exist and there is no option that is clearly superior for all patients
  - When the evidence supporting one option over others is considerably uncertain or variable
  - Patients’ views about the most important benefits and acceptable risks of a technology vary considerably within a population, or differ from those of healthcare professionals

What are the opportunities?
In-center hemodialysis for kidney failure

• In-center hemodialysis is difficult
  • Travel to clinic at least 3 times per week
  • High treatment-associated symptom burden
  • Difficult to work, travel, and/or go to school
  • Burdensome medication regimens and dietary restrictions

• Home dialysis, wearables, implantables, or other alternatives may increase convenience and/or tolerance of treatment
Kidney failure is “preference sensitive”

<table>
<thead>
<tr>
<th>Preference-sensitive condition</th>
<th>Dialysis-dependent kidney failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple treatment options and no clearly superior option for all patients</td>
<td>✓</td>
</tr>
<tr>
<td>Evidence for one option over others is uncertain or variable</td>
<td>✓</td>
</tr>
<tr>
<td>Patients’ views about the most important benefits and acceptable risks of a technology vary considerably within a population</td>
<td>✓</td>
</tr>
<tr>
<td>Self-use treatment vs. treatment by a health care professional</td>
<td>✓</td>
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To determine if experienced home hemodialysis patients would perform solo home hemodialysis after considering the benefits and risks of treatment

To identify risk tolerance thresholds for which experienced home hemodialysis patients would remain willing to perform solo home hemodialysis

Regulatory PPI example: solo home hemodialysis

Company and FDA Discussions + Community (Patient) Input → Qualitative Survey → Informed Consent Tool → Discrete Choice Model → FDA Clearance of solo home hemodialysis

Shared decision between patient and clinician via supplemental user guide

Additional solo ancillary equipment and training
Other PPI examples

Human-centered design human factors
(Survey with ranking, interviews)

Human factors considerations in designing a personalized mobile dialysis device: An interview study

Ji-Eun Kim, Larry Kessler, Zach McCauley, Itsumi Niiyama, Linda Ng Boyle

Risk Benefit Assessment
(Choice-based conjoint discrete choice instrument)

Next-Generation Renal Replacement Therapies (RRT): How Do Patients Weigh the Risks and Benefits?

Wilson, Frassetto, Sarathy, Fissell, and Roy.
Kidney Health Initiative PPI Project (in progress)

Integrating Patient Preferences into Regulatory Decision Making to Advance Innovation in Kidney Disease

- **Overall objective:** Develop a sustainable strategy for collecting PPI from a representative sample of dialysis patients to drive patient-centered innovation in dialysis devices

- **Specific objectives:** Develop a pilot patient preference survey that will serve as a prototype of similar surveys to be administered in the future
  - Survey development and administration
  - Infrastructure development (sustainable process for administration)
Kidney Health Initiative PPI Project

Collaborative 3-year effort

- KHI (diverse stakeholder convener)
- FDA
- Academic nephrologists
- Patient advisors
- Research partners

**Scope:** PPI re: wearable dialysis devices (HD or PD)
- Selected because more “near-term” and immediately useful to the FDA
Summary - PPI studies in regulatory science

- Well-designed and conducted PPI studies can provide valid and important evidence regarding patients’ risk tolerance and perspective on benefit

- **Strong patient preference studies**
  - *All about patients*
    - Patient-centered
    - Sample representativeness
    - Capture heterogeneous preferences
  - *Good study design*
    - Rigorous methods
    - Minimal cognitive bias
  - *Good study conduct and analysis*
    - Robust conduct and analysis

Diverse Stakeholders
- Patients
- Industry
- Professional Organizations
- Academic Centers
- FDA