

cost-utility analysis in the same way one considers a change in blood pressure, A1C or LDLs as an effectiveness measure in a cost-effectiveness analysis. The connection of a benefit in QALY to the long term benefit in disease outcomes has largely not been made for most US payers. There are pockets of change from the perspective of the employer, where a connection between the QALY and employee productivity is clearer, and perhaps in the integrated health care system where all costs are accounted for. This would appear to be highly relevant to a single payer such as Medicare; however the drug benefit for the elderly is delivered through the fragmented private payer.

In conclusion, I applaud the initiative to bring researchers, decision makers, and observers together to contribute to an ongoing dialogue of how to resolve current barriers to the acceptance of the QALY as a measure of patient benefit, the assignment of a cost to that benefit, and the application of this evidence to improved decisions in the future.

For further details on this ISPOR invitation-al (funded by a grant from US Agency for Health Care Research and Quality) workshop, see: <http://www.ispor.org/meetings/MeetingsInvited.aspx>.

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POLICY ANALYSIS

Patient Preference Methods - A Patient Centered Evaluation Paradigm

John FP Bridges PhD, Assistant Professor, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, USA; Ebere Onukwugha PhD, Assistant Professor, University of Maryland, School of Pharmacy, Baltimore, MD, USA; F. Reed Johnson PhD, Senior Fellow, RTI Health Solutions, RTP, NC, USA; A. Brett Hauber PhD, Senior Economist, RTI Health Solutions, RTP, NC, USA

The increased focus on patient reported outcomes (PROs) in medical research in recent years has heightened the awareness of the patient's perspective of health outcomes. It is unclear, however, if the use of PROs alone will lead us toward patient-centered care or if we need to rethink some of the foundations of our research methods in order to better understand the patient's point of view. The aim of this paper is to draw awareness to an alternative class of methods that are rooted in economic theory known as patient preference methods that, although being used in many other sectors of the economy (both public and private alike), have been somewhat neglected in health care. While patient preference methods are related to PROs, health related quality of life and the expected-utility methods used to motivate quality adjusted life years (QALYs), they are also a distinct class of methods that are increasingly being applied in medicine [1]. Despite the growing popularity of preference methods such as conjoint analysis and willingness to pay (WTP) in outcomes research, there remains some confusion about them among outcomes researchers, not only in terms of best practice, but in terms of how they differ from the current evaluation paradigm in our field. This paper attempts to address the second of these questions by highlighting why patient preference methods constitute a more patient-centered, theory-based, and flexible group of methods than the current status quo.

Benefits of Patient Preference Method

While it has been well documented in the health economics literature that patient preference methods are far more grounded in economic theory [1-3] and are far more patient centered [4] than the current health related quality of life (HR-QoL) and QALY methods used in outcomes research, it is really the flexibility of the methods that should capture the interest of most outcomes researchers. Patient preference methods are flexible in that they:

- can be designed to focus either on the total value of medical interventions (including both process and outcome features), or on the marginal effect that modifying a single factor has on the value (e.g. marginal innovation);

- can be used to evaluate interventions that currently do not currently exist (i.e. hypothetical treatments) allowing evaluation to commence before a program/intervention is implemented or even designed/developed;
- address issues of patient choice, and hence can be used to understand diseases like obesity, diabetes, and coronary-artery disease where long term prognosis depends directly on patient lifestyle choice [4-5];
- focus on issues of patient adherence [6]; and
- focus on process-related aspects of health care in addition to health outcomes [1, 7].

Patient preference and HR-QoL

While both patient preference methods and the traditional patient reported HR-QoL methods aim to make outcomes research more patient-centered, it is important to distinguish between the two methods.

- Patient-reported HRQoL methods are concerned with measuring the patient's status along several aggregate domains (for example, mental, physical, functional, social, and emotional domains). Outcomes in a given domain are focused on attempting to identify a given state of being (albeit with bounds set a priori by the researcher) and are less focused on attempts to identify or value how the respondent feels about being in that state of health; while
- Patient preferences are concerned with measuring the patient's value for a specific component, or attribute, either in absolute terms or in relation to another attribute. The relative importance is identified by choices that inevitably require trading off one or more desirable outcomes (including price/co-payment) in a given area (or domain) in order to obtain a more desirable composite outcome.

Patient reported HR-QoL measures provide real-time information along general or disease-specific domains as reported by the patient. This type of information is useful for qualifying a person's health

status by, for example, adjusting survival measures to account for decreased quality of life. Unlike patient preference methods, PROs capture patient reports of outcomes in individual domains and thus do not provide information about patient preferences across domains [8]. Information about patient preferences across domains facilitates efforts to characterize and better understand patients' needs and wants. Consider a patient who receives a steroid treatment for her skin problem. A HR-QoL would capture the patient's ratings of symptom relief (desired outcome, e.g. relief of itching) and adverse reactions (undesirable outcome, e.g. weight gain) by self-report. Clinicians or researchers would understand the status or improvement of status with the steroid treatment. However, the preference of the person regarding the relative importance of the advantage (i.e. symptom relief) versus the discomfort (i.e. adverse reaction), or vice versa, is not captured. This relative importance is exactly what patient preference methods seek to quantify. Another important difference between the two approaches relates to the scientific nature of the methods - the HR-QoL approach aims to provide a statistically valid measure that provides general results, while preference methods focus on an economic sense of validity (an outcome is valid if it is valued by patients) and can be used to estimate very specific results that allow detailed sub-group analysis - potentially conducted even at the individual level.

Methods to Measure Patient Preferences

Preferences can be understood and measured in two ways. Stated-preference methods use surveys/questions to elicit subjects' preferences for hypothetical options in an experimental framework. Alternatively, revealed-preference methods are based on observed data relating to individuals' actual behavior. In the latter, individuals never directly state their preferences (except maybe at an auction), but observed choices made in real decision

contexts reveal their implicit preferences [2]. Revealed preference data indicate how patients choose among available alternatives under actual clinical conditions. While such data can tell us what patients do, they often provide little information on why they do it. SP methods give researchers experimental control over choice alternatives, and ensure statistical variability necessary to estimate decision weights for individual features.

In medicine, while revealed-preference methods have the advantage of incorporating the clinical, emotional, and financial consequences of actual health care decisions, revealed-preference data often cannot answer decision-makers' questions. Revealed-preference data may lack variability in these factors or factors of interest may be confounded with other variables. For example, suppose there are only two available treatments. Treatment A has better efficacy, a worse side-effect profile, and higher cost. Treatment B has poorer efficacy, a better side-effect profile, and lower cost. If patients choose Treatment B instead of Treatment A, we cannot say whether they did so because the better side-effect profile was more important than improved efficacy, lower cost was more important than improved efficacy, or some combination of effects. Stated-preference methods give researchers experimental control over the choice context, which makes it possible to estimate the relative importance of each factor in the experimental design.

The contingent-valuation or willingness-to-pay (WTP) method is one example of a stated-preference method. In its simplest form, subjects are offered a hypothetical treatment with specified features at a specified cost and asked whether they would be willing to pay the cost or not. Conjoint analysis (also called discrete-choice experiments or stated-choice method), employs a sequence of evaluations of hypothetical choice sets. In each evaluation, >

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respondents are asked to choose their preferred alternative from a set of two or more alternatives in which each alternative is defined by attributes of the alternative. Conjoint analysis has a history in market research, environmental economics, and transport economics and has found increasing use in health care settings [1, 3, 9].

What Do We Learn from Preference Methods?

Unlike other PRO methods, stated-preference methods have a clear conceptual basis in neoclassical consumer theory [1, 9]. Although the term utility in health contexts usually refers to von Neumann-Morgenstern expected (cardinal) utility used to construct quality-adjusted life years, most applied research in economics relies on neoclassical (ordinal) utility theory based on the concept of preferences (i.e. an ordering of possibilities). This theory postulates that an individual has complete preferences (any two options can be compared to one another), reflexive (a given option can be compared to itself), and transitive (if A is preferred to B and B is preferred to C, then one can conclude that A is preferred to C). These properties are testable. Using the concept of utility to interpret preferences (it is important to recall that in neoclassical economics utility is derived from preferences, not the reverse), provides additional mathematical assumptions of continuity (that very small changes in the consumption basket should not lead to very large changes in utility), monotonicity (to allow linear modeling of factors), and convexity (to avoid multiple equilibrium).

WTP provides a monetary measure of what a person is willing to give up in order to obtain something else or achieve a specific outcome. Therefore, WTP is a measure of implicit value rather than a measure of cost. While economists often use WTP to measure value, many people are uncomfortable about valuing health benefits in monetary units. The same neoclassical utility framework that allows us to value dissimilar outcomes in comparable monetary units can be used to value dissimilar outcomes in other common units. For example, time-tradeoff surveys use stated-preference data to identify time-equivalent health states. Conjoint methods can be used to value both process and outcome attributes of drug therapy [9]. This flexibility of the method is due to its roots in utility theory and the recognition that patients care not just about their physical, emotional and mental state while on a given therapy but also about the mode, location, and timing of administration. Recently, several studies have used conjoint methods to estimate maximum acceptable risk instead of maximum WTP [10, 11]. In many situations, it may be sufficient, and even helpful, simply to quantify the relative importance weights for efficacy, mild-to-moderate side effects, serious adverse event risks, convenience factors, and cost without scaling the preference parameters in money, time, or risk units [12].

Applications of the Methods

Recent examples of stated-preference methods indicate the wide range of applications including outcomes (e.g. illness, death) and process issues related to the provision of care (treatment options, treatment locations; educational programs) [3]. Examples include studies to estimate predictors of choice over anemia treatment scenarios among cancer patients [13], determinants of non-adherence to bipolar disorder treatments [6], relative importance of aspects of insulin therapy [12], WTP for a diabetes reduction program among high-risk individuals [5], preferences for HIV treatment options [9], patient preferences over treatment location involving intravenous antibiotic therapy [14], parents' WTP to avoid a cold [5], WTP to reduce the risk of death from severe acute respiratory syndrome [16].

While many think that QALY measure attempt to value the health care states, they fail to adequately embrace preference theory, focusing rather on expected-utility theory. This said, there has been a movement in outcomes research

to value the QALY using method more grounded in economic theory such as WTP, conjoint analysis and other preference related methods. This growing body of research, in some respects, can be thought of as the missing link between traditional outcomes research methods and modern applications of patient preference methods.

Challenges with Using the Methods

Despite their wide-ranging applications, challenges exist in the application of patient-preference methods, particularly with stated preference methods. As with any approach that focuses on self-reported results, there are concerns as to whether patients are providing responses that are consistent with their true preferences [1, 3]. The researcher must create an environment in which responders consider choice alternatives and constraints seriously, despite not having to experience the consequences of those choices. This bias also can be characterized as a lack of acceptability [13]. A related issue has to do with the extent to which responses are internally consistent [13]. Internal consistency can be tested in a number of ways including the addition of dominant alternatives, use of multiple techniques to value a pair of alternatives, measures of correlation between answers to similar questions, and internal checks for transitive preferences [3].

In addition to the challenges of the experimental setting, there are concerns as to whether patients whose decision making capacity is otherwise incapacitated are able to provide, either directly or through a proxy, responses that are consistent with their true preferences. These concerns arise, for example, in the elicitation of preferences among patients who suffer from Alzheimer's disease, dementia, or stroke such that the patient may be unwilling or unable to participate in a study. In addition there are other challenges related to the collection and analysis of the data that might impact the reliability of the inferences drawn from the study.

As currently practiced, researchers using conjoint methods apply a set of rules in determining the experimental design - the final set of choice scenarios that are presented to the patient. The implicit assumption is that the addition of deleted scenarios to the choice set will not alter the results regarding which attributes are important to the decision making process. This assumption may not hold; there may be omitted scenarios that, if presented, would result in a different set of attributes that are identified as important. However, continuing advances in experimental design methodology ensure that the likelihood of a bias is minimized.

Other challenges can arise once the quantitative data have been assembled and are ready for analysis. Misspecification of the model used in the analysis might result in misleading or inaccurate assessments of attribute levels important for decision making as well as correlates of WTP. Misspecification can arise in the form of an omitted conditioning variable; inappropriate functional form (e.g. assuming additive, instead of multiplicative or nonlinear effects); violation of the independence of irrelevant alternatives assumption; failure to adjust for endogenous covariates; or failure to adjust for correlated data [1]. The increasing use of advanced multivariable models like mixed logit and hierarchical Bayes regression models lead to more reliable inference using stated choice data. Along with the opportunity comes the challenge of specifying, testing, and drawing correct inference from the model results.

Conclusion


It is clear that patient preference methods present an alternative method for characterizing patient needs and wants. Unlike patient-reported HRQoL methods, the focus is on understanding the relative importance of attributes via revealed or stated preferences. Preference methods are flexible and adaptable to practically any health-related question and are thus uniquely

suiting to quantifying the effect of treatment features on adherence, the trade-offs between health outcomes and other treatment features, the risk-benefit tradeoffs, and/or monetary valuations related to treatment options. Patient preference methods offer a scientifically rigorous alternative to traditional patient-centered outcomes research methods and are worth a closer look.

Postscript

Future work of the ISPOR Patient Preference Methods Special Interest Group (SIG) aims to increase the appropriate application of contingent valuation, conjoint analysis, stated choice/preference, discrete-choice experiment and similar methods for assessing patient preferences and values in outcomes research and encourage the use of this information by decision-makers. In the coming year we will focus on developing recommendations for good research practices for patient preferences methods, initially focusing on conjoint analysis methods. Interested ISPOR members who would like to contribute to these activities should refer to our web page at: (www.ispor.org/signs/PRO_PPMI.asp) or contact the group's chair, John F. P. Bridges at: jbridges@jhsp.edu.

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