Health Years in Total

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Affordable Care Act /Inflation Reduction Act language

‘‘(c)(1) The Secretary shall not use evidence or findings from comparative clinical effectiveness research conducted under section 1181 in determining coverage, reimbursement, or incentive programs under title XVIII in a manner **that treats extending the life of an elderly, disabled, or terminally ill individual as of lower value than extending the life of an individual who is younger, nondisabled, or not terminally ill.**”

Health Years in Total (HYT)

An alternative that can solve the inherent bias of QALYs without failing to appreciate the nuanced benefits (or harm) of treatment during the added years of life

Basu, Carlson, Veenstra. *Value in Health* 2020

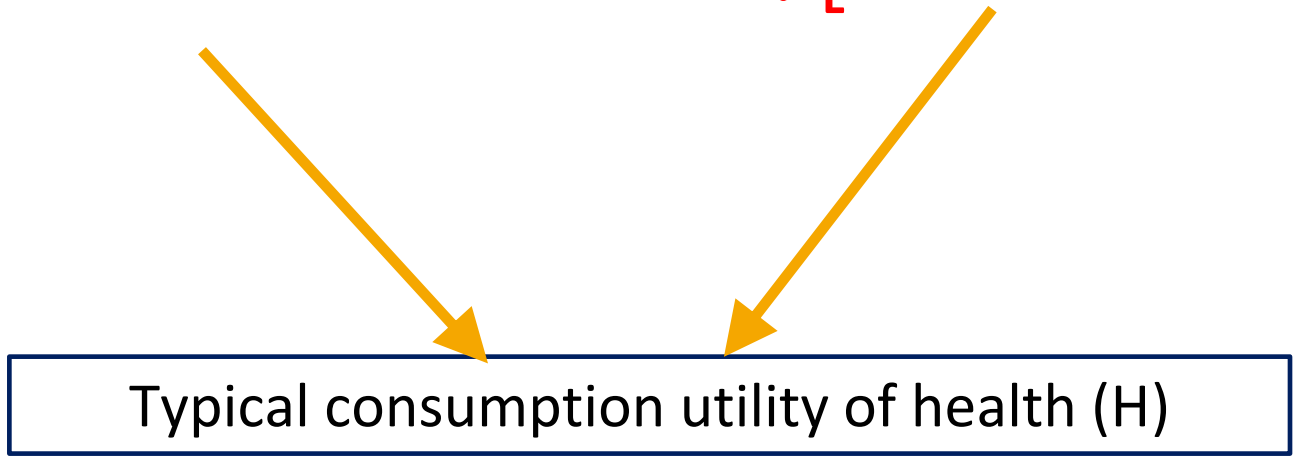
Two Primary Dimensions of Health

Quality of Life

- individual's overall well-being stemming from their health
- **q(H)**

Length of Life

- expected life expectancy
- **L**



Consumption Utility for Health

Intrinsic/Experiential Utility	That a consumer experiences
Decision Utility	That a consumer uses to make decisions, e.g., to answer a time-trade-off question or to choose a therapy.
Normative Utility	A social planner uses to do welfare analysis

Kahneman et al., QJE 1997; Bernheim and Taubinsky, Handbook BE 2018; Reck and Seibold NBER 2024

Consumption Utility for Health
Expected Utility Formulation

Intrinsic/Experiential Utility $U(H) = q(H) \cdot L$

Decision Utility $q(H) \cdot L$ = Used for QoI elicitation using TTO

Normative Utility $q(H) \cdot L$ = QALY model

Fanshel and Bush, Oper Res 1970; Torrence et al. Health Serv Res 1972; Bleichrodt et al. JRU 1997

Literature on non-EU application to QALY

- Non-EU approaches applied to the elicitation of QoL weights
  - i.e., obtain estimates of QoL weights using prospect theory for decision utility

- Less work on applying non-EU approaches to normative utility

Attema et al. *JHE* 2016; Doctor et al. JHE 2004; Bleichrodt and Pinto, *EJ* 2015

Consumption Utility for Health
Reference-Dependent Formulation

Intrinsic/Experiential Utility $U(H) = q(H)\cdot L$

Decision Utility $q(H)\cdot L + V(H, R)$

Normative Utility $q(H)\cdot L + V'(H, R)$

Additional Terms for Reference® Dependence

Bleichrodt and Pinto, *EJ* 2015; Bernheim and Taubinsky, Handbook BE 2018; Reck and Seibold NBER 2024

A Reference-Dependent Utility (RDU) Foundation

Reference: R = {Q* , L* }

Q* = Best QoI Possible = 1,

L* = Max LE possible

- Reference constant for everyone – reflect normative preeferences

- Reference (may) shift with new technology.

Kahneman and Tversky's (1979); Bleichrodt 2007;

Consumption Utility for Health
Proposed Reference-Dependent Formulation

Intrinsic/Experiential Utility $U(H) = q(H)\cdot L$

Decision Utility $q(H)\cdot L - (Q^* - q(H))(L^* - L)$

Normative Utility $q(H)\cdot L - (Q^* - q(H))(L^* - L)$

Bleichrodt and Pinto, *EJ* 2015; Kőszegi and Rabin 2006; Masatlioglu and Uler 2013

A Reference-Dependent Utility (RDU) Foundation

Decision and Normative Utility for a treatment k generating q_k & l_k, give R:

$$U(q_k, l_k, R) \quad \propto \quad (l_k + L^* \cdot q_k) \qquad = \qquad HYT$$

Basu, Carlson, Veenstra. *Value in Health* 2020

A Reference-Dependent Utility (RDU) Foundation

Decision and Normative Utility for a treatment k generating q_k & l_k, give R:

$$U(q_k, l_k, R) \propto (l_k + L^* \cdot q_k) = HYT$$

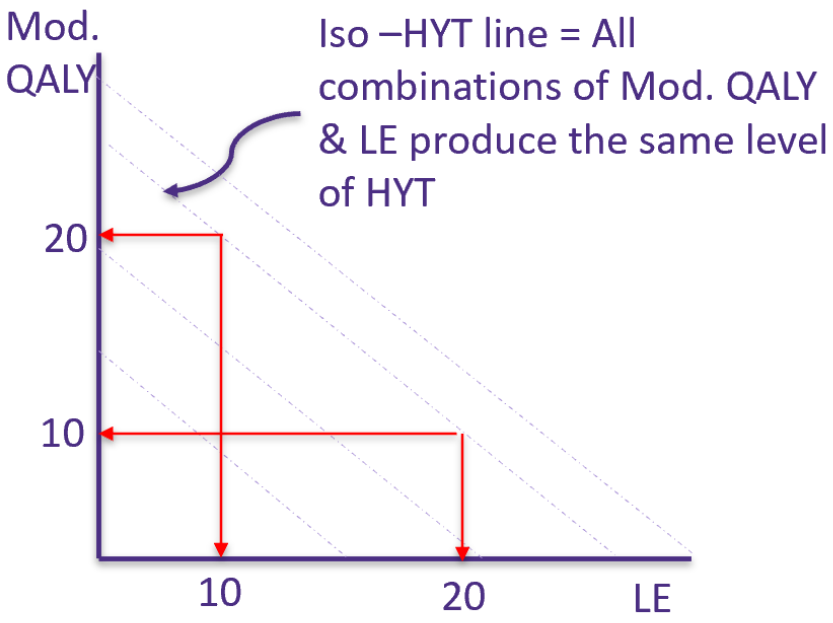
Life Expectancy for Trt. k

Modified QALY for Trt. k

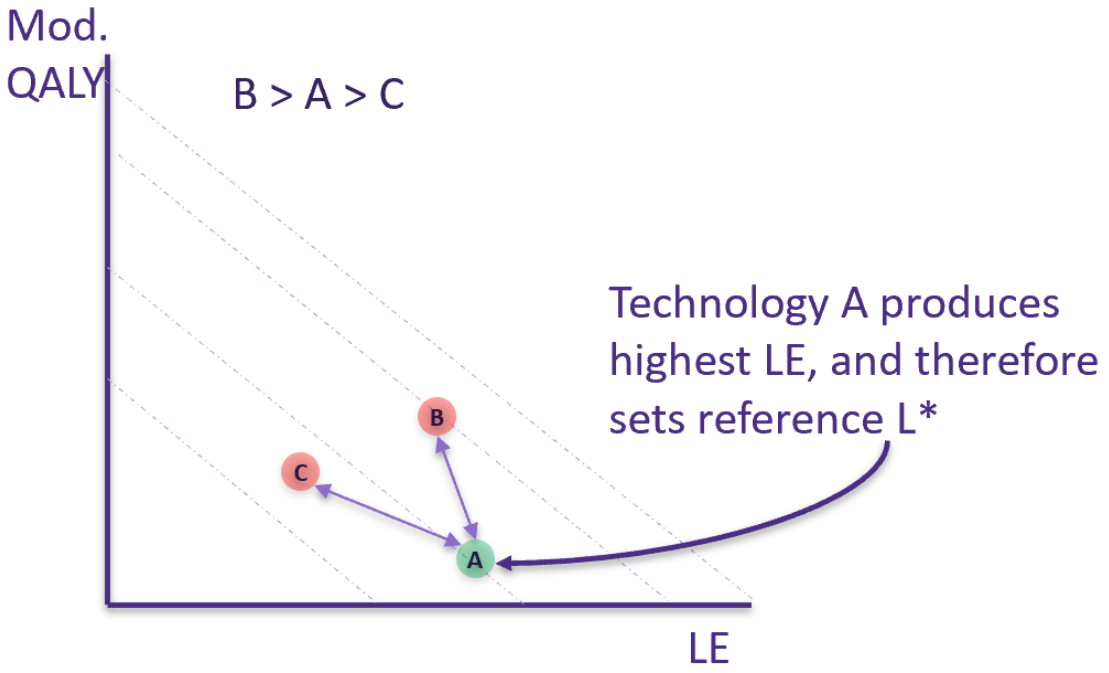
Basu et al. VIH 2020

Properties of HYT

Additively Separable Formulation



Treatment Choices



Other properties of HYT

Questions	Answers
• Would TTO measures of QoL be no longer valid?	• No! HYT-based Decision Utility applied to TTO would produce the same estimate of QoL weights
• Meet IRA requirements?	• YES!

Other properties of HYT

Questions	Answers
• Would TTO measures of QoL be no longer valid?	• No! HYT-based Decision Utility applied to TTO would produce the same estimate of QoL weights
• Meet IRA requirements?	• YES!
• Is extra information required to calculate HYT?	• NO.
• Independence from Irrelevant Alternatives?	• Maintained in EU; Violated in RDU if R changes
• Are we imputing positive QOL after death in HYT?	• No! Positive QOL under counterfactual for living longer

HEALTH VALUE =

$$\boldsymbol{A} \cdot (75K) \cdot \begin{pmatrix} (Healthy\ Years\ from\ Longevity) \\ +(Healthy\ Years\ from\ QoL) \end{pmatrix}$$

A represents an overall equity weight greater than zero to recognize the overall disease burden and other social value elements (e.g., inequality aversion) to place on a target population

10:00AM - 11:15AM SPOTLIGHT SESSION

319: How to Adjust Economic Models for Health Equity in the Conduct of Generalized Cost-Effectiveness Analysis (GCEA)

HEALTH VALUE =

$$\boldsymbol{A} \cdot (75K) \cdot \begin{pmatrix} (2 - \boldsymbol{B}) \cdot (Healthy\ Years\ from\ Longevity) \\ +\boldsymbol{B} \cdot (Healthy\ Years\ from\ QoL) \end{pmatrix}$$

B represents a weight ranging from zero to two to determine whether longevity or QoL gains are valued more than the other. The standard HYT metric assumes B = 1.

$$q(H) \cdot L - (\boldsymbol{B} \cdot Q^* - q(H))\,((2 - \boldsymbol{B}) \cdot L^* - L)$$

HEALTH EQUITY WITH HYT

Basu et al. *Health Affairs Forefront* 2023

Price Acceptability Curves

Annals of Internal Medicine

ORIGINAL RESEARCH

Gene Therapy Versus Common Care for Eligible Individuals With Sickle Cell Disease in the United States

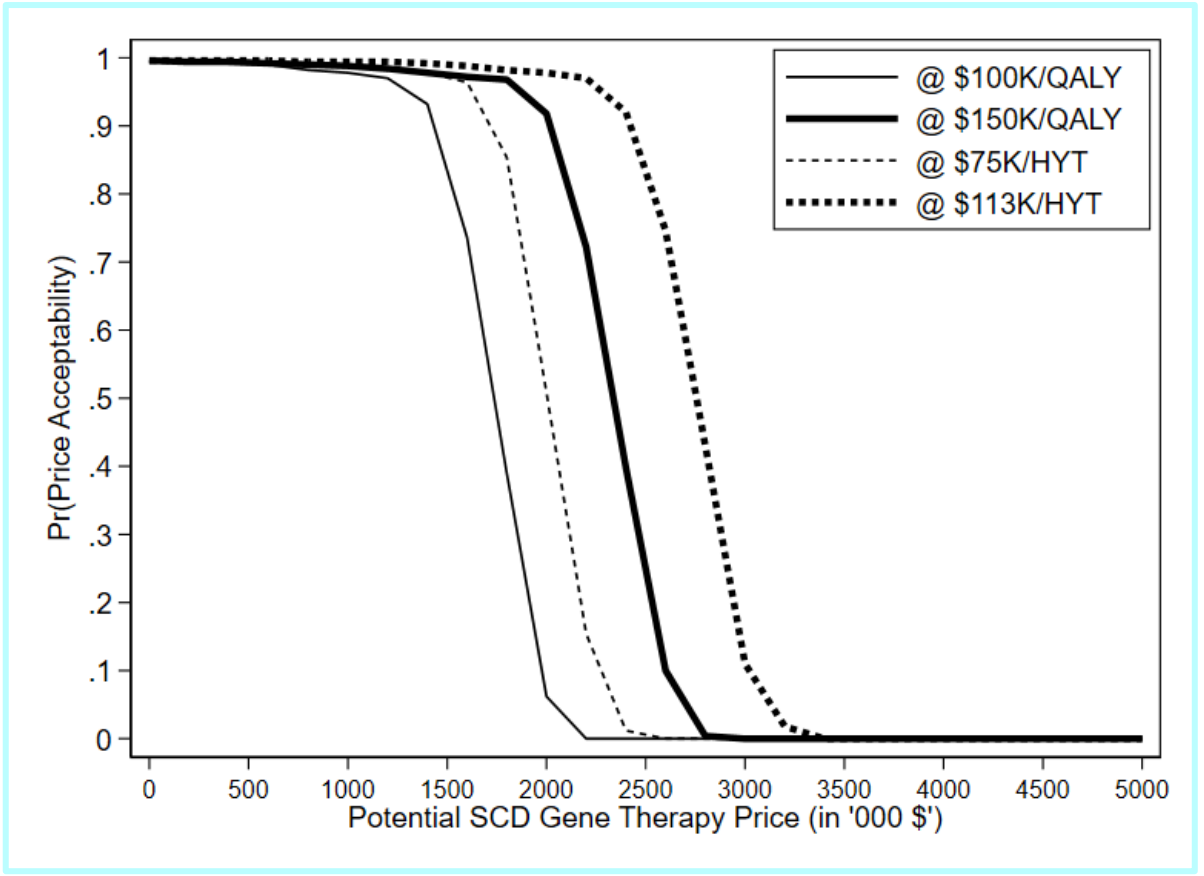
A Cost-Effectiveness Analysis

Anirban Basu, PhD; Aaron N. Winn, PhD; Kate M. Johnson, PhD; Boshen Jiao, PhD, MPH; Beth Devine, PhD, PharmD, MBA; Jane S. Hankins, MD, MS; Staci D. Arnold, MD, MBA, MPH; M.A. Bender, MD; and Scott D. Ramsey, MD, PhD

Background: Sickle cell disease (SCD) and its complications contribute to high rates of morbidity and early mortality and high cost in the United States and African heritage community.

Objective: To evaluate the cost-effectiveness of gene therapy for SCD and its value-based prices (VBPs).

Design: Comparative modeling analysis across 2 independently developed simulation models (University of Washington Model for Economic Analysis of Sickle Cell Cure [UW-MEASURE] and Fred Hutchinson Institute Sickle Cell Disease Outcomes Research health care sector perspective. Corresponding estimates from the societal perspective were $126 000 per QALY and $281 000 per QALY. The difference in results between models stemmed primarily from considering a slightly different target population and incorporating the quality-of-life (QOL) effects of splenic sequestration, priapism, and acute chest syndrome in the UW model. From a societal perspective, acceptable (>90% confidence) VBPs ranged from $1 million to $2.5 million depending on the use of alternative effective metrics or equity-informed threshold values.



Basu et al. *Annals of Internal Medicine* 2024

Conclusions

- Health Years in Total presents an alternative formulation of an effectiveness metric in CEA
- Several attractive properties, none more than its simplicity.
- Does not violate IRA principles
- Forces decision-maker to be explicit about other distributional issues necessary for pricing or HTA-level decisions
- More work needed to develop full welfare analysis.