QALYS OR THE SOCIAL RATE OF RETURN: WHAT'S THE RIGHT BENEFIT MEASURE?

5 Dec. 2016

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Summary

1. The question: When policymakers assess vaccine benefits, which benefits count?

2. A statement and articulation of the competing narrow and broad views

- Narrow: only health benefits measured in QALYs matter
- Broad: non-health benefits matter too

3. Do we misunderstand the narrow and broad views? Two claims:

- QALYs *can* internalize some non-health benefits, so the distinctive contribution of the broad benefits view is an emphasis on *externalities*.
- Maximizing QALYs is best understood as maximizing intrinsic *private value* rather than *health* or *well-being*.

Summary, cont'd.

4. Whose answer to the question matters?

   Society's.

   Social preferences determine the answer to the question.

5. We should replace QALYs/ICERs with Social Welfare Functions/Social Rates of Return

   Social Welfare Functions are our most flexible framework for representing social preferences regarding health.

   Since QALYs have important informational content, they remain and important part of SWF/SRR analysis.

1. The question: When policymakers assess vaccine benefits, which benefits count?

Policymakers: HTAs or NITAGs, Ministers of Health, Ministers of Finance

I ignore costs and cost savings today

This question is a specific example of a more general set of questions:

- How evaluate the relative benefits of competing health expenditures
- How evaluate the relative benefits of health- and non-health (e.g. schooling) expenditures

Standard views:

- Narrow view: only health benefits matter (measured in QALYs)
- Broad view: non-health benefits matter too (productivity, risk reduction, equity/fairness, fiscal impacts, etc.)

2. A statement and articulation of the competing narrow and broad views

2.1. Narrow view is typically understood as saying that only health benefits matter

- health is measured in QALYs
- QALY is a QALY is a QALY

We can think of QALYs as having two parts:

- Health States (captured in a Health State Description or HSD)
- *Private* valuation (captured in a Health State Valuation or HSV)

2. A statement and articulation of the competing narrow and broad views, cont'd.

2.1. Narrow view, cont'd.

Standard gamble example of HSV

- Person has quadriplegia and will live for some duration
- Can undergo treatment which with probability *p* kills immediately but probability *1-p* eliminates the quadriplegia for the duration
- What is maximum *p* this person will tolerate to undergo treatment?
- The HSV or QALY weight is given by *1-p,* so if willing to risk 0.90 chance of death, the HSV or QALY weight is 0.10.

2. A statement and articulation of the competing narrow and broad views, cont'd.

2.1. Narrow view, cont'd.

Private, public and social value:

- Private value: Value of a health state to the person whose health state it is
  - Intrinsic private value: a health state can be valued for its own sake (e.g. freedom from pain)
  - Instrumental private value: a health state can be valued because it has some causal effect that is intrinsically valued (e.g. I value my vision because it allows me to be an artist)
- Public value: value of a health state to any person other than the person whose health state it is (if your disability raises my tax burden, your health has public value, where I am the public)
- Social value: private and public value

2. A statement and articulation of the competing narrow and broad views, cont'd.

2.1. Narrow view, cont'd.

The narrow view that a QALY is a QALY is a QALY is the view that the only valuations that matter for the valuation of health states are private values.

> If you value a year in your life spent blind at 0.7 and I value a year of my life spent deaf at 0.7, then these blind and deaf years count equally in the narrow view.
>
> It is irrelevant to the narrow view, for example, if it just so happens that blindness is more likely to result in early retirement (with its consequent fiscal and productivity consequences for everyone else), than hearing disability.

2. A statement and articulation of the competing narrow and broad views, cont'd.

2.2. The broad view is typically understood as saying that non-health benefits matter too

- Non-health benefits are measured using metrics other than the QALY (e.g. productivity growth)
- a QALY is not a QALY is not a QALY

Examples of non-health benefits:

- Economic growth and productivity
- Fiscal implications
- Financial risk protection
- Equity and fairness

2. A statement and articulation of the competing narrow and broad views, cont'd.

2.2. The broad view, cont'd.

The broad view that a QALY is not a QALY is not a QALY is the view that public values matter to the evaluation of health states.

> If you value a year spent blind at 0.7 and I value a year spent deaf at 0.7, and if it also just so happens that the adverse fiscal and productivity consequences of visual disability are larger than those of hearing disability, then there is greater public and social value to preventing your blindness than to preventing my deafness.

3. Two claims about the difference between the narrow and broad views

So far, I believe I've said nothing controversial. I've just stated and articulated the narrow and broad views.

But now I propose that we should revise our understanding of these views. More specifically, I make two claims:

QALYs *can* internalize some non-health benefits, so the distinctive contribution of the broad benefits view is an emphasis on *externalities*

Maximizing QALYs is best understood as maximizing personal value rather than personal health or well-being.

3. Two claims about the difference between the narrow and broad views, cont'd

Claim 1: QALYs *can* internalize some non-health benefits, so the distinctive contribution of the broad benefits view is an emphasis on *externalities*.

- A standard gamble, or indeed any other HSV elicitation method (time-trade-off, visual analogue scale) can allow a a person to have *any instrumental reasons* for valuing quadriplegia at 0.10. A person may find quadriplegia very bad because of the catastrophic financial burdens it can have on the person's family.

- This is an example of a non-health benefit driving the HSVs of QALYs. So QALYs can incorporate non-health benefits.

- It is, however, a *privately* valued non-health benefit. It is a non-health benefit that the person who is faced with quadriplegia cares about.

3. Two claims about the difference between the narrow and broad views, cont'd

Claim 1: QALYs *can* internalize some non-health benefits, so the distinctive contribution of the broad benefits view is an emphasis on *externalities*.

- Conclusion: QALYs can incorporate non-health benefits so long as they are privately valued.
- Corollary 1: The only non-health benefits outside the reach of QALYs are externalities, i.e. non-health benefits to the public that the person whose health state is at issue does not care about. Such externalities are therefore the distinctive province of the broad view.
- Corollary 2: The fundamental distinction between the narrow and broad view is not health v. non-health, but internalized v. externalized non-health, or private v. public value. The broad view should be understood as being primarily about externalities and public value.
- Corollary 3: Beware double counting of internalized non-health benefits!

3. Two claims about the difference between the narrow and broad views, cont'd

Claim 2: Maximizing QALYs is best understood not as maximizing *health* or even *well-being*, but rather as maximizing intrinsic *private value* whatever the object of that value.

- The standard view is that maximizing QALYs is maximizing health. This is misleading.

- Recall intrinsic v. instrumental value. Only the former is foundational. The latter is wholly derivative of the former.

  - In math terms, instrumental value is a function of intrinsic value, so in any math expression (e.g. the maximand in a QALY-maximization problem) that involves instrumental value, we can always substitute it out with intrinsic value.

3. Two claims about the difference between the narrow and broad views, cont'd

Claim 2: Maximizing QALYs is best understood as maximizing intrinsic *private value* rather than *health* or *well-being*.

- Let's see what intrinsic values are served by QALY maximization by looking to the quadriplegia example. We will finds that these intrinsic values fall into three groups:
  - Own health: avoiding the pain and discomfort of quadriplegia
  - Own non-health well-being: the ability to have desired career
  - Others' non-health well-being: financial security of family

3. Two claims about the difference between the narrow and broad views, cont'd

Claim 2: Maximizing QALYs is best understood as maximizing intrinsic *private value* rather than *health* or *well-being*.

- So the intrinsic values served by QALY maximization extend beyond health, and even (own) well-being. They extend to whatever the person involved happens to privately intrinsically value, and this can include own-well-being as well as the well-being of others (altruism).

- You might ask: but couldn't health be the quantitatively most important intrinsic value served by QALY maximization?
  - As an empirical matter, I don't know. But as a normative matter, it is irrelevant. The QALY approach is agnostic with respect to which intrinsic value is weightiest and defers to the structure of private values to determine which is weightiest.

3. Two claims about the difference between the narrow and broad views, cont'd

Claim 2: Maximizing QALYs is best understood as maximizing intrinsic *private value* rather than *health* or *well-being*.

- Health is only pre-eminent in QALY maximization in the instrumental sense. It is the primary "control variable" and therefore has pre-eminent instrumental value even if it does not necessarily have pre-eminent intrinsic value.

- This makes the narrow view similar to the broad view in the following sense: both see health as having pre-eminent instrumental value, but not necessarily pre-eminent intrinsic value. Both views defer to the structure of private and public values to determine the relative weight of the different intrinsic values. So the narrow view is less different from the broad view than you might think.

4. Whose answer to the question matters?

Recap:

- I've posed the question
- I've stated, articulated, the two main answers: narrow v. broad
- I've recast the similarities and differences between them:
  - Similarities: They both encompass non-health benefits. They deny pre-eminence to the intrinsic value of health, and allow private or public values to determine the relative weight of the intrinsic values of health and non-health goods
  - Differences: the narrow view recognizes only internalized non-health benefits, while the broad view is an externality view
- But so far I've not argued for or against either one.

4. Whose answer to the question matters? Cont'd.

- But now, instead of asking *which* answer to the question is superior, I ask *whose* answer is decisive.

- So long as we believe that government exists to serve the people, then the answer is clear: *society's* answer is decisive.

  - The relationship between society and government is that of a principal and its agent (i.e. a principal-agent relation).

- Since social preferences are decisive, policymakers need to learn what they are.

4. Whose answer to the question matters? cont'd.

When we try to learn what social preferences are, we should try to discover social preferences regarding a specific question:

Does the value to society of some public sector output depend on *which* ministry produces it?

For example, I assume that you value mortality risk reduction. Do you value mortality risk reduction *only* when the health ministry produces it but not when the energy ministry produces it? Similarly, do you value financial risk protection only when it is the result of a social transfer program but not when it results from health policy?

If NO (e.g. if you value FRP the same whether it is promoted by a health sector policy or by social transfer policy) then broad view wins. This is because the health minister is obliged to give FRP the exact same weight as does the minister of social transfers.

4. Whose answer to the question matters? Cont'd.

Does the value to society of some public sector output depend on *which* ministry produces it?

My guess is that what matters to society is the outcome (FRP) rather than the instrumentality (health policy or social transfer) that produces it.

Thus the HTA, NITAG, and health ministers must respect the full public value of non-health benefits produced by vaccines, health technologies, or policies.

Just as we want the energy minister to do full justice to the health consequences of energy policy, so we want the health minister to do full justice to the broad socio-economic consequences of health policy. We should understand line ministries (e.g. Health, Education, Energy, and Finance) as each specializing in a particular set of institutions, technologies, and expertise, but together optimizing with respect to a single menu of value-weighted social goals (with a single government-wide value of a statistical life, for example, or value to lifting a household out of poverty). Doing otherwise is a massive coordination failure that makes society worse off.

5. We should replace QALYs/ICERs with Social Welfare Functions/Social Rates of Return

Social preferences matter. But for them to be useful to policymakers, they have to be reducible to a decision criterion that policymakers can use to inform actual decisions.

One of the strengths of the narrow view is that it yields a natural decision criterion, the incremental cost effectiveness ratio (ICER), that a policymaker can compare across competing programs. Indeed, it has been stated in the literature that one of the reasons the QALY/ICER framework is so entrenched is that although people know it has many shortcomings, they don't have a replacement.

My final argument is that in fact we do have a replacement. Economists and decision scientists know that when an individual person's preferences satisfy certain axioms of rationality, these preferences can be represented by mathematical objects called utility functions. The same is true for social preferences. When social preferences satisfy certain axioms, they can be represented by Social Welfare Functions (SWFs).

5. We should replace QALYs/ICERs with Social Welfare Functions/Social Rates of Return

- Example of SWF:

$$W = u_1(c_1, h_1)^p + u_2(c_2, h_2)^p$$

$$0 < p \pounds 1$$

- Standard results show that when social preferences satisfy the Pareto principle, symmetry, continuity, independence of unconcerned agents, independence of common scale, and the Dalton principle of transfers, then they can be represented in the above form.

- This formulation can capture: QALY analysis (as a special case), the interaction between health and non-health goods, risk aversion, diminishing marginal utility, and equity.

5. We should replace QALYs/ICERs with Social Welfare Functions/Social Rates of Return

- Consider a policy that taxes person 1 and uses the revenue to vaccinate person 2. The net impact on W is:

$$dW = -C + B$$

- And this net impact is positive if and only if:

$$-C + B > 0$$

$$B > C$$

$$B / C > 1$$

$$(B / C) - 1 > 0$$

$$r = (B - C) / C > 0$$

5. We should replace QALYs/ICERs with Social Welfare Functions/Social Rates of Return

- Thus we can summarize the impact of a policy on the SWF through an easily interpretable statistic called the Social Rate of Return. The larger the SRR, the higher the better the policy.

- SRRs are comparable across health- and non-health programs (e.g. vaccines v. road construction).

- We have a readily available alternative to QALY analysis. The SWF/SRR is able to fully capture non-health benefit externalities. But since QALYs have important content, they should remain a component of SWF/SRR analysis.