April 21, 2017

How CE Analyses Are Used

Also,

1. Other Resources for Cost-Effectiveness Analyses

2. Tornado Diagrams in TreeAge

3. Changes in Course for Next Year

How CE Analyses Are Used

• At the bedside/In the office
• Health policy
  – Public Health
  – Clinical care

CEA in Public Health

• Tobacco control
• Preventing injury to motor vehicle occupants
• Screening
• Childhood immunizations
• Blood product safety
Cost-Effectiveness Analysis to Inform Health Policy outside the United States

Canada

The federal Patented Medicine Prices Review Board, an independent, quasi-judicial body, regulates the introductory prices of new patented medications in Canada. The Review Board’s mandate is to ensure that patented drug prices are not “excessive,” on the basis of their “degree of innovation” and through a comparison with the prices of existing medicines in Canada and in seven other countries including the United States and the United Kingdom. . .
Germany

... the Federal Joint Committee has wide-ranging regulatory power to determine the services to be covered by sickness funds and to set quality measures for providers. To the extent possible, their coverage decisions are based on evidence from health technology assessments and comparative-effectiveness reviews. The Federal Joint Committee is supported by the Institute for Quality and Efficiency (IQWiG), a foundation legally charged with evaluating the cost-effectiveness of drugs with added therapeutic benefits.

Australia

The Australian Government is a near-monopolist purchaser of patent medicines which, combined with tight prescribing requirements, allows it to control pharmaceutical pricing. New pharmaceuticals have to meet cost-effectiveness criteria and are subject to nationally negotiated pricing before inclusion in the formulary of publicly subsidized medicines.

United Kingdom

- National Institute for Clinical Excellence (NICE)
  - Started in 1999
- Problem was “Postcode Lottery”
NICE

- Guidance based on cost-effectiveness analyses, modified by “other social values”
- NICE recommends against proposed drug coverage 10-15% of time
  - 30% of these recommendations are appealed
  - 10% of these appeals are successful

NICE

- Only 3 of the first 22 technologies were not recommended
  - Prophylactic removal of wisdom teeth
  - Laparoscopic surgery for colorectal cancer
  - Autologous cartilage transplantation for knee joints
Some of the more controversial NICE decisions have concerned drugs for the treatment of Alzheimer's disease (donepezil, galantamine, rivastigmine and memantine) and for renal cell carcinoma (bevacizumab, sorafenib, sunitinib and temsirolimus). All are drugs with a high cost per treatment, and NICE has either rejected or restricted their use on the grounds that they are not cost-effective.

NASTY – Not Available, So Treat Yourself

### NICE and Multiple Sclerosis

- Beta interferon and glatiramer acetate
- Rejected
- Controversy over how to judge long-term results with only short-term trials
- Conditional acceptance
  - If the drugs don’t deliver a long-term ICER less than $66,000 per QALY, the pharmaceutical companies will return the monies they received from the government
NICE and Blockers of Proprotein Convertase Subtilisin/Kexin type 9 (PCSK9) to Lower Cholesterol

• In November 2015
  – NICE rejected Repatha (Amgen) for reasons of cost and effectiveness
• In February 2016
  – NICE approved Repatha for limited use in specific types of patients contingent on Amgen offering a discount
  – Rejected Praluent (Sanofi/Regeneron)

In general, NICE considers treatments cost-effective if their incremental cost-effectiveness ratio is £30,000 ($43,400) or less per QALY. This ratio, however, is not a rigid cutoff. On occasion, NICE accepts values between £20,000 and £30,000 ($28,900). On rare occasions, it accepts values beyond £50,000. This ap-

The University of York Centre for Health Economics Research Paper 93
November 2013
Beginning in April 2013

- NICE became a public body independent of the government
- New name: National Institute for Health and Care Excellence (still NICE)
- New responsibilities include
  - Guidance for social services
  - Value-based pricing for drugs (beginning in 2014)
Additional Criteria for Drug Pricing

• Prices reflect factors that are not fully recognized by QALYs, for example, drugs for diseases with
  – A greater “burden of illness”
  – Unmet need
  – Particularly severe consequences
• And drugs with
  – Greater therapeutic innovation
  – Wider societal benefits

NICE times: a valedictory dispatch

Sir Michael Rawlins

NICE: Moving Onward
Michael D. Rawlins, M.D.

“If the United States is to meet the needs of all its citizens, especially in the face of an increasingly elderly population, it will someday have to take both clinical effectiveness and cost-effectiveness into account in determining the contents of its package of universal health care. Our experience in the United Kingdom shows that, though sometimes uncomfortable, it is possible.”
What about the United States?

Oregon

• Expand Medicaid to cover more people
• Identify conditions paired with treatments
• Rank condition-treatment pairs
  – Use CE analyses
  – Telephone survey of utilities using rank-and-scale method
• Pay only for condition-treatment pairs above the budget line
  – 688 procedures were ranked, and only the first 568 were covered.

Oregon

• 1990 list
  – Tooth capping ranked higher than surgery for ectopic pregnancy
  – Splints for TM joints ranked higher than appendectomies
• 1992 list
  – Expert judgment, not CE analyses
Oregon’s 1992 List

- Challenged by the federal government
- Violated Americans with Disabilities Act
  - Quality of life measures were based only on the preferences of healthy individuals
  - Treatments that restored people to their usual disabled state were undervalued relative to treatments that restored people to their usual normal state

But the plan hit a snag in 2008 when a woman with recurrent lung cancer was denied a drug that cost $4,000 a month because the proven benefits were not enough to warrant the costs. The national backlash to this illuminated our collective difficulty in discussing the fact that some treatments might not be worth the money. The Oregon health plan made things worse in this case, however, by offering to cover drugs for the woman’s physician-assisted suicide, if she wanted it. Even supporters of the plan found the optics of this decision difficult to accept.

What Happened in Oregon?

“The most fundamental lesson... was that the use of CE analysis was unlikely to produce a socially or politically acceptable definition of necessary care” in the United States.
--Peter J. Neumann, ScD
Medicare

• 1965 authorizing legislation prohibits payment for “. . . items and services that are not reasonable and necessary for the diagnosis or treatment of illness or injury or to improve the functioning of a malformed body member.”
• Reasonable and necessary means safe, effective, generally accepted (“customary”)

Medicare

• 1989 proposed regulations
  “We believe the requirement . . . that a covered service be ‘reasonable’ encompasses the authority to consider cost as a factor in making Medicare coverage decisions.”
• Opposition (“rationing”)
• 1998 Medicare Coverage Advisory Committee (MCAC)
  – Cost considered only when effects are equivalent

Medicare Exceptions

• Some adult vaccines
• Screening mammography
• Annual Medicare wellness exam
• Implantable cardiac defibrillators
  “We don’t use cost to decide the evidence issue, but we do use cost to decide if the issue is important enough to address.”
If You’re Going to Use CE Analyses, What Is the Willingness to Pay?

- US Government
  - EPA: $9.1 M/life (~ $222,000/undiscounted YOLS)
  - FDA: $7.9 M/life (~ $176,000/undiscounted YOLS)
  - DOT: $6.0 M/life (~ $133,000/undiscounted YOLS)
- Australia: ($AU 42,000 to 76,000)/YOLS
- Italy: € 60,000/QALY
- Netherlands: € 80,000/QALY
- Sweden: SEK € 54,000/QALY
- UK: (£ 20,000 to 30,000)/QALY
- WHO for developing countries: 3 times GDP per DALY

Other Organizations that Use Cost Analyses

- Some state Medicaid programs
- Blue Cross Technology Evaluation Center
- Pharmaceutical benefits managers (PBM)s
- Department of Veterans Affairs
- Department of Defense
- Health system and hospital drug formularies
- Centers for Disease Control (CDC)
- Agency for healthcare Research and Quality (AHRQ)

Comparative Effectiveness Research

- 2008 IOM recommended national program of comparative effectiveness research
- 2009 American Recovery and Reinvestment Act (ARRA)
American Recovery and Reinvestment Act (ARRA) of 2009 (P.L. 111-5)

- Comparative-effectiveness research (CER) covers "research that compares the clinical outcomes, effectiveness, and appropriateness of items, services, and procedures that are used to prevent, diagnose, or treat diseases, disorders, and other health conditions."

JAMA. 303(10):951-8, 2010 Mar 10

- Analyzed 328 medication studies recently published in 6 top medical journals
- Just 32% were aimed at determining which available treatment was best
- The rest compared a medication with a placebo
- 87% of the comparative effectiveness studies were funded entirely or in part by nonprofit foundations or government institutions

Patient Protection and Affordable Care Act, March 2010

- The bill establishes an independent, not-for-profit corporation, the Patient-Centered Outcomes Research Institute (PCORI)
- "to assist patients, clinicians, purchasers, and policy-makers in making informed health decisions . . . with respect to the relative health outcomes, clinical effectiveness, and appropriateness of medical treatments, services, . . . ."
Patient Protection and Affordable Care Act, March 2010

- Patient-Centered Outcomes Research Trust Fund ($500 m/yr)
- Research priorities based on the prevalence and burden of diseases and patient care
- Primary research and systematic reviews of existing studies
- Will contract with NIH, AHRQ, and non-government researchers

Patient-Centered Outcomes Research Institute (PCORI)

What & Who We Fund

Research Focus

Comparative Clinical Effectiveness Research (CER)
- Studies that compare outcomes to determine effectiveness, including risks and benefits, of one or more approaches in healthcare.

CER Methods and Infrastructure
- Development of large, highly representative electronic dataset structures, called CER infrastructures, for improving the quality of comparative CER.

Conditions Studied
- Those that affect large numbers of people across a range of populations.
- Those that play a role in the key evidence, limited, high-priority, priority, and priority issues of health care.

Population of Interest
- Those that employ or social determinants of health as a focus.
The Incidental Economist

Who says PCORI can't do cost effectiveness?

Posted: 14 Oct 2013 03:00 AM PDT

The following is a guest post by Nicholas Bagley, University of Michigan Assistant Professor of Law.

• The first thing to notice is that this isn't a flat prohibition on folding cost into PCORI research. It's drafted much more narrowly. The statute just forbids PCORI from using a dollar-per-QALY metric "as a threshold" for establishing cost-effectiveness or for making recommendations. What does that mean? Well, it means that PCORI can't say that a treatment costs "too much" just because its costs exceed, say, $50,000 for every QALY saved. That $50,000-per-QALY line would be a threshold.
• But does the statute prohibit PCORI from considering costs altogether? Nope. So far as the ACA is concerned, it's perfectly OK for the institute to use dollar-per-QALY metrics. It just can't use those metrics as thresholds. In practice, that leaves a lot of room for PCORI to think about costs. The institute could, for example, compile cost information about the treatments that it studies. No thresholds there. Alternatively, it could rank the cost-effectiveness of alternative treatments. Again, no thresholds.
Why the American Aversion to CEA?

- People don’t understand CEAs
  - “Cost-effectiveness analysis” = “death panels”
- People don’t trust CEAs
  - Pharmaceutical sponsorship
  - NEJM limitations
- CEAs are not relevant
  - Budget constraints
  - Indirect social benefits are difficult to estimate
- CEAs threaten interest groups

Legal Issues

- State regulations
  - California requires insurance coverage
    “unhindered by a plan’s fiscal concerns”
- Courts
  - Often have overturned coverage decisions
  - Standard is “usual, customary, and reasonable,” not scientific evidence
Ethical issues

• “Veil of Ignorance”
  Decision makers should have no knowledge of their future health needs, so self-interest cannot affect decisions
• “Rush to Rescue”
  Small gains for many, invisible people vs. big gains for a few, highly visible people
• Heterogeneity in preferences
• Inherently immoral

In 2014, the American College of Cardiology and the American Heart Association released new guidance for developers of clinical practice guidelines emphasizing the importance of “value” considerations in such guidelines and have chosen to highlight ranges of cost-per-QALY thresholds as complements to traditional grading methods based on the strength of the clinical evidence.
At the same time, the Institute for Clinical and Economic Review, a nonprofit organization that uses cost-effectiveness analysis as part of a process for assessing the value of drugs and other technologies, has received widespread attention for a series of reports on therapies for heart failure, multiple myeloma, and other conditions. Other organizations, such as the American Society for Clinical Oncology, Memorial Sloan Kettering Cancer Center, and the National Comprehensive Cancer Network, have released their own value frameworks that examine components such as clinical benefit, adverse events, and quality of life, though they do not aggregate these measures into formal cost-effectiveness analyses.
On March 8, the Centers for Medicare & Medicaid Services (CMS) announced a proposed rule to test new models to improve how Medicare Part B pays for prescription drugs and supports physicians and other clinicians in delivering higher-quality care. The initiative “is designed to test different physician and patient incentives to do two things: alter the prescribing of the most effective drugs, and test new payment approaches to reward positive patient outcomes,” according to CMS. For consumers, the move towards value-based pricing of drugs “is certainly a good step in the right direction,” said Patricia Ganzen, Wharton professor of health care management.

Determining Value and Price in Health Care

Paying for value is the rage in health care, and recently the spotlight has been brightest on prescription drugs (http://bit.ly/2vxOY5G). It’s hard to argue with the notion that how much we pay for a drug should be related to the value it provides. Hard to argue, that is, until you try to pin down whose values count, what value means, or how much to pay for it.

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http://dx.doi.org/10.1136/bmj.i2214

Association between the Value-Based Purchasing pay for performance program and patient mortality in US hospitals: observational study
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CONCLUSIONS
Evidence that HVBP has led to lower mortality rates is lacking. Nations considering similar pay for performance programs may want to consider alternative models to achieve improved patient outcomes.
Let’s Switch Direction
Resources for CEAs

• Journals
• Professional Societies
  and Their Meetings
• Other Resources

Journals That Are Resources for CEAs

• Methodology and CE Analyses
  – Medical Decision Making
  – Health Economics
• CE Analyses
  – Value in Health
  – Pharmacoeconomics
Societies and Meetings That Are Resources for CEAs

- Society for Medical Decision Making
  - http://www.smdm.org/

- International Society for Pharmacoeconomics and Outcome Research (ISPOR)
  - http://www.ispor.org/
Other Resources

Let's Switch Directions Again

Tornado Diagrams
Bottom Line

- A tornado diagram uses multiple, one-way, deterministic, sensitivity analyses to identify variables with greater and lesser influence on the decision choice.
- In TreeAge, do NOT use the NMB (Net Monetary Benefits) option for a tornado diagram, even though it is the program's default option.
- Use the option for ICER (Incremental Cost-Effectiveness Ratio), instead.
COURSE GOAL
The overall goal of this course is for students to learn quantitative methods for understanding medical decisions.

COURSE CONTENT AND APPROXIMATE SEQUENCE
- Diagnostic tests with dichotomous results
- Diagnostic tests with continuous results
- Prediction rules
- Understanding Cost / Measuring and Analyzing cost / Discounting
- Mathematical modeling with decision trees
- Mathematical modeling with Markov techniques
- Measuring outcomes in terms of “utility”
- Conducting, analyzing, and understanding cost-effectiveness analysis
- Economic assessment and policy analysis

Suggestions about Course Changes for Next Year?
- Location
- Time
- Notes and handouts
- Reading
- Homework
- TreeAge software
- Critical appraisals
- Quizzes
- Other