

What does the value of modern medicine say about the \$50,000/QALY decision rule?

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Introduction

- CEA results often presented with simple decision rules to guide interpretation
 - 34% of 338 published refer to \$50K/QALY
- However these rules generate skepticism
 - Little theoretical or empirical grounding
 - Poor face validity
 - \$50,000/QALY not changed nominally since it came into common use > quarter-century ago

Introduction

- Many studies sought to inform CEA decision rules based on society's WTP
- Limitations compromise face validity
 - Hypothetical rather than real tradeoffs
 - Confounding factors
 - Choosing unsafe occupations may reflect risk-seeking behavior or other factors
 - Divergent results make inferences difficult
 - \$21,000/QALY to \$1,180,000/QALY (US\$ 1997)

Objective

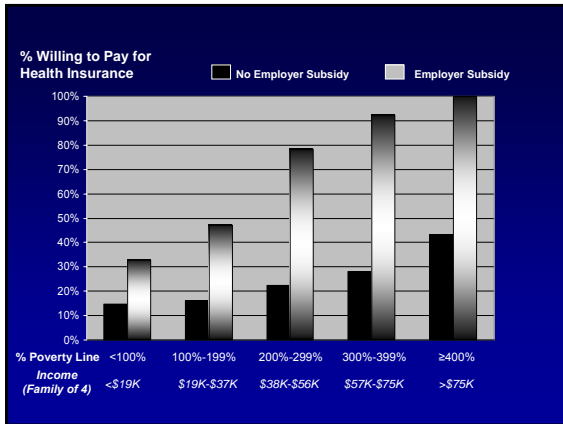
- To make inferences regarding CEA decision rules based on health care purchasing choices in US
 - Relies on two distinct but complementary analyses

Methods

- **Analysis #1: Estimate ICER of modern care**
- Presumes individuals prefer modern health care (with its higher costs and benefits) to pre-modern care (with its lower costs and benefits)
 - Not studied empirically but strong anecdotal evidence
 - Face validity: No calls for "less" health care or return to lower-tech medicine
- If individuals are WTP for modern care, then the ICER of modern care may inform lower (i.e., less inclusive) bound for CEA decision rule

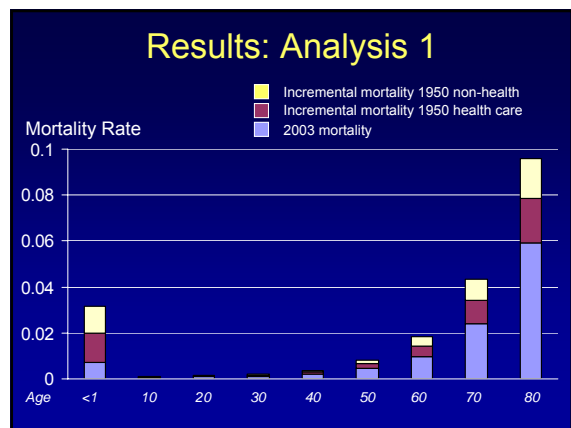
Methods

- **Analysis #2: Estimate ICER of health insurance for those without subsidized insurance**
- Presumes individuals prefer no insurance (with its lower costs and benefits) to insurance (with its higher costs and benefits)
 - Free rider effect: Pay 1/10 costs, get 2/3 benefit
 - Strong empirical support
 - Even among wealthy, majority elect not to buy insurance
 - Revealed preference
- If individuals are not WTP for health insurance, then ICER of health insurance may inform higher (e.g., more inclusive) bound for CEA decision rule



- ### Analysis #1: ICER of modern care
- Incremental **benefit** of modern care
 - Based on published reports, “modern” health care confers ≈ 4.7 additional LY
 - Sum up gains from proven treatments (Bunker et al)
 - Definition of “modern” based on published consensus
 - Based on ΔLY we back-calculated age-stratified mortality reductions attributable to modern care
 - Assumed health care has same proportional contribution to mortality reduction across age strata
 - Permits birth cohort simulations
 - Consider discounting, sensitivity analyses, etc
 - Mortality based on US Census Bureau estimates

- ### Analysis #1: ICER of modern care
- Incremental **cost** of modern care
 - Age-stratified health expenditures based on Meara et al’s analysis of MEPS data
 - Assumed age distribution of costs has remained constant over time
 - 1950 expenditure was 13% of 2003 expenditure
 - Alternatively exposed US birth cohort to
 - Costs/benefits of 1950 health care
 - Costs/ benefits of 2003 health care
 - All analyses in US\$ 2003
 - 3% discount rate



- ### Results: Analysis 1
- Incremental **benefits** of modern care
 - 53% of observed mortality decrease
 - 0.65 LYs (3% discount)
 - 4.7 LYs (no discount)
 - Incremental **costs** of modern care
 - \$118,000 (3% discount)
 - \$452,000 (no discount)
 - **ICER** of modern medical care
 - \$183,000/LY (3% discount)
 - \$96,000/LY (no discount)

- ### Analysis #2: ICER of health insurance
- Incremental **benefit** of insurance
 - From additional care with health insurance vs no insurance
 - Used 2 approaches
 - RAND health insurance experiment
 - Elasticity of health care demand
 - Observational studies comparing likelihood of receiving care with vs without insurance
 - Multivariate to control for confounders
 - 2 approaches yielded consistent estimates
 - RAND: **38% less care if no insurance**
 - Observational studies: **22%-43% less care**

Analysis #2: ICER of health insurance

- Incremental **cost** of insurance
 - Based on OOP expend for uninsured vs insured
 - MEPS
 - Assumed that incremental cost is Δ between
 - OOP expenditures without insurance
 - Total expenditures (OOP + premium) with insurance
 - Assumes no tax or other subsidies
- Alternatively exposed nonelderly adult cohort to costs and benefits of purchasing insurance
 - Duration of decision: 1 year

Results: Analysis 2

- Incremental **benefits** of buying insurance
 - Mortality reduced by 18%
 - Comparison IOM estimate 25%
 - LE increased by 0.014 years (3% discount)
 - LE increased by 0.020 years (no discount)
- Incremental **costs** of buying insurance
 - \$4100 (regardless of discount)
- **ICER** of purchasing insurance
 - \$295,000/LY (3% discount)
 - \$204,000/LY (discount)

Results Re-Cap

- Analysis #1 ICER of modern health care
 - Lower (less inclusive) bound for rule
 - \$183,000/LY discounted
 - \$96,000/LY undiscounted
- Analysis #2 ICER of health insurance
 - Higher (more inclusive bound for rule)
 - \$295,000/LY discounted
 - \$204,000/LY undiscounted

Sensitivity Analyses - QALYs

- Base case analyses do not involve QALYs
 - Unclear whether LYs added are high or low quality
 - Unclear whether quality added independent of LYs
- With **pessimistic assumption** (no quality added, additional LYs average quality for age)
 - Analysis #1 (lower bound) **\$204,000/QALY**
 - Analysis #2 (upper bound) **\$331,000/QALY**
- With **optimistic assumption** (reverses ½ of age-associated decrements in quality-of-life)
 - Analysis #1 (lower bound) **\$109,000/QALY**
 - Analysis #2 (upper bound) **\$133,000/QALY**

Sensitivity Analyses – Age distribution

- Benefits from health care may occur disproportionately early or late in life
- If distributed disproportionately **early**
 - Lower bound \$183K/LY → **\$137K/LY**
- If distributed disproportionately **late**
 - Lower bound \$183K/LY → **\$253K/LY**
- Analysis had little impact on upper bound

Sensitivity Analyses - Discounting

- Recent published ICER of “modern” health care (Cutler et al) \approx \$20,000/LY
 - Discounted costs but not benefits
- When we discounted costs but not benefits, our ICER \downarrow to \$28,000/LY
- However this is not appropriate to inform CEA decision rule
 - CEAs generally discount both or neither

Limitations

- Analysis 1 assumes modern care is preferable to pre-modern care
 - No empirical investigation to support claim
- Analysis 2 assumes accurate expectations of costs and benefits from insurance
- Estimates will evolve with changes in
 - Wealth
 - Preferences for health care vs other spending

Conclusions

- Lower bound for CEA rule **≈\$100,000/QALY**
 - Reminiscent of inflation-updated-rule (\$121,000/QALY) or WHO rule (\$113,000/DALY)
- Higher bound for CEA rule **≈ \$300,000/QALY**
 - Reminiscent of Ubel's \$265,000/QALY suggestion
- Decision rule nihilists may argue that wide plausible range justifies skepticism
- Decision rule pragmatists may argue for change
 - Possibly take form of "band" rather than "line"
- \$50,000/QALY unlikely to be valid

Implications

- CEAs may be increasingly linked to cost-sharing decisions in future
- Updating decision rule has policy relevance
 - > \$300K/QALY: **Increase** cost-sharing
 - \$100K-300K/QALY: **No Δ** cost-sharing
 - < \$100K/QALY: **Waive** cost-sharing
 - Cost-saving: **Share** cost-savings?