

PH3915

CEA, CUA and CBA
in Project Evaluation

Stages of Health Care Reform

- The extension of public funding or health insurance cover to a high proportion of the population.
- The control of the subsequent surge in health expenditure.
- The focusing of reform on efficiency and remaining inequities.

Health Care Spending in Five Countries, 1960, 1990, and 2001

	Per capita health care spending			Percent of GDP spent on health		
	1960	1990	2001	1960	1990	2001
Canada	\$103	\$1,696	\$2,245	5.5	9.2	9.7
Germany	\$68	\$1,279	\$2,407	4.8	8.7	10.7
Japan	\$26	\$1,082	\$2,864	3.0	6.0	7.6
United Kingdom	\$74	\$955	\$1,848	3.9	6.0	7.6
United States	\$149	\$2,799	\$4,887	5.2	12.6	13.9

Source: OECD Health Data 2003

U.S. National Health Care Expenditures (NHE) for 2018 and projections through 2027

	2018	2021	2024	2027
NHE (\$billions)	\$3,649.4	\$4,255.2	\$5,048.7	\$5,963.2
NHE Per Capita	\$11,172	\$12,656	\$14,660	\$16,907
NHE/GDP	17.7%	18.0%	18.7%	19.4%

Source: Centers for Medicare and Medicaid Services

THE FUNDAMENTAL ECONOMIC EVALUATION CRITERION:

COST-FOR-VALUE

Cost – Income Identity

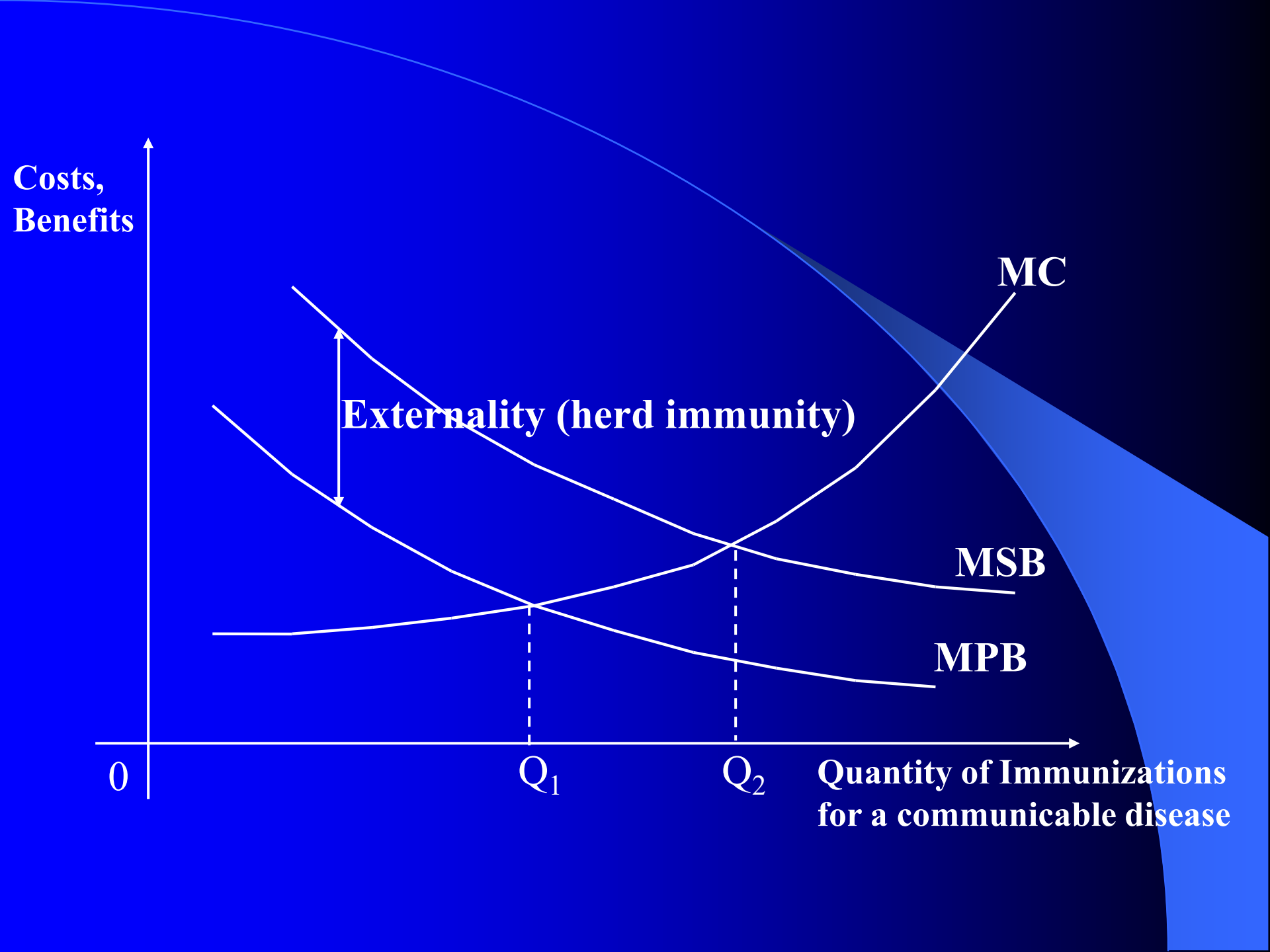
Health Sector Costs

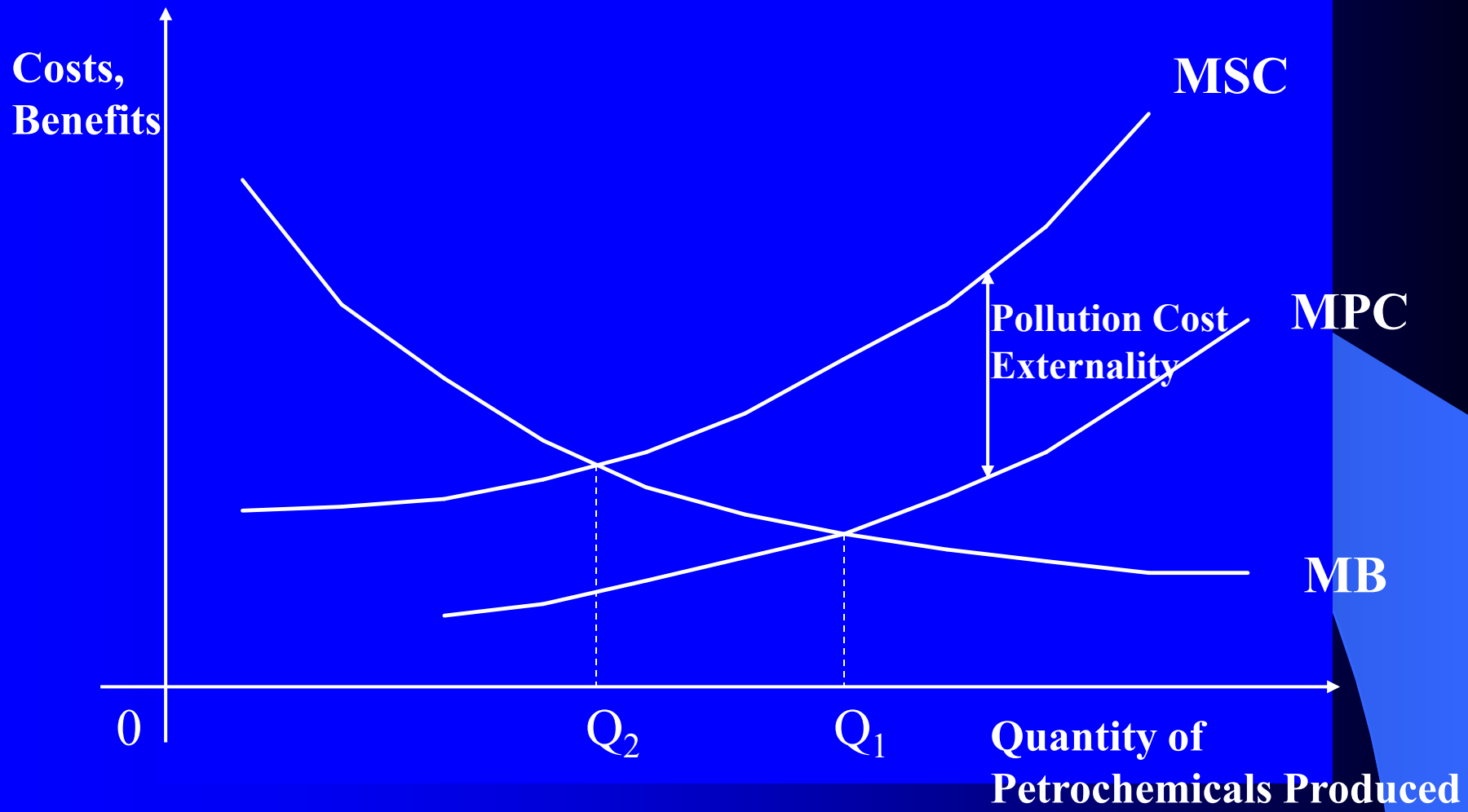
Equal

Health Sector Incomes

OPPORTUNITY COSTS

BENEFITS FOREGONE BY USING
RESOURCES FOR STRATEGY A
INSTEAD OF B





Distinguishing Characteristics of Health Care Evaluation

Are both costs (inputs) and consequences (outputs) of the alternatives examined?

Is there comparison of two or more alternatives?	NO	NO		YES
		Examines only consequences	Examines only costs	
		1A PARTIAL EVALUATION	1B	2 PARTIAL EVALUATION
		Outcome Description	Cost description	Cost-income description
	YES	3A PARTIAL EVALUATION	3B	4 FULL ECONOMIC EVALUATION
		Efficacy or effectiveness evaluation	Cost analysis	Cost-minimization analysis Cost-effectiveness analysis Cost utility analysis Cost-benefit analysis

CEA, CUA AND CBA

For two or more programs, compare resource costs (which are measured by the same methods for all of these analysis) with the following outcomes.

OUTCOMES MEASURES

1. Health Inputs Achieved; e.g.

CEA

- number of immunizations given
- number of prenatal visits to physician
- number of people “reached” with a health promotion message

CEA

2A. Clinical Indicators Achieved; e.g.

- reduction in cholesterol achieved
- reduction in blood pressure achieved

2B. Health Outcomes Achieved; e.g.

CEA

- number of side effects prevented
- number of cases prevented
- number of cases cured
- number of lives saved
- number of years of living saved

3. Increase in “Utility” of a Target Population due to Health Outcomes Achieved

CUA

- QALYs – Quality adjusted life years
 - current patient
 - prospective patient

CBA

4. **Monetary Value of Having Achieved Health Outcomes**

- Willingness to pay for a given health outcome
 - current patient
 - prospective patient
 - population in general

ECONOMIC EVALUATION METHODS

SOME BASIC POINTS:

- The results of an economic evaluation are not intended to provide the final answer to funding or approval questions. Rather, they provide information to assist in the decision-making process.

That is, they omit distributional and intangible items.

- Each method seeks to answer a different question; that is, to inform the decision-making process with a different type of information.

Economic Evaluation Methods (continued)

- It is not uncommon to simultaneously employ more than one evaluation method.
- The approach to cost measurement is the same in all of the four methods they vary in their treatment of outcomes.
- However the study's perspective can vary and if so costs will vary with it.
- The focus of most economic evaluations is on statistical rather than identified lives.

What Decision Do You Make?

Budget limit: \$100,000 for this year.

Physicians can treat patients with therapy X or Y, where X results in 5 added healthy years of life, and Y results in 10 added healthy years of life.

If therapy X costs \$1,000 and Y cost \$5,000, which therapy should be used?

Which is the Right Choice?

Therapy X or Y, \$100,000 Budget

Clinical Treatment Decision

- Years of healthy living gained per patient:
X: 5 years
Y: 10 years
(choose Y)

Clinical Planning Decision

- Lives saved at time of treatment:
Use all \$ on X: 100 lives
Use all \$ on Y: 20 lives
(choose X)
- Cost per person saved
X: \$1,000
Y: \$5,000
(choose X)

Clinical Planning

Decision

- Number of years of living saved

Use all \$ on X: 500 years

Use all \$ on Y: 200 years

(choose X)

- Cost per year of living saved

Use all \$ on X: \$200

Use all \$ on Y: \$500

(choose X)

Cost Minimization Analysis

Question: What is the least cost strategy to achieve a given outcome?

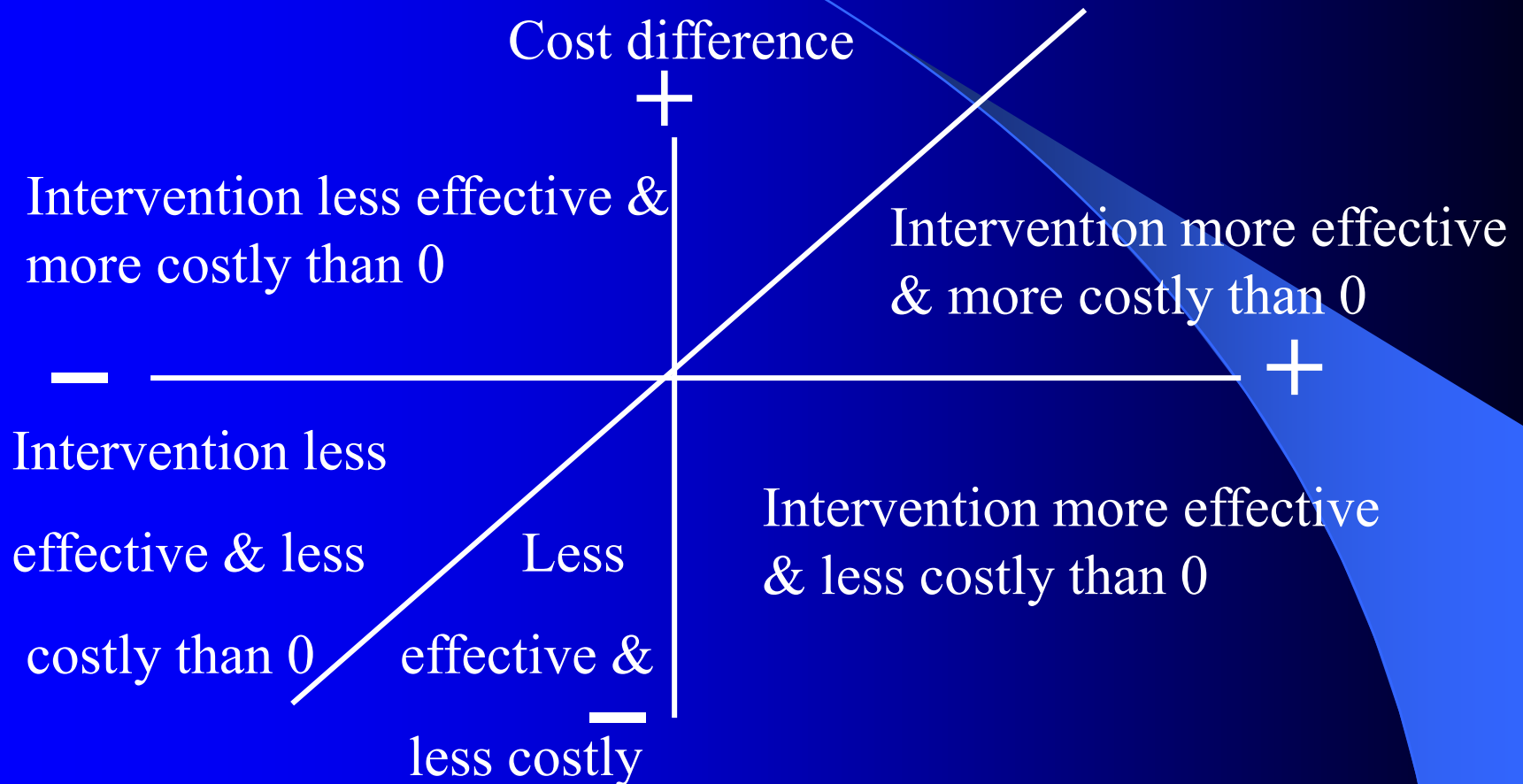
CMA: Identification, measurement and comparison of the resource costs of alternative strategies available to achieve a given outcome (outcomes are assumed or determined to be equivalent).

Cost Effectiveness Analysis

Question: What is the relative (incremental) cost per unit of effect (outcome) between two or more strategies which have a single, common effect?

CEA: Identification, measurement and comparison of the resources costs and the effectiveness of alternative strategies designed to prevent/cure a given problem, where effectiveness is measured in terms of physical units of inputs, clinical indicators and/or health outcomes.

Box 3.2 Cost-effectiveness plane



The horizontal axis represents the difference in effect between the intervention of interest and the relevant alternative (0), and the vertical axis represents the difference in cost.

Cost Utility Analysis

Question: What is the relative (incremental) cost per unit of value (to the patient) between two or more strategies, which may have multiple effects.

CUA: Identification, measurement and comparison of the resource costs and utility derived from the health outcomes (as measured from individual preferences) of alternative courses of action. Utility is the value placed on health outcomes by actual or potential patients.

Cost Benefit Analysis

Question: What are the absolute costs and benefits of a strategy? Is the strategy worth doing?

CBA: Identification and measurement of the resources costs and the value of the health outcome(s), as determined by assessment of the willingness to pay for it. The analysis can be for one strategy or compare interventions across a diverse array of problems.

Some Advantages of CBA:

1. Forces the analyst to make a complete enumeration of expected costs and benefits, as opposed to purely anecdotal information.
2. Forces the analyst to make all assumptions in the analysis explicit, particularly those regarding the quantitative evaluation of benefits and costs.
3. Yields, within a given area of application (e.g. alternate control programs for a given disease), a priority ranking of the alternative projects.

Advantages of CBA (continued)

4. Stimulates the research for alternatives.
5. Points out clearly inferior programs.
6. Yields, for a given program or project, the net economic benefit of the project, which must then be used in conjunction with distributional and non-economic considerations, and evaluated by government decision-makers.

Limitations to CBA

1. There are real social costs and benefits which cannot be quantified and hence are omitted from the calculations (intangibles).
2. CBA provides only one piece of information that decision-makers must consider in conjunction with intangible social, political and other information. It omits important distributional considerations.

3. If CBA to be used as the decision criteria, this must be done within a framework (including social and political issues) decided upon in advance.
4. It is generally applicable only to partial equilibrium programs.
5. Data problems:
 - A. Difficulty in obtaining accurate estimates of social values, i.e eliminating all market imperfections in one's estimate is not practical.
 - B. Necessity of using sensitivity analysis for important parameters such as the social discount rate.

**Example--Two Alcoholism Rehabilitation Programs,
With Different Clients: Each With a Budget of \$100,000**

OUTCOMES	HEALTH OUTCOMES	CEA	ECONOMIC GAIN	CBA
PROJECT A	50 Rehabilitated Alcoholics	\$2,000 Per Rehabilitation	\$300,000 Gain	B/C = 3.0
PROJECT B	100 Rehabilitated Alcoholics	\$1,000 Per Rehabilitation	\$200,000 Gain	B/C = 2.0

Review of Project Outcome Measures

A project results in changes in:

1. Health service inputs (e.g., the number of physician hours provided)
2. Clinical indicators achieved (e.g. lowering of cholesterol)
3. Health outcomes (e.g., the number of patients cured of a disease)
4. The utility or value attained by actual or potential patients
5. Economic values of health outcomes (economic consequences of preventing or curing the disease)

Numbers 1, 2, & 3 are CEA outcomes. #4 is CUA. CBA takes this a step further and compares the program costs to the economic consequences of the program, i.e. #5.

