

King Saud University
College of Business Administration
Department of Health Administration - Masters` Program

HHA 524 Health Economics
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COST-EFFECTIVENESS ANALYSIS

Learning Objectives

- *Describe the components necessary to conduct a cost-effectiveness analysis (CEA).*
- *Explain the nuances that should be considered when calculating the cost of an intervention.*
- *Summarize how perspective can change the elements used in conducting a CEA.*
- *Discuss the difference between a clinical measure of health and a qualitative measure of health.*
- *Identify relevant cost data used in a CEA.*

COST-EFFECTIVENESS ANALYSIS

Core Concepts

- *Before individuals make a purchase, they usually consider the cost and benefits of the purchase. For example, suppose **Laura** is searching for a house to buy and has narrowed down her choices to two.*
- *One house is large, newly built, and within her price range, but it is located one hour away from her job, her family and friends, and all the businesses she frequents.*
- *The drive required will cut into her limited free time.*

COST-EFFECTIVENESS ANALYSIS

Core Concepts

- *The other house is small, has many charming features because it was built in the 1920s, and is close to everything, but it costs \$30,000 more than the first house.*
- *Faced with these choices, **Laura** has to weigh each house's **cost** against its **benefits**.*
- *In this example, the benefits may include location, square footage, and **Laura's** personal happiness factor.*

COST-EFFECTIVENESS ANALYSIS

Core Concepts

- *Whatever benefit metric she uses, **Laura** must assess the benefits, not just the cost, to inform her decision about which house to purchase.*
- *The same exercise—formally referred to as **cost-effectiveness analysis (CEA)**—is undertaken for health-related decisions.*
- *CEA is an economic evaluation method that utilizes the cost of a program or intervention and its effectiveness.*

COST-EFFECTIVENESS ANALYSIS

Core Concepts

- *Costs are measured in monetary units, and outcomes are expressed in health-related terms.*
- *For example, CEA may be employed to estimate the cost per life-year saved.*
- *More and more policymakers are using CEA in their decision analyses.*
- *For example, a unit director deciding which intervention to fund among many alternatives can use CEA to compare alternatives.*

COST-EFFECTIVENESS ANALYSIS

Core Concepts

- *Policymakers or decision makers may also use CEA to justify the presence of a program or identify programs that do not make good use of scarce resources.*
- *There are limits to what CEA can do, however.*
- *It does not address ethical dilemmas, and it is only as good as the data used (the necessary data may not always be available).*
- *It also does not recommend whether the intervention even if determined to be cost-effective should be implemented or whether a program is actually needed.*

COST-EFFECTIVENESS ANALYSIS

CONSIDER THIS

- *Other methods can be used to economically evaluate and compare interventions, such as:*
- *cost–benefit analysis and*
- *cost-minimization analysis.*
- *However, the method health economists and policymakers use most often is CEA.*

COST-EFFECTIVENESS ANALYSIS

CONSIDER THIS

- ***A cost-benefit analysis** is the process of comparing the projected or estimated **costs and benefits** (or opportunities) associated with a program decision to determine whether it makes sense from a business perspective.*
- ***Cost minimization analysis (CMA)** for example, comprises for the least costly alternatives when the outcomes of two or more therapies are virtually identical. **CMA** involves calculating drug costs to analyze the least costly drug or therapeutic modality. It also reflects the cost of preparing and administering a dose.*

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Cost-Effectiveness Analysis (CEA)

- *When evaluating the economic worth of an intervention or program, one needs to know if it costs more or less than **comparator** programs (**alternatives**) and if it is more or less effective than the others.*

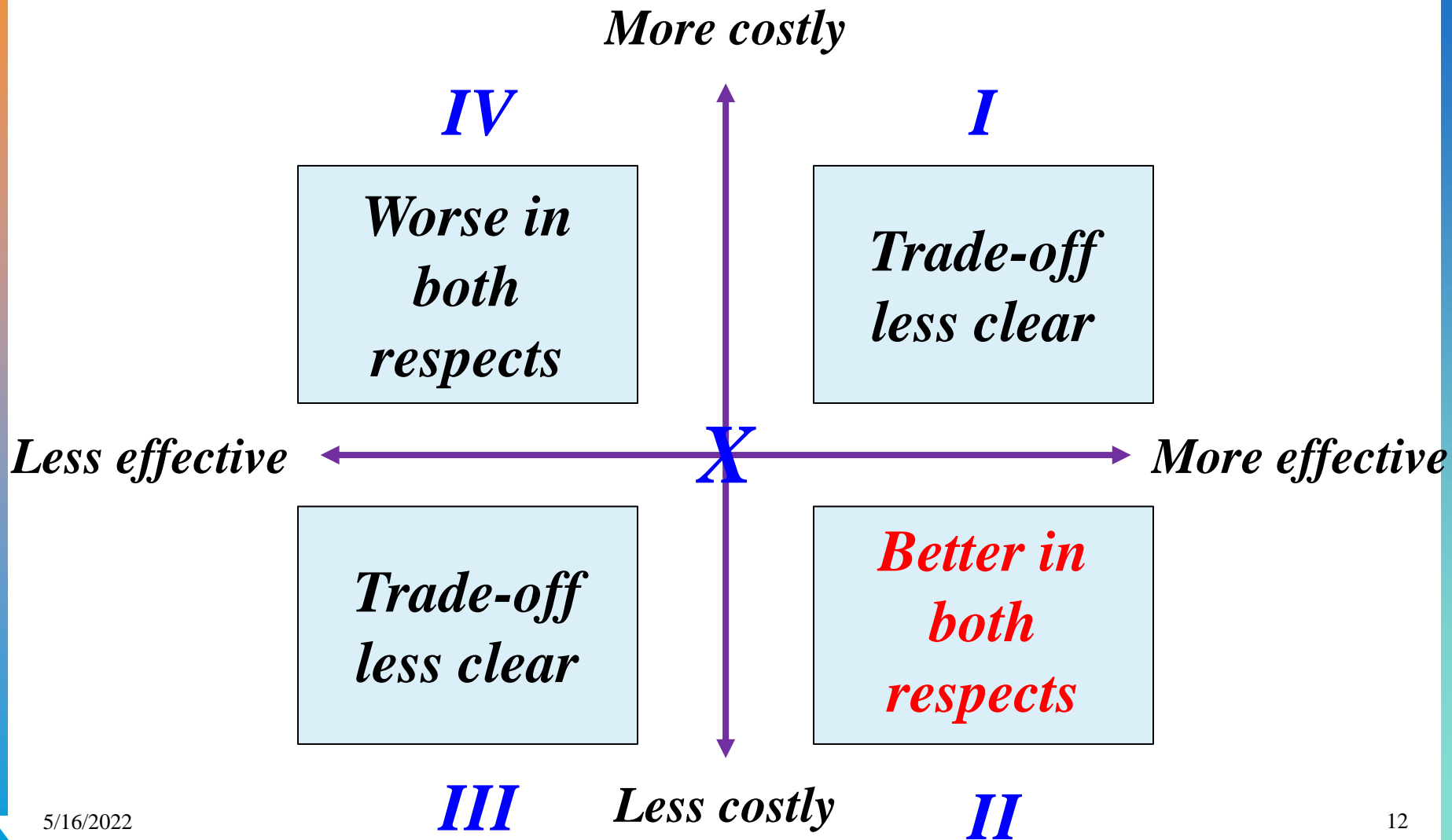
COST-EFFECTIVENESS ANALYSIS

Cost-Effectiveness Analysis (CEA)

Four different scenarios may play out during this process:

- 1. A new program is more costly and more effective than the comparator (alternatives) program.*
- 2. A new program is more costly and less effective than the comparator (alternatives) program.*
- 3. A new program is less costly and more effective than the comparator (alternatives) program.*
- 4. A new program is less costly and less effective than the comparator (alternatives) program.*

Exhibit 9.1 Matrix for Comparing Alternative Interventions



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Cost-Effectiveness Analysis (CEA)

- *Exhibit 9.1 puts these scenarios in an easy-to-understand schematic.*
- *Areas I and III in Exhibit 9.1 represent situations where the intervention is either*
 - 1. more costly and more effective or*
 - 2. less costly and less effective.*
- *CEA is helpful for comparing programs in these particular situations.*

COST-EFFECTIVENESS ANALYSIS

Incremental Cost-Effectiveness Ratio (ICER)

- *A ratio of the difference in costs to the difference in benefits*

Incremental Cost-Effectiveness Analysis tasks and Components

- *The **first** task is to specify the intervention to be evaluated (e.g., a new treatment for cancer, the flu, or HIV). Two different programs or treatment approaches must be identified, one of which can be the current program or approach.*
- ***Next**, relevant data must be collected.*
- ***Afterward**, an incremental cost-effectiveness ratio (ICER) is computed.*

Equation 9.1 *The ICER is simply a ratio of the difference in costs to the difference in benefits (effectiveness of each intervention)*

$$ICER = \frac{Cost_{Program1} - Cost_{Program2}}{Effectiveness_{Program1} - Effectiveness_{Program2}}$$

- Costs are measured in dollars (or another currency), and effectiveness is typically measured in quality-adjusted life years (QALYs).*

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Target Population

- *Another critical task in conducting a CEA is to specify the target population or the focus of the analysis.*
- *The target population could be everyone who gets a disease in the country or in a region.*
- *The target population could include only adults, only children, or only women.*

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Costs *The cost component of a CEA can be broken down into these five tasks:*

- 1. Identify the cost of the intervention.** *Generating a list of the items that need cost data is an obvious starting point. For example, a surgical intervention for cancer may include pre-surgery testing, physician services, follow-up care, medications, and rehabilitation, and each has a cost. Nonclinical costs, such as lost wages, transportation, and child care, may also be considered. Identifying the cost of all clinical and nonclinical items involved is challenging, especially given the role that health insurance plays in reimbursing services.*

COST-EFFECTIVENESS ANALYSIS

***Costs** The cost component of a **CEA** can be broken down into these five tasks:*

***2. Adjust for the timing of costs.** Many healthcare projects and programs have costs that are distributed over many years, so a CEA must take into account the timeliness of the costs. Standard methods exist for calculating the value of future costs in present dollars or Riyals.*

COST-EFFECTIVENESS ANALYSIS

***Costs** The cost component of a **CEA** can be broken down into these five tasks:*

- 3. Adjust for data collected in prior years. Cost data are typically not collected every year. Thus, even if the latest available cost data are used, they may not be current. “Old” data must be adjusted for inflation. Adjusting for inflation is not a complicated process, but it is not perfect.***

COST-EFFECTIVENESS ANALYSIS

***Costs** The cost component of a **CEA** can be broken down into these five tasks:*

- 4. Transform charges to cost.** Often, actual cost data are simply not available. Private providers are under no obligation to share their cost data, but their charge data—how much they actually charged for services—do tend to be available. **Charge data may not be fully representative of the cost of services.** Insurance companies negotiate the charged amount with providers, and this amount is based on many factors, including the cost of the service.*

COST-EFFECTIVENESS ANALYSIS

Costs *The cost component of a CEA can be broken down into these five tasks:*

- 5. Calculate time cost.** *The value of the time a patient spends receiving medical care is called the time cost. This cost can include the time spent travelling to and from the service or treatment as well as waiting time. A caregiver's time cost (e.g., traveling, waiting, caring for the patient) can also be included in this calculation.*

COST-EFFECTIVENESS ANALYSIS

***Costs** The cost component of a **CEA** can be broken down into these five tasks:*

- 5. Calculate time cost.** The wages of the patient and caregiver provide a good basis for estimating time cost. However, if the individual does not receive monetary compensation for work (e.g., **child care**), then the wage of an equivalent job is often used (e.g., a babysitter's hourly rate).*

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Perspective

- *Perspective is a theoretical concept. A CEA typically takes either the private or the societal perspective.*
- *A private perspective is focused on the provider, patient, or payer.*
- *For example, if the perspective of interest is the patient, the CEA will focus on the costs to the individual.*
- *If insurance is the focus, the CEA will aim to find out how much of insurance resources are used.*

COST-EFFECTIVENESS ANALYSIS

Perspective

- *For example*, suppose a particular type of cancer can be treated with surgery or with chemotherapy and radiation.
- *An insurance company will most likely take a private perspective and will be interested in the costs that the insurance company incurs under each treatment option.*
- *The insurance company will not be interested in the costs to the patient or the patient's caregiver.*

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Measuring Outcomes

- *Two categories of health outcomes are considered in CEA: clinical health outcomes and quality-adjusted life years.*
 1. *Clinical health outcomes are objective measures that are frequently collected in clinical settings and used in CEA.*
 2. *Quality-adjusted life year (QALY), which is based on a person's health state. A health state—which is not the same as a general health measure, such as alive or dead.*

COST-EFFECTIVENESS ANALYSIS

Measuring Outcomes

Clinical health outcomes include, but are not limited to:

- *morbidity,*
- *mortality,*
- *births,*
- *blood pressure,*
- *cholesterol,*
- *life-years or longevity,*
- *number of individuals who survive five years after a medical intervention, and*
- *number of individuals who quit smoking after a smoking cessation program.*

These are standard measures; therefore, making comparisons across empirical studies is fairly easy.

COST-EFFECTIVENESS ANALYSIS

Measuring Outcomes

- *Quality-adjusted life year (QALY), which is based on a person's health state. A health state—which is not the same as a general health measure, such as alive or dead provides more information, such as inability to walk, difficulty breathing, and constant pain. By itself, a health state does not convey the complete picture of an individual's health, however.*

COST-EFFECTIVENESS ANALYSIS

Measuring Outcomes

- *Health state needs to be contextualized. **For example,** an individual who has reduced blood pressure from a new medication but feels lousy from the drug's side effects will interpret his health state differently from what the blood pressure changes alone indicates.*
- *Adjusting the clinical health outcome to reflect how the individual experiences a health state is **what quality adjusted means.***

COST-EFFECTIVENESS ANALYSIS

Measuring Outcomes

- *Health-related quality of life (HRQL) is an index used in CEA to factor in how patients value being in one health state over another health state.*
- *These indexes use preference scores to weight various health states. Preference scores are used in combination with health state to generate a weighted measure of health status.*

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Measuring Outcomes

- *Preference score A numerical measure of health status ranging from **0** (signifying a preference for death) to **1** (signifying perfect health)*
- *Typically, a score of **0** means the person would prefer to be dead, and a score of **1** signifies the person is in perfect health.*
- *A score of **0.6 is 60** percent of the way between a preference for death and a feeling of perfect health.*

COST-EFFECTIVENESS ANALYSIS

Measuring Outcomes

- *Using preference scores is fairly intuitive. Suppose a new medical intervention promises to extend your life two more years but cautions you that during those extra years you will be in constant pain (health state). If you feel that a year in constant pain is worth **60** percent of what a healthy year is worth, then your **QALY** is **1.2** years ($2 \times 0.60 = 1.2$).*

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Using Cost-effectiveness analysis (or similar methods) in Policy Decisions

- *Health policymakers in both public and private sectors use **CEA**. For example, the UK National Health Service (**NHS**) has **CEA** guidelines that are considered, but not used exclusively, when making decisions about **NHS**-covered services.*

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The Oregon Plan

- *In 1994, Oregon received a waiver from the federal government to use a ranking system to determine which procedures would be covered by Medicaid. The thinking was that if only services that were deemed **cost-effective were covered**, the system would have enough money to insure more individuals.*
- *Of **688** procedures ranked according to their cost-effectiveness, Oregon policymakers decided to cover the first **568**.*
- *Although Oregon's Medicaid program ran into many problems, the explicit use of **CEA** was groundbreaking to many in the health policy arena.*

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