

Principles of Pharmacoeconomics

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Cost Determination

Lecture 2

Objectives

- Compare and contrast direct, indirect, and intangible costs
- Describe the relationship between marginal and average costs
- Describe the five steps involved in determining the cost of therapy or service

Objectives

- Given a specific perspective, identify all relevant costs that should be included in an analysis
- Identify at least five sources of cost data
- Discuss the differences between costs and charges
- Explain why discounting is necessary and perform the discounting calculation

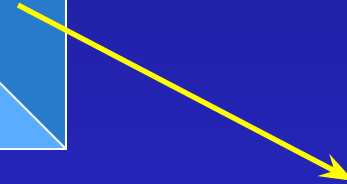
Measurement of resource use



Cost
Data

Components of Cost

Direct Medical Costs

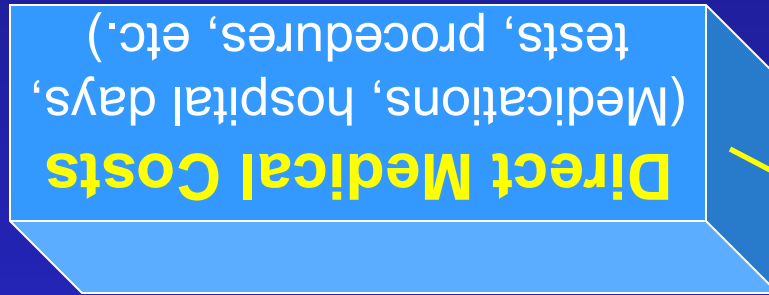


Cost
Data

expenditures on
tangible health care
products or services,
which contribute to the
gross national product

Components of Cost

Direct Medical Costs
(Medications, hospital days,
tests, procedures, etc.)



**Cost
Data**



Components of Cost

Other Direct (non-medical) Costs

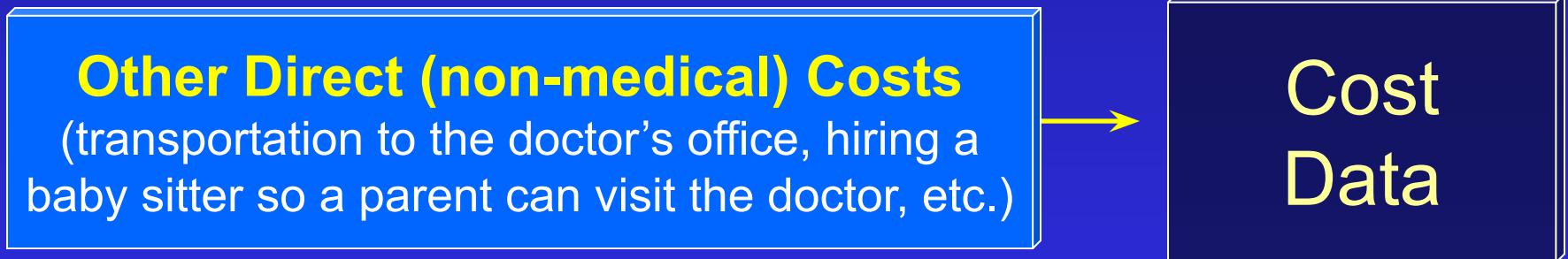


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graph LR; A[Other Direct (non-medical) Costs] --> B[Cost Data];
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**Cost
Data**

expenditures on tangible products or services, which contribute to the gross national product. They are needed to obtain care, but they do not directly contribute to health care.

Components of Cost



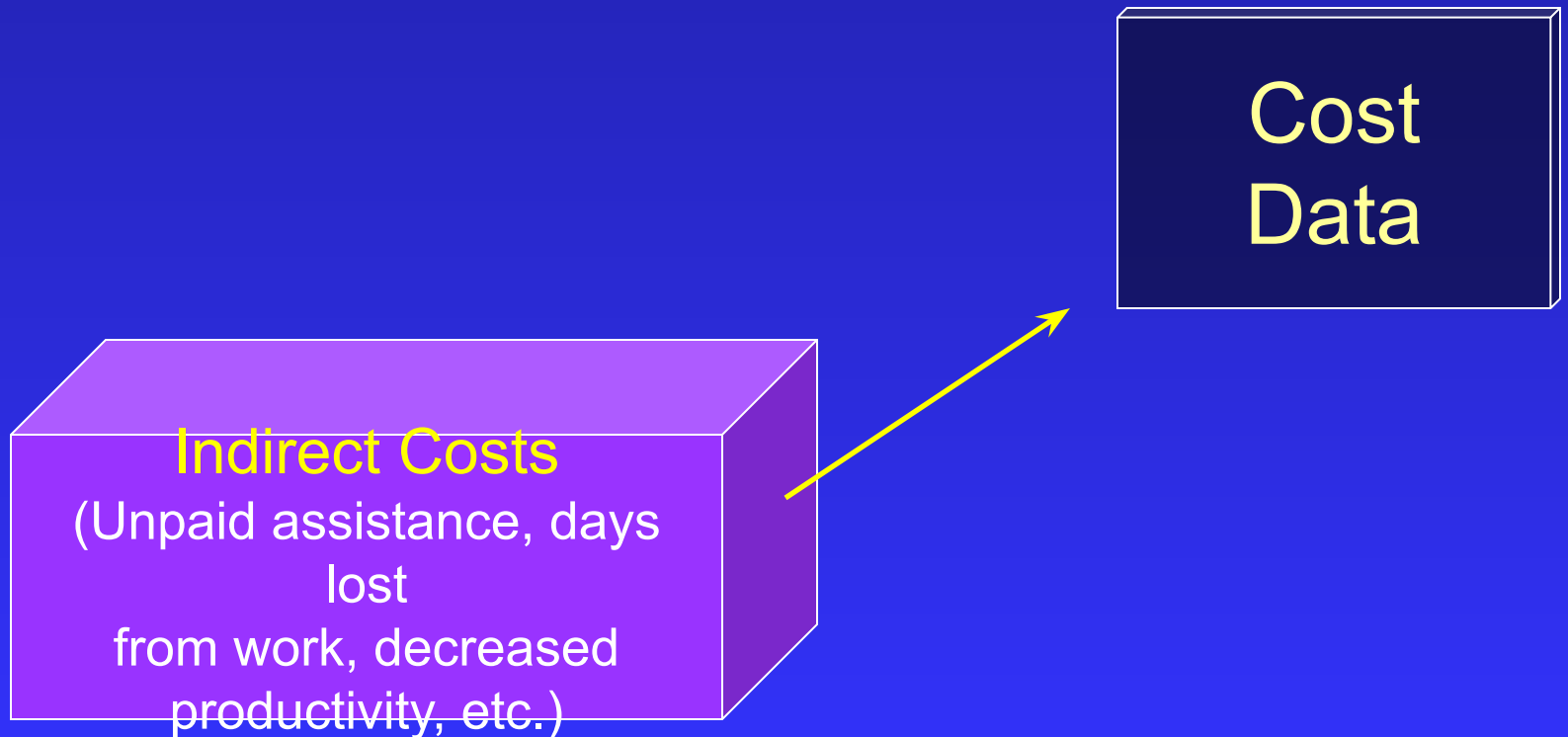
Components of Cost

Unpaid resource
commitment. Cost of
morbidity and mortality.

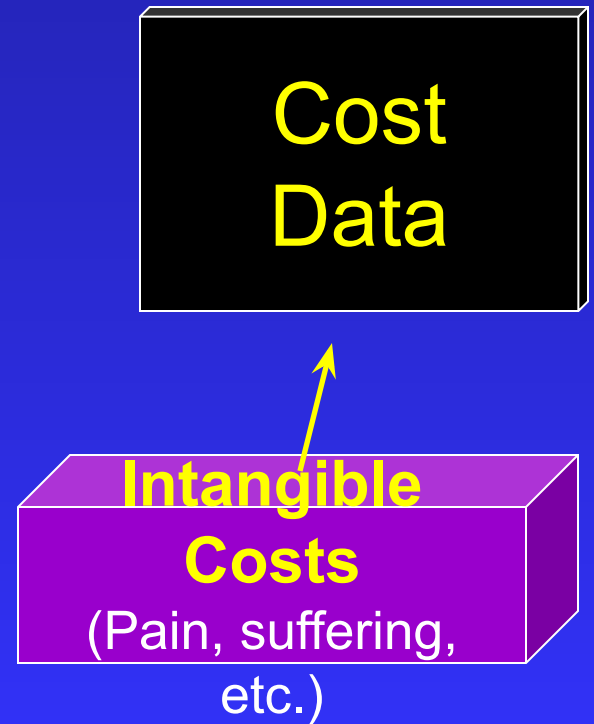
Cost
Data

Indirect Costs

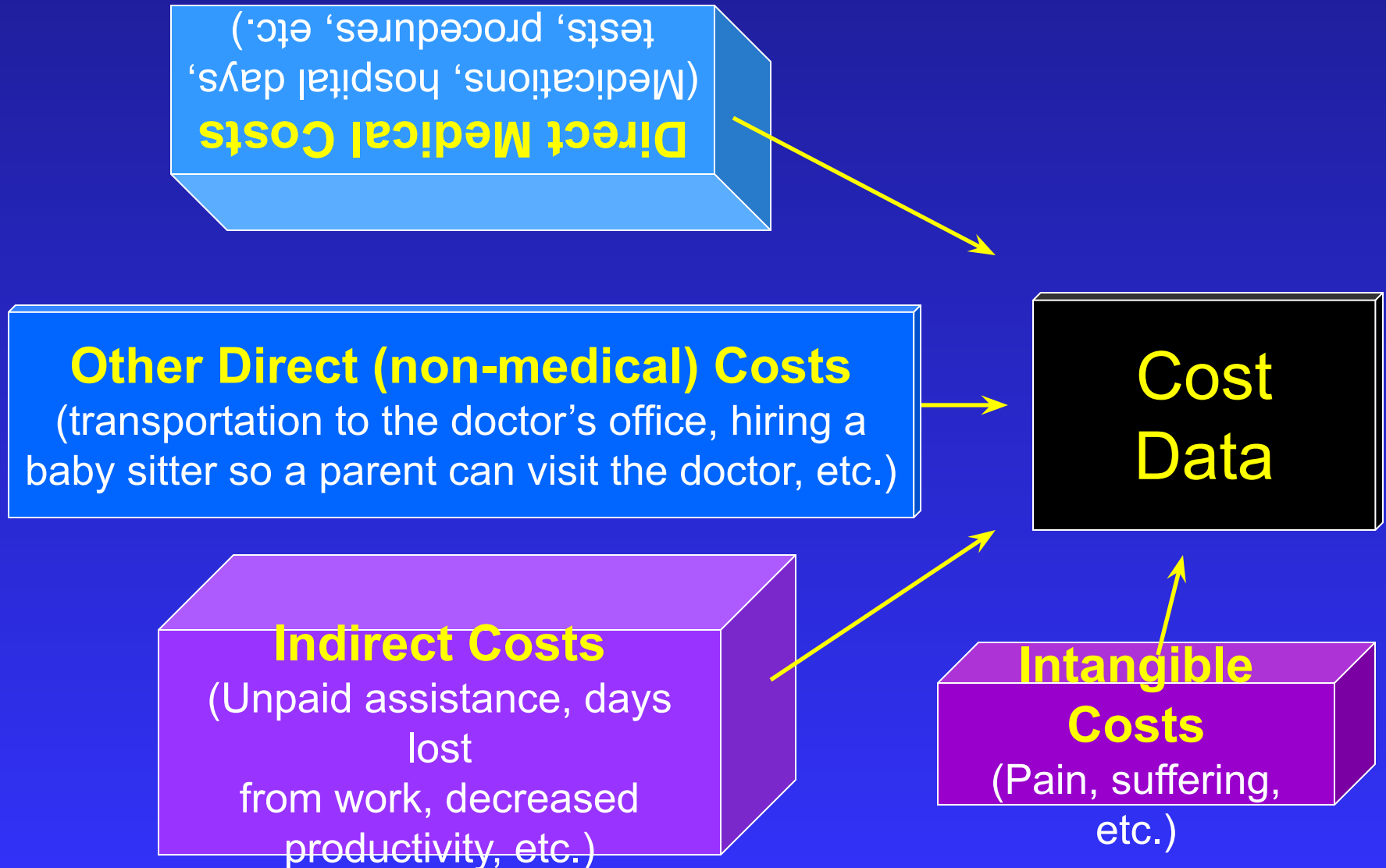
Components of Cost



Components of Cost



Measurement of resource use

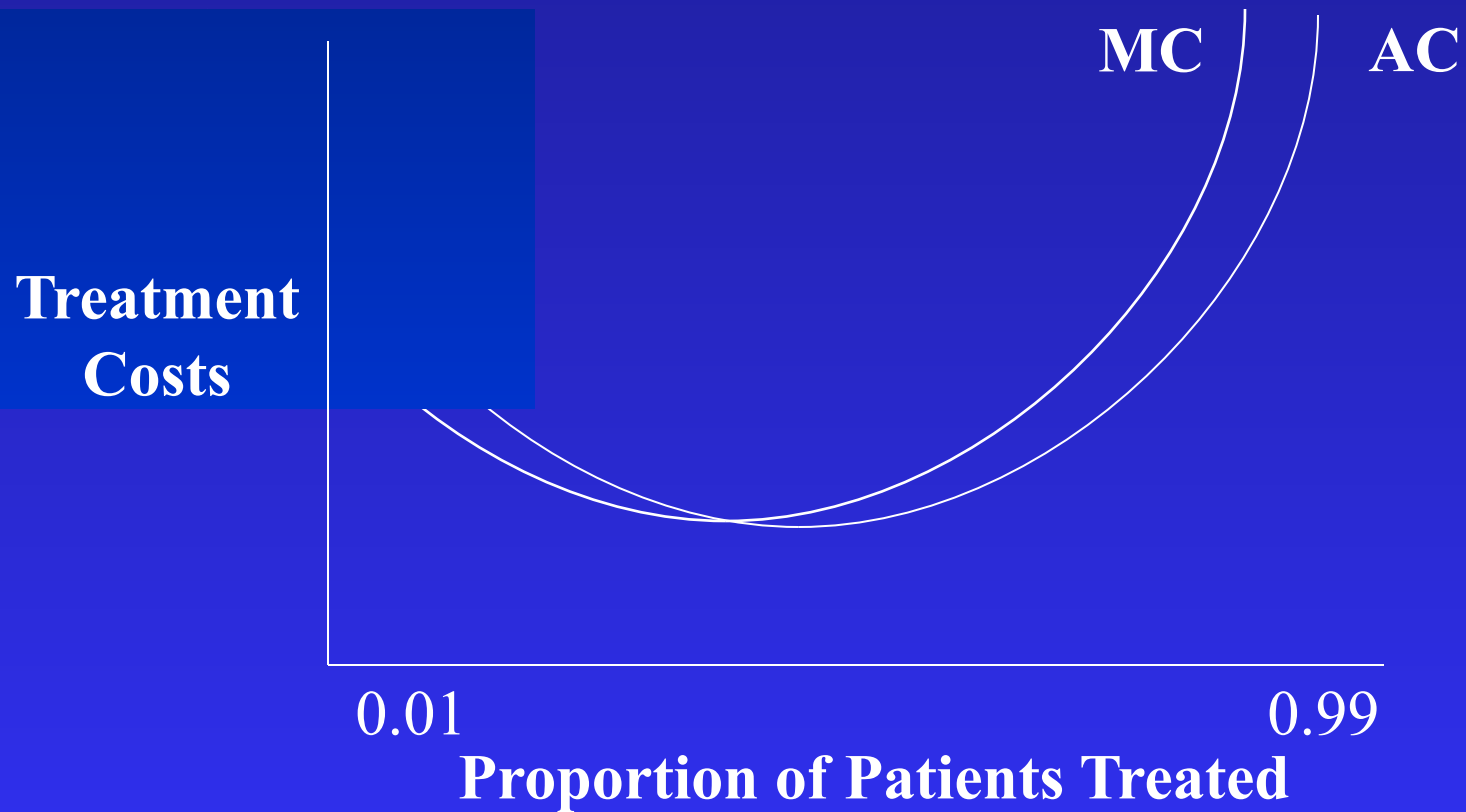


Cost Terminology

- ❑ **Variable costs vs. fixed costs**
- ❑ **Total Cost:** Sum of all health care expenditures for entire population
- ❑ **Marginal Costs:** The cost to produce one more unit of outcome (i.e. the cost to successfully treat one additional patient)
- ❑ **Average Cost:**
(total cost of treatment)
(total # of patients treated)

[Link to avg cost worksheet](#)

Average Vs. Marginal Costs



Specifying the Inputs

- Develop comprehensive list of ALL relevant inputs (i.e. resources consumed) to produce a given output or consequence
- The list will be determined by the perspective of the analysis
- Common to all forms of economic evaluation

Payer Perspective



□ Direct



□ Indirect

Asthma management service

Payer Perspective



Asthma management service

- Direct
 - ❖ Hospitalizations
 - ❖ Laboratory costs
 - ❖ Medications
 - ❖ Medical devices
 - ❖ Physician / pharmacist fees
- Indirect
 - ❖ ?

Provider Perspective



□ Direct

□ Indirect (overhead /
accounting costs)

Community pharmacy providing
asthma management services

Note: Cost categories were taken from
Brad Stoltz's 2001 Pharm.D. project

Provider Perspective



- ❑ Direct
 - ❖ Equipment / leases
 - ❖ Fees
 - ❖ Education
 - ❖ Marketing
 - ❖ Dedicated personnel
- ❑ Indirect (overhead / accounting costs)
 - ❖ Maintenance
 - ❖ Utilities
 - ❖ Mortgage / rent
 - ❖ Business licenses
 - ❖ Office supplies
 - ❖ laundry, haz. waste disposal, etc.

Community pharmacy providing asthma management services

Note: Cost categories were taken from Brad Stoltz's 2001 Pharm.D. project

Patient Perspective

- Direct

- Indirect

Asthma management service

Patient Perspective

- ▣ Direct
 - ❖ Co-pays,
 - ❖ education,
 - ❖ insurance premium,
 - ❖ transportation,
 - ❖ prescriptions,
 - ❖ sitters
- ▣ Indirect
 - ❖ missed work,
 - ❖ sitters

Asthma management service

Societal Perspective

- Direct

- Indirect

Asthma management service

Societal Perspective

□ Direct

- ❖ healthcare costs,
- ❖ e.g. premiums,
- ❖ Medicare & Medicaid,
- ❖ Taxes,
- ❖ Medication R&D,
- ❖ Healthcare workforce,

□ Indirect

- ❖ lost productivity,
- ❖ lost wages

Asthma cost of illness

Counting Units

- Determine the unit of use for a given resource (e.g., hospital day, single lab test, 30-day supply of medication)
- Determine how many units will be consumed over the study period

Assigning Dollar Values

- Opportunity costs Vs. market price
- Personnel time / costs
- Medication costs
- Physician and other services
- Hospital / emergency department costs
- Based upon cost accounting system

Example of Hospital Costs and Charges

LOS	Age	Charges	Payments	Variable Cost	Abx Cost	Fixed Cost	Total Cost
10	83	\$6,112	\$2,668	\$2,397	\$53	\$1,698	\$4,095
18	94	\$23,287	\$5,478	\$6,722	\$437	\$3,739	\$10,461
6	76	\$6,734	\$4,038	\$2,059	\$130	\$1,124	\$3,183
7	94	\$7,656	\$4,053	\$2,300	\$32	\$1,315	\$3,615
2	85	\$2,921	\$4,092	\$781	\$93	\$502	\$1,283

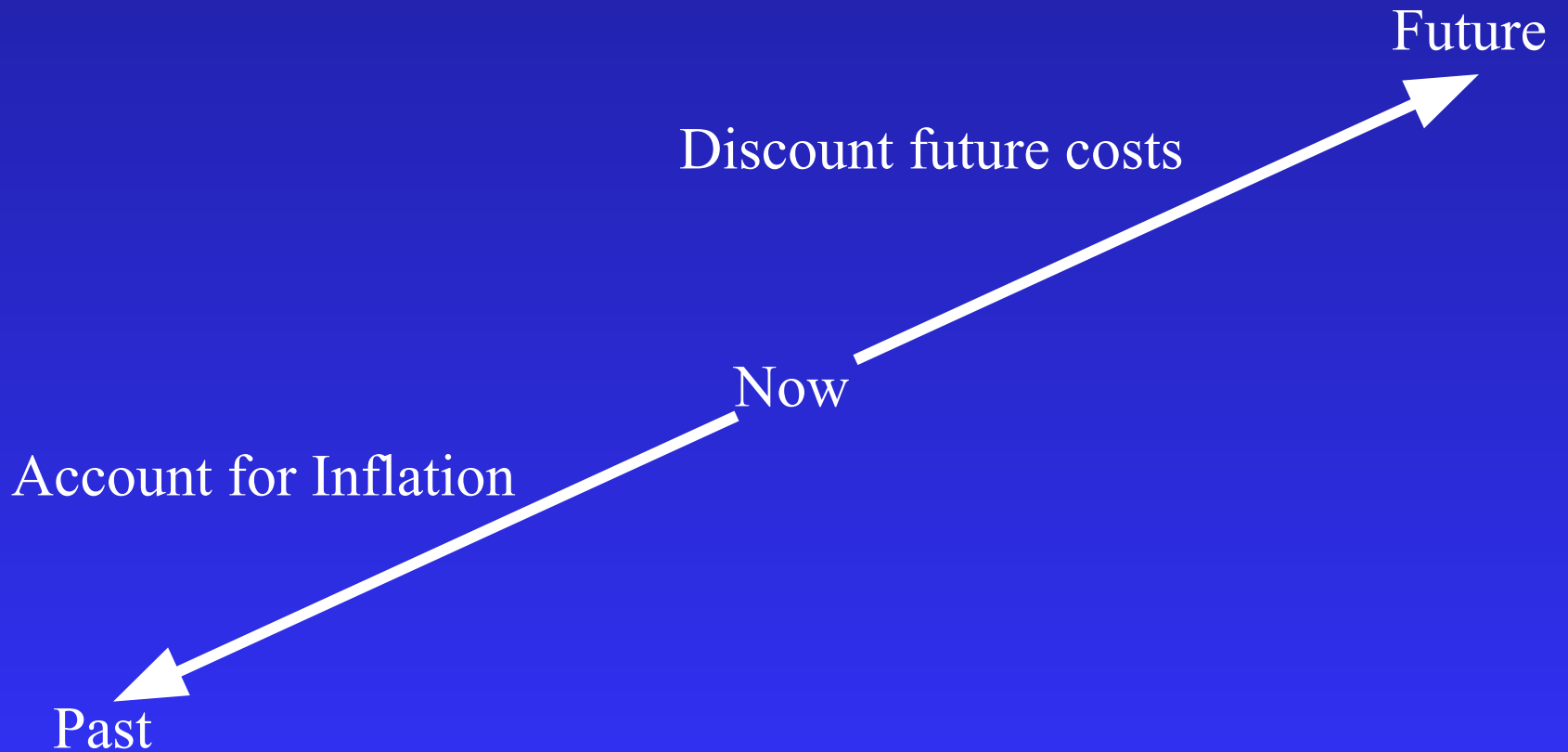
Sources of Cost Data

- Primary data collection methods
 - ❖ Clinical trials
 - ❖ Naturalistic trial / observation cost / accounting system
- Secondary data collection methods
 - ❖ Administrative / claims databases
 - ❖ Literature / published AWP
 - ❖ Expert opinion
- Model
 - ❖ Decision analytical
 - ❖ Statistical

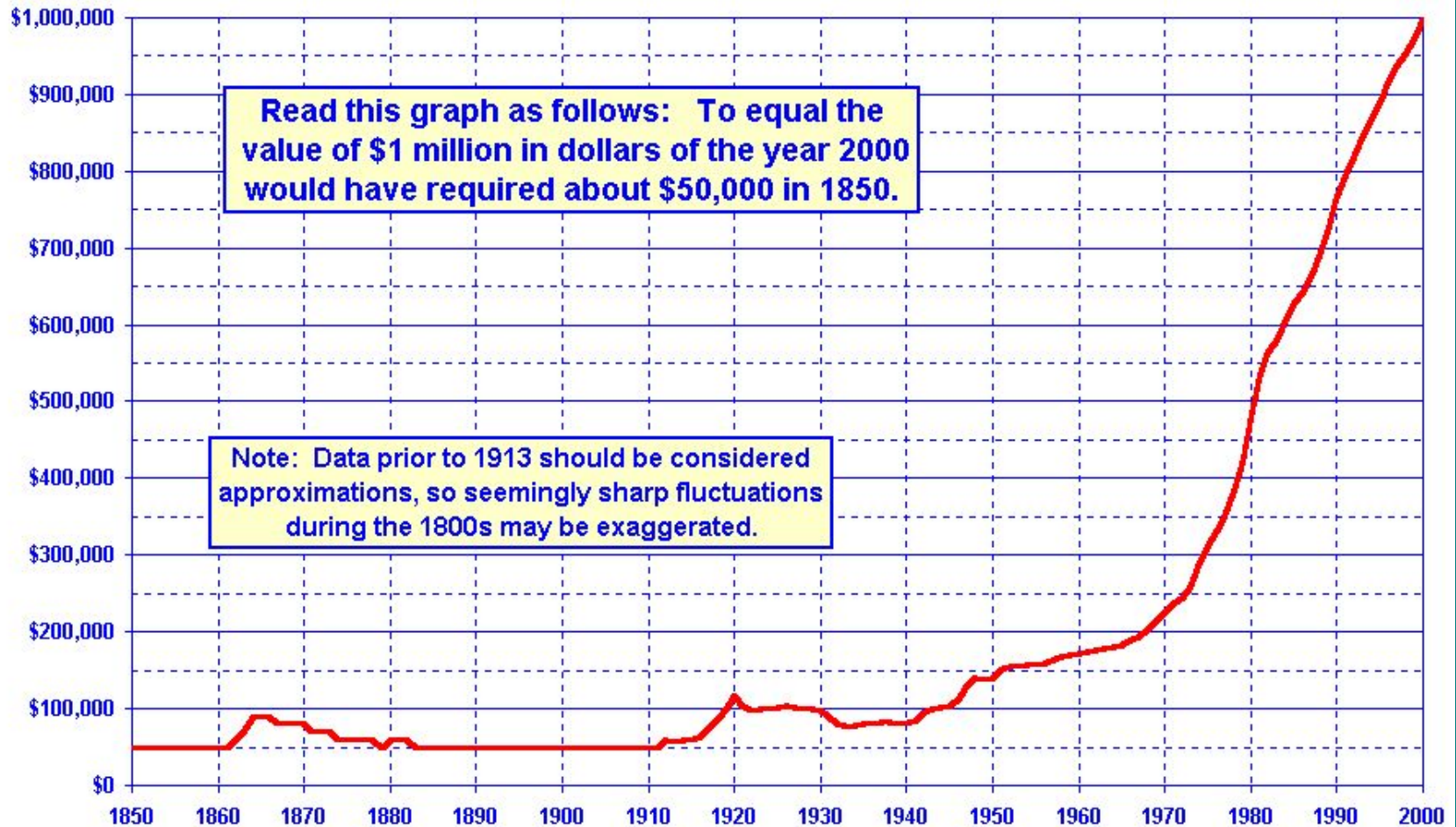
Adjusting for Differences in the Timing of Costs

- A cost or benefit today is not equivalent in value to the same cost or benefit in the future
- Consider amount of money that would have to be set aside today to get predetermined amount in the future
- What rate do you use?

Discounting

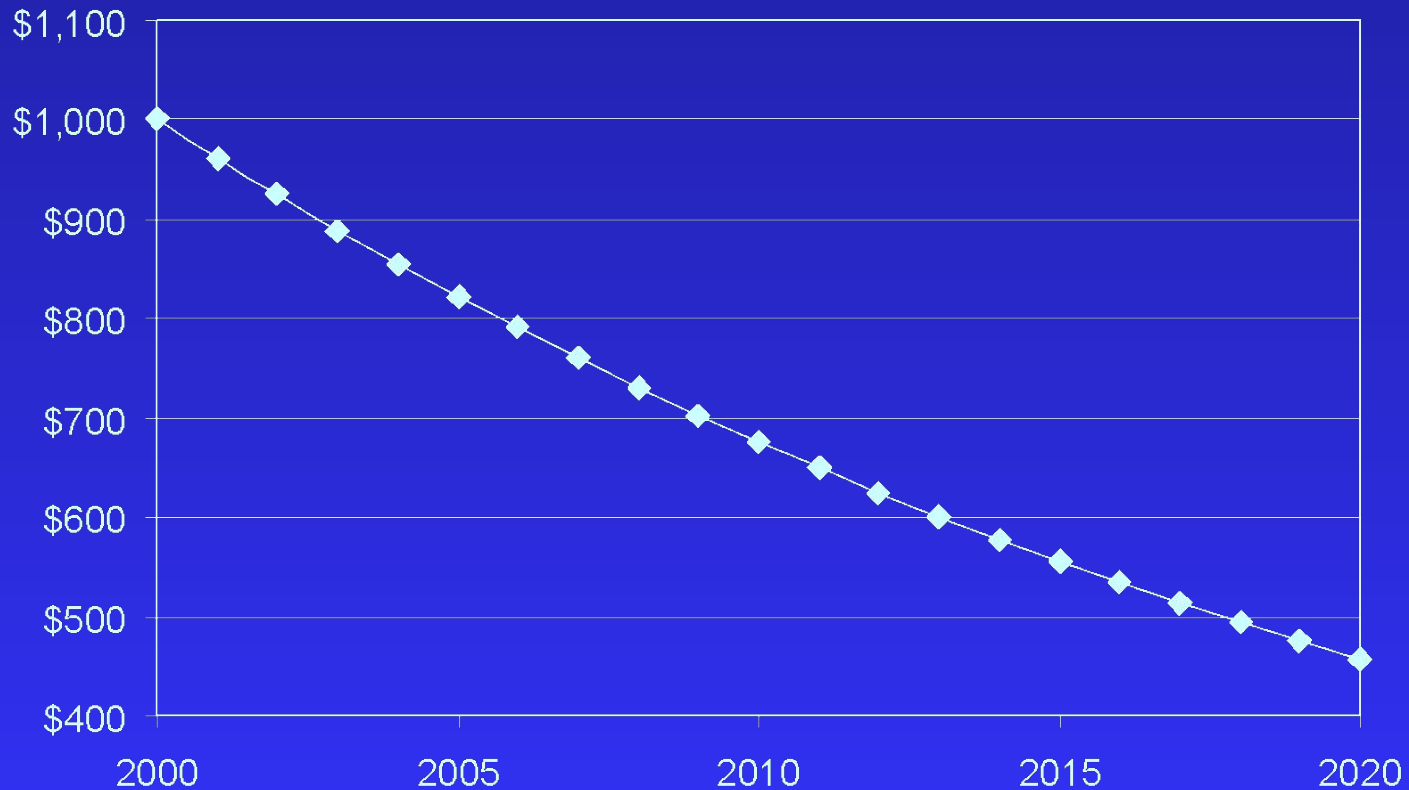


Dollars Needed to Equal in Value \$1 Million in the Year 2000 for each Year 1850 to 2000



Net Present Value

(Amount equivalent to \$1000 in 2000)



[Go to Discounting](#)
[Discounting Worksheet](#)

Discounting

□ What rate do you use?

❖ HH Bonds

4% (fixed rate)

❖ EE Bonds

• 5.73% (based on 90% of 5 yr avg Treasury securities yield)

❖ I Bonds:

3.6% (fixed rate +

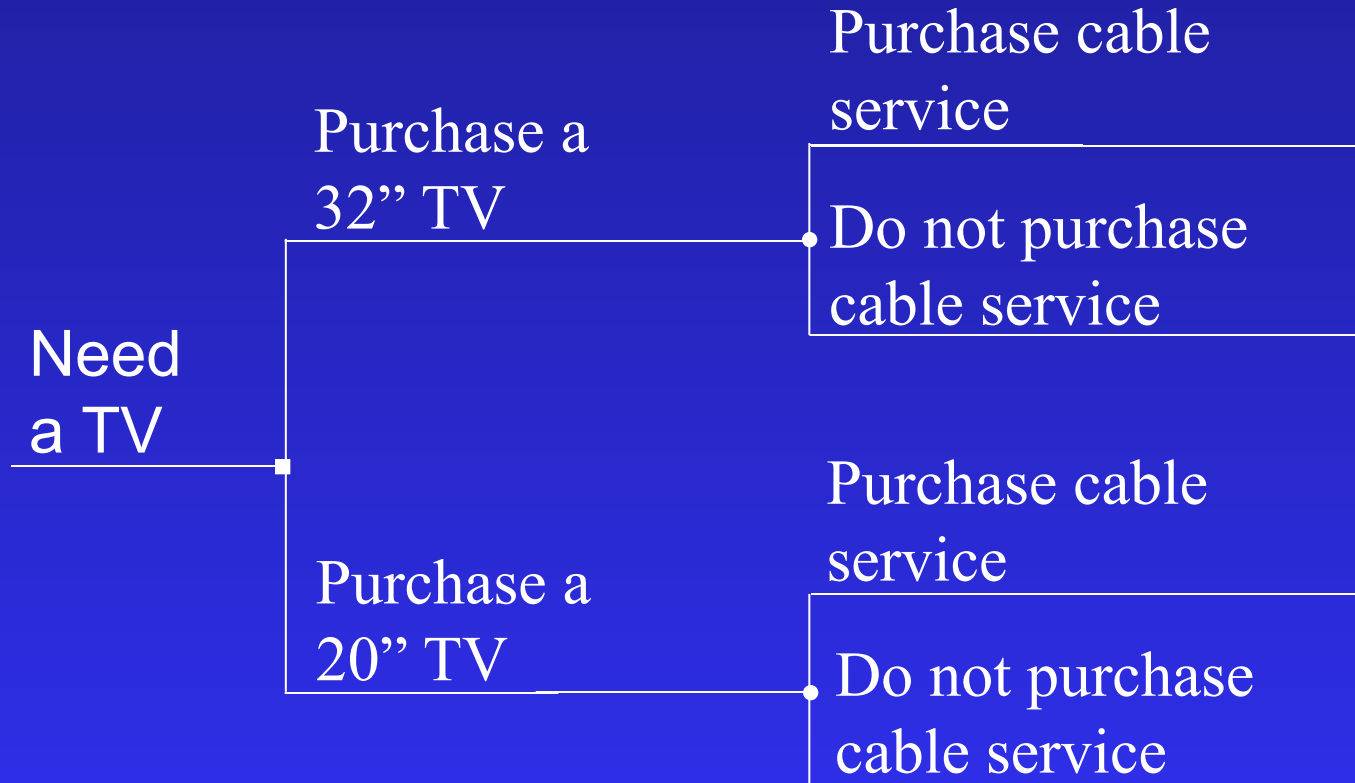
3.89% variable (inflation-based) rate)

= 7.49%

Allowing for Uncertainty

- What if the type and number of resources included in the analysis change?
- What if a different discount rate is used?
- Sensitivity analysis is the technique of systematically varying key variables in an analysis to determine if the results of the analysis change. (This will be covered later).

Example



Go to cost determination worksheet

Questions

