

# 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

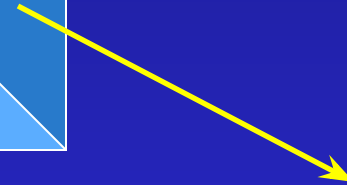
# Measurement of resource use



Cost  
Data

# Components of Cost

Direct Medical Costs

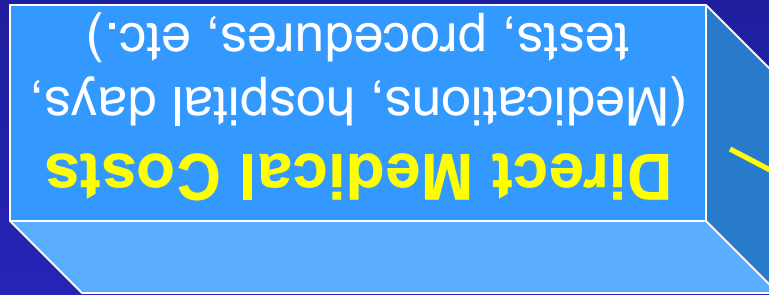


Cost  
Data

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**



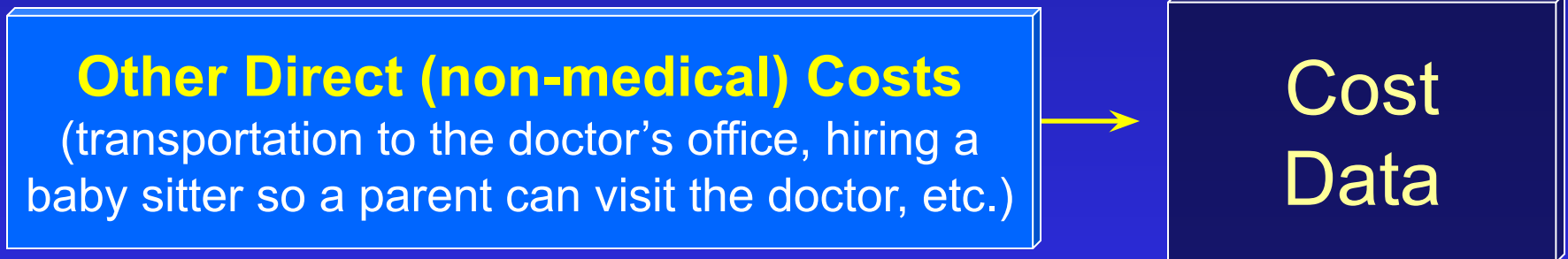
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graph LR; A[Other Direct (non-medical) Costs] --> B[Cost Data]
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**Cost  
Data**

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



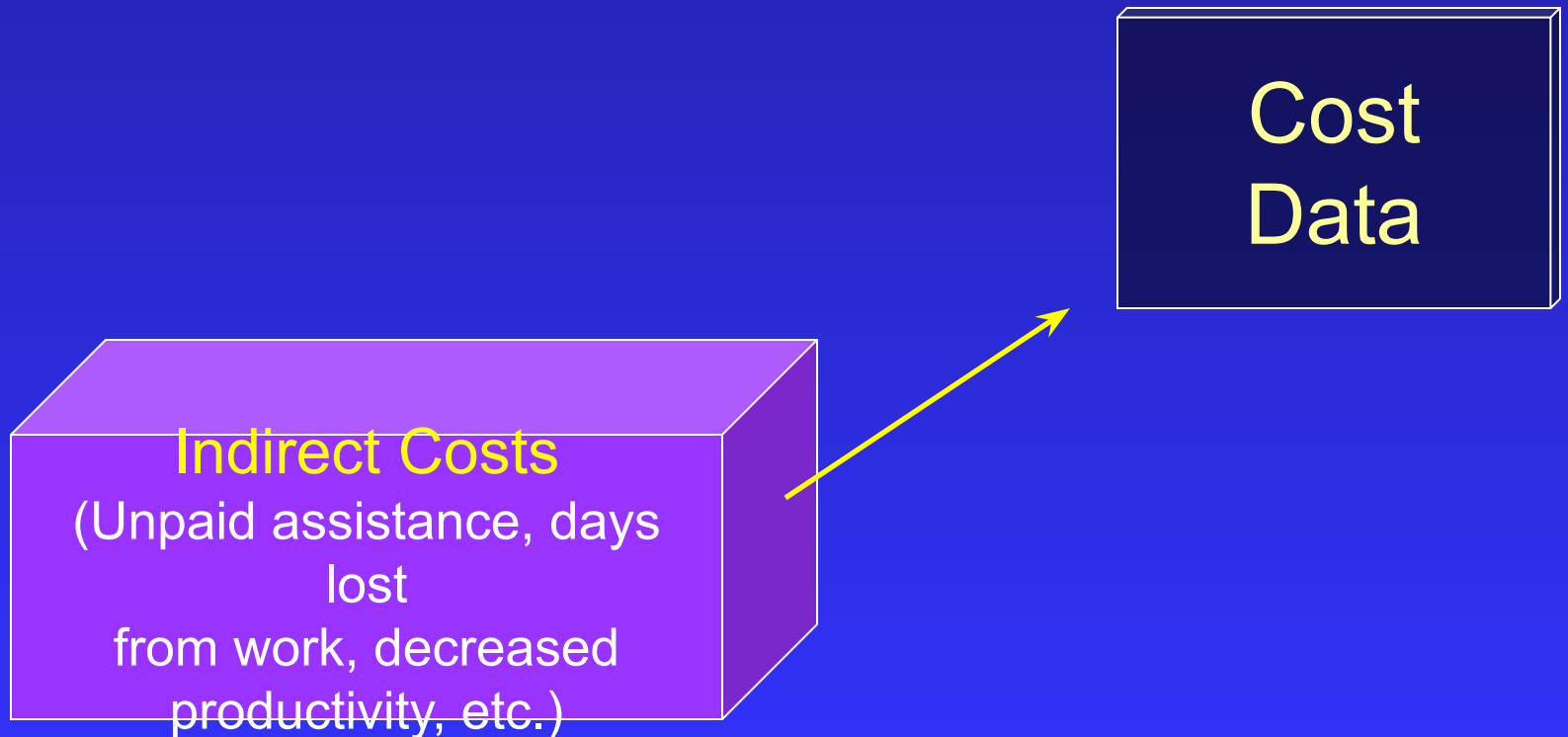
# Components of Cost

Unpaid resource  
commitment. Cost of  
morbidity and mortality.

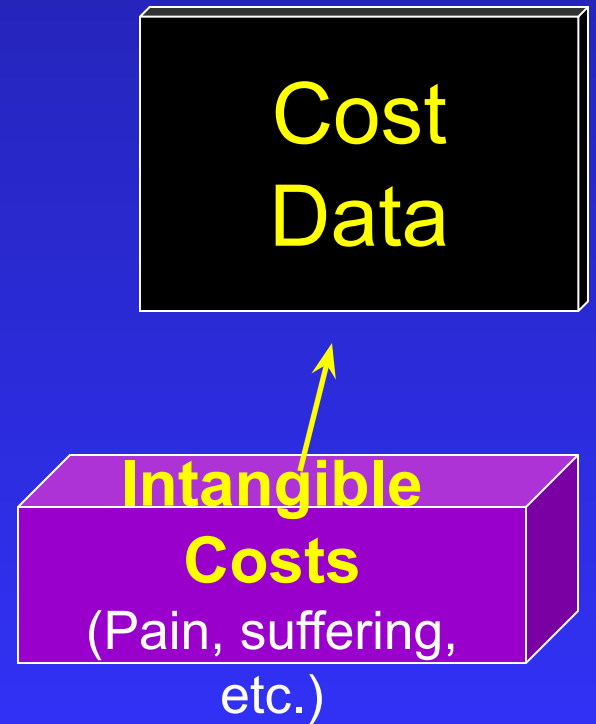
Cost  
Data

Indirect Costs

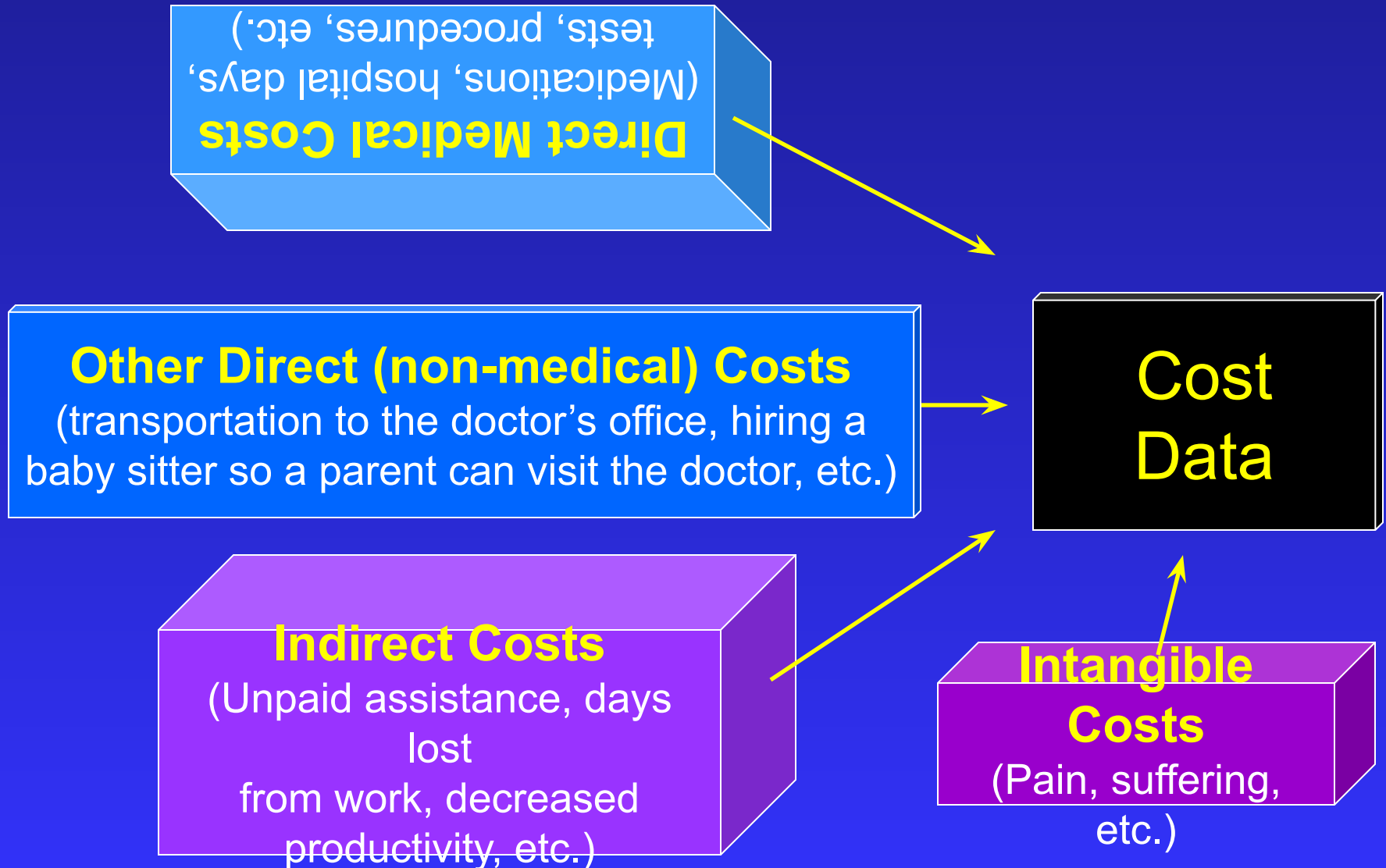
# Components of Cost



# Components of Cost



# Measurement of resource use

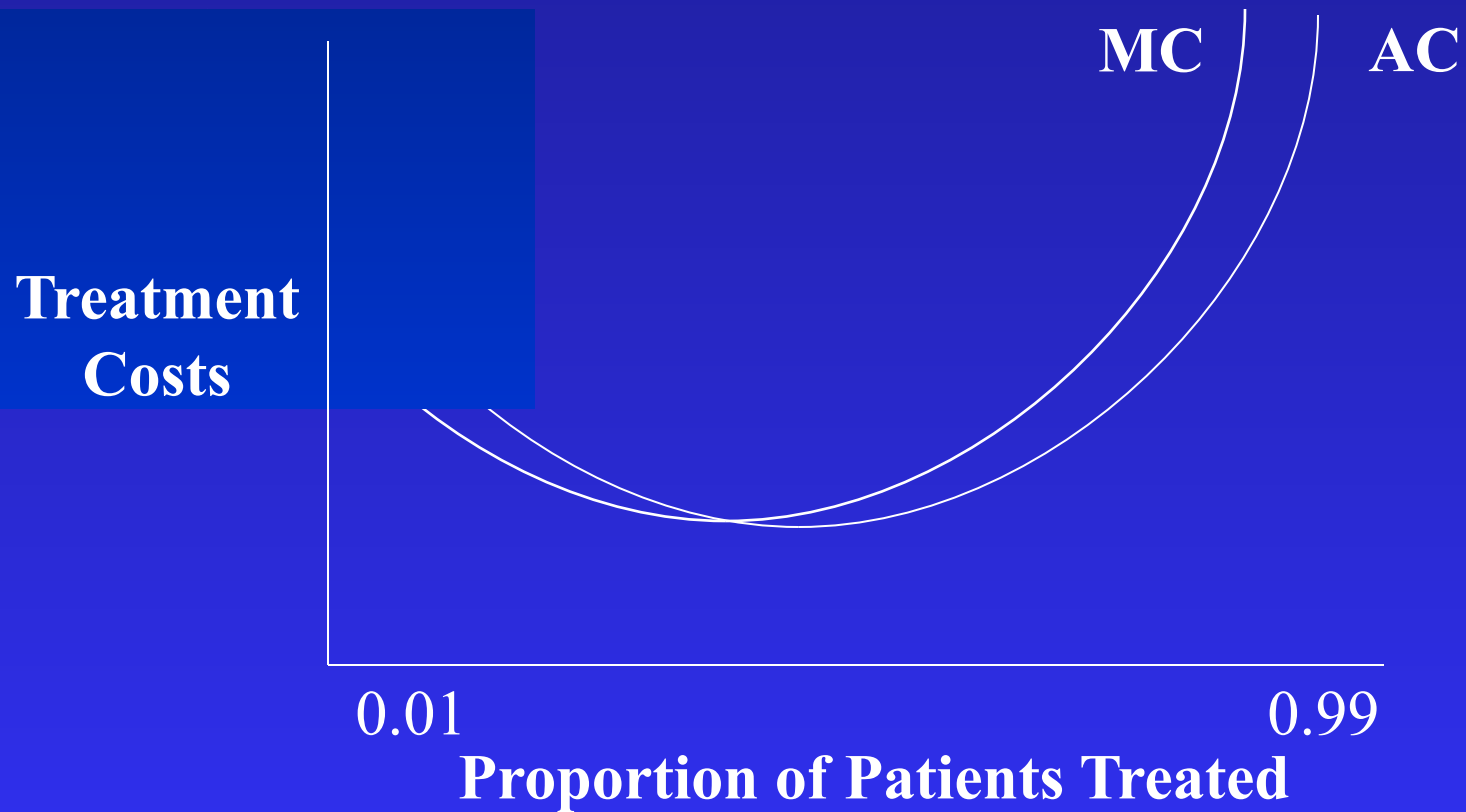


# Cost Terminology

- ❑ **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

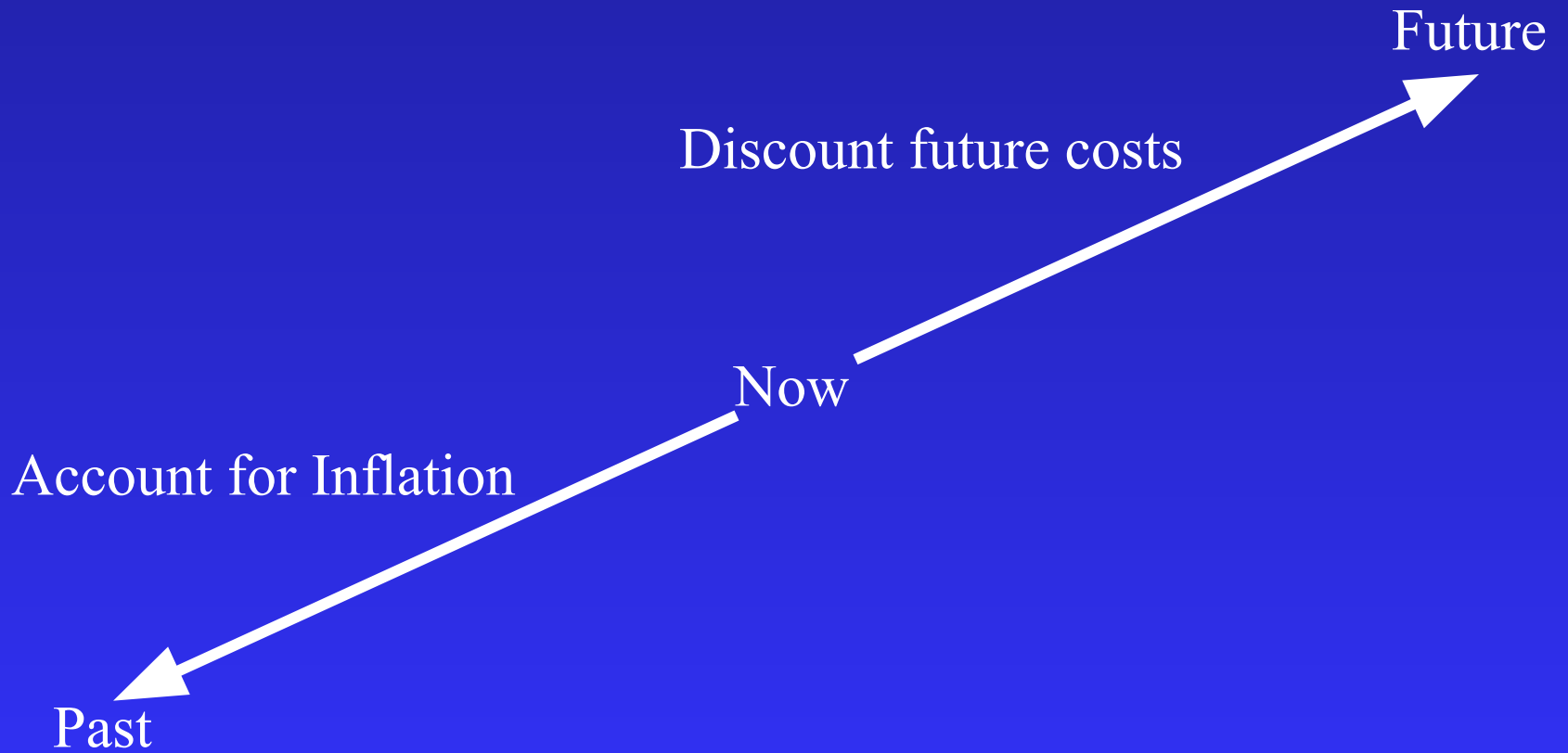
# Sources of Cost Data

- 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

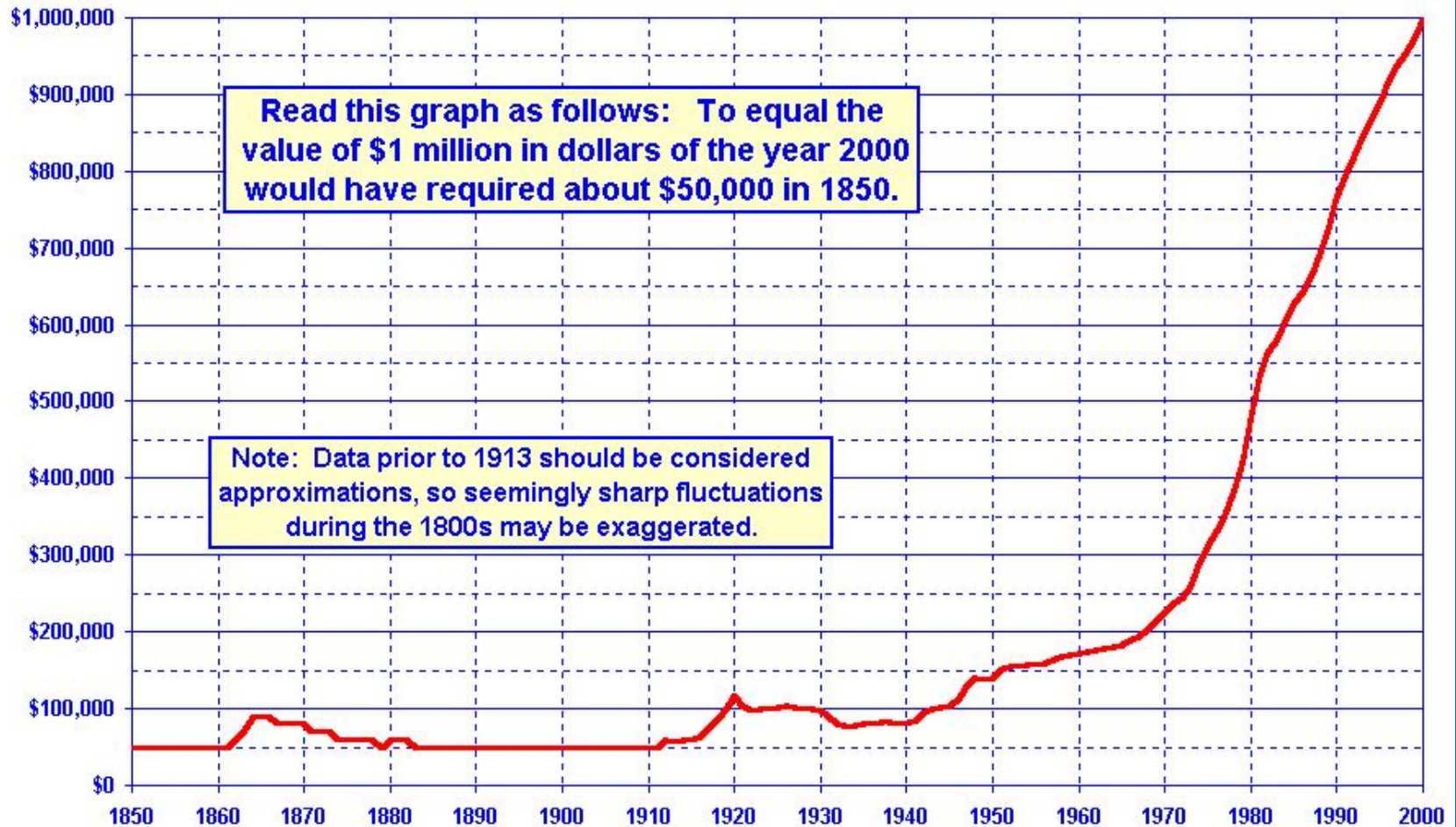
# Adjusting for Differences in the Timing of Costs

- 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

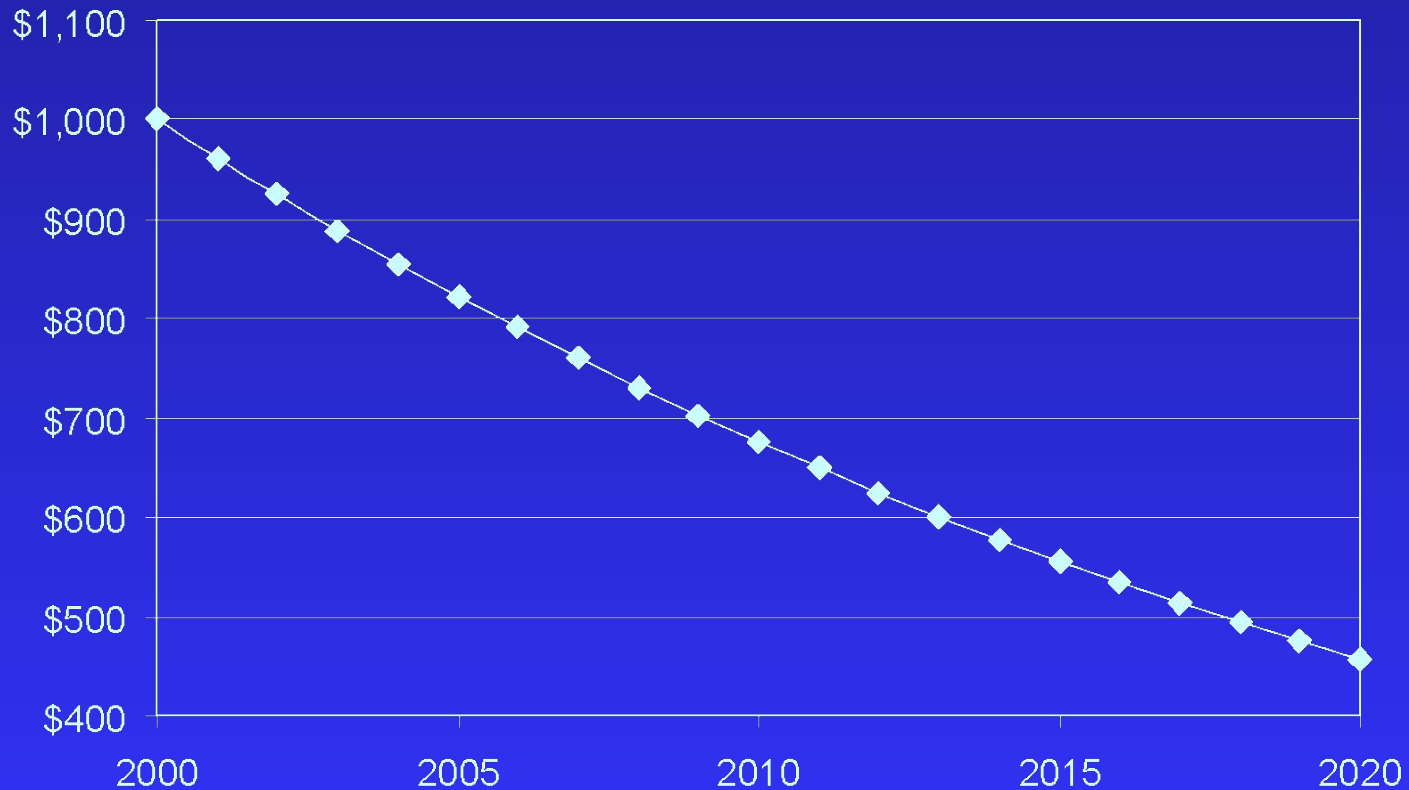


## Dollars Needed to Equal in Value \$1 Million in the Year 2000 for each Year 1850 to 2000



# Net Present Value

(Amount equivalent to \$1000 in 2000)



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

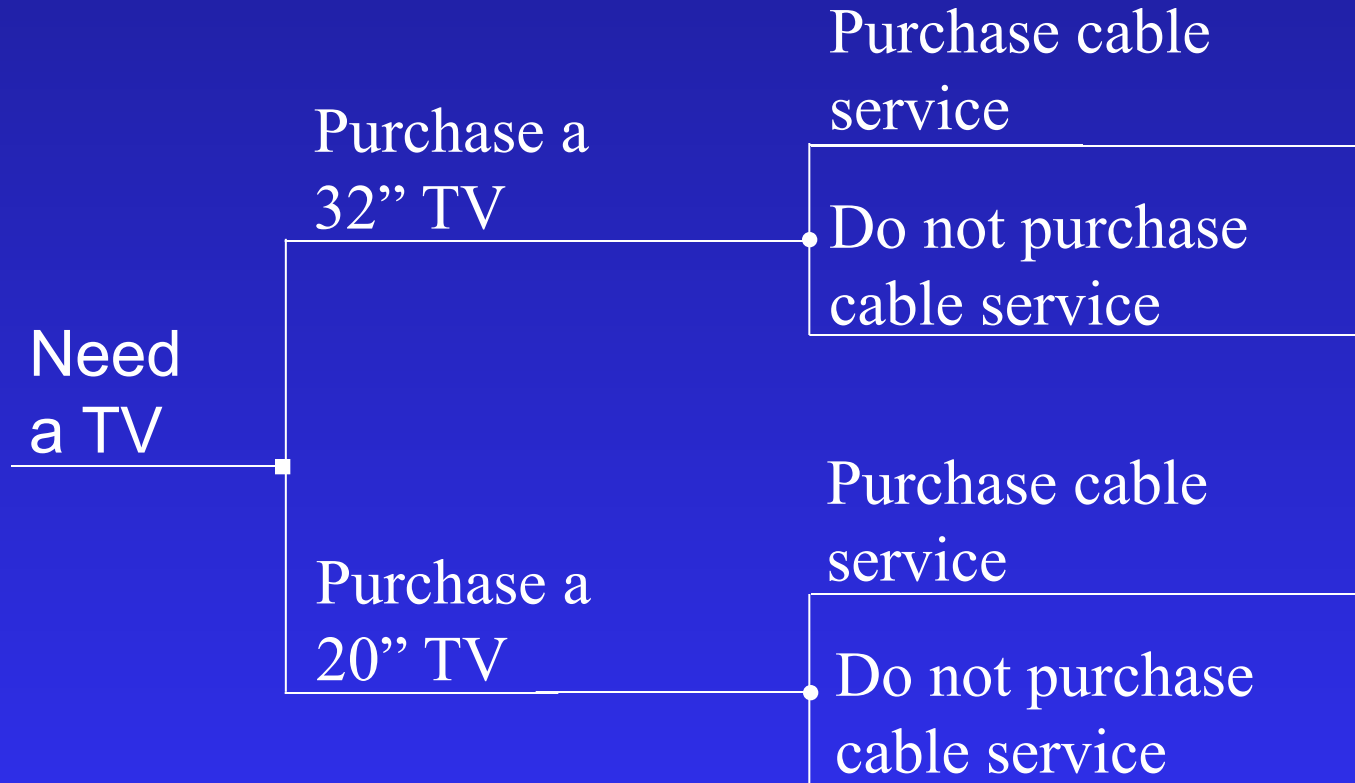
3.89% variable (inflation-based) rate)

= 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

