# Introduction to key concepts and definitions

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# WORLD DEVELOPMENT REPORT 1993

# Learning objectives

Twenty minutes from now, you will be able to:

- Distinguish cost analysis from cost-effectiveness analysis (CEA) from comparative effectiveness analysis.

- Define five key concepts in cost-effectiveness analysis.

# Five key concepts:

1. Perspective
2. Financial vs. economic cost
3. Output vs. outcome
4. Incremental analysis
5. Sensitivity analysis

# 1. Perspective

A *cost analysis* identifies inputs or resources that a program uses and their costs.

*Perspective* is the point of view from which the costs are calculated. It addresses the issue of which inputs or resources to include.

# Training program budget

| | Cost per unit | Computer-based training plus 3-day workshop | | 10-day training plus on-site visits | |
|---|---|---|---|---|---|
| | | Units | Cost | Units | Cost |
| Trainer | $100 per day | 3 | $300 | 10 | $1,000 |
| On-site | $1,000 per visit | 0 | | 5 | $5,000 |
| [..] | | | | | |
| Training program budget | | | $7,350 | | $12,250 |

# Donor perspective

| | Cost per unit | Computer-based training plus 3-day workshop | | 10-day training plus on-site visits | |
|---|---|---|---|---|---|
| | | Units | Cost | Units | Cost |
| Training program budget | | | $7,350 | | $12,250 |
| Hotel contract | $225 per day | 3 | $675 | 10 | $2,250 |
| Donor cost | | | $8,025 | | $15,000 |

# Societal perspective

| | Cost per unit | Computer – based training plus 3-day workshop | | 10-day training plus on-site visits | |
|---|---|---|---|---|---|
| | | Units | Cost | Units | Cost |
| Training program budget | | | $7,350 | | $12,250 |
| Contract with venue | $225 per day | 3 | $675 | 10 | $2,250 |
| Trainees' time | $20 per day | 200 | $4,000 | 275 | $5,500 |
| Total cost | | | $12,025 | | $20,000 |

# 1. Perspective

To repeat, *Perspective* is the point of view from which the costs are calculated.

Professional guidelines from the U.S. Panel on Cost Effectiveness in Health and Medicine recommend that analyst report the total cost from the societal perspective as a reference case so costs are comparable across analyses.

# 2. Financial vs. economic cost

*Financial cost* – For goods and services that are traded on a competitive market, the opportunity cost is simply the price

where *opportunity cost* is the value of the most beneficial alternative use of the resources.

*Economic cost* – Value of goods and services that are not purchased such as volunteer time or for which the price is distorted

# 3. Output vs. outcome

1. The cost per unit of output is valid when the two programs being compared are equally effective.

2. A cost per unit of outcome can address differences in effectiveness across programs.

3. The scope of the analysis is determined by the denominator. Only programs with a common denominator can be compared.

# Cost per unit of output

| | Computer training plus 3-day workshop | 10-day training plus on-site |
|---|---|---|
| Cost of transfer of learning | | |
| Training | $12,025 | $20,000 |
| Supervision | 8,000 | $2,000 |
| Total cost | 20,025 | $22,000 |
| Number of trainees | 25 | 25 |
| Cost per trainee | $20,025/25 = $801 | $22,000/25 = $880 |

# Cost per unit of intermediate outcome

| | Computer training plus 3-day workshop | 10-day training plus on-site |
|---|---|---|
| Cost of transfer of learning | $12,025 | $20,000 |
| Training | $12,025 | $20,000 |
| Supervision | 8,000 | $2,000 |
| Total cost | 20,025 | $22,000 |
| Number of trainees | 25 | 25 |
| Cost per trainee | $20,025/25 = $801 | $22,000/25 = $880 |
| Trainees who meet standard | 15 | 22 |
| Cost per trainee who met standard | $20,025/15 = $1,335 | $22,000/22 = $1,000 |

# 3. Output vs. outcome

- **Cost analysis:** Compares the cost per unit of output when to programs are equally effective or cost per intermediate outcome

- **Cost-effectiveness analysis (CEA)**: Compares incremental cost to incremental effectiveness, e.g. $/life years saved from intervention vs. usual care

- **Cost-utility**: Special case of CEA with effectiveness measured as quality-adjusted life years (QALYs)

# 4. Incremental analysis

Incremental cost effectiveness ratio (ICER)

$$\frac{\Delta \text{ Change in health care cost}}{\Delta \text{ Change in health outcomes}}$$

# PMTCT Cost per HIV infection averted

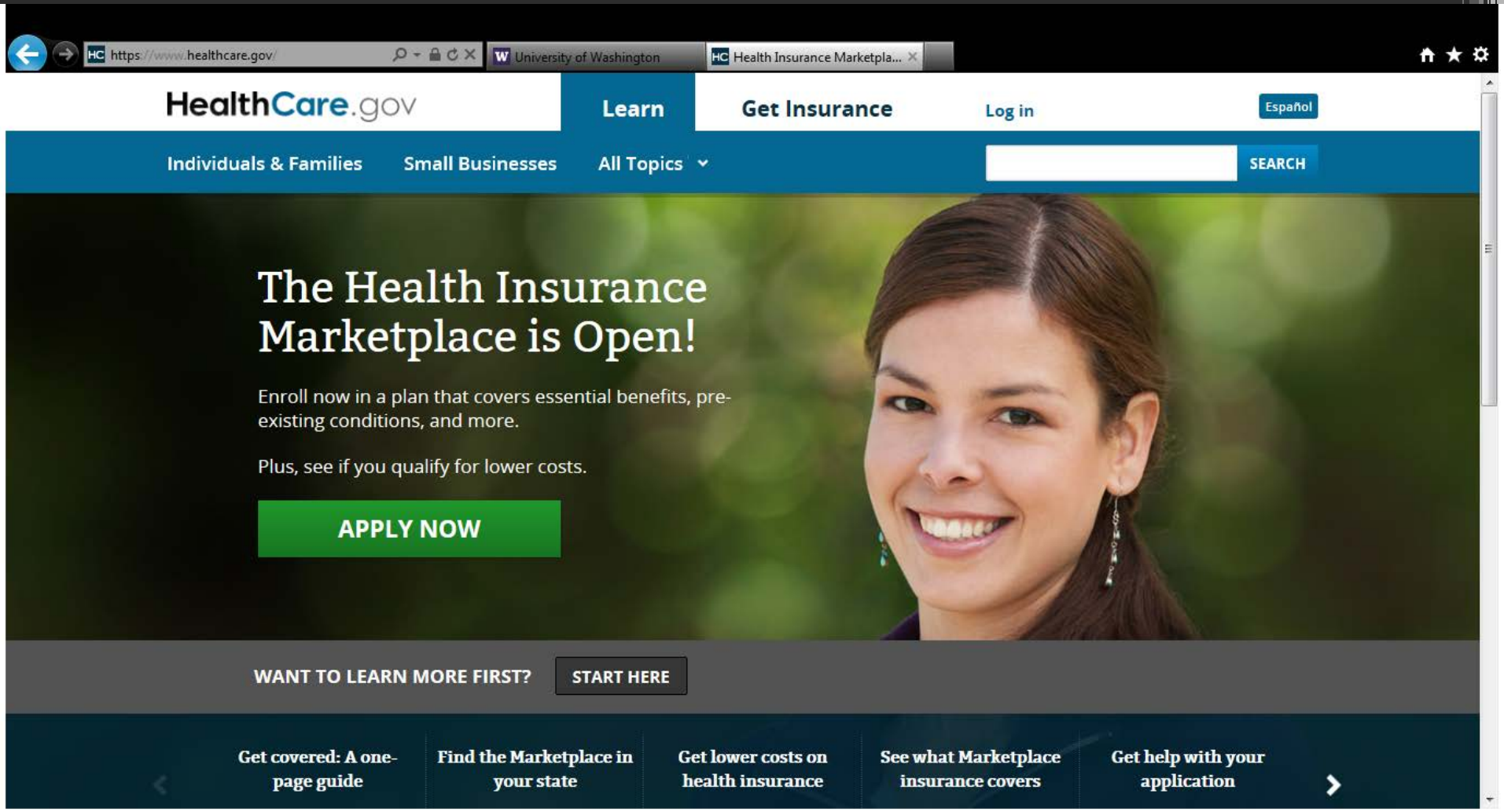
| | Pre-training | Post-training |
|---|---|---|
| Program cost | | |
| Remuneration | $80,000 | $84,000 |
| Supplies | 15,000 | 18,000 |
| Capital | 5,000 | 10,000 |
| Total Cost | $100,000 | $112,000 |
| Number of mother-infant pairs | 1,000 | 1,200 |
| Base case-vertical transmission | 25% | 25% |
| Number of HIV infections averted | 1,000*.25*.63=158 | 1,200*.25*.63=189 |
| Incremental cost | $112,000 - $100,000 = $12,000 | |
| Incremental effectiveness | | 189 – 158 = 31 |
| ICER | | $12,000/31 = $283 |

# 5. Sensitivity analysis

- Calculation of alternative cost-effectiveness results when there is uncertainty about one or more parameters.
- Sensitivity analysis is generally incorporated in CEA that are deterministic.
- It show the extent to which uncertainty about a parameter would substantially affect the estimate.

# PMTCT CEA with uncertainty

| | Pre-training | Post-training |
|---|---|---|
| Total Cost | $100,000 | $112,000 |
| Number of mother-infant pairs | 1,000 | 1,200 |
| Base case-vertical transmission | 25% | 25% |
| Lower bound | 19% | 19% |
| Upper bound | 30% | 30% |
| Incremental cost | $112,000 - $100,000 = $12,000 | |
| ICER – base case | | $12,000/31 = $283 |
| Lower bound | | $215 |
| Upper bound | | $340 |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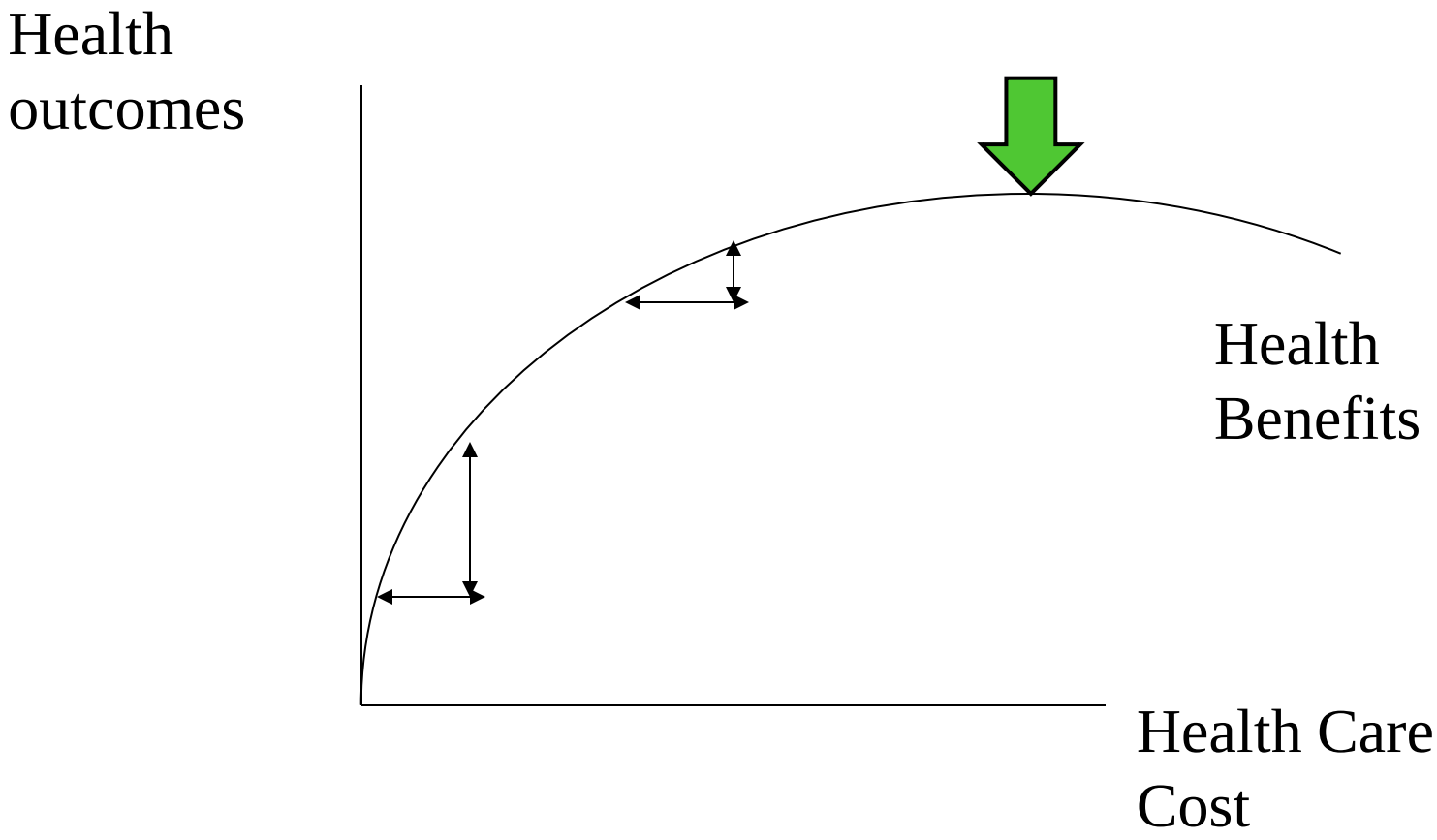
Get lower costs on health insurance
See what Marketplace insurance covers
Get help with your application

# “Flat of the Curve” Medicine



# Questions?

Photo by: Charles Steinberg

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