Introduction to Health Economics
AND ECONOMIC EVALUATION

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Did you learn about Health Economics in medical school?

- Yes
- No

What is Health Economics?
What is Alberta's healthcare budget for 2022?

- 15.0 billion
- 18.2 billion
- 21.4 billion
- 22.0 billion
Hospital has one dialysis machine that can run for 30 hrs/week. You are the boss. Decide how you will allocate the hours in order of preference.

60 year old male 5 hrs/week. He is married with grown up children.

6 year old male 10 hrs/week. Is awaiting a kidney transplant that will happen in about 1 year.

78 year old female 4 hrs/week. Is widowed. Full recovery expected.

3 year old male 4 hrs/week. Will need dialysis indefinitely.

7 year old female 4 hrs/week. Has 3 siblings.

8 year old female 5 hrs/week. Does not have any siblings.

65 year old female 10 hrs/week. Promises to buy the hospital another dialysis machine if she is alive in 1 year’s time.

30 year old male 4 hrs/week. Has two young children.

30 year old female 6 hrs/week. Does not have children.

45 year old male 6 hrs/week. Has no children. His brother will donate a kidney in 6 months’ time.
## Learning objectives

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<td>Introduction to measuring costs and benefits</td>
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<td>Combining costs and outcomes to aid in decision making</td>
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**Economics**

“*The study of how people end up choosing to employ scarce resources that could have alternative uses*”.

(Samuelson 1980)

| Framework to help make choices that will maximize the health of the population subject to resource constraints |

**Health Economics**
OPPORTUNITY COST

- RESOURCES
- CHOICES
- CONSTRAINTS
- SCARCITY
Opportunity cost

Benefit that a person could have received, but gave up, to take another course of action.
How would you invest $20 million?

MAXIMIZE HEALTH!

1. Build another wing at ACH
2. Hire more healthcare professionals
3. Buy state-of-the-art equipment
How would you invest $20 million?

- More building
- More people
- More technology
How would you devest $20 million?

**MAXIMIZE HEALTH!**

1. Shut down Unit 4
2. Fire healthcare professionals
3. Cancel Connect Care
Role of health economics – priority setting

To measure and evaluate:

• the demand and supply of healthcare

• allocation of resources within the healthcare system to promote efficiency and equity
Aim of health economics

To ensure that we do those activities whose benefits outweigh their opportunity cost

i.e. we do the most beneficial things with the resources at our disposal
1. Ensuring quality of care in our communities
2. Partnering for better health outcomes
3. Achieving health system sustainability

AHS strategy for clinical health research
Economic evaluation

Comparative analysis of alternative courses of action in terms of both their costs and consequences


https://www.cadth.ca/guidance-document-costing-health-care-resources-canadian-setting
Economic evaluation

Comparative analysis of alternative courses of action in terms of both their costs and consequences


https://www.cadth.ca/guidance-document-costing-health-care-resources-canadian-setting
Cost Categories

examples

consider perspective

HEALTH SECTOR
- Drugs
- Diagnostics
- Ambulance
- Homecare
- Equipment
- Hospital
- Healthcare providers

PATIENT/FAMILY
- Out-of-pocket
- Co-payments
- Travel

PRODUCTIVITY
- Indirect
<table>
<thead>
<tr>
<th>Perspective</th>
<th>Types of Cost</th>
<th>Examples</th>
</tr>
</thead>
</table>
| Societal perspective        | Direct costs to publicly funded services (other than health care)              | Social services, such as home help, meals on wheels
Income transfer payments paid (e.g., disability benefits)
Special education           |
| Public payer                | Direct costs to publicly funded health care system                             | Drugs, medical devices
Equipment, space, facilities, and associated overhead costs
Aids and appliances paid by government
Health care providers and other staff
Medical services, including procedures
Hospital services
Emergency visits
Ambulance services
Diagnostic, investigational, and screening services
Rehabilitation in a facility or at home
Community-based services, such as home care, social support
Long-term care in nursing homes |
| Publicly funded health care system | Direct costs to patients and their families                                   | Out-of-pocket payments (including co-payments) for drugs, dental treatment, walking aids
Cost of travel for treatment, paid caregivers
Premiums paid to, and benefits received from, private insurers
Income transfer payments received (e.g., disability benefits) |
| Time costs to patients and their families | Patient’s time spent for travel and receiving treatment | Lost time at unpaid work (e.g., housework) by patient and family caring for the patient |
| Productivity costs          | Lost productivity due to reduced working capacity, or short-term or long-term absence from work (during friction period)
Costs to employer to hire and train replacement worker for patient |
# Health Sector - Resources

<table>
<thead>
<tr>
<th>Resource</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospitalization</td>
<td>Discharge Abstract Database (DAD)</td>
</tr>
<tr>
<td>Physician Visits</td>
<td>Physician Claims</td>
</tr>
<tr>
<td>Medications</td>
<td>PIN dispense data</td>
</tr>
<tr>
<td>ED visits</td>
<td>National Ambulatory Care Reporting System (NACRS)</td>
</tr>
<tr>
<td>Diagnostic Imaging</td>
<td>Physician Claims</td>
</tr>
<tr>
<td>Lab Tests</td>
<td>Lab data</td>
</tr>
</tbody>
</table>

AHS Analytics, Data Integration, Measurement & Reporting (DIMR)
### Patient/Family - Resources

- Travel
- Parking
- Insurance
- Surveys

### Productivity - Resources

- Median hourly wage
- Surveys
Economic evaluation

Comparative analysis of alternative courses of action in terms of both their costs and consequences

https://www.cadth.ca/guidance-document-costing-health-care-resources-canadian-setting
Measuring benefits (consequences, outcomes)

Clinically meaningful effectiveness measures

- Condition-specific measures
- Disease rates
- Quality of life (QoL)
- Mortality rates
- Healthcare utilization
- Intermediate outcomes (BP, FEV$_1$, viral load)

Caution!
# Measuring benefits - resources

<table>
<thead>
<tr>
<th>Resource</th>
<th>Data Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discharge Abstract Database (DAD)</td>
<td>healthcare utilization</td>
</tr>
<tr>
<td>Physician Claims</td>
<td>healthcare utilization</td>
</tr>
<tr>
<td>Ambulatory Care (NACRS)</td>
<td>healthcare utilization</td>
</tr>
<tr>
<td>Calgary Lab Services</td>
<td>blood biomarkers</td>
</tr>
<tr>
<td>PIN Dispense data</td>
<td>drugs</td>
</tr>
<tr>
<td>Alberta Blue Cross</td>
<td>drugs</td>
</tr>
<tr>
<td>Census</td>
<td>SES, income, education, smoking, BMI</td>
</tr>
<tr>
<td>Vital Statistics</td>
<td>births, deaths, migration</td>
</tr>
<tr>
<td>Health Quality Council</td>
<td>patient satisfaction</td>
</tr>
</tbody>
</table>
Measuring benefits - techniques

Quality adjusted life years (QALYs)
- Euroqol, HUI, SF-6D
- Discrete choice experiment
- Contingent valuation

<table>
<thead>
<tr>
<th>Health State</th>
<th>Value</th>
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<tbody>
<tr>
<td>normal health</td>
<td>1.0</td>
</tr>
<tr>
<td>Atopic eczema – not recurrent</td>
<td>1.0</td>
</tr>
<tr>
<td>Asthma – symptom free</td>
<td>0.97</td>
</tr>
<tr>
<td>JIA – controlled</td>
<td>0.77</td>
</tr>
<tr>
<td>Vision loss</td>
<td>0.5</td>
</tr>
<tr>
<td>extremely bad health</td>
<td>0.0</td>
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</table>
What type of economic evaluation are you doing?
Economic evaluations attempt to take into account the decision-maker’s viewpoint.
Cost Effectiveness Analysis (CEA)

Compares costs and outcomes (effects) of different courses of action.

Eg. deaths averted/yr
decreased cases of NEC/yr
# of RSV hospitalizations/mo
Cost Benefit Analysis (CBA)

Like a CEA, but values the benefits in dollar value

Measure whether benefits exceed the costs

Often used to evaluate programs

Eg. Cost and cost benefits of a 12 hr vs 24 hr Peds ED at SHC
Cost Utility Analysis (CUA)

Like a CEA, but values the benefits in healthy years

*Quality Adjusted Life Year (QALY)

Eg. cost of cochlear implantation per QALY
    cost of rotavirus vaccine per QALY
Framework for decision-making

*Putting costs and outcomes together relative to the comparator*
COSTS MAY:

A: DECREASE
B: REMAIN UNCHANGED
C: INCREASE
OUTCOMES MAY:

1. IMPROVE
2. REMAIN UNCHANGED
3. WORSEN
Matrix linking effectiveness and cost

<table>
<thead>
<tr>
<th>EFFECTIVENESS</th>
<th>1</th>
<th>2</th>
<th>3</th>
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</thead>
<tbody>
<tr>
<td>COST increasing</td>
<td>A</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>B</td>
<td></td>
<td></td>
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<td></td>
<td>C</td>
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Compared with the current drug/program, the new drug/program is:

1. more effective
2. of equal effectiveness
3. less effective

✓ recommend new drug/program
X do not recommend new drug/program
? judgement required
~ indifferent

A. less costly
B. of equal cost
C. more costly
Now graphically

- **Change in Costs**
  - New program is dominated (less effective & more costly)
  - New program is more effective but more costly

- **Change in Effects**
  - New program is less effective and less costly
  - New program dominates (more effective & less costly)
Change in Effects

Change in Costs

New program is dominated (less effective & more costly)

New program is more effective but more costly

New program is less effective and less costly

New program dominates (more effective & less costly)
The “ICER”
Incremental cost-effectiveness ratio

\[
\frac{\text{change in costs}}{\text{change in outcomes}}
\]

Summary measure – economic value of an intervention
WHAT IS GOOD VALUE?

Program under consideration: Lung cancer screening among smokers using low-dose CT scans

Compared with no screening, the ICER is $52,000 per QALY

Would you fund this screening program?

How much would you pay for a year of perfect health?
WHAT IS GOOD VALUE?

Lung cancer screening among smokers using low-dose CT scans
Compared with no screening, the ICER is $52,000/QALY

NICE (UK) states that it employs an ICER of $30,000-$46,000/QALY
In practice, evidence shows that the threshold is closer to $64,000/QALY

Canada – general acceptability threshold of $50,000/QALY with a grey zone extending up to $150,000/QALY (orphan drugs)
What does the evidence say?

https://www.cadth.ca/reimbursement-review-reports
Economic evaluation - summary

In a time of financial restraint, we should measure costs of activities we do and want to do AND we need to measure outcomes.

Economic evaluation provides data to assist in decision-making.
Value for money

In a time of financial restraint, we need to consider:

Is this new treatment/program value for money?

Will the healthcare system overall see cost avoidance or cost savings?
Would an economic evaluation enhance your research project?

- Yes
- Yes, but as a Part II
- Unsure
- No
Costing websites

_O’Brien Institute for Public Health. Costing Resources_
https://obrieniph.ucalgary.ca/groups/health-economics/he-costing-resources

_Canadian Institute for Health Information. Patient Cost Estimator_

_CADTH. List of Publicly Available Canadian Cost Information_
https://www.cadth.ca/list-publicly-available-canadian-cost-information