Health Economic Analysis and Methods

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Educational Objectives

- Types of Economic Evaluations in Health Care
- Economic Perspectives: Societal, Institutional
- Datasets: Measures of Cost and Effectiveness
- Medicare Data: Use and Implications
I. Types of Economic Evaluations

- Four approaches to analyzing costs:
  - Cost Identification Analysis (CIA)
  - Cost Effectiveness Analysis (CEA)
  - Cost Benefit Analysis (CBA)
  - Cost Utility Analysis (CUA)

I. Cost Identification Analysis (CIA)

- Also called “Cost Minimization Analysis”
- Answers the question, “What is the cost per service or program?”
- Goal is to select the least cost option
- Assumes health outcomes are the same for the two programs / interventions
- Ignores benefits or health outcomes
I. Cost Effectiveness Analysis (CEA)

- Includes both costs and outcomes
- Numerator of Cost Effectiveness Ratio (CER) reflects change in cost
- Denominator reflects change in outcome (e.g., lives saved, complications averted, cases of illness prevented)
I. Cost Effectiveness Analysis (CEA)

- Testing to see if health outcomes are the same under two interventions/strategies.
- If one of the interventions/strategies is cheaper and more effective, it “dominates” the other.
- If an intervention/strategy is more expensive and more effective, it’s cost effective if the extra benefit justifies the extra cost.
I. Cost Effectiveness Analysis (CEA)

- Can only compare interventions whose benefits are measured in the same units of effectiveness
- Cannot inform decisions about how much to spend on housing, food, or education in relation to health care
I. Cost Benefit Analysis (CBA)

- Answers the question, “Is the benefit worth the extra cost?”
- Aggregates all effects (benefits and costs) into dollar amounts
  - This can be controversial: it involves asking consumers what they are willing to pay to avoid an injury or illness, for example
I. Cost Benefit Analysis (CBA)

- Provides no distinction between cost and effect, input or outcome
- Broader application than CEA
- Can inform decisions about how much to spend on housing, food, or education in relation to health care
I. Cost Utility Analysis (CUA)

- A variant of CEA
- Measures outcomes in life-years of survival or quality-adjusted life years (QALYs)
- Can not typically perform CUA with claims data alone...
II. Economic Perspectives

Whose costs/benefits should be considered?

- **Societal Perspective** (“gold standard”)
  - Health care institutions, patients, caregivers

- **Institutional Perspective**
  - Health care institutions, third party payers
II. Economic Perspectives

Whose costs/benefits are considered?

- **Societal Perspective** ("gold standard")
  - Direct medical expenses
    » Hospital Inpatient (IP)
    » Outpatient care (OP)
    » Prescriptions (Rx)
    » Supplies, labs (e.g. x-rays, blood tests, etc.)
II. Economic Perspectives

Whose costs/benefits are considered?

- **Societal Perspective** ("gold standard")
  - Indirect medical expenses (accounting definition)
    » Overhead (utilities)
    » Facility (rent)
    » Capital financing
  - Patient’s time (travel time, time lost from work/leisure)
  - Caregiver’s time (travel time, time caring for patient)
II. Economic Perspectives

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    - Overhead (utilities)
    - Facility (rent)
    - Capital financing
Third party payer
Insurance Company or Government Agency

Financing
- Premiums
  - Insurance coverage

Consumers
Patients

Medical Services

Out of pocket fees

Producers
Health Care Providers (hospitals, physicians, etc.)

Charges

Reimbursement
Third party payer
Insurance Company or Government Agency

Financing

Premiums

Charges

Claims Data

Reimbursement

Consumers
Patients

Insurance coverage

Medical Services

Out of pocket fees

Producers
Health Care Providers
(hospitals, physicians, etc.)
III. Datasets: Measures of Cost

- **Third Party Payer:**
  - **Claims data** represent reimbursement
    - CMS files:
      - MedPAR
      - Standard Analytical Files (SAFs)

- **Hospital or Institution:**
  - **Charges** represent institutional direct costs + overhead (indirects) + profits
  - **Cost of services** represent institutional direct costs
    - Medicare Claims & Cost Reports → cost to charge ratio
III. Datasets: Measures of Cost

- **Societal Perspective:**
  - Cost of services represent institutional direct costs
    » Medicare claims & Cost Reports need to use cost to charge ratio
  - If QALYs do not account for the value of patient’s time lost from work, travel costs, and value of caregiver time, include these costs in numerator of CER
    » Medicare claims & Master Beneficiary Summary files contain patients’ zipcodes to calculate distance traveled to see providers
    » CMS files: Provider of Service (POS) files contain institutions’ zipcodes or Cost Report website
  - NOT in CMS files:
    » Time lost from work
    » Caregiver’s time
III. Datasets: Measures of Effectiveness

- **QALYs** - not in Medicare claims data
- **Mortality**
  - Deaths (CMS data: MedPAR, Denominator/Master Beneficiary Summary file)
- **Morbidity measures**
  - LOS in hospital (CMS data: MedPAR, SAFs)
  - LOS in ICU (CMS data: MedPAR, SAFs)
  - Re-interventions & complications (CMS data: MedPAR, SAFs)
III. Datasets: Measures of Effectiveness

- **Comorbidity measures**
  - Chronic conditions: CCW Master Beneficiary Summary Files contain indicator variables for chronic conditions
  - Risk adjustment scores: use diagnoses (Dx) codes in claims files to calculate risk adjustment scores (e.g. Charlson, ACGs)
    » May want to include all SAFs (e.g. Skilled Nursing Facilities (SNF), Home Health (HH), Hospice) for outpatient analyses
  - Health & functional status measures are not in CMS claims data
    » e.g. # Activities of Daily Living (ADLs)
    » e.g. # Independent Activities of Daily Living (IADLs)
III. Datasets: Measures of Effectiveness

- Comorbidity measures
  - Assessment datasets
    » Minimum Data Set (MDS) – clinical assessment data for nursing home residents
    » Outcome and Assessment Information Set (OASIS) – assessment data for home care patients
    » Inpatient Rehabilitation Facilities - Patient Assessment Instrument (IRF-PAI)
    » Medicare Current Beneficiary Survey (MCBS) Access to Care Files – health and functional status measures
IV. Datasets: Use and Implications

- Medicare
  1. Payment or reimbursement (claims)
  2. Charges (vary by institutions)
  3. Cost (what we’re really trying to measure!)
  4. Cost to charge ratios (calculation)
IV. Datasets: Use and Implications

- Medicare

1. Payment or Reimbursement
   - Claims data
   - May or may not cover a specific institution’s costs or charges
   - Offers standardized approach to measuring costs
IV. Datasets: Use and Implications

- Medicare
  2. Charges
    » Lots of variation across hospitals
    » Within hospitals, lots of variation across departments
    » Accounting systems allow for cross subsidizing across departments
    » In theory, no upper limit on charges
IV. Datasets: Use and Implications

- **Medicare**

3. Cost (what we’re really trying to measure!)
   - Derived using Cost to Charge Ratios (CCR)
     - CCR = Cost/Charge
     - Cost = Charges * CCR
   - Lots of variation across hospitals in overall CCRs
   - Lots of variation in departmental CCRs within hospitals
IV. Datasets: Use and Implications

- **Medicare**

4. Cost to Charge Ratios (CCR) = Cost/Charge
   - CCR < 1 ➞ Cost < Charge ➞ making $$$
   - CCR > 1 ➞ Cost > Charge ➞ losing $$$
   - Accounting systems allow for cross subsidizing across departments