PHG 537

Pharmacoeconomics, Genetics, and Healthcare

Wednesdays, 9-11:50 AM
Autumn 2007

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Instructors:

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Office Hours: By appointment
Course objectives:

After this course, the student will be able to:

• Compare and contrast the different methods for economic evaluation in health care;
• Describe the instruments for measuring health state preferences;
• Evaluate a simple decision analysis model;
• Identify the role of economic evaluation in decision making and health policy;
• Critically evaluate a published cost-effectiveness study;
• Apply economic evaluation and health technology assessment to genetic tests

General description of the course

This is an introductory course in economic evaluation in healthcare offered jointly by the School of Pharmacy’s Pharmaceutical Outcomes Research and Policy Program (http://depts.washington.edu/porpp/) and the School of Public Health’s Institute for Public Health Genetics (http://depts.washington.edu/phgen/). Attention is focused on cost-effectiveness and cost-benefit analysis, measures of health-related quality of life, technology assessment, resource allocation, pharmacoeconomics, and medical decision-making. We will also cover issues related to genomics, including cost-effectiveness of genetic testing and screening, and insurance and employment issues related to genetic information.

This class is ‘withered’ (taught along with) PHARM534/HSERV583, which covers the same material but requires a research project. References to the course project below do not apply to students taking PHG537. However, PHG537 students are expected to attend all presentations of the projects, and fully participate in discussion of them.

GRADING:
All assigned work will be graded on a 5-point scale for excellent (5) to poor (1) and reviewed by both instructors. Grading will be based on classroom participation, a midterm exam, and a written critique of a published cost-effectiveness paper.

Classroom participation 25%
Midterm exam 25%
Written critique of a published paper 50%

Grading will be based on student performance using the grading system for undergraduate and graduate students published in the 2002-2004 University of Washington General Catalog.

Readings

The following required textbooks can be purchased at the South Campus University Bookstore:

Required:


**Recommended:**

### OUTLINE

1. **September 26**
   - Course Introduction. Overview and Rationale for Economic Evaluation in Healthcare and Theoretical Foundations
     - *Veenstra & Garrison*

2. **October 3**
   - Methods for Economic Evaluation. CEA/CUA/CBA and Resource Allocation
     - *Garrison*

3. **October 10**
   - Framing Studies and Decision Analysis, Class Modeling Exercise
     - *Veenstra*

4. **October 17**
   - Numerator: Identification and Measurement of Resource Utilization, Non-Medical Resources and Unit Cost Determination
     - *Garrison*  
     - **Midterm Distributed**

5. **November 24**
   - Denominator: Methods for Preference Elicitation and QALY Determination, Class Exercise
     - *Midterm Due*
     - *Beth Devine*

6. **November 31**
   - **Student Project Updates** (3-5 min each, no slides, total 1 hour)
     - Journal of Cost and Outcomes Research: Editorial Board Meeting
     - (40 min. each, 3 groups – 3 manuscripts)
     - *Garrison & Veenstra*

7. **November 7**
   - Markov Modeling, Uncertainty Simulations, and Discrete Event Simulation
     - *Veenstra*

8. **November 14**
   - Cost-effectiveness trials; Economic issues and genetics
     - *Veenstra and Garrison*

9. **November 21**
   - Resource Allocation Decisions in the Real World
     - *Sean Sullivan*

10. **December 28**
    - Student Project Presentations
     - *Veenstra & Garrison*

11. **December 5**
    - **Student Project Presentations**
     - *Veenstra & Garrison*
     - **Project Paper Due beginning of class**
Objectives for this Session - After this session, students will be able to:

1. Define economic evaluation and its potential applications in healthcare
2. Identify how expected utility theory and social welfare theory provides a theoretical basis for economic evaluation methods;
3. Discuss the theoretical origins of preference-based measures of health status and quality of life.

Topics:

1. Discuss course content and guidelines for student assessment, review student project topics
2. Relevance and role economic evaluation in health and medicine
3. Decision making under uncertainty
5. Welfare economics and QALY maximization as a basis for social policy
6. The importance of perspective
7. Time costs, preference, and future costs
8. Theories of positive well-being and quality of life

Required Readings:


Suggested Readings:

SESSION #2

October 3
METHODS FOR ECONOMIC EVALUATION: CEA/CUA/CBA AND RESOURCE ALLOCATION
Garrison

Objectives for this Session - After this session, student will be able to:

1. Describe the paradigm for classifying cost/outcomes studies;
2. Compare and contrast the various methods for economic evaluation of health care programs;
3. Define and interpret the incremental cost-effectiveness ratio (ICER).
4. Define and discuss the appropriate and inappropriate use of league tables, CE acceptability curves, and net benefits calculations;
5. What is the appropriate budget constraint?
6. Explain the results of cost/outcomes studies to health policy and other decision-makers.

Topics:

1. Designing cost-effectiveness studies for technology assessment
2. Specifying the incremental cost-effectiveness ratio
3. Interpreting the results of cost-effectiveness studies
4. Challenges to the use of cost benefit analysis in health care
5. Four quadrant cost/outcomes map
6. League tables and budget constraints
7. Cost-effectiveness acceptability curves
8. Net benefits
9. Decision rules for the results of economic evaluations
10. Current use of cost/outcomes data for decision-making
11. Evaluation of a hypothetical model

Required Readings:


Suggested Readings:

4. Chapters 5, 6 and 7 in Drummond. [Text book]
SESSION #3

October 10

FRAMING ECONOMIC EVALUATIONS
AND DECISION ANALYSIS

Veenstra

Objectives for this Session - After this session, student will be able to:
1. Assess the policy context for a cost and outcomes study;
2. Define the objective for a cost and outcomes study;
3. Identify the audience and appropriate comparators;
4. Frame the study question using a decision analysis approach.
5. Define decision-analysis and interpret studies utilizing this methodology.
6. Place cost values within a clinical decision model.
7. Derive costs and outcome values using decision analysis software package

Topics:
1. Framing the study
2. Designing the study
3. Data sources
4. Building a decision tree
5. Informing a decision tree
6. Analyzing a decision tree
7. Sensitivity analysis
8. Class exercise
9. Antiseptic Catheter CEA Example

Required Readings:

Suggested Readings [Particularly for those conducting modeling studies]:
SESSION #4

October 17

NUMERATOR:
MEDICAL RESOURCE UTILIZATION AND COSTS
Garrison

**MIDTERM DISTRIBUTED AT END OF CLASS**

Objectives for this Session - After this session, student will be able to:
1. Differentiate between marginal and average costs, variable and fixed costs, incidence and prevalence-based costs, and direct medical and indirect nonmedical costs;
2. Explain the differences between actual costs, provider charges, and payer reimbursement;
3. Use a cost to charge ratio to adjust hospital billing records;
4. Design a cost-of-illness or cost-of-treatment study.

Topics:

1. The importance of definition of costs in economic evaluation: prices, costs, charges, reimbursements
2. Cost-of-illness methodology
3. Valuation of costs
   a. Market-based valuation of direct and indirect costs
   b. Non-market valuation of indirect costs
4. Adjusting prices
   a. Time preference
   b. Inflation and common year
5. Marginal and incremental costs
6. Allocating overhead

Required Readings:


Suggested readings:

1. Chapter 4 in Drummond text. [Text]
SESSION #5

October 24

DENOMINATOR:
METHODS FOR PREFERENCE ELICITATION AND QALY DETERMINATION
Beth Devine

**MIDTERM DUE AT BEGINNING OF CLASS**

Objectives for this Session - After this session, student will be able to:

1. Values and utility theory: gambles and trade-offs – von-Neumann/Morgenstern
2. Identify the types of outcome measures used in the denominator of cost-effectiveness analyses.
3. Describe quality-adjusted survival and disability-adjusted survival.
4. Define and describe methods for eliciting preference weights for QALY calculations.
5. Define and describe methods for willingness-to-pay estimation

Topics:
1. Concepts, domains, and indicators
2. QALYs and HYEs
3. Instruments, indexes, profiles, and single measure valuations of utility
   a. Multiattribute utility theory
   b. Standard gamble
   c. Time trade-off
   d. Rating scales
4. Discounting benefits
5. Equity in the QALY measure: disability, age, and ethics
6. Willingness to pay as a measure of preference?

Required Readings:

Suggested Readings:
SESSION #6

October 31

I. **Student Project Updates; Progress Reports Due**

II. JOURNAL OF COST AND OUTCOMES RESEARCH EDITORIAL BOARD MEETING

Veenstra & Garrison


Authors (Summarize results, defend assumptions and analysis): GROUP 1
Reviewers (Summarize study importance, highlight weaknesses): GROUP 2
Editorial board (Synthesize Authors/Reviewers comments, REJECT or ACCEPT paper) GROUP 3


Authors (Summarize results, defend assumptions and analysis): GROUP 2
Reviewers (Summarize study importance, highlight weaknesses): GROUP 3
Editorial board (Synthesize Authors/Reviewers comments, REJECT or ACCEPT paper) GROUP 1


Authors (Summarize results, defend assumptions and analysis): GROUP 3
Reviewers (Summarize study importance, highlight weaknesses): GROUP 1
Editorial board (Synthesize Authors/Reviewers comments, REJECT or ACCEPT paper) GROUP 2

Required Reading


Chiou et al. Development and validation of a grading system for the quality of cost-effectiveness studies. Med Care 2002;41(1)32-44. [HealthLinks]
SESSION #7

November 7

MARKOV MODELING, PROBABILISTIC SENSITIVITY ANALYSIS, AND DISCRETE EVENT SIMULATION

Veenstra

Objectives for this Session - After this session, students will be able to:

1. Evaluate published studies using Markov modeling techniques
2. Model disease progression using a Markov model
3. Derive transition probabilities for a Markov model
4. Build a simple Markov model using standard spreadsheet software
5. Derive probability distributions for Monte Carlo simulations
6. Conduct 1-way and 2-way sensitivity analyses
7. Explain the conduct and interpretation of probabilistic sensitivity analysis
8. Describe the pros and cons of discrete event simulation

Required Readings:


Suggested Readings:

SESSION #8

November 14

COST-EFFECTIVENESS TRIALS; ECONOMIC ISSUES AND GENETICS

Garrison and Veenstra

Objectives for this Session - After this session, students will be able to:
1. Define the data collection requirements for trial-based economic evaluations
2. Understand the challenges of statistical analysis of economic evaluations
3. Identify cost-effectiveness drivers for genetic testing
4. Explain the potential economic risks associated with genetic testing.

Topics
1. Design of trial-based economic evaluations
2. Statistical analysis of trial-based economic evaluations
3. Assessing cost-effectiveness of genetic testing
4. Genetic testing and employability and insurability

Required Readings:

Suggested Readings:
SESSION #9

November 21

RESOURCE ALLOCATION DECISIONS IN THE REAL WORLD.
Sean Sullivan

Objectives for this Session - After this session, student will be able to:

1. Describe the challenges of utilizing cost-effectiveness studies for decision making in the U.S.;
2. Develop a strategy for presenting cost-effectiveness information to real-world decision makers

Required Readings:

   http://www.fmcpnet.org/data/resource/Format~Version_2_1~Final_Final.pdf

Suggested readings:

1. Chapter 10 in Drummond text.

Useful websites for HTA and Resource Allocation:
http://www.cms.hhs.gov/home/medicare.asp
http://www.nice.org.uk/
http://www.cadth.ca
http://www.ohsu.edu/drugeffectiveness/reports/final.cfm
http://www.ahrq.gov/clinic/techix.htm#progress
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# SESSION #11

## December 5

### ALL PROJECT PAPERS DUE AT BEGINNING OF CLASS

### STUDENT PROJECT PRESENTATIONS

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