EPI 5189: HEALTH ECONOMIC EVALUATION
DEPT. OF EPIDEMIOLOGY AND COMMUNITY MEDICINE
UNIVERSITY OF OTTAWA

TIME:	**13.00-16.00, THURSDAYS**
LOCATION:	**ROOM 3001, ROGER GUINDON HALL, UNIV. OF OTTAWA**
INSTRUCTOR:	**DOUG COYLE**

COURSE OUTLINE

The economic analysis course uses seminar type sessions rather than formal lectures. For most of the sessions, you will be provided with readings well in advance of each class. The reading will include both specific articles as well as sections of the course textbook:

Drummond et al. Methods for the Economic Evaluation of Health Care Programmes Oxford University Press, Third Edition 2005.

Copies of the textbook have been ordered at the Health Sciences bookshop. It is essential you obtain a copy of this text and specifically of the third edition.

The sessions are devoted to discussing the readings and any questions you may have. However, we are NOT going to go over each reading in an organized fashion: hence, **you must read all the material ahead of time**. The readings can be heavy going – so don't leave reading them until the night before class!

The main assignment for this class is to produce a proposal for an economic analysis – details of the requirements are attached. It is hoped that you can identify a topic for this assignment as soon as possible as often we will discuss how what you've learned in the session can be applied to your proposal. There will be a number of shorter written assignments throughout the term and I will also give specific questions for each session which you should be prepared to address orally in class. Brief feedback on each written assignment will be provided in class.

The grade for the class will be based on work in four areas. Class participation (10 %), written assignments (30 %), project presentation (10 %) and the major assignment (50 %).

Feel free to contact me at any time to discuss aspects of the course. I can be contacted either by email (dcoyle@uottawa.ca) or by phone (613 562 5800 ext. 8690). We can arrange a time to meet in my office – room 3105H. I am usually in my office Mondays, Thursdays and Fridays.

MAIN ASSIGNMENT

The main assignment for this course is to prepare a proposal for an economic evaluation of a health care intervention(s). The proposal should demonstrate your understanding of many of the theories and methods relating to economic evaluation in health care.

The proposal should be approximately ten pages long (single spaced excluding tables and references). The proposal should be realistic – in other words, something that could actually be done if funds were available.

The proposal should reflect the guidelines for economic evaluation published by CADTH. The proposal should cover the following topics:

- Background to study including the topic importance and why an economic analysis is needed
- Study objectives
- Treatment comparators and justification for their choice
- Choice of perspective and justification
- Choice of form of analysis and justification
- Choice of analytic horizon and justification
- What outcomes will be measured and how.
- What resource use is to be included and how they will be measured
- What is the source for cost data
- What discount rate and why
- Range of sensitivity analysis, methods and justification
- How the results will be interpreted
- Study limitations

It may be useful to provide a schematic of the decision tree or model which may be used in your study if appropriate.

By the second session of the course you should have some ideas of the possible topic of your proposal. You will be given opportunities to discuss aspects of your proposal during class as well as during an individual session with myself in mid-March. You will be asked to give a presentation of a draft proposal on either March 25th or April 1st.

Completed proposals are to be handed in by April 12th.

Should you wish to turn your proposal into an actual study I will be willing to assist you after the class is over. An economic evaluation would be sufficient in detail for a potential thesis within the Epidemiology department.

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SCHEDULE

Session 1	January 7th 2010	Introduction to Economic Evaluation
Session 2	January 14th 2010	Determining costs
Session 3	January 21st 2010	Utility Measurement
Session 4	January 28th 2010	Cost Benefit Analysis
Session 5	February 4th 2010	Decision Analysis
Session 6	February 11th 2010	Analysis of Uncertainty and Variability
Session 7	February 18th 2010	Practical session (1)

BREAK WEEK

Session 8	March 4th 2010	Practical session (2)
Session 9	March 11th 2010	Economic Evaluations alongside Clinical Trials
Session 10	March 12th, 15th or 16th 2010	Individual Meetings re. Project
Session 11	March 25th 2010	Project Session
Session 12	April 1st 2010	Project Session
Session 13	April 8th 2010	The Role of Economics in Priority Setting

SESSION 1

INTRODUCTION TO ECONOMIC EVALUATION

OBJECTIVES

- To understand the arguments for and the theoretical foundations of economic analysis of health care interventions.
- To understand what an economic evaluation is, and to be comfortable with some of the commonly used definitions such as cost effectiveness, cost utility and cost benefit.
- To understand the need for incremental analysis.

READINGS

1. Drummond MF et al. Methods for the Economic Evaluation of Health Care Programmes: Chapters 1, 2, 3 and 5 (excluding sections 5.1.4 and 5.4)

2. Loewy EH. Cost should not be a factor in medical care. Letter to the Editor. N Engl Med 1980;202(12):697.

3. Detsky AS, Naglie G. A Clinician's guide to cost-effectiveness analysis. Ann. Intern. Med. 1990:113;147-154.

4. Black WC. The cost-effectiveness plane, A graphical presentation of cost-effectiveness. Med Decis Making 1990;10: 212-215.

5. Berenson A. Pinning down the money value of a person's life. New York Times June 11, 2007.

CLASS ASSIGNMENT

1. Start to think of a topic for your main assignment.

It requires the identification of a population for whom an intervention is required – i.e. a patient population with a specific disease, a general population for which a population health manoeuvre could be applied. Once you've identified the population think about the various intervention options there are.

2. Discuss the importance of incremental versus absolute cost-effectiveness ratios.

SESSION 2

DETERMINING COSTS

OBJECTIVES

- To understand when cost minimization analysis is appropriate.
- To understand the type of costs that should be included in different economic evaluations, how to value resource use and where to obtain data about costs.
- To understand the rationale for discounting in economic evaluation.

READINGS

1. Drummond MF et al. Methods for the Economic Evaluation of Health Care Programmes. Chapter 4 and Section 5.1.4.

2. Baladi JF. A guidance document for the cost process. Version 1.0. CCOHTA 1996.

3. Koopmanschap MA, Rutten FFH. Indirect costs in economic studies: confronting the confusion. PharmacoEconomics 1993;4(6):446-454.

4. Briggs AH. O'Brien BJ. The death of cost-minimization analysis?. Health Economics. 2001; 10:179-84.

5. Coyle D, Tolley K. Discounting of health benefits in the pharmacoeconomic analysis of drug therapies: an issue for debate? Pharmacoeconomics, 1992, 2(2):153-162.

6. Cost sources for economic evaluations in Canada.

CLASS ASSIGNMENT

1. Be prepared to discuss the appropriateness of including indirect costs, future health care costs and non-health care costs in economic evaluations.
2. Discuss the usefulness of the guidance document provided by CCOHTA.
3. Think about the range of resource items relevant to your study proposal. How can they be measured and what are the potential sources of unit cost data?
4. Describe the rationale for discounting in economic evaluation
5. Should health benefits necessarily be discounted at the same rate as costs?

Copies of utility questionnaires will be handed out at the end of the class. Please complete these and hand them in next week. We will discuss these further in a later class.

WRITTEN ASSIGNMENT 1
(To be handed in by February 1st)

Assume that you are a health care decision-maker of any level (e.g. local, provincial or national). Your role is to:

1. critically appraise the following study

O'Brien BJ et al. Cost-effectiveness of the implantable cardioverter-defibrillator: results from the Canadian Implantable Defibrillator Study (CIDS). Circulation. 2001 Mar 13; 103(10): 1416-21.

2. give recommendations concerning whether its results should influence practice and indicate what other pieces of information you would require.

You are asked to provide **no more than a six-page report.**

With respect to the critical appraisal of the study, you should address at least the following issues.

1. What is the perspective of the study and is it relevant to the choice I need to make?
   If not, can you make inferences regarding the study's result from your preferred perspective?

2. Was the choice of the form of analysis (CMA, CEA, CUA, CBA) addressed?
   If not, how might the results differ if a different form was used?

3. Did the study involve using evidence from a single RCT and/or data from a variety of sources?
   Was this appropriate?

4. What alternatives were compared and were they the most relevant ones?
   Could other alternatives have been included and would they affect the conclusions of the study?

5. Were all relevant costs included, measured accurately and valued credibly?
   If not, does this put in question the study's result?
   Were future costs, non health care costs and productivity costs included?
   If so, was this appropriate?
   If not how might this affect the results and their applicability to my situation?

6. Were all the relevant benefits, measured accurately and valued credibly?
   Was quality of life included in the study?
   If so, how was it incorporated and was this correct?
   If not, would the inclusion of quality of life considerations affect the results of the study?

7. Were future costs and benefits discounted?
   What discount rate was used and was this an appropriate rate?

8. Was a detailed sensitivity analysis conducted and did it include all relevant parameters across an adequate range of values?
   If not, do you have concerns over the robustness of the study's results?

SESSION 3

UTILITY MEASUREMENT

OBJECTIVES

- To understand the theoretical basis of utility measurement and QALYs.
- To understand the methods of and the arguments for and against the use of direct utility measurement techniques.
- To understand the concepts of reliability and validity.
- To understand the features of three commonly used health state questionnaires referred to in this session (EQ5D, SF6D, HUI).

READINGS

1. Drummond MF et al. Methods for the Economic Evaluation of Health Care Programmes. Chapter 6.

2. McGregor M. Cost-utility analysis: use QALYs only with great caution. CMAJ. 2003 18; 168: 433-4.

3. Green C, Brazier J, Deverill M. Valuing health related quality of life: A review of health state valuation techniques Pharmacoeconomics 2000;17;151-165.

4. Brazier J, Roberts Deverill M. The estimation of a preference based measure of health from the SF36 Journal of Health Economics 2002;21:271-92.

5. Brazier J, Deverill M. A checklist for judging preference based measures of health related quality if life. Learning from psychometrics. Health Economics 1999; 8: 41-51

CLASS ASSIGNMENT

1. Discuss the appropriateness of von-Neuman Morgenstern expected utility theory.
2. Discuss the pros and cons of the use of QALYs.
3. Discuss the pros and cons of the different methods of preference elicitation.
4. Whose values should be used in measuring QALYs for cost-utility analysis?
5. Be prepared to discuss the pros and cons of using utility questionnaires compared to standard gamble, time trade off etc.
6. Will you incorporate QALYs into your study proposal? If yes, how? If not, why not?

WRITTEN ASSIGNMENT 2 (To be handed in by February 15th)

Briefly describe the properties and scoring mechanisms for the EQ-5D, SF6D and the HUI (i.e. no more than 3 pages in total).

Briefly describe the following techniques: standard gamble, time trade off and feeling thermometer. (i.e. no more than 2 pages in total)

Provide arguments for and against each of their use and discuss which of these questionnaires you would recommend under various settings. Focus on the reliability and validity of the instruments and their ease of use by both patients and analysts.

SESSION 4

COST BENEFIT ANALYSIS

OBJECTIVES

- To understand the various methods of evaluating health benefits in monetary terms.
- To understand the advantages and disadvantages of these methods especially in terms of their theoretical underpinnings.

READINGS

1. Drummond MF et al. Methods for the Economic Evaluation of Health Care Programmes. Chapter 7

2. O'Brien B, Viramontes JL. Willingness to pay: a valid and reliable measure of health state preference? Med Decis Making 1994: 14; 289-297.

3. Cookson R. Willingness to pay methods in health care: a sceptical view. Health Econ. 2003; 12: 891-4

4. Ryan M, Farrar S. Using conjoint analysis to elicit preferences for health care. BMJ. 2000 320(7248): 1530-3.

CLASS ASSIGNMENT

1. Discuss the pros and cons of the alternative methods of valuing health benefits in monetary terms.
2. Discuss the role of conjoint analysis?
3. Critique both the Ryan and O'Brien studies.
4. Would you consider using cost benefit analysis within your study proposal?

SESSION 5

DECISION ANALYSIS

OBJECTIVES

- To understand key terms in decision analysis.
- To understand the advantages and disadvantages of using decision analysis in economic evaluation.
- To understand the role of Markov models.

READINGS

1. Drummond MF et al. Methods for the Economic Evaluation of Health Care Programmes. Chapter 9

2. Brennan A, Akehurst R. Modelling in health economic evaluation. What is its place? What is its value? Pharmacoeconomics. 2000 May; 17(5): 445-59. (skip section 5.5)

3. Briggs A. Sculpher M. An introduction to Markov modelling for economic evaluation. Pharmacoeconomics. 1998;13:397-409.

4. Cooper NJ, Coyle D, Abrams KR, Mugford M, Sutton AJ. Use of evidence in decision models: an appraisal of health technology assessments in the UK to date. Journal of Health Services Research and Policy 2004

5. Decision analytic modelling in the economic evaluation of health technologies. A consensus statement. Consensus Conference on Guidelines on Economic Modelling in Health Technology Assessment. Pharmacoeconomics. 2000 May; 17(5): 443-4.

CLASS ASSIGNMENT:

1. Be prepared to discuss the advantages and disadvantages of conducting economic evaluations through decision analysis.
2. Will you use decision analysis for your proposed study?
3. Be able to discuss the major features of Markov models
4. Which do you believe should be more common – simple decision trees or Markov models?
    - Think of one example where a decision tree would be appropriate and another where a Markov model is appropriate.

SESSION 6

ANALYSIS OF UNCERTAINTY AND VARIABILITY

OBJECTIVES

- To understand the difference between uncertainty and variability
- To understand the different methods of handling uncertainty analysis in economic evaluation.
- To understand approaches to handling variability in economic evaluation

READINGS

1. Drummond MF et al. Methods for the Economic Evaluation of Health Care Programmes. Sections 9.5, 9.6, 9.7

2. Griffin, S, Claxton, K, Sculpher, M. Decision analysis for resource allocation in health care J Health Serv Res Policy 2008 13: 23-30

3. Briggs AH. Handling uncertainty in cost-effectiveness models. Pharmacoeconomics. 2000; 17:479-500.

4. Felli JC. Hazen GB. A Bayesian approach to sensitivity analysis. Health Economics 1999. 8:263-8

5. Coyle D, Buxton MJ, O'Brien BJ. Stratified cost-effectiveness analysis: a framework for establishing efficient limited use criteria. Health Economics 2003; 12:421-427.

CLASS ASSIGNMENT

1. Discuss different approaches to analyzing uncertainty in economic analysis. Which do you think have most value?
2. What do you feel about the use of stratified cost effectiveness analysis
3. Describe how sensitivity analysis will be incorporated into your proposal.

WRITTEN ASSIGNMENT (to be handed in March 22nd)

1. Consider two treatments for a chronic disease.

Treatment 1 costs $ 500 per annum. With treatment 1 the life expectancy of a patient is 5 years with a QALY weight of 0.7 for each year.
Treatment 2 costs $ 3000 in Year 1 and $200 every subsequent year. The life expectancy of a patient is 6 years. QALY weight in the first year is 0.4 and for subsequent years 0.75.

What are the expected costs and QALYs for each treatment both undiscounted and discounted at a 5% per annum rate? What is the incremental cost-effectiveness ratio both undiscounted and discounted at 5%?

2. Consider two treatments for another chronic disease.

Treatment A leads to a life expectancy of 5 years with a QALY weight of 0.7 for each year.
Treatment B extends life by one additional year but at a reduced quality of life.

What would the QALY weight for treatment B have to be for the expected QALYs for both therapies to be equal? Assume in turn a 5%, 3% and 0% discount rate.

3. The following data are the results of Monte Carlo simulation analysis with 20 replications.

The data presents the incremental costs and incremental QALYs gained for a new intervention.

What is the net benefit of treatment based on alternative threshold values ($0, $10000, $20000, $30000, $40000, $50000, $60000, $70000, $80000, $90000 and $100000)?

Give the percentage of replications which are below each threshold.

Estimate the total EVPI for each threshold.

Replication	Incremental Cost	Incremental QALYs	Replication	Incremental Cost	Incremental QALYs
1	7300	0.23	11	-100	0.2
2	24000	0.18	12	8000	0.16
3	2400	0.24	13	7000	0.17
4	22000	0.23	14	12000	0.23
5	4400	0.09	15	600	0.13
6	18000	0.25	16	3700	0.18
7	12000	0.23	17	12000	0.3
8	4000	0.17	18	12000	0.14
9	6900	0.28	19	11000	0.2
10	17000	0.25	20	12000	0.22

SESSIONS 7 AND 8

PRACTICAL SESSION

OBJECTIVES

- To go through the construction of a decision model and a Markov model in Excel
- How to draw decision models within TreeAge.
- To gain a greater understanding of the practicalities involved in conducting economic analysis.
- To understand advanced methods in analysis of uncertainty such as Monte Carlo simulation.

Material for these sessions will be provided beforehand

SESSION 9

ECONOMIC EVALUATION ALONGSIDE CLINICAL TRIALS

OBJECTIVES

- To understand the advantages and disadvantages of conducting economic evaluations alongside clinical trials.
- To understand issues in the conduct of economic analysis alongside clinical trials

READINGS

1. Drummond MF et al. Methods for the Economic Evaluation of Health Care Programmes. Chapter 8

2. Campbell MK, Torgerson DJ, Bootstrapping: estimating confidence intervals for cost-effectiveness ratios, QJM 1999:92; 177-182.

3. Coyle D, Lee KM. The problem of protocol driven costs in pharmacoeconomic analysis. Pharmacoeconomics 1998, 14:357-363.

4. Sculpher MJ, Claxton K, Drummond M, McCabe C. Whither trial based economic evaluation for health care decision making? Health Econ. 2006 Jul;15(7):677-87.

5. Mark DB, Hlatky MA, Califf RM, Naylor CD, Lee KL, Armstrong PW et al. Cost effectiveness of thrombolytic therapy with tissue plasminogen activator as compared with streptokinase for acute myocardial infarction. N Engl J Med 1995;332:1418-24.

CLASS ASSIGNMENT:

1. Be prepared to discuss the advantages and disadvantages of conducting economic evaluations alongside clinical trials, and to discuss instances where modelling of data is essential.
2. What do you think are the positive and negative features of the Mark study?
3. Will you obtain all or some of the data for your proposed study from an RCT?

SESSION 10

INDIVIDUAL MEETINGS RE. PROJECT

For this week I will meet with each of you individually to discuss your ideas for your main assignment. Please try to send me in advance a summary (preferably by March 1st) of what you are thinking of doing so I can give you ideas and any further material to help.

I will be available the following times to meet with you.

Friday March 12th 1-5
Monday March 15th 9-5
Tuesday March 16th 9-5

Please ensure that you have confirmed a time well in advance.

SESSIONS 11 AND 12

PROJECT SESSION

In this session students are asked to make a 20-30 minute presentation of their proposed study protocol. The presentation should cover the following headings:

- Background
- Objectives
- Treatment comparators
- Perspective
- Form of analysis
- Analytic horizon
- Outcome measures
- Costs
- Discounting
- Sensitivity analysis
- Study limitations

Please also make a copy of the overheads you have used for this presentation,
Remember the presentation accounts for 10% of your final mark.

SESSION 13

THE ROLE OF ECONOMICS IN PRIORITY SETTING

OBJECTIVES

To review different theories on using economic analysis in priority setting for health care.
To review current attempts to incorporate economic concerns into priority setting

READINGS

1. Drummond et al. Chapter 12.

2. Detsky AS, Laupacis A. Relevance of cost-effectiveness analysis to clinicians and policy makers. JAMA. 2007;298(2):221-224.

3. Claxton K, Sculpher M, Drummond M. A rational framework for decision making by the National Institute For Clinical Excellence (NICE). Lancet. 2002;360:711-5.

4. McMahon M, Morgan S, Mitton C. The common drug review: A NICE start for Canada? Health Policy 2006.

5. Buxton MJ. Economic evaluation and decision making in the UK. Pharmacoeconomics. 2006;24(11):1133-42..

6. Laupacis A. Incorporating economic evaluations into decision-making: the Ontario experience. Med Care. 2005;43(7 Suppl):15-9.

7. Picard A. We do have to put a price on life. Globe and Mail. October 3rd, 2009.

CLASS ASSIGNMENT

1. Do you believe priority setting within a public health care system is inevitable?
2. What do you think of the various attempts to introduce economics into priority setting? Do you think they go far enough?
3. How would you ration health care?