**SPH 274**
**Economic Evaluation in Health Care**
2017 Spring Quarter
(as of February 13, 2017)

**CRN Number:** 89341
**Credit:** 3 units
**Grade:** Letter

**Course Director:** Byung-Kwang (BK) Yoo, MD, MS, PhD, Associate Professor, Department of Public Health Sciences, School of Medicine
**Office:** Medical Sciences 1C Bldg, Room 141
**Email:** byoo@ucdavis.edu (preferred to **Tel:** 530-752-6375)
**Location & Time:** the Carlson library, Room 24, Thursdays 2:10-5pm in Spring 2017
**Office hours**: By appointment

**Course overview:**
This course will focus on the cost-effectiveness/cost-benefit analysis (CE/CBA) methods among various economic evaluation methods. CE/CBA is increasingly used to evaluate alternative choices in public health and clinical practice and to enlighten and inform health policy determinations.

In this course, students are introduced to the methods and objectives of CE/CBA, as well as to important study design issues that distinguish these analyses from other clinical research studies. Students will also participate in a lab to learn CE/CBA (decision analysis) software (TreeAge) such that they can perform analyses themselves as a class project.

The objectives of the course are:
1. To understand the concepts of cost and outcome in application to health-related programs, policies and interventions
2. To describe steps for designing and conducting CE/CBA evaluation of health-related programs, policies and interventions
3. To be able to use decision analytic modeling for CE/CBA evaluation
4. To learn how to tailor CE/CBA evaluation to reflect the interests and concerns of the critical stakeholders

All students will be expected to read all the required readings. Additional recommended readings: are also listed.

**Required textbook and recommended books**
Required Textbooks:
- Drummond MF. et al. Methods for the economic evaluation of health care programmes. **3rd ed.** New York: Oxford University Press; 2005. ISBN-10: 0198529457; ISBN-13: 978-0198529453 – on reserve for students to check out at the Carlson Health library

Recommended Textbooks:
Cost-effectiveness/benefit analysis:
- Drummond MF. et al. Methods for the economic evaluation of health care programmes. **4th ed.** New York: Oxford University Press; 2015. ISBN-10: 0199665885; ISBN-13: 978-0199665884

- Gold MR, Siegel J, Russell L, Weinstein M. Cost-effectiveness in health and medicine. New York: Oxford University Press; 1996.
- Tolley G, Kenkel D, Robert Fabian R, Valuing Health for Policy: An Economic Approach, University Of Chicago Press; 1994

Health Economics:
- Sherman Folland, Allen C. Goodman, Miron Stano. The Economics of Health and Health Care: Pearson New International Edition, 7th Edition, Routledge, 2012, ISBN-10: 0132773694, ISBN-13: 978-0132773690
- Charles E. Phelps. Health Economics, 5th Edition, Routledge, 2012, ISBN-10: 0132948532
- ISBN-13: 978-0132948531

Microeconomics theory:
- Hal R. Varian. Intermediate Microeconomics: A Modern Approach, 9th Edition, W.W. Norton & Company, 2014, ISBN-10: 0393123960, ISBN-13: 978-0393123968
- Kevin Wainwright, Alpha Chiang. Fundamental Methods of Mathematical Economics, 4th Edition, McGraw-Hill Education, 2004, ISBN-10: 0070109109, ISBN-13: 978-0070109100

**Course Requirements:** The course has four requirements:
(1) a written (in class; closed book/note) midterm exam that covers the basic concepts of CEA/CBA covered in the first half of the class (20%)
(2) Presentation: (either (A) CE/CBA project using decision analysis and TreeAge software, or (B) Systematic review of previously published CE/CBA, detailed below) (40%),
(3) Final paper (revising a presentation) due June 15 (Th) 5pm (20%), and
(4) Participation in class discussion (20%).
(NOTE) You will fail this course if you miss the midterm exam or one of two student presentation sessions. You are strongly recommended to take this course next year or later, if you plan to miss session #5 and/or #6 that are not covered in any text book – so that you could hardly catch up.

**Student Presentations and Final Paper:**
(1) Options

(A) CE/CBA project using decision analysis and TreeAge software.

(B) Systematic review of previously published CE/CBA. In order to pursue this option, there must be at least 5 previously published studies addressing the CE/CBA of a defined health-related question. For students considering this option, they need to discuss with the instructor for approval and further direction.

(2) General instruction
- A final written version of your paper is due 5pm on June 15.
- To assist in moving your ideas forward you will be required to <u>write a 1-paragprah overview of your project (due 5pm on April 19), a 1-page overview (structured abstract format) of your project (due 5pm on April 26) and to give a presentation (June 1 or June 8)</u> including your results as well as their public or clinical policy implications.
- Format:
  - double-spaced in main text (single spaced for tables/figures), 1 inch margin; 11 font Arial)
  - Cover page (Title and name)
  - Abstract (1 page; 350 words; JAMA format)
  - Revised PPT slides (2 slides per page)

- 1 page summary of your PPT revisions
  - Based on feedback received during your presentation
  - Please note there'll be no feedback from the instructor after your presentation.
- Main Text: Results-ONLY (3-5 pages)
  - Explain "full" Tables and Figures (see next slide)
- Reference list

(3) Instruction for Student Presentation
(a) Out of 40 points, you will lose 10 points if your presentation time exceeds every 1 minute. Please pay attention to notices from a time-keeper. you will lose 5 points if your presentation time exceeds every 1 minute SHORTER THAN 15 min.

**Software purchase: TreeAge *(Please install in your laptop and bring to Lab sessions)***
(1) Students are required to bring a laptop to class and will be using the following software:

(2) How to purchase: ***(Please purchase and test if the program file opens THIS WEEK, you might need to call TreeAge for help)***
(a) Active students with ACADEMIC EMAIL ADDRESS
TreeAge, $45 for a student version (http://www.treeage.com/shop/)
Choose TreeAge Pro Suite *among various TreeAge software* > choose "Academic Use" > select an option of "Purchase Student Course License ($45.00)"

(b) Non-students
TreeAge, $365 for an annual license (http://www.treeage.com/shop/)
Choose TreeAge Pro Healthcare *among various TreeAge software* > choose "Academic Use" > select an option of "Purchase Annual License ($395.00)"

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## Course Structure

**4/6/17 (Th): (#1)** **Introduction**

Required Readings:
Drummond et al. text book, (Chapter 1-3)

Suggested Readings:
Tengs TO, Adams ME, Pliskin JS, Safran DG, Siegel JE, Weinstein MC, Graham JD. Five-hundred life-saving interventions and their cost-effectiveness. Risk Analysis, 1995; 15;3:369-390.

Yang NH, Dharmar M, Yoo BK, Leigh JP, Kuppermann N, Romano PS, Nesbitt TS, Marcin JP. Economic Evaluation of Pediatric Telemedicine Consultations to Rural Emergency Departments. *Medical Decision Making*, 2015 May 7.

Yoo BK, Kim M, Sasaki T, Melnikow J, Marcin JP. Economic Evaluation of Telemedicine for Patients in ICUs. *Critical Care Medicine*, 2016 Feb;44(2):265-74.

**4/13/17 (Th): (#2)** **(1) Cost effectiveness/utility analysis**

Required Readings:
Drummond et al. text book, (Chapter 5)

**(2) Lab 1: Introduction to Decision Trees and Software**
- **Simplest cost effectiveness analysis**

Required Readings:
Lab session note

TreeAge Pro 2012 User's Manual: Chapter 3. TreeAge Pro Interface, p. 14-22
TreeAge Pro 2012 Users' Manual: Chapter 4. A Decision Tree Tutorial, p.23-34

Suggested Readings:
Detsky AS, Naglie G, Krahn MD, Naimark D, Redelmeier DA. Primer on Medical Decision Analysis : Part 1 - Getting Started. *Medical Decision Making*, 1997; 17;2:123-125.

**4/20/17 (Th): (#3)**

**(1) Cost utility analysis & Economic using patient level data**

Required Readings:
Drummond et al. text book, (Chapter 6 and 8)

**(2) Lab 2: Building a Decision Model Using Formulas**
- **Sensitivity analysis of cost effectiveness analysis**

Required Readings:
Lab session note

TreeAge Pro 2012 Users' Manual: Chapter 17. Building Formulas Using Variables and Functions, p.181-201

Suggested Readings:
Detsky AS, Naglie G, Krahn MD, Redelmeier DA, Naimark D. Primer on Medical Decision Analysis : Part 2 - Building a Tree. *Medical Decision Making*, 1997; 17;2:126-135.

**4/27/17 (Th): (#4)**

**(1) Economic evaluation using decision analytic modeling & Presentation and use of economic evaluation results**

Required Readings:
Drummond et al. text book, (Chapter 9-10)

**(2) Lab 3: Monte Carlo Simulation of Cost-Effectiveness Analysis**

Required Readings:
Lab session note
TreeAge Pro 2012 Users' Manual: Chapter 31, p. 369-386.

Suggested Readings:
TreeAge Pro 2012 Users' Manual: Chapter 32 and 33, p. 387-430.

Krahn MD, Naglie G, Naimark D, Redelmeier DA, Detsky AS. Primer on Medical Decision Analysis: Part 4 - Analyzing the Model and Interpreting the Results. *Medical Decision Making*, 1997; 17;2:142-151.

**5/4/17 (Th): (#5)**

**(1) Exercise: Bias direction in the effectiveness estimated by observational data analyses**

Required Readings:

Yoo BK, Grosse S and Frick K, "Self-selection and Evaluation of Influenza Vaccination Effectiveness among Elderly", *Vaccine*, 2006, 24(40-41):6374-75

**(2) Cost analysis Part 1:** Conversion factor

Drummond et al. text book, (Chapter 4, Section 4.1-4.2)

**(3) Examples of Student Projects**

Required Readings:

Drummond et al. text book, (Chapter 3)

**5/11/17 (Th): (#6)**

**(1) Exercise: Bias magnitude in the incremental cost effectiveness ratio (ICER)**

Required Readings:

Yoo BK, and Grosse S, "Cost-Effectiveness of Screening Newborns for Congenital Adrenal Hyperplasia", *Public Health Genomics*, 2009;12(2):67-72. (PMID: 19039250)

**(2) Review for the midterm exam**

**(3) Q&A for Student Presentation and Final Papers**

**5/18/17 (Th): (#7)**

**Midterm exam** (in class, closed book/note)

**5/25/17 (Th): (#8)**

**(1) Review of the midterm exam**

**(2) Cost analysis Part 2:** Allocation of overhead cost

Required Readings:

Drummond et al. text book, (Chapter 4, Section 4.3-4.6)

Yoo BK, Szilagyi PG,, et al., "The Cost of Universal Influenza Vaccination of Children in Pediatric Practices", *Pediatrics,* 2009 Dec;124 Suppl 5:S499-506

Yoo BK, Berry A, Kasajima M, Szilagyi PG, "Association between state Medicaid reimbursement rate and child influenza vaccination rate", *Pediatrics* 2010, Nov;126(5):e998-1010. Epub 2010 Oct 18.

(For the RFA below, to skim in 15 minutes would be enough)
CDC (2006), Request For Applications (RFA) Number: RFA-IP-06-005
Title: Support and Resources Needed For Universal Childhood Influenza Vaccination: Providers' Perspective;
http://grants.nih.gov/grants/guide/rfa-files/RFA-IP-06-005.html

**(3) Measuring effects with monetary values**

Suggested Readings:

Drummond et al. text book, **4th edition (NOT 3rd edition)** (Chapter 6)

**(4) Q&A for Student Presentation and Final Papers**

**6/1/17 (Th): Student Presentation 1**
**(#9)**

**6/8/17 (Th): Student Presentation 2**
**(#10)**

**6/15/17 (Th): Due: Paper submission 5pm**
**(#11)**