

HMP 542 Cost Utility Analysis and Clinical Research

University of Michigan School of Public Health

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Economic issues and analytical techniques relevant to the performance and evaluation of clinical research are investigated. Special emphasis is placed on the theory, practice, usefulness, and limitations of cost-effectiveness analysis. Topics covered include decision analytic modeling as applied to economic evaluation, estimation of costs, and quality-adjusted measures of benefits. Class sessions will include lecture, classroom exercises and discussion, computer exercises with TreeAge Pro Healthcare software, and student presentations of original research proposals.

This course is part of the OJOC master's program in Clinical Research Design and Statistical Analysis. Enrollment is restricted to students in this OJOC program.

Grading and Course Requirements

- **Exam** (35% of total grade), held during our October 2016 class. During this exam, you may not consult any books, articles, or notes, and you may not use the Internet. You may use a calculator, but I will try to avoid requiring any messy calculations.
- **Short paper** (30% of total grade), due at the beginning of our first class meeting in September 2016. Each student is to select *one* of the three published articles available under the September readings on the CTools site for this course, then write a 6-10 page paper (double-spaced) critiquing the economic analysis in this article. The critique should focus on the extent to which the article provides cost-effectiveness or cost-benefit analysis that helps relevant parties make decisions about a medical treatment, prescription drug, public health intervention, etc. We will discuss all four of these articles in class in September.

The emphasis in your paper should be identifying strengths and weaknesses of the article, rather than merely summarizing the article. An excellent paper will reflect additional research you have done, drawing from information in sources cited by the article you are reviewing or from other publications on related topics.

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I will post on the CTools site for this course an excellent paper from a previous HMP 542 student, who analyzed a different journal article (not one of the three you have been assigned). Read this sample paper to get a better idea of what I am looking for in your paper.

Cite any sources from which you obtained ideas or information. Use quotation marks and cite the source if you replicate five or more sequential words from somebody else's work. Failure to do this is plagiarism, a grave offense in the academic world. For more information about cultural norms in the U.S. about plagiarism, see:

<http://cmsw.mit.edu/writing-and-communication-center/avoiding-plagiarism/>

Please email your papers to me at saltzman@umich.edu **no later than the beginning of our September 2016 class**. Since we will be discussing the three published articles in the September readings during the September class, I will not accept late papers **about one of these three articles**. I therefore strongly advise you to begin work on your paper shortly after our July class to make sure that you complete it prior to our September class. But I realize that HMP 542 students have many other responsibilities besides this class and that obligations sometimes arise at the last minute. I will provide an alternative article that any students who miss the September deadline can analyze in their papers.

- **Original research proposal** (35% of total grade), which you will present to the class during one of our last five sessions (December 2016 or January or February 2017). Working in groups of two or three, develop a proposal for an original cost-effectiveness research study related to health. Prepare a PowerPoint presentation and lead a 30-minute class discussion of the proposal. You should distribute to the class a 1-2 page outline of your proposal; this need not be in sentence form. Please e-mail me, no later than the beginning of our October 2016 class, the names of the students in your group, the title of your proposed research study, and the preferences of the members of your group regarding which of the five available months you wish to present. We will use our November 2016 class for discussions within each group of their project, and I will speak with each group and try to provide advice. I strongly encourage you to be ambitious in your proposal. Try to develop a proposal for a real research project that plausibly could lead to a refereed journal article, even if you do not have the time or the resources to get beyond the early stages of this project before this course finishes. It is far better to outline the early stages of a publishable study than to present a fully polished academic exercise that has no prospect of leading to a refereed journal article.

Please e-mail both the 1-2 page outline of your proposal and your PowerPoint presentation to me at saltzman@umich.edu by or soon after the date of your class presentation about your proposal.

- **Classroom exercises** (ungraded). We will have a series of classroom exercises, some done with pencil and paper or with Excel, some done with TreeAge Pro Healthcare software. These will be ungraded, and you will not need to turn anything in. If you don't finish them during class, then you should finish them as homework. Doing these exercises will help prepare you for the exam and for your original research proposal.

Textbooks and Required Software

You need to buy and read two books, one basic and one advanced:

1. Peter Muennig and Mark Bounthavong, *Cost-Effectiveness Analysis in Health: A Practical Approach*, 3rd edition (Jossey-Bass, release date February 29, 2016), ISBN-13: 978-1119011262. This book presents cost-effectiveness analysis at a level accessible to clinical researchers with no prior economics background. You must master the material in the Muennig and Bounthavong book to be able to understand a lot of the research literature and to work productively with an expert on cost-effectiveness analysis on a joint research project.
2. Alastair M. Gray, Philip M. Clarke, Jane L. Wolstenholme, and Sarah Wordsworth, *Applied Methods of Cost-effectiveness Analysis in Health Care* (Oxford University Press, 2011), ISBN-13: 978-0199227280. This book is more advanced than the Muennig and Bounthavong book. If you master the material in the Gray *et al.* book, then you will be able to make an important contribution to the cost-effectiveness aspects of a research project.

You will also need to buy and use this specialized software, beginning with our July class:

3. *TreeAge Pro Healthcare*, student course license (\$45), available from:
<https://www.treeage.com/shop/treeage-pro-healthcare/>

The following book is so difficult that I do **not** recommend it for purchase, but it set the standards for cost-effectiveness studies in health and medicine:

4. Marthe R. Gold, Joanna E. Siegel, Louise B. Russell, and Milton C. Weinstein (eds.), *Cost-Effectiveness in Health and Medicine* (Oxford University Press, 1996).

If you need to convince a journal editor of the appropriateness of your methodology for a cost-effectiveness study, then cite the Gold *et al.* book. This book, however, does not address techniques developed since 1996, such as cost-effectiveness acceptability curves.

I have assigned the first chapter of the Gold *et al.* book (which is less difficult than the other chapters) as a reading for our February 2016 class.

Learning Objectives

My goal in HMP 542 is to teach very smart students with no prior background in economics enough about some advanced topics in health economics that they can:

- Understand published studies using cost-effectiveness analysis and decision analysis
- Work effectively with a co-author who is knowledgeable about cost-effectiveness analysis or decision analysis on a research study applying these techniques to a health care or public health intervention

Course Schedule (subject to change)

Saturday, February 13, 2016, 1:30-5:20 PM (4 class hours)

Introduction to Economic Evaluation

Muennig and Bounthavong book, chapters 1 – 3.

Gray *et al.* book, chapters 1 – 2.

Peter B. Bach, “New Math on Drug Cost-Effectiveness,” *New England Journal of Medicine*, Vol. 373, No. 19, November 5, 2015, pp. 1797-1799.

Allan S. Detsky and Andreas Laupacis, “Relevance of Cost-effectiveness Analysis to Clinicians and Policy Makers,” *JAMA*, Vol. 208, No. 2, July 11, 2007, pp. 221-224.

R. E. Ferner and Sarah E. McDowell, “A model for NICE in the US will provide data on comparative efficacy and cost-effectiveness to improve health care,” *British Medical Journal*, Vol. 338, No. 7708, June 13, 2009, pp. 1401-1402.

Andrew Flowers, “How The FDA Could Change The Way It Approves Drugs,” *FiveThirtyEight.com*, September 3, 2015.

Peter J. Neumann and Joshua T. Cohen, “Measuring the Value of Prescription Drugs,” *New England Journal of Medicine*, Vol. 373, No. 27, December 31, 2015, pp. 2595-2597.

Peter J. Neumann, Joshua T. Cohen, and Milton C. Weinstein, “Updating Cost-Effectiveness – The Curious Resilience of the \$50,000-per-QALY Threshold,” *New England Journal of Medicine*, Vol. 371, No. 9, August 28, 2014, pp. 796-797.

Peter J. Neumann and Milton C. Weinstein, “Legislating against Use of Cost-Effectiveness Information,” *New England Journal of Medicine*, Vol. 363, No. 16, October 14, 2010, pp. 1495-1497.

Steven D. Pearson and Michael D. Rawlins, “Quality, Innovation, and Value for Money: NICE and the British National Health Service,” *JAMA*, Vol. 294, No. 20, November 23/30, 2005, pp. 2618-2622.

Alan Rosenberg, Abla Agiro, Marc Gottlieb, *et al.*, “Early Trends Among Seven Recommendations From the Choosing Wisely Campaign,” *JAMA Internal Medicine*, Vol. 175, No. 12, December 2015, pp. 1913-1920.

Louise B. Russell, Joanna E. Siegel, Norman Daniels, *et al.*, “Cost-Effectiveness Analysis as a Guide to Resource Allocation in Health: Roles and Limitations,” in Marthe R. Gold, Joanna E. Siegel, Louise B. Russell, and Milton C. Weinstein (eds.), *Cost-Effectiveness in Health and Medicine* (New York: Oxford University Press, 1996), pp. 3-24.

Peter A. Ubel, Amy P. Abernethy, and S. Yousuf Zafar, “Full Disclosure – Out-of-Pocket Costs as Side Effects,” *New England Journal of Medicine*, Vol. 369, No. 16, October 17, 2013, pp. 1484-1486.

Friday, March 10, 2016, 8:30 AM – 12:20 PM (4 class hours)

(1) *Basic Principles of Cost-Effectiveness Analysis (continued from February)*

(2) *Measuring Costs*

Muennig and Bounthavong book, chapter 4.

Gray *et al.* book, chapters 6 – 7.

Alan M. Garber and Neil A. Solomon, “Cost-Effectiveness of Alternative Test Strategies for the Diagnosis of Coronary Artery Disease,” *Annals of Internal Medicine*, Vol. 130, No. 9, May 4, 1999, pp. 719-728.

Friday, April 8, 2016, 1:30 – 5:20 PM

Saturday, April 9, 2016, 1:30 – 3:20 PM (6 class hours)

(1) *Discounting*

(2) *Measuring Outcomes*

Muennig and Bounthavong book, chapters 5 – 8.

Gray *et al.* book, chapters 3 – 5.

Thursday, May 5, 2016, 8:30 AM – 12:20 PM and

Friday, May 6, 2016, 1:30-3:20 PM (6 class hours)

(1) *Measuring Outcomes (continued from April)*

(2) *Decision Analysis and Sensitivity Analysis*

Muennig and Bounthavong book, chapter 9.

Gray *et al.* book, chapters 8 – 10.

Shumin Chen, Jianhong Li, and Anneke Van Den Hoek, “Universal Screening or Prophylactic Treatment for *Chlamydia trachomatis* Infection Among Women Seeking Induced Abortions: Which Strategy Is More Cost-Effective?” *Sexually Transmitted Diseases*, Vol. 34, No. 4, April 2007, pp. 230-236.

Friday, June 10, 2016, 1:30-3:20 PM (2 class hours)
Reporting Results

Muennig and Bounthavong book, chapter 10.

Gray *et al.* book, chapters 11 – 12.

Thursday, July 7, 2016, 10:30 AM – 12:20 PM

Saturday, July 12, 2016, 1:30 – 5:20 PM (6 class hours)

(1) *Discussion of Two Published Cost-Effectiveness Studies*

(2) *Computer exercises with TreeAge Pro Suite decision-analysis software*

***Note: you will need to obtain a 6-month student license for this software for \$45 and load it onto your laptop prior to the July 7 class.

Muennig and Bounthavong book, chapters 11 and 13.

Read “Questions for Assessing Cost-Effectiveness Studies” (on CTools site)

Discussion in class, based partly on the checklist, of the following cost-effectiveness studies:

Graham Nichol, Padma Kaul, Ella Huszti, and John F. P. Bridges, “Cost-Effectiveness of Cardiac Resynchronization Therapy in Patients with Symptomatic Heart Failure,” *Annals of Internal Medicine*, Vol. 141, No. 5, September 7, 2004, pp. 343-351.

Neil S. Horowitz, Randall K. Gibb, Thomas J. Herzog, *et al.*, “Utility and Cost-Effectiveness of Preoperative Autologous Blood Donation in Gynecologic and Gynecologic Oncology Patients,” *Obstetrics and Gynecology*, Vol. 99, No. 5, Part 1, May 2002, pp. 771-776.

August 11 – 14, 2016

This class does not meet in August 2016.

September 8 – 11, 2016 (4 hours of class)

- (1) More computer exercises with *TreeAge Pro Suite* decision-analysis software.
- (2) Discussion of economic analysis in three published studies.

Students should read all of the articles listed below, which will be discussed in class. ***A short paper on one of the three articles is due no later than the beginning of the first class for HMP 542 in September.***

Sylvia E. Rosas and Harold I. Feldman, “Synthetic Vascular Hemodialysis Access Versus Native Arteriovenous Fistula,” *Annals of Surgery*, Vol. 255, No. 1, January 2012, pp. 181-186.

Li Yan Wang, Lauren P. Nichols, and S. Bryn Austin, “The Economic Effect of Planet Health on Preventing Bulimia Nervosa,” *Archives of Pediatrics and Adolescent Medicine*, Vol. 165, No. 8, August 2011, pp. 756-762.

Federico Spandonaro, Fabio Ayala, Enzo Berardesca, *et al.*, “The Cost Effectiveness of Biologic Therapy for the Treatment of Chronic Plaque Psoriasis in Real Practice Settings in Italy,” *BioDrugs*, Vol. 28, No. 3, June 2014, pp. 285-295.

October 6 – 9, 2016 (2 hours of class)

Exam in class. During this exam, you may not consult any books, articles, or notes, and you may not use the Internet. You may use a calculator, but I will try to avoid requiring any messy calculations.

Topics for research proposals due. Each group should e-mail Greg Saltzman (saltzman@umich.edu), no later than the start of today’s class, the names of the students in the group, the topic for the research proposal, and the preferences of the members of the group regarding when to present (December 2016, January 2017, or February 2017). I will work out the presentation schedule while you are taking the exam, then have a brief discussion with the class immediately after the exam to make sure that my proposed presentation schedule is acceptable to everyone.

November 10 – 13, 2016 (4 hours of class)

Discussion within each student group of proposal for original cost-effectiveness research study. Greg Saltzman will meet briefly with each group.

Muennig and Bounthavong book, chapter 12.

December 8 – 11, 2016 (2 hours of class)

Three student presentations of proposals for original cost-effectiveness research studies

January 5 – 8, 2017 (4 hours of class)

Six student presentations of proposals for original cost-effectiveness research studies

February 9 – 12, 2017 (2 hours of class) (*last HMP 542 class*)

Three student presentations of proposals for original cost-effectiveness research studies