
CLRES 2122 / HPM 2215

Advanced Methods for Decision and Cost-Effectiveness Analysis

11/1/10 – 11/29/10

Mondays and Thursdays 3:00 – 5:00 p.m.

Location: Parkvale Building, 200 Meyran Ave, Room 222**Course Instructors:**

Ken Smith, MD, MS

smithkj2@upmc.edu

Mark Roberts, MD, MPP

robertsm@upmc.edu

Course Objectives:

This course provides hands-on training in decision and cost-effectiveness analysis using TreeAge Pro Suite software. It is intended for those students who are interested in doing their own modeling, as it is a time-intensive lab and project course. Topics to be covered include:

- How to use TreeAge.
- How to program Markov Models in TreeAge.
- How to do one-way sensitivity analyses and graph tornado diagrams using Microsoft Excel.
- How to do Monte Carlo probabilistic sensitivity analyses in TreeAge.
- Pitfalls and controversies in cost-effectiveness modeling.

Course Requirements:

Each student will complete a three-part tutorial using TreeAge. Thereafter, students will complete an identical cost-effectiveness model using the same model inputs and suggestions. Hence, there will be a correct answer. Most of your work on the decision model will be completed outside of class, and homework assignments will lead to progressive completion of the model. However, in-class time will be available after lectures, where students may work on their models with faculty available.

Homework = 30%

Class Project = 70%

- Tree files due Sunday 11/28/10, 6:00 p.m.
- 300-350 word abstract and PowerPoint presentation delivered 11/29/10, 3:00-5:00 p.m. in class

Course Mechanics:

1.0 credit, 2 hours/session, 8 sessions.

The computer classroom has full copies of TreeAge with help documentation on each of the computers. You may choose to do most of your work in the computer lab. However, it is strongly recommended that you download a student version of TreeAge Pro Suite for home use during the course, which is limited to 125 nodes (sufficient for the project), expires in 1 year, and is available for download from TreeAge at a cost of \$45. Go to <http://server.treeage.com/treeagepro/purchase/stuLic.asp>; you must select "student" for License Type and "Download Only" for Delivery. This version is for educational purposes only. We will supply additional handouts as needed.

There will be no class on Thursday, November 25, due to the Thanksgiving Holiday.

Session 1	11/1	Course overview and TreeAge tutorial	Smith
<p>Concepts and Topics:</p> <p>In this session we will introduce the mechanics of the course and discuss the project assignment, then provide an introduction to the computational aspects of decision modeling and take you through the tutorial using TreeAge Pro Suite. This will include tree construction (branches, nodes, probabilities, values) and tree evaluation (average out/fold back).</p> <p>Required Reading (during the session)</p> <ol style="list-style-type: none"> Sanders GD, Bayoumi AM, Sundaram V, et al. Cost-effectiveness of screening for HIV in the era of highly active antiretroviral therapy. <i>N Engl J Med.</i> 2005;352:570-85. 			
Session 2	11/4	Tree Building and Assigning Health States	Smith
<p>Concepts and Topics:</p> <p>In this session we will discuss basic tree building concepts, assigning health states in a Markov model, and the simplifying assumptions they entail.</p> <p>Required Reading (prior to session):</p> <ol style="list-style-type: none"> Detsky AS, Naglie G, Krahn MD, Redelmeier DA, Naimark D. Primer on medical decision analysis: Part 2--Building a tree. <i>Med Decis Making</i> 1997;17:126-35. Naimark D, Krahn MD, Naglie G, Redelmeier DA, Detsky AS. Primer on medical decision analysis: Part 5--Working with Markov processes. <i>Med Decis Making</i> 1997;17:152-9. <p>Homework: Assign Markov health states for the project – bubble diagram and tree format (due 11/8)</p>			
Session 3	11/8	Mathematical concepts in modeling	Smith
<p>Concepts and Topics:</p> <p>In this session we will discuss mathematical concepts you will have been exposed to in the tutorial: the half-cycle correction, accounting for competing causes of mortality, and rates and probabilities</p> <p>Required Reading (prior to session):</p> <ol style="list-style-type: none"> Sonnenberg FA, Beck JR. Markov models in medical decision making: a practical guide. <i>Medical Decision Making</i> 1993;13:322-338). National Vital Statistics Report, United States Life Tables, 2001. <p>Homework: Apply half cycle correction and life table mortality into tree (due 11/11)</p>			
Session 4	11/11	Sensitivity Analysis	Smith
<p>Concepts and Topics:</p> <p>This session will cover one-way sensitivity analyses and their use in “de-bugging” trees. Additionally, students will be walked through a method for graphically representing the results of one-way sensitivity analyses in a tornado diagram. Finally, we will review the concept, already introduced in the tutorial, of probabilistic (or 2nd order Monte Carlo) sensitivity analyses.</p> <p>Required Reading (prior to session):</p> <ol style="list-style-type: none"> Krahn MD, Naglie G, Naimark D, Redelmeier DA, Detsky AS. Primer on medical decision analysis: Part 4--Analyzing the model and interpreting the results. <i>Med Decis Making</i> 1997;17:142-51 Briggs AH, Goeree R, Blackhouse G, O'Brien BJ. Probabilistic analysis of cost-effectiveness models: choosing between treatment strategies for gastroesophageal reflux disease. <i>Medical Decision Making</i> 2002; 22:290-308. <p>Homework: Semi-working model (due 11/18)</p>			

Session 5	11/15	Representing uncertainty in CEA results	Smith
Concepts and Topics:			
Newer techniques, such as acceptability curves, will be discussed as well as challenges for future cost-effectiveness research.			
Required Reading (prior to session):			
1. Briggs AH, O'Brien BJ, Blackhouse G. Thinking outside the box: recent advances in the analysis and presentation of uncertainty in cost-effectiveness studies. <i>Annu Rev Public Health</i> 2002;23:377-401.			
Session 6	11/18	Value of information analysis	Smith
Concepts and Topics:			
Value of information analysis and its major product, the expected value of perfect information, will be discussed. This technique shows great promise as an aid for decision making and for future research resource allocation.			
Required Reading (prior to session):			
1. Claxton K, Sculpher M, Drummond M. A rational framework for decision making by the National Institute For Clinical Excellence (NICE). <i>Lancet</i> . 2002;360:711-5.			
Session 7	11/22	Accounting for future costs	Roberts
Concepts and Topics:			
Handling of "unrelated" future costs of health care, an area of unresolved controversy, will be considered.			
Required Reading (prior to session):			
1. Meltzer D. Accounting for future costs in medical cost-effectiveness analysis. <i>Journal of Health Economics</i> 1997;16(1):33-64. (okay to skip Section 2 if you are not mathematically oriented)			
Session 8	11/29	Student Presentations	Smith/Roberts
Concepts and Topics:			
In this session students will present their findings in a formal PowerPoint presentation (10 minutes maximum) and be critiqued by Drs. Smith and Roberts.			