

PUB HLTH 527
Cancer Screening: Principles and Practice

0.5 Credits
Summer quarter, 2005
Tuesday 6-9PM (Starts July 5, 2005)

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I. Course Description

Screening is the early detection of cancer in “healthy” people with the sole goal of improving a person’s ultimate outcome. This course provides an overview of the key theoretical principles behind cancer screening, as well as an overview of the pragmatic issues faced in conducting research in this area. The emphasis is on research concepts; this is not a survey of current knowledge on cancer screening. Most discussion will relate to specific examples from the medical literature. The course is appropriate for students who have at least an introductory knowledge of epidemiology and biostatistics.

II. Course Objectives

After completing the course, students will be able to:

1. describe screening in the context of the natural history of cancer
2. define the concepts of lead-time and length bias
3. describe non-experimental designs for evaluating cancer screening methods, including their potential weaknesses
4. describe major obstacles in designing and conducting clinical trials to evaluate screening efficacy
5. critically evaluate published research, conducted on specific cancer screening modalities
6. describe some of the important forces that determine how a cancer screening test is disseminated in a population

III. Grading Policies

Paper 40%; class participation 40%; oral presentation 20%

IV. Course Materials

H. Gilbert Welch, Should I Be Tested for Cancer? : Maybe Not and Here’s Why, University of California Press, 2004.

It might seem to strange to assign a book written for a lay audience in a graduate-level course, but this is an unusually clear and cogent set of essays that lay out the major criticisms of contemporary cancer screening programs. After reading it, any naïve ideas you might have had about the benefits of early detection are likely to be banished for good.

Note: Please read pages 17-105 in Welch BEFORE the first class. (It is a fast read.)

Alan S. Morrison, "Screening", Chapter 25, p.499-518, Modern Epidemiology (2nd Ed.), Rothman KJ and Greenland S, Lippincott-Raven, Philadelphia, 1998.

This is a chapter-size version of the textbook (Screening in Chronic Disease, Oxford U. Press) that Morrison originally published in 1985. It still holds up as the probably the best explication of the essential concepts behind screening. Some parts are abstruse, but are well worth the effort to understand.

Other readings as assigned by the Instructor, from the medical literature.

V. Course Workload

Beyond participating actively in class discussion, students are expected to prepare a 3-page paper summarizing the state of research concerning a selected cancer screening modality. Students will also present their findings in class.

VI. Course Evaluation

The MPH Program administers Web-based course evaluations to students for each course near the end of the quarter. Your completion of the course evaluations is required; failure to complete the evaluations will result in an incomplete grade until they are submitted. Your evaluation of the course and faculty is anonymous; your identity cannot be linked to your responses.

VII. Topics and Schedule

Session 1 Screening and cancer natural history		
Reading (to be read before class)	In-Class Discussion Topics	Assignment for Next Session
Welch, "Part 1: Problems You Should Know About" pages 17-105	Lecture/discussion <ul style="list-style-type: none"> • the detectable preclinical phase • lead time • length bias • pseudodisease • validity metrics (Se, Sp, PV+) • identifying high-risk groups • primary vs secondary prevention • introducing B.E.A.C.H. mnemonic for evaluating a screening test • example: screening for testicular cancer 	Come to session 2 prepared to discuss the following questions: <ol style="list-style-type: none"> 1. What can we learn about the effects of cancer screening on a population by examining incidence and mortality rates? 2. In a case-control study of screening efficacy, who is a "case"?

Session 2 Study designs and the evaluation of screening		
Reading (to be read before class)	Concepts/Discussion Topics	Assignment for Next Session
Morrison A. Ch. 25 "Screening" p. 499-518	<ul style="list-style-type: none"> • breast cancer as the example • cross-sectional studies • ecological studies • cohort and case-control studies • randomized clinical trials • controversies: the 2001 Cochrane report, mammography in women 	At the end of this session, we will begin a PBL (problem-based learning) exercise involving the whole class.

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Session 3 Discussion of Problem-based Learning Case/ History of a Screening Test (PSA)		
Reading (to be read before class)	Concepts/Discussion Topics	Assignment for Next Session
<p>Han M, Gann PH, Catalona WJ. Prostate-specific antigen and screening for prostate cancer. <i>Med Clin North Am.</i> 88:245-65, 2004</p> <p>Gann PH, et al. A prospective evaluation of plasma PSA for detection of prostate cancer. <i>JAMA</i> 273:289-94, 1995</p>	<ul style="list-style-type: none"> • first half of class is student discussion of PBL case (case TBA) • second half will be lecture/discussion on PSA test for prostate cancer 	<p>Part 2 of your PBL case – you will determine your own assignments on the case.</p>

Session 4 Finish PBL Case/Framework for Developing New Early Detection Markers/Emerging Technologies (Proteomics, Genomics)		
Reading (to be read before class)	Concepts/Discussion Topics	Assignment for Next Session
<p>Pepe MS, et al. Phases of biomarker development for early detection of cancer. <i>JNCI</i> 93:1054-61, 2001</p> <p>Petricoin EF, et al. use of proteomic patterns in serum to identify ovarian cancer. <i>Lancet</i> 359:572-77, 2002</p>	<ul style="list-style-type: none"> • first half: students finish their presentations on the PBL case • in-class discussion of the “Phases” paper and proteomics 	<p>Before leaving session 4, students will choose a cancer site as the topic for the final paper and presentation</p>

Session 5 Student Presentations/Summary: What Do the Authorities Recommend?		
Reading (to be read before class)	Concepts/Discussion Topics	Assignment for Next Session
<p>Material TBA from selected websites</p>	<ul style="list-style-type: none"> • most of session will be student presentations – their critiques of a selected cancer screening modality • lecture/discussion on recommended screening policies of the ACS, ACP, USPSTF, etc. • what determines actual use of a screening test in the real-world? 	