University of Massachusetts at Boston
McCormack School of Policy Studies

Epidemiological Thinking and Population Health

PPol G/ Nursing 753
Syllabus
Spring 2011

Introduction to the concepts, methods, and problems involved in analyzing the biological and social influences on behaviors and diseases and in translating such analyses into population health policy and practice. Special attention given to social inequalities, changes over the life course, and heterogeneous pathways. Case studies and course projects are shaped to accommodate students with interests in diverse fields related to health and public policy. Students are assumed to have a statistical background, but the course emphasizes epidemiological literacy with a view to collaborating thoughtfully with specialists, not technical expertise.

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Contact hours: Weds 1.00-2.00; 6.30-7.00 (in office or by phone), by email signup at http://ptaylor.wikispaces.umb.edu/PTOfficeHours, or by arrangement
Course Website: http://www.faculty.umb.edu/pjt/753-11.html
Course wiki: http://ppol753.wikispaces.umb.edu (with links for each session to lecture, notes about preparing, and annotations of the common & additional readings)
Discussion Leading SignUp Sheet: http://ppol753.wikispaces.umb.edu/EpiSignUp
Voicethread for asynchronous discussion and responses: http://voicethread.com/#u915443 (password required)
Class email list: Emails sent to epicourse@googlegroups.com will go to everyone in the course.
Password-protected readings: Link to site to access these
Glitches--use this link to report glitches in online materials--bit.ly/692glitches

SECTIONS TO FOLLOW IN SYLLABUS:

- Texts and Materials
- Mechanics of class sessions
- Assessment and Requirements
- Bibliography

TEXTS AND MATERIALS

Gordis, L. Epidemiology. Philadelphia, Saunders/ Elsevier. (=primer for the course. Old editions are OK.)
Readings on a password-protected site (not on Healey e-reserves).
A searchable compilation of syllabi from epidemiology courses bookmarked at http://www.diigo.com/user/epicourse/syllabus.

OVERVIEW AND MECHANICS OF COURSE

The syllabus is organized around a sequence of basic ideas in thinking like epidemiologists, especially epidemiologists who pay attention to possible social influences on the development and unequal distribution of diseases and behaviors in populations. The topic for any given class will be introduced through a mini-lecture during the last part of the previous class (and then posted online). The class itself begins with one (or two) student(s) (co-)leading discussion on one to three common readings, which are chosen not only to illustrate the topic (and pick up on topics of previous classes) but also to identify controversies or problems around the topic. The other students will be responsible for bringing into the discussion the key ideas from one reading they choose from the supplementary list or from an article they find that connects the topic to their own area of interest or from following up on the research behind a relevant recent article in the media. (Online students lead or contribute via voicethread presentations.) Via a googledocs form students post an annotation of the one of the common readings (when the student is [co-]leading the discussion) or the supplementary or additional article (when the student is not leading). These annotations are uploaded periodically by the instructor onto a course wiki.

The middle period of each class -- between the discussion and the mini-lecture -- takes the form of a workshop in which each student prepares a sketch of ways that the concepts, methods, and problems of that week might be applied to a research or policy question in their own area of interest. The workshop period allows for one-on-one interaction with instructor and peer input/support/coaching. (Online students arrange this one-on-one interaction at mutually convenient times each week.) It is expected that the definition of the research/policy question will not be clear at the start but will become focused as the course proceeds. The sketches are assembled into an evolving portfolio, which will also include the annotations and weekly additions to a personal glossary of terms from chapters of the Gordis text illustrated by examples from the student's field. At the end of the course, students select highlights from their portfolio and introduce them with an essay that explains the development of their thinking to an outside reader.

The conventional notion of teaching as transmission of knowledge from instructor to students has some place in this course. The instructor will provide (through the mini-lectures and course wikipages) an introduction to and motivation of each sessions' readings and cases. The instructor will also provide assistance with technical questions of concern either to the whole class or to individual students, refer to relevant sections of Gordis and Kirkwood, and/or help students create a network of specialists they can consult with during and the semester and after the course is over. At the same time, it is expected that students (and the instructor) will have to employ strategies of reading that allow us to extract take-home lessons from readings even as we skip sections that become too technical for us. The course as a whole aims to cultivate skills and dispositions of critical thinking and of life-long, cooperative learning facilitated by the resources of the internet. The use of controversies follows an idea central to critical thinking that we understand ideas better by holding them in tension with alternatives.

ASSESSMENT & REQUIREMENTS

Written assignments, 3/4 of course grade

Notes on teaching/learning interactions (incl. rationale for Assessment Requirements).
Note: Individual assignments are not given grades, but students may often be asked to revise and resubmit in response to the instructor's comments before the assignment is deemed complete.

a. Weekly additions to personal glossary of terms from the Gordis text, illustrated by examples from the student's field (1-2 terms [or set(s) of related terms] each week; 5-10 lines each; weeks 2-14).
b. Weekly sketches of ways that the concepts, methods, and problems of that week might be applied to a research/policy question in their own area of interest (1 page; submitted 1 week after the class for weeks 2-13).
c. Weekly annotations of references, EITHER one of the common readings when the student is (co-)leading the discussion OR one supplementary or additional reference for other weeks (1 paragraph; submitted at least 1 day before class; weeks 2-14).
d. Final portfolio selection (from a-c & prod./personal development plan) and essay (1000-1500 words).

Participation and contribution to the class process, 1/4 of course grade

e. Prepared participation in class meetings (14 items)
f. Minimum of two in-office or phone conferences on your portfolio projects, discussion leading, and other questions (2 items)
g. Discussion (co-)leading (3 items)
h. Work with another student commenting on each other's draft portfolio selection and essay

Overall course grade. If you complete at least 30 of the written assignments and at least 16 participation items you get 80 points. (If you do fewer of either, you get 2 points for each written assignment submitted on time & revised until OK/RNR is received [1 point for late submissions/revisions] and 1.25 for each participation item up to a maximum of 80.) The rubric below is used at the end of the course to add further points.

For each quality "fulfilled very well" you get 3 additional points. If you "did an OK job, but there was room for more development/attention," you get 1.5 points.

1. Written assignments submitted weekly (and revisions timely),
2. often revised thoroughly and with new thinking in response to comments,
3. showing progressive growth in ability to translate epidemiological thinking into your own area of interest, and resulting in
4. final portfolio with well-selected examples and a well-structured essay that explains your development during the semester and future plans.
5-7. Consistent work outside class connecting topics to your own interests, as evidenced in

5. Preparation for discussion leading
6. Preparation and submission of annotated references
7. Preparation and submission of glossary entries

8. Active, prepared participation and building class as learning community.

Minimum points for letter grades: A >= 95 points, A- 87.5, B+ 80, B 72.5, B- 65, C+ 57.5, and C 50.

ACCOMMODATIONS: Sections 504 and the Americans with Disabilities Act of 1990 offer guidelines for curriculum modifications and adaptations for students with documented disabilities. If applicable, students may obtain adaptation recommendations from the Ross Center (287-7430). The student must present these recommendations to each professor within a reasonable period, preferably by the end of the Drop/Add period.

Students are advised to retain a copy of this syllabus in their personal files.

This syllabus is subject to change, but workload expectations will not be increased.

www.faculty.umb.edu/pjt/753-11.html
after the semester starts.
Version 24 January ‘11

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SCHEDULE of CLASSES and PREPARATION

Recommended reading in advance of the course: see readings for Class 1 (below)

(1/26) 1a. The course as a learning community
Idea: Developing epidemiological literacy requires collaboration with others (of differing skills and interests) and reflection on personal and professional development. Students identify personal, intellectual, professional interests in relation to central themes about inequality, pathways of development, and policy (worksheet, followed by spoken introductions).

1b. Reading strategies, part 1
Idea: Developing epidemiological literacy requires establish our own practices of learning from material we don't fully grasp at first reading/hearing.

Case 1: Risks in risk reduction (Rabin 2009)
Case 2: On analysis that relates to effective interventions, absolute versus relative risk, and how health disparities are conceived (video; may require downloading free realplayer software)

Mini-lecture to set the scene for the topic of the next week. (ditto for subsequent weeks, even though not listed explicitly from week 2 on.)

"Of Rice and Men" (The case of Christiaan Eijkman and his search for the cause of beriberi in the Dutch East Indies in 1890s, D. Allchin) (introduction; link to full case to be added after the class)

Homework: Review this syllabus, the Wiki and links in the navigation bar, Notes on teaching/learning interactions and linked guidelines on the wiki site, assessment system, access to readings, Voicethread instructions (password required). (Online students should play around in the voicethread sandbox.) Email questions to the email group or bring to class 2.

(2/2; 11.25am-1.55pm) 2. Phenomena: Exploring the "natural history" of disease
Idea: Detailed observation (like a naturalist) or detective work--albeit informed by theoretical ideas--may be needed before we can characterize what the phenomenon is we are studying, what questions we need to ask, and what categories we need for subsequent data collection and analysis.

Common reading and cases: Oxford 2005 (1918 flu pandemic), Barker 1971 (buruli disease)


Idea (behind glossary): Non-specialists need to become comfortable with the fundamental ideas and basic vocabulary of epidemiology in order to converse intelligently with specialists in epidemiology and biostatistics. One way to move in that direction is to practice making the ideas accessible to the layperson.

Initial Workshop, which will cover glossary entries (instructions) and formulation of a useful project to pursue through the workshop sessions, as well as the translation of this week's concepts, methods, and problems into your own areas of interest. Also: Questions on syllabus and course mechanics, including coaching each other on use of voicethread, googledocs, and wiki.
(Workshop sessions will be held in future weeks even though not listed explicitly from this point on.)

(2/9; 5.00-7.30pm) 3. The scope and challenges of epidemiology
Idea: The uses of epidemiology are many, but shift over time, and are subject to recurrent challenges from inside and outside the field.
Idea: In advising on the most effective measures to be taken to improve the health of a population, epidemiologists may focus on different determinants of the disease than a doctor would when faced with sick or high-risk individuals.
Common readings: Davey-Smith 2001 (uses of epidemiology), Rose 1985 (population health)

(2/16) 4. Categories
Idea: Collecting and analyzing data requires categories: Have we omitted relevant categories or mixed different phenomena under one label? What basis do we have for subdividing a continuum into categories? How do we ensure correct diagnosis and assignment to categories? What meaning do we intend to give to data collected in our categories?
Common readings and cases: Davey-Smith et al. 2000 (Comparative methods for studying socioeconomic position and health in different ethnic communities), Poland 2004 (“schizophrenia”) 

(2/23) 5. Associations, Predictions, Causes, and Interventions
Idea: Relationships among associations, predictions, causes, and interventions run through all the cases and controversies in this course. The idea introduced in this session is that epidemiology has two faces: One from which the thinking about associations, predictions, causes, and interventions are allowed to cross-fertilize, and the other from which the distinctions among them are vigorously maintained, as in "Correlation is not causation!"
The second face views Randomized Control Trial (RCTs) as the "gold-standard" for testing treatments in medicine. The first face recognizes that many hypotheses about treatment and other interventions emerge from observational studies and often such studies provide the only data we have to work with. What are the shortcomings of observational studies we need to pay attention to (e.g., systematic sampling errors leading to unmeasured confounders-see next class)?
Common readings and cases: Ridker 2007 (Cardiac risk factors), Stampfer 1991, 2004 (Hormone replacement therapy)

(3/2) 6. Confounders & conditioning of analyses
Idea: Statistical associations between any two variables generally vary depending on the values taken by other "confounding" variables. We need to take this dependency (or conditionality) into account when using our analyses to make predictions or hypothesize about causes, but how do we decide which variables are relevant and real confounders?
Common readings and cases: Davey-Smith 1997 (Control at work and mortality), Davey-Smith & Ebrahim 2007 (Mendelian randomization to analyze environmental exposures), Hernan (2000), Lynch 2007 (video)

(3/9) 7. Variations in health care (by place, race, class, gender)
Idea: Inequalities in people’s health and how they are treated are associated with place, race, class, gender, even after conditioning on other relevant variables.
Common readings and cases: Alter 1999 (Access to cardiac procedures), Krieger 2005 (Variation in mortality across communities), Lynch 2007 (video)
Mid-semester self-assessment

No class 3/16 - chance to catch up with glossary and sketches and revisions

**(3/23) 8. Heterogeneity within populations and subgroups**

*Idea:* How people respond to treatment may vary from one subgroup to another—When is this a matter of chance or of undetected additional variables? How do we delineate the boundaries between subgroups?

Common readings and cases: Regan 2005 (Forms of breast cancer), Lagakos 2006 (Statistical concerns)

**(3/30) 9. Placing individuals in a multileveled context**

*Idea:* Different or even contradictory associations can be detected at different levels of aggregation (e.g., individual, region, nation), but not all influences can be assigned to properties of the individual—Membership in a larger aggregation can influence outcomes even after conditioning on the attributes of the individuals.

Common readings and cases: Freedman 2001 (Ecological and atomistic fallacies), Diez-Roux 2002a, b (Neighborhood effects), Marcelli 2006 (Obesity)

**(4/6) 10. Life course epidemiology**

*Idea:* How do we identify and disentangle the biological and social factors that build on each other over the life course from gestation through to old age?

Common readings and cases: Ben-Shlomo 2002 (Life course development of disease), Brown 1978 (Life Events and Difficulties)

**(4/13) 11. Multivariable "structural" models of development**

*Idea:* Just as standard regression models allow prediction of a dependent variable on the basis of independent variables, structural models can allow a sequence of predictive steps from root ("exogeneous") through to highest-level variables. Although this kind of model seems to illuminate issues about factors that build up over the life course, there are strong criticisms of using such models to make claims about causes.

Common readings and cases: Kendler 2002 (pathways to depression in women), Freedman 2005 (Structural models as causal models?)
Supplementary Reading: Chandola 2006, Ou 2005, Rini 1999

**(4/20) 12. Heritability, heterogeneity, and group differences**

*Idea:* As conventionally interpreted, heritability indicates the fraction of variation in a trait associated with "genetic differences." A high value indicates a strong genetic contribution to the trait and "makes the trait a potentially worthwhile candidate for molecular research" that might identify the specific genetic factors involved. I contest the conventional interpretation and contend that there is nothing reliable that anyone can do on the basis of estimates of heritability for human traits. While some have moved their focus to cases in which measurable genetic and environmental factors are involved, others see the need to bring genetics into the explanation of differences among the averages for groups, especially racial groups.

Common readings and cases: Moffitt 2005 (Interaction of measured genes and measured environments), Taylor 2010 (skepticism about the estimation and interpretation of heritability)
Supplementary Reading: Caspi 2002, Davey-Smith 2009, Dickens 2001, Plomin 2006,

(4/27) 13. Genetic diagnosis, treatment, monitoring, and surveillance

Idea: Genetic analysis has begun to identify genetic risk factors. We need to consider the social infrastructure needed to keep track of the genetic and environmental exposures with a view to useful epidemiological analysis and subsequent healthcare measures. Even in cases where the condition has a clear-cut link to a single changed gene and treatment is possible, there is complexity in sustaining that treatment.

Common readings and cases: Khoury 2007 (Many genes as small risk factors), Paul 1998 (Complexities of social support after PKU diagnosis)

Supplementary Reading: Bowcock 2007, Frank 2005, Taylor 2009

Note: Complete draft of final portfolio selection due; 2 copies, for instructor and peer commentator.

(5/4) 14a. Popular epidemiology and health-based social movements

Idea: The traditional subjects of epidemiology become agents when: a. they draw attention of trained epidemiologists to fine scale patterns of disease in that community and otherwise contribute to initiation and completion of studies; b. their resilience and reorganization of their lives and communities in response to social changes displaces or complements researchers' traditional emphasis on exposures impinging on subjects; and c. when their responses to health risks displays rationalities not taken into account by epidemiologists, health educators, and policy makers.

Common readings and cases: Brown 1992 (Popular epidemiology), Davison 1991 (Lay epidemiology)


14b. Taking Stock of Course: Where have we come and what do we need to learn to go further?

Idea: In order to move ahead and continue developing, it is important to take stock of what went well and what needs further work.

- Comparison of initial plans and current position. Revision of plans for personal and professional development.
- Instructor's and formal course evaluations.

No class, 5/11. Portfolios due by email attachment.

Bibliography

Link to site to access password-protected readings


Pickles, A. and A. Angold (2003). "Natural categories or fundamental dimensions: On carving nature at the joints and the rearticulation of psychopathology." Development and
Psychopathology 15: 529-551.