Syllabus - CHL 5416 Environmental Epidemiology 2012

Introduction

Much of both the current and projected future global burden of disease and injury is attributed to environmental sources of exposure e.g. contaminated water or air, or changes in environmental conditions e.g. climate change. Environmental epidemiologists have; determined whether increases in adverse health outcomes are attributable to environmental exposures e.g. cluster investigations; tracked down etiological linkages between environmental exposures-conditions and health status in particular populations; estimated the attributable burden both in the past and projecting into the future e.g. risk and health impact assessment to inform programs and policies; and increasingly, evaluated the impact of policy and program interventions aimed at reducing the environmental burden of disease. This environmental epidemiology course will include each of these activities in environmental epidemiology.

Prerequisite/Co-Requisites

As a level-III course in the MHSc-MPH program of the Dalla Lana School of Public Health (DLSPH), this course requires pre-requisites:

1. At least one epidemiology course covering the building blocks of an epidemiological study i.e. population, exposure, outcome, covariates +/- intervention, analysis, and different epidemiological designs e.g. cross-sectional survey, cohort study. For DLSPH students, this will likely be CHL5401F Introduction to Epidemiology.
2. At least one biostatistics course covering quantitative analysis methods appropriate to epidemiology i.e. which can produce measures of association, risk or risk reduction. For DLSPH students, this will likely be CHL5201F Biostatistics 1 or another quantitative methods course.
3. Some experience with or training in environmental health. Although harder to define, the instructors expect some basic understanding of types of exposure e.g. chemical, physical, and pathways and routes of exposure e.g. oral, dermal, in particular populations e.g. children. Other courses treating environmental exposures, issues or policy more generally are available through the DLSPH Occupational and Environmental Health Program, e.g. CHL5903H Environmental Health, or the School of the Environment (http://www.environment.utoronto.ca/) e.g. ENV 4002H F Environment and Health of Vulnerable Populations.

Enrolment

As the course aims to advance competencies in the specific area of environmental epidemiology, it will be of interest to:
Students in the MHSc-MPH programmes in Community Health and Epidemiology and Occupational and Environmental Health, but also some students in Health Promotion;

MSc and PhD students affiliated with the Centre of the Environment or in the Institute of Medical Sciences with backgrounds in environmental sciences and health, or toxicology; and
MSc and PhD students in related areas, fields or disciplines such as geography and planning, engineering, or policy studies with sufficient background to contribute to and benefit from the course.
If in doubt, please check with the lead instructor. Usual complement is 8-18 students.

Registration

Students are required to register for the course and pay fees up front (no retroactive registration permitted). Not doing so means that the student cannot receive grades or credit for their work or access the course website. Deadlines are posted on the DLSPH website.

Instructors & Administrative Support

- Loren Vanderlinden (course director), Supervisor, Environmental Health Assessment & Policy, Healthy Public Policy Directorate, Toronto Public Health 7th Fl. 277 Victoria Street: lvander@toronto.ca 416-338-8094;
- Shelley Harris, Scientist, Population Studies & Surveillance, Cancer Care Ontario, 620 University Ave.: Shelley.Harris@cancercare.on.ca 416-971-9800 x3234
- Stephanie Gower, Research Consultant, Healthy Public Policy Directorate, Toronto Public Health, sgower@toronto.ca 416-338-8101
- Hong Chen, Environmental Epidemiologist, Environmental & Occupational Health, Public Health Ontario, 480 University Ave, Suite 300, Hong.Chen@oahpp.ca, 647-260-7109
- Matilda Kong, Administrative Assistant, Division of Epidemiology, DLSPH: matilda.kong@utoronto.ca 416-978-7213, 155 College Street, 6th floor

Objectives - Relevant competencies to build during course

Framing – Able to:
-appropriately *frame* environmental health issues such that they are tractable for investigation and response e.g. ecosystem health, risk assessment, benchmarking exposures
-*classify* environmental exposures by: nature e.g. chemical, physical; intensity; and duration e.g. acute or chronic; and describe environmental pathways and human exposure routes; and
-*identify* ethical issues associated with an environmental exposure among a vulnerable population

Information - Able to:
-*appraise* new environmental epidemiological findings in light of relevant literatures (not only epidemiological) and the context of community and global health; and

-*critique* and *interpret* reports of individual environmental epidemiological studies

Study Design - Able to:
-*formulate* an environmental epidemiology research (attributable burden, etiology, prognosis potentially, intervention effectiveness) question or hypothesis and choose a study design from a range of relevant options
-*describe* an appropriate population of interest, considering vulnerability, in order to estimate likely health impacts of environmental exposure(s) or test causal hypotheses
-*enumerate* options available for exposure assessment in environmental epidemiology, the challenges involved in obtaining data or conducting measurements, and the multidisciplinary approaches and resultant tools needed to better understand and measure exposure
-*describe* appropriate measures of outcome (and their associated data sources) and understand the strengths and weaknesses of each measure
-*assess* major sources of bias and variation and implement strategies to control such biases and reduce random variation at the design stage; and
-*specify* information needs for sample size or power estimation and estimate sample size requirements

Data Analysis & Interpretation - Able to
-*recognize* potential sources of bias and *apply* appropriate analytic techniques to assess and control these biases in environmental epidemiological studies
-*make inferences* from results of analyses using moderately complex statistical methods and
-*interpret* findings in a causal framework and in light of a community/organizational context

Application of Results - Able to:
-*apply* environmental epidemiological methods to investigating emergent environmental health problems as they might present to public health practitioners in different settings
-*apply* weight of evidence approaches to decision-making on environmental health concerns
-*use* epidemiologic evidence in risk assessment or health impact assessment around an environmental exposure or condition, at least deterministically, and be *aware* of probabilistic and scenario modeling approaches and who to access to conduct them
-*evaluate* changes in exposures and/or health outcomes associated with environmental health policies or programs

Assessment – Able to:
-*provide* constructive feedback to peers on ideas both in person and in writing

Communication – Able to:
-*present* their work using either scientific or lay language in ways appropriate to their audience's understandings and concerns
-clearly *communicate* in writing the results of their work; and
-*discuss* environmental epidemiology and its applications with their peers in the sessions.

Format of Instruction

Resources

Combination of readings e.g. electronic papers, book chapters, supplemented by student searches, web site consultation, lectures, & peer assessments (see next section), detailed on Blackboard.

Several relevant *texts*, unfortunately few available in the UT library system, may be helpful as background resources, particularly if you are passionately interested in environmental epidemiology:

Aldrich Tim E., Griffith J, Cooke C (eds). Environmental Epidemiology and Risk Assessment. Toronto et al: Wiley, 2002. ISBN 978-0-471-29066-7. 288 pp – good on links between the two, though now getting dated. (only older version available.)

Baker Dean, Nieuwenhuijsen Mark J (eds). Environmental Epidemiology. Study Methods and Application. Toronto et al: Oxford University Press, 2008. ISBN 978-0-19-852792-3. 398 pp – very good overview, international set of authors, good practical material also global, and reflective on epidemiology contributions and limits. Strongly recommended. (Copy on reserve for the course at Gerstein Science Information Centre - GSIC.)

Thomas Duncan C. Statistical Methods in Environmental Epidemiology. Toronto et al: Oxford University Press, 2009. ISBN 978-0-19-923290-1, 432 pp. – up to date, basic to more complex, comprehensive wrt methods, includes formulas for the more biostatistically minded. (Copy on reserve for the course at GSIC.)

Face to Face Sessions

Time: Thursdays 1:30 to 4:30 (September 13-December 6)
Place: Health Sciences, HS 705

Sessions will comprise different mixes of interactive discussion, presentations, and review of tasks by faculty, guests and students. A more detailed schedule with specific resources is being provided and will be posted on Blackboard. It may be updated during the course, depending on changes in guest or instructor availability. We will also provide more detailed outlines for individual sessions, including readings and background preparation, on Blackboard each week.

Enrichment Sessions

CHL 5416 students will be encouraged to attend selected seminars of the Environment & Health Seminar Series sponsored by the School of the Environment, the Environment & Health Collaborative Program Usually from 16:10-18:00 Thursday afternoons, Rm. 1170, 40 St. George Street, Bahen Centre for Information Technology.

Assessment

A separate document with detailed instructions on assignments will be available as a handout and on Blackboard by the first class.

Participation

Graded by the instructors as a group, based on attendance, preparation (news & events, readings), engagement in discussions, and contribution to the learning of all group members throughout the class (***10%).*** Students will also choose one of the 4- 5 proposed "tutorial" sessions to co-facilitate by reviewing required readings, preparing key points and discussion questions and leading/facilitating class discussion (***10%***). ***– 20% total***

In-class Presentations

Two in-class presentations (Oct 18 and Nov 29) (accompanied by short written submissions) will provide the opportunity to develop skills to critically evaluate study designs, analytical methods, and findings presented in articles selected from the environmental epidemiology literature, based on the concepts acquired in the epidemiology introductory courses. One focused on critical appraisal skills, second focused on application of environmental epidemiology to a policy issue. – ***25% each***

Study Design Project

Students will develop a research study design on a topic related to environmental or occupational epidemiology chosen early in the term. Students will discuss with one supervising instructor a proposed research question that can be addressed with an epidemiologic study, by the week of October 11. The study design paper (5 – 6 pages, not including references) will focus on the aims of the project and study design(s) best suited to test a hypothesis stemming from your chosen research question. Due Dec 6. – ***30%***

Let us know if you have any challenges with the assignments and need accommodation.

Academic Integrity

Academic integrity is essential to the pursuit of learning and scholarship. Check the UofT code of behaviour at http://www.governingcouncil.utoronto.ca/policies/behaveac.htm. When developing and implementing projects, respect others' work by citing it, making links, and avoid plagiarism of any kind: http://www.writing.utoronto.ca/advice/using-sources/how-not-to-plagiarize

Assignment of grades will be according to DLSPH and SGS guides (website link http://www.governingcouncil.utoronto.ca/policies/grgrade.htm Criterion for passing will be a grade of B-. If you are concerned about a grade, submit the nature of your concern in writing to the instructor marker and the lead instructor. We will consider it and get back to you with a response.

May the course be a good learning experience for the students and the instructors!