

Environment and Health: Exposures from Transportation and Urban Form

Course Instructors:	Michael Brauer (UBC) and Chava Peretz (TAU)
Date / Time:	July 17-21, 2016 (S, M, Th 8:30-13:00 / T, W 8:30-13:30)
Location	Room TBA /Sackler Faculty of Medicine
Final Exam:	July 22, 2016 / 9:00-11:00
Credits:	2 Academic Credits
Pre-requisites:	Statistics and Epidemiology

Course Description

The course will introduce classical, contemporary, and cutting-edge approaches to the estimation of human exposure to environmental exposures related to transportation and urban form for epidemiologic studies as well as risk assessment, regulatory compliance, exposure source/route apportionment, and susceptibility factors. Qualitative and quantitative methods in exposure science will be covered, including surrogate measures, exposure modeling (themes: geographic information systems and geospatial data, land use regression, dispersion modeling) and biological markers of exposure, in addition to methodological concepts such as exposure measurement error and efficient study design. Emphasis will be placed on examples from air pollution but other media and environmental stressors related to transportation and urban form will also be included. Thus, in lectures, review of literature, case studies and practical exercises, students will gain familiarity with exposure assessment concepts and methodology and their applications to environmental health.

Learning objectives: At the end of this this course participants should be able to:

1. Describe the general concepts of exposure assessment as applied to environmental health, with emphasis on epidemiology and risk assessment.
2. Explain common approaches (direct and indirect measurement, modeling, biomarkers) to assess environmental exposures related to transportation and urban form: noise, air contaminants, greenness, physical inactivity, temperature
3. Use geo-statistical approaches to develop a exposure estimates for traffic-related air pollution
4. Illustrate how routinely collected environmental measurements and information on human behavior can be used to estimate exposure
5. Understand how to use simple measurements to directly assess exposure
6. Appreciate the role of exposure misclassification in environmental epidemiology
7. Have familiarity with readily available data sources related to transportation and urban form in Israel
8. Design an exposure assessment strategy for a selected environmental hazard

Requirements

Participants must pass the final exam with a grade of at least 60 (D) to receive academic credit. Non-credit participants are not required to take the final exam.

Course Schedule

Sunday, July 17 (Day 1)	
08:30-08:45	Welcome and introduction
08:45-10:00	Introduction/overview of exposure assessment in environmental health; Spatial and temporal variability; Intake fraction Lecturer: Michael Brauer
10:00-10:30	Break
10:30-12:00	Applications to epidemiology of exposures related to transportation and urban form Lecturer: Michael Brauer
12:00-12:15	Break
12:15-13:00	Group exercise in class: Applications to risk and health impact assessment Lecturer: Michael Brauer and Chava Peretz
Monday, July 18 (Day 2) – Computer Lab	
08:30-10:00	Exposure modeling I: Exposure factors, time - activity, questionnaires Lecturer: Michael Brauer
10:00-10:30	Break
10:30-12:00	Exposure modeling II: Dispersion models , Geospatial models (interpolation, Kriging, co-kriging, land use regression), Remote sensing Computer exercise: Geospatial analysis Lecturer: Michael Brauer
12:00-12:15	Break
12:15-13:00	Computer exercise: Geospatial analysis
Tuesday, July 19 (Day 3)	
08:30-10:00	Exposure measurement I: Transportation and urban form data sources in Israel Lecturer: TBD
10:00-10:30	Break
10:30-12:00	Exposure Measurement II: Passive sampling, direct reading instrumentation, integrated exposure sampling, biomonitoring Lecturer: Michael Brauer
12:00-12:15	Break
12:15-13:00	Group exercise in class: Design your own exposure assessment

13:00-13:30	Questions & Discussion
Wednesday, July 20 (Day 4) – Computer Lab	
08:30-10:00	Residential exposures (Indoor-outdoor relationships, Indoor sources [allergens, phthalates, etc.]), Consumer products Lecturer: Michael Brauer
10:00-10:30	Break
10:30-12:00	Computer exercise: Regression modelling with examples from land use regression Lecturer: Chava Peretz
12:00-12:15	Break
12:15-13:00	Computer exercise: Determinants of exposure modeling Lecturer: Chava Peretz
13:00-13:30	Questions & Discussion
Thursday, July 21 (Day 5)	
08:30-10:00	Exposure misclassification (impacts on exposure-response relationships); Study efficiency Lecturer: Chava Peretz
10:00-10:30	Break
10:30-12:00	Group exercise in class: Design your own exposure assessment
12:00-12:15	Break
12:15-13:00	Assessment of multiple exposures related to transportation and urban form Lecturer: Michael Brauer
Friday, July 22 (Final Exam 9:00-11:00) Sackler Faculty of Medicine, Room TBA	