



MODULE SPECIFICATION

Academic Year (student cohort covered by specification)	2020-21
Module Code	1301
Module Title	Environmental Epidemiology
Module Organiser(s)	Professor Paul Wilkinson
Faculty	Public Health & Policy
FHEQ Level	Level 7
Credit Value	CATS: 15 ECTS: 7.5
HECoS Code	101317 : 101335 : 101048
Term of Delivery	Term 2
Mode of Delivery	For 2020-21 this module is delivered online. Teaching will comprise a combination of live and interactive activities (synchronous learning) as well as recorded or self-directed study (asynchronous learning).
Mode of Study	Full-time
Language of Study	English
Pre-Requisites	All students will require a sound basic knowledge of epidemiology (i.e. the equivalent of the Basic Epidemiology or the Extended Epidemiology modules).
Accreditation by Professional Statutory and Regulatory Body	None
Module Cap (Maximum number of students)	40
Target Audience	The module is compulsory for students taking the Environment & Health stream of the MSc in Public Health. It is intended for anyone with an interest in the links between the environment and health, and covers both local hazards and global environmental concerns. An understanding of basic epidemiological principles is assumed such as would be gained from any introductory module on epidemiology. Students with a background in veterinary epidemiology might wish to consult the module organizer as it is assumed students have knowledge of human epidemiology (such



	topics as risks, confounding, study design) and epidemiological analytical methods, including familiarity with simple regression methods and the interpretation of regression coefficients. There is a focus on methods and principles. The module is relevant to both high and low-income settings, but there is greater emphasis on examples and methods from higher income settings.
Module Description	This module focuses on understanding of the epidemiological methods by which evidence has been obtained on environmental risks to health: how we know what we think we know about such risks. Its chief focus is therefore on principles, methods, interpretation and critical thinking and less on factual knowledge. It concentrates on methods common in environmental epidemiology, including time series studies, spatial studies and risk assessment/modelling methods, and considers the evidence for the main areas of current interest in environmental epidemiology. These include: climate change/planetary health; air pollution; non-ionizing and ionizing radiation; wastewater use; hazardous waste; stratospheric ozone depletion, as well as cluster investigations and risk assessment. The intention is to equip students with good understanding of how to design an epidemiological study to investigate an environmental hazard to health and how to interpret evidence from the published literature.
Duration	5 weeks at 2.5 days per week
Timetabling slot	Term 2 - slot D2
Last Revised (e.g. year changes approved)	October 2020

Programme(s)	Status
This module is linked to the following programme(s)	
MSc Public Health (Environment & Health)	Compulsory
MSc Epidemiology	Recommended
MSc One Health: Ecosystems, Humans and Animals	Recommended
MSc Public Health	Recommended
MSc Public Health (Health Promotion)	Recommended
MSc Public Health (Health Services Research)	Recommended
MSc Public Health for Development	Recommended



Module Aim and Intended Learning Outcomes

Overall aim of the module

The overall module aim is to:

- give students a theoretical and practical understanding of the design and analysis of studies in environmental epidemiology, with main emphasis on the industrialized world.

Module Intended Learning Outcomes

Upon successful completion of the module a student will be able to:

1. Describe the main methodological issues in environmental epidemiology, specifically those relating to the investigation of the health effects of pollution of air, water and land, climate change, and the health effects of ionizing and non-ionizing radiation;
2. Assess and critically interpret scientific data relating to potential environmental hazards to health;
3. Plan, conduct and interpret the initial investigation into a putative disease cluster;
4. Describe the principles of geographical and time-series studies for the investigation of the health effects of environmental exposures, and the specific value of Geographical Information Systems as an investigative tool;
5. Describe the principal issues relating to waste water and excreta re-use, and the epidemiological investigation of associated health effects;
6. Describe the methods of quantitative risk assessment.

Indicative Syllabus

Session Content

The module is expected to cover the following topics:

- Key issues in environmental epidemiology, including methods for investigating environmental hazards
- Investigation of the health effects of:
 - air pollution
 - climate change
 - ionizing radiation
 - hazardous waste
 - non-ionizing radiation
 - stratospheric ozone depletion
 - water-related health risks
- Analysis of health and exposure data using
 - Geographical Information System/spatial methods
 - time-series methods (including through computer-based practical)



Session Content

- Risk assessment
- Disease clusters
- Biomarkers
- Estimation of exposure and problems of measurement
- Critical review of key papers on air pollution epidemiology and case studies of other environmental hazards to health.

Teaching and Learning

Notional Learning Hours

Type of Learning Time	Number of Hours	Expressed as Percentage (%)
Contact time	30	20%
Directed self-study	20	13%
Self-directed learning	60	40%
Assessment, review and revision	40	27%
Total	150	100%

Student contact time refers to the tutor-mediated time allocated to teaching, provision of guidance and feedback to students. This time includes activities that take place in face-to-face contexts such as lectures, seminars, demonstrations, tutorials, supervised laboratory workshops, practical classes, project supervision as well as where tutors are available for one-to-one discussions and interaction by email. Student contact time also includes tutor-mediated activities that take place in online environments, which may be synchronous (using real-time digital tools such as Zoom or Blackboard Collaborate Ultra) or asynchronous (using digital tools such as tutor-moderated discussion forums or blogs often delivered through the School's virtual learning environment, Moodle).

The division of notional learning hours listed above is indicative and is designed to inform students as to the relative split between interactive (online or on-campus) and self-directed study.

Teaching and Learning Strategy

Lectures and seminar/group activities, including class discussions; guided reading; case studies and critical review of the literature (through individual, group and class work); private study.

Assessment

Assessment Strategy

The assessment for this module has been designed to measure student learning against the module intended learning outcomes (ILOs) as listed above.

The assessment for this module will be online.

The summative assessment will be a multiple-choice test (MCQ) covering all aspects of the module.

Summative Assessment

Assessment Type	Assessment Length (i.e. Word Count, Length of presentation in minutes)	Weighting (%)	Intended Module Learning Outcomes Tested
Timed Test (in-module MCQ)	25 questions 1 hour 15 mins	100%	1 – 6

Resitting assessment

Resits will accord with the LSHTM's [Resits Policy](#)

Assessment being replaced	Approved Alternative Assessment Type	Approved Alternative Assessment Length (i.e. Word Count, Length of presentation in minutes)
Timed Test (in-module test e.g. MCQ)	The task will be to write an essay in response to a technical enquiry about an environmental epidemiology issue. The task would be described as a policy choice facing a local authority, a senior official of which calls for epidemiological advice. The response is to be written using language that would be understood by an educated non-epidemiologist.	no more than 1,500 words



Resources

Indicative reading list

- (1) WHO. Climate Change and Human Health - Risks and Responses. SUMMARY WHO; 2003
- (2) Andy Haines, Anthony J McMichael, Kirk R Smith, Ian Roberts, James Woodcock, Anil Markandya, Ben G Armstrong, Diarmid Campbell-Lendrum, Alan D Dangour, Michael Davies, Nigel Bruce, Cathryn Tonne, Mark Barrett, Paul Wilkinson* Public health benefits of strategies to reduce greenhouse-gas emissions: overview and implications for policy makers. *The Lancet*; Nov 25, 2009; DOI:10.1016/S0140-6736(09)61759-1
- (3) Anderson HR, Ponce de Leon A, Bland JM, Bower JS, Strachan DP. Air Pollution and daily mortality in London: 1987-92. *BMJ* 1996; 312:665-9
- (4) Hoek G, Brunekreef B, Goldbohm S, Fischer P, van den Brandt PA. Association between mortality and indicators of traffic-related air pollution in the Netherlands: a cohort study. *Lancet* 2002; 360: 1203-09
- (5) Pope CA 3rd, Burnett RT, Turner MC, Cohen A, Krewski D, Jerrett M, Gapstur SM, Thun MJ. Lung cancer and cardiovascular disease mortality associated with ambient air pollution and cigarette smoke: shape of the exposure-response relationships. *Environ Health Perspect*. 2011 Nov;119(11):1616-21. doi: 10.1289/ehp.1103639. Epub 2011 Jul 18.
- (6) Mara DD, Sleigh PA, Blumnthal UJ, Carr RM. Health risks in wastewater irrigation: comparing estimates from quantitative microbial risk analyses and epidemiological studies. *J Water Health* 2007; **5(1)**:39-50
- (7) Roman E, Doyle P, Maconochie N, Davies G, Smith PG, Beral V. Cancer in children of nuclear industry: report on children aged under 25 years from nuclear industry family study. *BMJ* 1999; **318**:1443-50
- (8) Dolk H, Vrijheid M, Armstrong B, Abramsky L, Bianchi F, Garne E, Nelen V, Robert E, Scott JES, Stone D, Tenconi R. Risk of congenital anomalies near hazardous waste landfill sites in Europe: the EUROHAZCON study. *Lancet* 1998; **352**: 423-27
- (9) Gallo V, et al. Strengthening the Reporting of OBServational studies in Epidemiology – Molecular Epidemiology (STROBEME): an Extension of the STROBE Statement. *PLoS*. October 2011; Vol 8(10): e1001117



Other resources

Students may find it useful to consult the following websites:

- World Health Organization air pollution pages https://www.who.int/health-topics/air-pollution#tab=tab_1
- Intergovernmental Panel on Climate Change, especially the report on 1.5 deg C warming <https://www.ipcc.ch/sr15/>
- The independent UK Climate Change Committee website and its reports: <https://www.theccc.org.uk/>
- Public Health England UKradon site: <https://www.ukradon.org/>
- International Agency for Research on Cancer (IARC) monographs on non-ionizing radiation: <https://publications.iarc.fr/Book-And-Report-Series/Iarc-Monographs-On-The-Identification-Of-Carcinogenic-Hazards-To-Humans/Non-ionizing-Radiation-Part-1-Static-And-Extremely-Low-frequency-ELF-Electric-And-Magnetic-Fields-2002>
- WHO guidelines for safe use of wastewater, excreta and greywater: https://www.who.int/water_sanitation_health/wastewater/wwuvol2intro.pdf

Teaching for Disabilities and Learning Differences

The module-specific site on Moodle gives students access to lecture notes and copies of the slides used during the lecture. Where appropriate, lectures are recorded and made available on Moodle. All materials posted on Moodle, including computer-based sessions, have been made accessible where possible.

LSHTM Moodle is accessible to the widest possible audience, regardless of specific needs or disabilities. More detail can be found in the [Moodle Accessibility Statement](#) which can also be found within the footer of the Moodle pages. All students have access to “SensusAccess” software which allows conversion of files into alternative formats.

Student Support Services can arrange learning or assessment adjustments for students where needed. Details and how to request support can be found on the [LSHTM Disability Support pages](#).