MODULE SPECIFICATION

Academic Year (student cohort covered by specification)	2020-21
Module Code	EPM202
Module Title	Statistical Methods in Epidemiology
Module Organiser(s)	Emily Webb, Rein Houben, Lois Kim
Contact	The LSHTM distance learning programmes and modules are run in collaboration with the University of London. Enquiries may be made via their Student Advice Centre at: https://london.ac.uk/contact-us
Faculty	Faculty of Epidemiology and Population Health London School of Hygiene & Tropical Medicine http://www.lshtm.ac.uk/eph/
FHEQ Level	Level 7
Credit Value	**CATS** 15 **ECTS** 7.5
HECoS Code	101335 : 101030 : 100962
Mode of Delivery	Distance Learning
Mode of Study	Directed self-study, through online materials via the Virtual Learning Environment
Language of Study	English
Pre-Requisites	Epidemiology students must have passed EPM101 *Fundamentals of Epidemiology* and EPM102 *Statistics with Computing [from 2018-19 this module is entitled Statistics for Epidemiology]*, and should have studied and have an understanding of EPM103 *Practical Epidemiology* and EPM105 *Writing and Reviewing Epidemiological Papers* prior to studying this module. PG Diploma and MSc Public Health students who wish to take this module are required to have passed both PHM101 *Basic Epidemiology* and PHM102 *Basic Statistics for Public Health and Policy*; a grade of at least 4 in PHM102 is recommended. In particular, for adequate preparation, students should have studied the optional PHM102 CAL Session on 'Measures of Effect in 2x2 Tables' and carried out all the Stata exercises in PHM102.

	Students studying this module as an individual module must have basic epidemiological knowledge and skills equivalent to EPM101 *Fundamentals of Epidemiology*, EPM102 *Statistics with Computing [from 2018-19 this module is entitled Statistics for Epidemiology]*, EPM103 *Practical Epidemiology* and EPM105 *Writing and Reviewing Epidemiological Papers*.
Accreditation by Professional Statutory and Regulatory Body	Not currently accredited by any other body.
Module Cap (Maximum number of students)	There is no cap on the number of students who can register for this distance learning module.
Target Audience	**Statistical Methods in Epidemiology** is a compulsory module for students on the DL PG Diploma/MSc in Epidemiology and available to students as an elective module on the DL PG Diploma/MSc Public Health. It may also be taken as an "individual module" for those working in the field of epidemiology who wish to enhance their statistical skills within this discipline.
Module Description	This module equips students with the skills needed to analyse and interpret data from cohort, case-control and cross-sectional studies. It is aimed at students familiar with STATA who wish to acquire further skills in the statistical analysis and interpretation of epidemiological studies, and is assessed through a data analysis and reporting exercise.
Duration	Students may start their studies at any time from access of study materials (made available annually usually in October, depending on date of registration) until completion of their assessment (see in the 'Dates' section below for more details).
	Students registering after September (individual module students only) should note that introductory messages, and some online activities (for example discussion forums and/or real-time welcome sessions) may have already taken place before they get access to the Virtual Learning Environment (Moodle). All such messages and recordings (where applicable) will be available to access throughout the study year.
Last Revised (e.g. year changes approved)	February 2020

Programme(s) This module is linked to the following programme(s)	Status
PGCert/PGDip/MSc Epidemiology (Distance Learning - University of London Worldwide)	Compulsory
PGDip/MSc Public Health (Distance Learning - University of London Worldwide)	Elective

Module Aim and Intended Learning Outcomes

Overall aim of the module
The overall module aim is to: • provide students with the key statistical knowledge and skills needed to analyse and interpret data from the common forms of epidemiological studies.

Module Intended Learning Outcomes
Upon successful completion of the module a student will be able to: 1. Explain the key statistical and epidemiological concepts which underlie the analysis of epidemiological data; 2. Perform analyses of data arising from epidemiological studies, using appropriate computer software (the software used throughout will be STATA); 3. Investigate and assess confounding and effect modification (interaction) in epidemiological data; 4. Interpret appropriately the results of these analyses, taking into account study design issues; 5. Write a clear report presenting and interpreting the results of an analysis of epidemiological data.

Indicative Syllabus

Session Content
The module is expected to cover the following topics: SM01 Introduction/Revision of key concepts SM02 Cohort studies SM03 Introduction to survival analysis SM04 Case-control studies SM05 Likelihood SM06 Introduction to multivariable analysis

Session Content
SM07 Logistic regression 1
SM08 Logistic regression 2
SM09 Logistic regression 3
SM10 Matched case-control studies
SM11 Introduction to Poisson and Cox regression
SM12 Strategies of analysis
SM13 Choice of controls in a case-control study
SM14 Summary.
In the first half of the module the focus is on issues specific to different types of study. The second half of the module deals with statistical modelling, multivariable analyses, and study design. The combined materials will enable students to choose and use the techniques appropriate for estimation and hypothesis testing in selected situations.

Teaching and Learning

Notional Learning Hours

Type of Learning Time	Number of Hours	Expressed as Percentage (%)
Directed self-study	70	47
Self-directed learning	30	20
Assessment, review and revision	50	33
Total	**150**	**100**

Teaching and Learning Strategy
Learning is self-directed against a detailed set of learning objectives using the materials provided. The key learning methods are: • Reading and reflecting on the CAL materials which introduce, explain and apply the principles and methods covered in the module. • Reading and reflecting on other resources which support the learning in the CAL sessions. • Completing practical exercises. • Accessing academic support which is available from the module tutors through the online discussion forums and occasional real-time sessions (using Collaborate Ultra) in which students are encouraged to participate. • Completing the self-assessed assignment which tests understanding of the principles and methods covered in the module, and helps preparation for the formative and assessed assignments.

Teaching and Learning Strategy
• Completing the formative assignment and reflecting on written feedback from module tutors. • Completing the assessed assignment and reflecting on written feedback from module tutors.

Assessment

Assessment Strategy
Formal assessment of the module will be by one assessed assignment contributing 100% of module marks. If a student fails the module overall, they are allowed one further attempt at the assignment. For both their formative and summative assessments, students are asked to analyse a dataset to address a research question and to prepare a brief report describing their analysis strategy and the results they obtained, discussing their results in the light of the methods used to obtain the data. The assessment tasks require students to demonstrate: the ability to select and apply appropriate statistical methods to a specific problem, including the investigation of confounding and effect modification; the ability to present their analysis strategy and results in an appropriate way; and the ability to interpret their findings appropriately in the light of the study design and research question. The formative assessment task enables students to prepare for their summative assessment, as both have the same format, but may cover different epidemiological study designs. The assessment tasks thus give students an opportunity to consolidate their learning and require students to apply their learning across the whole of the module. Prior to 2019/20, students were required to sit an unseen written examination (70% of module marks) and submit an assessed assignment (30% of module marks). Students who registered for EPM202 prior to 2019/20 must note the following: • <u>A student registered for EPM202 prior to 2019/20 who has not attempted any element of the EPM202 assessment</u> will be required to complete the assessed assignment only (100% of the module marks). • <u>A student registered for EPM202 prior to 2019/20 who has completed one element of assessment but not the other</u> (i.e. the unseen written examination or the assessed assignment) must still complete both elements of assessment. • <u>A student registered for EPM202 prior to 2019/20 who has obtained a GPA of between 1.0 and 1.99 for the module overall</u>, must resit the failed element(s) unless the overall EPM202 GPA is compensatable.

Assessment Strategy

A student registered for EPM202 prior to 2019/20 who has previously obtained a GPA of less than 1.0 on the assessed assignment or the module overall, must resit the failed element(s).

Summative Assessment

Assessment Type	Assessment Length (i.e. Word Count, Length of presentation in minutes)	Weighting (%)	Intended Module Learning Outcomes Tested
Assessed Assignment	1500 words of text plus a maximum of 3 tables	100	1 – 5

Resitting assessment

Resits will accord with the LSHTM's Resits Policy

Resources

Indicative reading list

1. Textbook:
Kirkwood, B.R. and Sterne, J.A.C. Essential medical statistics. Blackwell Science, 2003

2. Journal articles relating to analysis and reporting

Altman, D. and Bland, M. Absence of evidence is not evidence of absence. BMJ 1995; 311:485

Sterne, J.A.C. and Davey Smith, G. Sifting the evidence – what's wrong with significance tests? Another comment on the role of statistical methods. BMJ 2001; 322:226-31

Wasserstein, R.L. and Lazar, N.A. The ASA's Statement on p-Values: Context, Process, and Purpose, The American Statistician 2016; 70:2, 129-133

Amrhein V., Greenland S., McShane B. Retire statistical significance. Nature 2019; 567:305-307

3. Journal articles relating to strategies of analysis

Victora, C., Huttly S.R., Fuchs, S.C., Olinto, M.T.A. The role of conceptual frameworks in epidemiological analysis: a hierarchical approach. IJE 1997; 26:224-227

Greenland, S. Modeling and variable selection in epidemiologic analysis. AJPH 1989; 79:340-9

4. Case-control study example

Mahmood, D.A., Feachem, R.G., Huttly, S.R. Infant feeding and risk of severe diarrhoea in Basrah city, Iraq: a case-control study. World Health Organisation, 1989; 67:701-706

Other resources

The Moodle Virtual Learning Environment (VLE) contains the key materials and resources for EPM202 as follows:

- Interactive study material, referred to as Computer Assisted Learning (CAL), which is the key learning material for the module. The CAL sessions are also available to download.
- Workbook (contain practical exercises to work through using the statistical software Stata)
- Readings (via the LSHTM online library)
- Discussion forums
- Assignments
- Past examination papers and examiner reports.

The following is also provided (if not already provided for core EPM1 or PHM1 modules):

- Stata software
- Textbook: *Essential Medical Statistics* (Kirkwood, Sterne).

Moodle can be accessed from the first week of October, after module registration. Students who are taking this as an individual module or as part of the MSc/PG Diploma Public Health programmes will also have online access to the EPM1 computer-based sessions (this access will exclude tutor support and associated readings / workbooks/ textbooks).

Teaching for Disabilities and Learning Differences

The module-specific site on Moodle provides students with access to the module learning materials, including a study guide and online reading list (containing both essential and recommended readings), and additional resources including supplementary exercises and optional lecture recordings. All materials posted up on Moodle areas, including computer-based sessions, have been made accessible where possible (this includes an accessible printable version of each session). The LSHTM Moodle has been made accessible to the widest possible audience, using a VLE that allows for up to 300% zoom, permits navigation via keyboard and use of speech recognition software, and that allows listening through a screen reader. All students have access to "SensusAccess" software which allows conversion of files into alternative formats.

For students with special needs, reasonable adjustments and support can be arranged – details and how to request support can be found on the University of London Worldwide website at
https://london.ac.uk/applications/how-it-works/inclusive-practice-access-arrangements