## Module Specification

### GENERAL INFORMATION

<table>
<thead>
<tr>
<th>Module name</th>
<th>Advanced Statistical Methods in Epidemiology</th>
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<tbody>
<tr>
<td>Module code</td>
<td>EPM304</td>
</tr>
<tr>
<td>Module Organiser(s)</td>
<td>Sian Floyd, Daniel Grint</td>
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<tr>
<td>Contact email</td>
<td>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: <a href="https://london.ac.uk/contact-us">https://london.ac.uk/contact-us</a> (Enquiries from London-based LSHTM MSc or research students regarding study of DL modules should be emailed to <a href="mailto:distance@lshtm.ac.uk">distance@lshtm.ac.uk</a>)</td>
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<tr>
<td>Home Faculty</td>
<td>Faculty of Epidemiology and Population Health, London School of Hygiene &amp; Tropical Medicine, <a href="http://www.lshtm.ac.uk/eph/">http://www.lshtm.ac.uk/eph/</a></td>
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<tr>
<td>Level</td>
<td>This module is at Level 7 (postgraduate Masters level) of the QAA <a href="https://www.qaa.ac.uk/">Framework for Higher Education Qualifications</a> in England, Wales &amp; Northern Ireland (FHEQ)</td>
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<tr>
<td>Credit</td>
<td>LSHTM award 15 credits on successful completion of this module.</td>
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<tr>
<td>Accreditation</td>
<td>Not currently accredited by any other body.</td>
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<tr>
<td>Keywords</td>
<td>Epidemiology, Statistics, Quantitative methods.</td>
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### AIMS, OBJECTIVES AND AUDIENCE

#### Overall aim

This module aims to enable students to understand, apply, and interpret the results of a range of relatively advanced techniques for the design and analysis of epidemiological studies.

#### Intended learning outcomes

On completion of this module students should be able to:
- select, apply, and interpret the results of, regression methods for the analysis of individually and frequency-matched case-control studies, cohort studies, quantitative outcomes and cluster-randomised trials, using appropriate computer software,
- explain the effect of lack of independence of individual observations on epidemiological analysis, and the use of statistical methods which take account of correlated data,
- evaluate when cluster randomised trials (CRTs) are appropriate and how to design and analyse them,
- compare and contrast additive and multiplicative models, and indicate how to choose between them,
- plan a strategy of analysis for an epidemiological dataset, using an appropriate choice of methods and statistical models, and considering concepts of causal inference,
- estimate the risk attributable to an exposure in a population,
- review and summarise information from many studies using meta-analysis.
**Target audience**

This is an advanced module intended for students with a strong grasp of quantitative methods, who have previously completed the module in Statistical Methods in Epidemiology.

**CONTENT**

**Session content**

Module content is structured around the self-study sessions listed below:

- AS01 Framework for regression modelling
- AS02 Strategies of analysis
- AS03 Conditional logistic regression
- AS04 Stratifying on time for cohort studies
- AS05 Further Poisson regression
- AS06 Cox regression
- AS07 Further issues for Cox regression
- AS08 Additive and multiplicative models
- AS09 Analysis of correlated data
- AS10 Cluster-randomised trials
- AS11 Population attributable fractions
- AS12 Meta-analysis and systematic reviews
- AS13 Quantitative analysis
- AS14 Causal Inference

These sessions are followed by one optional session:

- AS15 Missing data

**TEACHING, LEARNING AND ASSESSMENT**

**Study resources provided or required**

The following materials are provided to students after registration for this module once a year from October:

- EPM304 Advanced Statistical Methods in Epidemiology Study Workbook & Reader.
- **Software:**
  - Stata
- **Textbook:**
  - *Essential Medical Statistics* (Kirkwood, Sterne).

In addition to the materials above, students are given access to

1. the LSHTM Virtual Learning Environment, Moodle, which contains the key EPM304 learning materials in the form of Computer Assisted Learning (CAL) sessions and corresponding practical material (in the Study Workbook), as well as resources such as discussion forums and supplementary programme materials
2. the LSHTM online library.

Students who are taking this as an individual module or as part of the MSc CT programme also have online access to the EPM1 and EPM2 computer-based sessions (this access will exclude tutor support and associated textbooks).

1 If not already provided for core modules or EPM202

**Teaching and learning methods**

Learning is self-directed against a detailed set of learning objectives using the materials provided. The key learning methods are:

- Reading and reflecting on CAL (computer-assisted learning) materials which introduce, explain and apply the principles and methods covered in the module.
- Reading and reflecting on paper-based materials which support the learning in the CAL sessions.
- Completing paper and computer-based practical exercises.
- Accessing academic support which is available from the module tutors through the web-based discussion forums and real-time sessions (using Collaborate Ultra) in which students are encouraged to participate.
- 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 details**

Formal assessment of this module includes a two-hour unseen written examination with 15 minutes' additional reading/planning time (70%) and an assessed assignment (30%).

If students fail the module overall, they are allowed one further attempt at the failed element (examination and/or assignment).

**Assessment dates**

Assignments for this module can be submitted only once annually, no later than 31 March and must be submitted via the online Assignment Management System.

Unseen written examinations for DL modules are held once a year, in June (including resits). Examinations are normally taken in a student's country of residence, in one of over 650 examination centres worldwide (arranged mainly through Ministries of Education or the British Council). A list of examination centres can be found at https://london.ac.uk/current-students/examinations/examination-centres

A local fee will be payable direct to the examination centre. This fee is in addition to the programme/module fee and is set by, and paid directly to, the individual examination centres. The level of local examination centre fees varies across the world and neither the University of London nor the LSHTM have any control over the fee amount.

For students who are required to re-sit, or granted a deferral or new attempt at the written examination, the next examination date will be the following June.

**Language of study and assessment**

English (please see ‘English language requirements’ below regarding the standard required for entry).

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**TIMING AND MODE OF STUDY**

**Duration**

Students may start their studies at any time from access/receipt of study materials (made available annually usually in October, depending on date of registration) and work through the material until the start of the June examinations (although assessment submission deadlines which are earlier than this must be observed).

Students registering after September (continuing and 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.

**Dates**

Tutorial support for distance learning modules is available from the beginning of October through to the examination in June.

**Mode of study**

By distance learning.

**Learning time**

The notional learning time for the module totals 150 hours, consisting of:

- **Directed self-study** (reading and working through the provided module material) ≈ 75 hours
- **Self-directed learning** (general reading around the subject, library, Moodle discussion forums) ≈ 25 hours
- **Assessment, review and revision** ≈ 50 hours

### APPLICATION, ADMISSION AND FEES

| 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*, EPM105 *Writing and reviewing epidemiological papers* and **EPM202 Statistical Methods in Epidemiology prior** to studying this module. If students wish to study both EPM202 and EPM304 in the same year, they are recommended to have achieved at least a grade 3 in EPM102.

Epidemiology students may choose to study CTM208 *Further Statistical Methods in Clinical Trials* in place of EPM304, but must apply to the Programme Director for approval, and must not register for and must not study both EPM304 *Advanced Statistical Methods in Epidemiology* and CTM208.

**Clinical Trials students** must ensure that they have studied CTM207 *Design and Analysis of Epidemiological Studies* before studying this module or must obtain Programme Director approval before registration. Students must also have studied EPM202 or have equivalent knowledge. MSc Clinical Trials students may choose to study EPM304 in place of CTM208 *Further Statistical Methods in Clinical Trials*, but must apply to the Programme Director for approval, and must **not register** for and must **not study** both CTM208 *Further Statistical Methods in Clinical Trials* and EPM304.

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*, EPM105 *Writing and reviewing epidemiological papers* and EPM202 *Statistical Methods in Epidemiology*.

Those wishing to study this module **must have regular access to the internet** to access learning resources, participate in module-specific discussions on Moodle, benefit from online library facilities and submit assignments.

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<tr>
<th>English language requirements</th>
<th>A strong command of the English language is necessary to benefit from studying the module. Applicants whose first language is not English or whose prior university studies have not been conducted wholly in English must fulfil LSHTM’s <a href="https://london.ac.uk/applications/costs-your-course/course-fees">English language requirements</a>, with an acceptable score in an approved test taken in the two years prior to entry. Applicants may be asked to take a test even if the standard conditions have been met.</th>
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| Student numbers | There is no cap on the number of students who can register for this distance learning module. The number of students actively studying this module varies, but typically approx. 100-130 students register for the module per year. |

| Student selection | This module is available to those registered for the DL PG Dip and MSc Epidemiology or Clinical Trials programmes. Alternatively, students may register for this as an “individual module”.

This module is also open to students registered on LSHTM face-to-face (i.e. London-based) MSc programmes (subject to programme-specific limitations) and research degree students. |

| Fees | The current schedule of fees can be viewed at [https://london.ac.uk/applications/costs-your-course/course-fees](https://london.ac.uk/applications/costs-your-course/course-fees) (click on the Postgraduate Fees link) |
| Scholarships | Scholarships are not available for individual modules. Some potential sources of funding are detailed on the LSHTM website. |

| Admission deadlines | Applications for LSHTM distance learning programmes and modules are managed by the University of London. To apply to take either a formal award (i.e. PG Certificate, PG Diploma or MSc) or an individual module, please see here: [https://london.ac.uk/courses/epidemiology](https://london.ac.uk/courses/epidemiology)  

Key deadlines are as follows:
- Application deadline: 31 August
- Registration deadline: 30 September (new students)
- Registration deadline: 31 October (continuing students and those taking the module as an individual module).

**Please note:** The academic year starts 1 October. Students who register after 1 October should note that module welcome and Collaborate sessions held in October are recorded, but they cannot request an extension to assignment submission deadlines or apply for an examination extenuating circumstance as a result of registering later than 1 October.  

(In-house LSHTM research students can self-enrol on the module's Moodle area. In-house LSHTM MSc students wishing to study this module should note information given in the mixed mode study option link.) |

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**ABOUT THIS DOCUMENT**

**This module specification applies for the academic year** 2018-19  
**Last revised/approved** 18/4/2018, by Sian Floyd  
**Further revisions revised** [Date / Month / Year], by [Name]  

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