These study materials for the MSc and Postgraduate Diploma in Epidemiology have been prepared by the London School of Hygiene & Tropical Medicine (LSHTM).

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**Acknowledgements**

LSHTM would like to thank all the staff and associates of the School who developed and wrote these materials.

LSHTM would also like to thank the following freelances for their expertise:  
Marsaili Cameron and Steve Cranfield (Distance Learning Consultants)  
Penelope Lyons and Margaret Mellor (Editors)  
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Module overview

Aim

This module is designed to explain key concepts of communicable disease epidemiology and illustrate their application through reading about the characteristics of specific communicable diseases, studying examples of published research, completing a formative assignment and working on an extended exercise on outbreak investigation.

Objectives

By the end of this module students should be able to:

• identify factors that suggest a disease has an infectious cause
• understand the factors determining the spatial, temporal and social distributions of communicable diseases
• understand how to measure transmissibility of infections
• design, carry out, analyse, interpret and report an outbreak investigation
• understand the principles underlying mathematical models of communicable diseases
• understand methods for the evaluation of vaccine efficacy
• understand practical applications of epidemiological methods through the study of research papers on specific diseases
• understand key epidemiological concepts in the study of three infectious diseases of global health importance: HIV/AIDS, tuberculosis and malaria.

Overview

The approach of this module is a little different to previous modules in the MSc Epidemiology course. It is computer-aided learning (CAL)- based, but it also relies on extensive reading from the module textbooks and from articles in the module reader. A large proportion of your study time will be spent on an outbreak investigation exercise leading to your assessed assignment report. During this time, you will work with a small group of fellow students over a six week period using an assigned discussion group on the WebBoard. For this reason, the number of structured sessions is lower than in previous modules.

The material is at an advanced level and includes some interpretation of mathematical formulae. By the end of the module you should have an in-depth knowledge of important concepts in communicable disease epidemiology, and many of the skills to apply these concepts in practice.

We have included in the module some additional sessions. These are optional and will not be examined, but tutor support will be provided via the webboard if you
have any questions about the material in these sessions. The sessions include a session with some background information about the epidemiology of three important infectious diseases: malaria, HIV/AIDS and tuberculosis (EC09); and five sessions about molecular epidemiology (EC10-EC14). These sessions introduce the main concepts of molecular epidemiology, and show how molecular methods can be applied to enhance our understanding of the epidemiology of infectious diseases. After completing these sessions you should be able to:

• understand the basic concepts of molecular biology and molecular techniques
• critically evaluate published studies of the use of molecular methods in geographical studies
• describe the steps undertaken in transmission and pathogenicity studies of micro-organisms
• appreciate the usefulness of biological markers in epidemiological studies of chronic non-infectious diseases.

Further information on this five session mini-module is given below.

**Route Map**

*Epidemiology of Communicable Diseases* consists of nine CAL sessions, one of which is an introduction to the outbreak investigation exercise. Practical exercises are contained within the CAL sessions. You may need to review some of the basic material covered in *Fundamentals of Epidemiology* at points indicated in the sessions.

Short course students should be familiar with basic concepts in epidemiology before taking this module. You are advised to work through the module in the order of the sessions shown below. In particular, Session 5 assumes knowledge of the material in Sessions 1-4. However, it can be done after Sessions 6 or 7 if you prefer.

<table>
<thead>
<tr>
<th>Session number</th>
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<td>Is the disease infectious?</td>
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<td>Session 5</td>
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<td>Introduction to infectious disease modelling</td>
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<tr>
<td>Session 9</td>
<td>Introduction to the epidemiology of infectious diseases: HIV/AIDS, tuberculosis and malaria (optional)</td>
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The optional mini-module *Molecular Epidemiology of Infectious Diseases* consists of five CAL sessions. The aim of this mini-module is to provide an introduction to the main concepts and applications of molecular epidemiology. In the following sessions, we will explore how molecular methods can be used in epidemiological studies to facilitate infectious disease research:
Formative assignments

You will have the opportunity to complete formative assignments as part of this module, the details of which are provided on the DL MSc Epidemiology website. You are encouraged to discuss these assignments with other module participants and tutors through the WebBoard, and you will receive written feedback on your submitted work. Completing the formative assignments is not a compulsory requirement for passing this module, but it is strongly recommended as they will give you an opportunity to apply some of the concepts that are taught in the module in practice. The deadline for submitting the formative assignments is 31 March.

Assessed assignment

The simulated outbreak investigation (Session 5) is an exercise conducted during a specified 6-week period. Dates of the available 6-week periods will be notified to you via the WebBoard and email, and you will be asked to ‘sign up’ for a specific period. Please contact DLsupport@lshtm.ac.uk if you have not had notification of the dates by the end of October. During the 6 week period you will work in a small group with fellow students, communicating through an assigned discussion group on the WebBoard. You will request and receive information from a tutor who will be assigned to your group during the exercise. The end product will be a written report carried out by the group as a whole, and submitted by email for assessment (comprising 30% of the overall grade for the module). You will receive a mark and feedback on this assignment. The exercise will be an opportunity to assimilate and apply what you have learned in Sessions 1 to 4. More details of this exercise are given in Session 5.

Please note that the material covered in the optional sessions EC09 and EC10-14 is not assessed.
Study time

The following provides a rough guide to the time you should spend studying the module materials. Note that the times will vary from person to person. This module should take a total of approximately 100 hours to study.

CAL sessions: Approximately 2 to 4 hours study time for each session; 8 sessions excluding outbreak exercise, up to 8 x 4 = 32 hours. (Students who wish to study the optional molecular epidemiology sessions are advised that these are estimated to take an additional 16 hours study time.)

Reading time: Approximately 2 to 3 hours studying specific disease characteristics and reader articles together with each CAL session; 7 sessions excluding outbreak exercise and summary, up to 7 x 3 = 21 hours. (An additional 12 hours is estimated for those studying the optional molecular epidemiology sessions.)

Formative assignment: 6-8 hours. (An additional 3-4 hours is estimated for those wishing to complete the optional molecular epidemiology formative assignment.)

Assessed assignment: Outbreak exercise; Recommended 6 hours per week for 6 weeks = 36 hours.

Private study: Remainder of 100 hours.

Textbooks and papers

There are two supplementary textbooks supplied with this module:


*Modern Infectious Disease Epidemiology* by Giesecke (2002).

You should use these books extensively as an accompaniment to the CAL sessions. In many instances you will be directed to the textbooks, but you should also refer to them when faced with an infection or aspect of an infection you are not familiar with, and which is not described in the session. In this way, you should gain knowledge of the characteristics and methods of control of a wide range of communicable diseases. You will also find a collection of papers included in the reader which illustrate the application of concepts presented in the module.

Module assessment

Formal assessment of the module will consist of one assignment (30% of the final grade), and a two hour unseen written examination (70% of the final grade).
Module development

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CAL programmers: Steve Bond and Jonathan Wong


Acknowledgements

We would like to thank staff of LSHTM who were involved in the development of the in-house module on which some of this material is based, in particular Paul Fine, Andrew Hall, Felicity Cutts and Laura Rodrigues (EC1-9) and Judith Glynn and Sara Thomas (EC10-14). We would also like to thank the staff and students of LSHTM who assisted in piloting the CAL sessions.