MSc One Health (Infectious Diseases) Course Syllabus 2014-2015

Course Objectives

The aim of the course is to provide a comprehensive foundation in the principles of One Health as they apply to infectious diseases.

To demonstrate learning and understanding in the following areas:

- interpretation of the One Health concept and what it may mean in different contexts,
- One Health approach to complex disease issues using systems thinking, a trans-disciplinary approach and working from principles, apply concepts in order to address multi-faceted problems,
- disease ecology, evolution and emergence, the drivers of and impact of disease (social, economic, biological, demographic, ecological) and disease control or prevention options,
- The necessary cognitive skills (such as planning, logic and reasoning, comprehension) and scientific skills, including critically reviewing scientific literature and design and analysis of laboratory and/or field studies ,
- key skills such as learning and teaching theory, communication and networking skills, information gathering, statistical numeracy, problem solving and integration of knowledge, ethics and values.

Duration

The course can be undertaken on a full-time basis over one year

Teaching Strategy and Methods

Teaching, learning and assessment activities are aligned to ensure the objectives of the course are clearly defined and that students have the opportunities to achieve these outcomes. Topics within each module help to establish the theoretical knowledge base and assessment activities are designed to enhance the learning process and help students to measure their own progress. All teaching, learning and assessment activities are designed to help students become actively involved in their learning and provide tools for them to identify and manage their learning to achieve the learning objectives to the best of their ability.

We recognise that each student's learning requirements are different and that they will change as they progress through the course. At the start of the course, students are given structured guidance and learning support in particular on reflective practice to enable them to become reflective practitioners. This will be achieved via PBL methods and discussion groups. The tutors will provide feedback and hints for improving performance and learning. Discussion and sharing of learning points with others on the course is encouraged to help each learner develop his or her own understanding of the content.

As students' progress through the course, there will be increasing reliance on student-centred modes of learning, which will encourage and facilitate independent study both in the individual and team environments. This will help foster the development of a professional approach to lifelong learning.

Specific Teaching and Learning Activities for face to face delivery:

Each module will consist of a series of seminars/ lectures/ practicals. In each module teams of students will use single disease case studies but in the broadest context of multiple hosts and considering environmental factors and drivers in order to develop trans-disciplinary methodologies and a systems approach. This foundation will be built on in subsequent modules such that by the end of the course, students will understand the tools available from different specialist areas and how best to use integrative approaches to address disease issues in a variety of situations. To support the approach the following will be included:

1. All modules will have formative assessment – either mock open book exams (OBE) exams, reflective writing or other writing/presenting exercises
2. PBLs will be used throughout the course to facilitate inter-personal skills and team working in addition to deep and independent learning.
3. Tutor and Peer observation of presentations and critical appraisal by tutors and peers (using online resources) as well as critical appraisal of peers
4. Work-Based Directed tasks
5. Literature-based research
6. Self-directed and independent study

Teaching and learning theory will be incorporated throughout the course to provide insight into how these may impact the student experience and how these can be utilised in different situations.

Course Overview

Introduction

Emerging and re-emerging diseases of animals and humans have highlighted the threat from changing environmental, ecological, social and agricultural conditions. Significant amongst these are a number of infectious diseases.

Our unique joint Master's level course, delivered with London School of Hygiene and Tropical Medicine (LSHTM), is available through full-time MSc study. It addresses a number of issues under the One Health paradigm. The programme modules include: Foundations of One Health, Infectious Disease Emergence, Introduction to One Health Epidemiology, Economics of One Health, One Health Skills Development Module, Medical Anthropology and Public Health and finally, a choice from four LSHTM modules: Vector Biology and Vector-Parasite Interactions, Environmental Epidemiology, Epidemiology & Control of Communicable Diseases or Globalisation & Health.

Graduates will have the knowledge and skills to be able to develop One Health research projects, provide leadership in inter-disciplinary and applied research and, respond rapidly and effectively to outbreaks of disease as well as controlling endemic disease at the interface between humans, animals and the environment.

The course will benefit those interested in One Health and infectious disease control globally.

Outline structure of the course

MSc courses start in September or October each year and have a modular structure.

The course is structured into three terms and comprises:

- a taught component occupying two academic terms
- an individual research project carried out in the third term

Term One

Induction

The course commences with orientation on study at LSHTM and the RVC and includes sessions at the London International Development Centre (LIDC) on key computing and study skills. The methods of group work, problem based learning and collaboration exercises will be introduced as they will be a significant component of the training in all modules.

Module 1: Foundations of One Health

This module will give participants a critical understanding of key historical and contemporary issues arising in the Health sector and the transdisciplinary nature of One

Health as an approach to problem solving, contrasting the approaches taken to human and animal (domestic and wild) health by various sectors. The module will provide the foundation and understanding necessary for working across health sectors on the environmental nexus of change (e.g. climate change) and in particular on human behaviour and globalisation impacts on future threats. The course introduces the ecology of disease using a systems approach to provide a platform for preventing or resolving "wicked" problems in infectious disease. Case studies and group work will be used to develop a comprehensive understanding and critical analysis of issues raised in lectures.

Module 2: Introduction to Disease Agents for One Health

This module will provide knowledge on the life-cycles and characteristics of major infectious disease agents that have a strong environmental component and affect both animals and man, the principal intervention strategies used to combat these and the analysis of factors contributing to the success or failure of systems of control and intervention, including showing where a One Health approach is beneficial.

Module 3: Infectious Disease Emergence

This module includes basic biology, epidemiology and pathogenesis of emerging diseases with particular attention to food safety, agroecology, biodiversity, genetics and innovation in control under the One Health paradigm. There will be a focus on the application of risk analysis from human, animal and environmental perspectives and introduction to available tools.

Module 4: Introduction to One Health Epidemiology

This module will provide detail on surveillance and outbreak investigation using an integrated approach in human, animal, environmental and ecosystem health. It will provide basic statistics and modelling.

Term Two

Module 5: Economics of One Health

This module will cover the application of economics to One Health, showing (where sufficient data and modelling expertise are available), the application of economic tools and principles to One Health problems. Including; the quantification of the economic effects of One Health; the use of economic methods to aid decisions at individual, local and national levels; the economic evaluation of specific One Health procedures and control programmes. No prior knowledge of economics is required.

Module 6: One Health Skills

This module focuses on addressing complexity in disease ecology from biomedical, socio-ecological, behavioural, epidemiological and management perspectives and application of change theory,

systems analysis, syndemics and an ecosystem approach, taking into account values, morals and ethics. It provides a pathway to integrating science and policy, using modern communication, informatics and analytical tools. It provides a basis for scenario and contingency planning for unexpected events and consequences, and research design appropriate to One Health problems, and use of interdisciplinary teams and social capital in disease control.

Module 7: Medical Anthropology and Public Health

A focus on medical anthropology and public health will include demonstration of analytical understanding of a range of concepts, principles and definitions used in medical and social anthropology. These will be focused on One Health issues. Participants will also evaluate the role of anthropological enquiry in One Health and public health arenas and critically evaluate, from an anthropological perspective, epidemiological, medical, veterinary and public health approaches. The subject matter will provide a sound understanding of the social drivers of disease.

Module 8: Module Choice

Students choose from between four LSHTM established modules appropriate to One Health:

Vector Biology and Vector-Parasite Interactions module will focus on population and epidemiological study. It will demonstrate knowledge of key aspects of vector behaviour, vector ecology and vector-parasite interactions and apply a range of practical entomological techniques and tools. This module is intended primarily for medical entomologists and parasitologists who wish to develop an active research interest in this discipline.

Environmental Epidemiology module will cover key issues in environment and health, and methods for investigation of environmental health hazards, from climate change to water-related health risks, which includes a number of infectious diseases. Problems of measurement and estimations of exposure will be addressed and solutions discussed including use of GIS, time series and cluster analysis.

Epidemiology and Control of Communicable Diseases module will cover aspect from the compulsory module in more depth, providing an opportunity for exploring mathematical models of infection dynamics and sero-epidemiology. Outbreak investigation and surveillance will include a simulated outbreak which students investigate, analyse and write-up. Vaccinology is covered in detail mostly from the human perspective.

Globalisation and Health module covers key issues in global health including; definitions and conceptual frameworks, forms of global change related to health, theoretical and methodological challenges of measuring links between global change and health. Major issues in global health such as transborder health risks, global health inequalities, changing determinants of health and aspects of global health governance will be described and discussed.

Term Three

Project

The final five months is spent working on an individual project, under the guidance of a supervisor. The project consists of a research proposal and literature review and a study, which can be either empirical, strategic or policy oriented. The research can be done at the RVC, LSHTM or at an external institution with supervisors from either institution. Participants sponsored by their employer often carry out a project related to their work.

Teaching Locations

The teaching is delivered using the excellent facilities of the LSHTM in London as well as at the RVC's Camden Campus. The course also includes occasional visits to different institutions which students will be expected to attend.

Lecturers

Teaching staff will be drawn from the Royal Veterinary College (RVC), University of London; London School of Hygiene and Tropical Medicine; the Animal Health and Veterinary Laboratories Agency (AHVLA), London International Development Centre (LIDC), Chatham House; World Health Organisation; and other external experts.

Assessment Methods

Assessment takes place by eight module assessments (involving a variety of methods from written work, traditional examination questions, open book methods and in-course assessments such as problem based learning presentation assignments), and by project report and an oral examination.

Foundations of One Health

ORGANISERS: Prof Richard Kock and Dr Jo Lines

TIMETABLE SLOT**:** The module runs for 5 weeks for 2.5 days per week; this module runs from Monday morning to Wednesday mornings.

AIM

To introduce students to the evolving context for One Health and principles of a One Health problem solving approach at the interface between humans, animals and the environment.

OBJECTIVES

By the end of the Module students should be able to:

- demonstrate a practical understanding of the global context for One Health in relation to infectious diseases, including the principles and significance of disease ecology, recognising social and environmental drivers of disease, socioecological resilience, syndemics and changing patterns of global health
- critically evaluate what a 'One Health' approach means and how it can be applied at local, regional, national and international levels
- Demonstrate a conceptual understanding of Uni- multi- inter- and trans-disciplinary approaches and understand what tools are needed to apply One Health principles
- Systematically and creatively assess the changes posed by human driven environmental and ecosystem change.
- Construct and to critically evaluate policy interventions to address these for better ecosystem, human and animal health.

CONSTITUENCY

This unit is intended for students interested in the control of One Health problems at every level from the individual, local to national, in developed or less developed countries. This module is compulsory for MSc One Health students.

CONCEPTUAL OUTLINE

The module will provide the background on One Health to assist in:

- Understanding the evolution of single host pathogen models to ecological theories of disease;
- Exploring changing disease patterns and emergence;
- Developing a new paradigm in prevention and management of disease using systems thinking and transdisciplinary/ interdisciplinary approaches;
- The study unit addresses 3 areas:
- The construction of conceptual models of multi-host and multi-pathogen systems in an environmental context,
- Focusing on the impact of environmental and ecological change, human behaviour and globalisation on future infectious disease challenges

- The use of One Health approaches (e.g. transdisciplinarity) to problem solving, contrasting the scientific method taken to human and animal (domestic and wild) health by various sectors and how greater integration can benefit interventions and outcomes

TEACHING STRATEGY

The study unit will be based upon class activities that are a combination of lectures and discussion with individual and group exercises. This is reinforced by a marked in-course assessment and selected readings.

8 Lectures (Uni – to – transdisciplinarity, principles of One Health approach , One Health/ecohealth interventions, changing patterns of disease, human impacts on ecosystems and ecology, resilience theory and infectious disease ecology (host pathogen factors, biodiversity and strengths and weaknesses of dilution hypothesis), future disease threats (animal & human).

2 Integrating One Health Seminars

4 Problem-based learning practicals

Private study – reading

LEARNING TIME

Learning time for the module should total 150 hours, consisting of approximately:

- Contact time ≈ 60 hours
- Directed self-study ≈ 30 hours
- Self-directed learning ≈ 30 hours
- Assessment, review & revision ≈ 30 hours

ASSESSMENT

Formative assessment will include: group work interdisciplinary principles assessed (PBL and presentations).

Summative assessment will include:

- Written assignment in week 5 of the module.
- Open Book (1.5 hour) examination will take place in week 5 of the module.

ASSESSMENT DATES

Written assignment in week 5 of the module and the open book examination on the last day of module.

MODULE CREDIT**:** 15 M-level credits

Introduction to Disease Agents for One Health

ORGANISERS: Dr Mandy Nevel, Prof Michael Miles

TIMETABLE SLOT: The module runs for 10 weeks at 1.5 days per week – specific days being Wednesday afternoons and Fridays.

AIM

The main aim is to provide a multidisciplinary framework for understanding the principles of interventions against infectious diseases. This module specifically provides knowledge and understanding of important disease agents in the context of their routes of transmission and the potential intervention strategies, and considers some of the reasons for the success, partial success and failure of control programmes.

OBJECTIVES

By the end of this module, students should:

- Have a comprehensive understanding of the importance of principal major pathogens in the different regions of the world;
- Be able to critically evaluate the strengths and limitations of diagnostic techniques for these pathogens;
- Be able to apply knowledge of the life cycles of a range of pathogens to their transmission routes and pathogenesis, and to make sound judgements in the selection of appropriate interventions;
- Evaluate the inter-relationships between clinical skills, laboratory science, epidemiology, and health policy and the consequences of the selection of interventions;
- Critically assess the implementation of interventions and understand reasons for their success and failure;
- Demonstrate self-direction and originality in selecting appropriate interventions, taking account of the diverse social, political and economic contexts in which health systems operate.

CONSTITUENCY

MSc One Health students, possibly module and short course students in the future

CONCEPTUAL OUTLINE

The module is expected to include sessions addressing the following topics:

- The life cycle and characteristics of major infectious disease agents according to their principal transmission routes, namely: respiratory (proximity) diseases; contact diseases; water-borne; food-borne; sexually transmitted; blood-borne; congenital and perinatal; arthropod vector-borne; opportunistic, or emergent infections. This will include examples of laboratory methods for identifying disease agents;
- The principal intervention strategies used to combat such infectious diseases, namely: case management, vaccination, treatment and chemoprophylaxis and the many means of preventing exposure, from individual protection to environmental management;

- Analysis of factors contributing to the success or failure of systems of control and intervention strategies will be considered including: fundamental scientific difficulties with implementation procedures, managing people and resources; contextual problems associated with finance and interagency relationships; social and political issues.

TEACHING STRATEGY

Teaching methods will include lectures, practicals, group discussions, debates and problem solving exercises that will build on the previous experience and future career intentions of the students.

LEARNING TIME

Learning time for the module should total 150 hours, consisting of approximately:

- Contact time ≈ 60 hours
- Directed self-study ≈ 30 hours
- Self-directed learning ≈ 30 hours
- Assessment, review & revision ≈ 30 hours

ASSESSMENT

Formative assessment: a mock open book exam and end-of-module open-book exam (up to 2 hours)

ASSESSMENT DATE

Formative assessment: a mock open book exam that will occur in the first two weeks of the module so that it can impact on the OBE in module 1.
End-of-module open-book exam (up to 2 hours) week 10

MODULE CREDIT**:** 15 M-level credits

Infectious Disease Emergence

ORGANISER: Dr Damer Blake

TIMETABLE SLOT: The module runs for 5 weeks at 2.5 days per week – specific days being Monday to Wednesday lunchtime

AIMS

To provide biological, social and institutional perspectives on the (re)emergence of communicable diseases (human and animal) highlighting host/pathogen population dynamics, epidemiology and evolution, agroecology, biodiversity and climate change. Key concepts include the drivers and categories of disease emergence and the assessment of risk posed by emerging diseases. Viral, bacterial and parasitic examples will be included with a special focus on antimicrobial resistance.

OBJECTIVES

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

- Demonstrate an advanced understanding of the origins of novel pathogenic organisms and the drivers for pathogen re(emergence)
- Develop a comprehensive understanding of the relevance of virulence mechanisms including critical assessment of the evolution and impact of pathogenicity islands and antimicrobial resistance determinants
- Develop and apply knowledge of risk-based surveillance strategies with a focus on pathogen detection and response to novel pathogen range or genotype
- Use bioinformatics, including phylogenetics, to understand pathogen emergence and inform control strategy design
- Gain a holistic view of medical, veterinary, scientific, regulatory and social tools required to respond to pathogen emergence
- Evaluate and critically discuss emerging methods of pathogen control and therapy
- Be aware of the impact of agricultural intensification on host and pathogen evolution
- Integrate the impact of climate change on agricultural systems, global food security and pathogen challenge
- Design, carry out, analyse, interpret and report a biological risk assessment using the principles of risk analysis
- Develop capacity for critical evaluation of components essential (and desirable) in a multidisciplinary response to pathogen emergence

CONSTITUENCY

MSc One Health students, possibly module and short course students in the future

CONCEPTUAL OUTLINE

The module is expected to include sessions addressing the following topics (though please note that these may be subject to change):

- Assessment of current and projected global pathogen challenges

- Focus on specific emerging, and re-emerging viral, bacterial and parasitic pathogens
- Identification of reservoirs of infection
- Use of morphology, genetics and pathology as definitions of novel infectious organisms
- Impact of human social and commercial activities on pathogen evolution
- Introduction to biological risk assessment including an extended problem-based learning scenario supporting independent learning, group analysis and oral presentation

TEACHING STRATEGY

A variety of teaching methods will be used, including traditional didactic lectures, problem solving practicals, group work (risk analysis), journal club, demonstration and debate.

LEARNING TIME

Learning time for the module should total 150 hours, consisting of approximately:

- Contact time ≈ 60 hours
- Directed self-study ≈ 30 hours
- Self-directed learning ≈ 30 hours
- Assessment, review & revision ≈ 30 hours

ASSESSMENT

Formative assessment will be made in two PBL sessions during the module, when students will be required to give peer feedback and ask peers appropriate questions.
Summative assessment will be based upon individual presentation and peer feedback as part of a group-based exercise (15 min, 50%) and a written Risk Assessment exercise (1500 words, 50%).

ASSESSMENT DATE

Assessments will take place in the final PBL session of the module.

MODULE CREDIT**:** 15 M-level credits

Introduction to One Health epidemiology and surveillance

ORGANISERS: Dr Jackie Cardwell

TIMETABLE SLOT: The module runs for 12 weeks every Thursday.

AIMS

To provide participants with an understanding of key epidemiological concepts and the design and purposes of disease surveillance systems.
To introduce statistical concepts relevant to epidemiology and surveillance.

OBJECTIVES

This module will cover fundamental epidemiological concepts and basic statistical concepts, with no assumption of prior knowledge. Intended learning outcomes therefore begin with the ability to describe and explain these concepts, as important foundation skills. Formative assessments will help students to consolidate these skills, whilst at the same taking them towards a more systematic and practical understanding of key concepts and a critical awareness of their wider relevance. These higher order skills, along with the ability to evaluate critically current research, will be further developed and assessed by means of the summative assessment.
By the end of the Module students should be able to:

- Explain key epidemiological approaches to studying diseases in populations
- Explain basic statistical concepts relevant to the analysis of epidemiological data
- Interpret epidemiological and statistical results in scientific papers
- Explain the relevance of diagnostic test characteristics in different circumstances
- Describe in detail the impact of diagnostic uncertainty on disease control programmes
- Describe the concepts and components of disease surveillance systems
- Describe the use of risk analysis as a decision-making tool and its applications in the design of disease surveillance systems.
- Explain how risk analysis is used in the context of global health
- Critically evaluate existing surveillance systems and data sources
- Demonstrate a systematic understanding of concepts covered in the module by critical evaluation of appropriate scientific publications

CONSTITUENCY

MSc One Health students, possibly module and short course students in the future

CONCEPTUAL OUTLINE

The module is expected to include sessions addressing the following topics (though please note that these may be subject to change):

- Basic epidemiology including: the purpose of epidemiology in the context of global health; multi-factorial causal web; components of the epidemiological triad; temporal and spatial patterns of disease; methods of quantifying disease occurrence; epidemiological study design; measures of association and impact; population sampling methodologies

- Epidemiological aspects of diagnostic tests including: the importance of uncertainty in diagnostic test interpretation at individual and population levels; quantitative aspects of diagnostic test assessment and comparison; defining cut-off values; interpreting receiver-operating characteristic curves; applying likelihood ratios for diagnostic test interpretation; quantitative aspects of combining results from different diagnostic tests; impact of diagnostic test characteristics on disease control programmes; relevance of molecular typing techniques from an epidemiological perspective

- Surveillance of disease in populations including: concepts of disease surveillance and components of surveillance systems; critical evaluation of existing surveillance systems and data sources; designing surveillance systems; processes involved in risk analysis; conducting basic qualitative risk analyses; the use of risk analysis in the context of international trade and global health

- Basic statistical methods including: basic data management skills; key statistical concepts underlying the analysis of simple epidemiological data; approaches to sample size/power estimations; hypothesis testing; interpretation and presentation of results of hypothesis tests

Appropriate infectious disease case studies will be used to illustrate points in class sessions.

TEACHING STRATEGY
Class sessions will comprise a combination of lecture-style teaching and group activities (e.g. scenario discussions, exercises involving calculation and interpretation of results)

LEARNING TIME
Learning time for the module should total 150 hours, consisting of approximately:

- Contact time ≈ 60 hours
- Directed self-study ≈ 30 hours
- Self-directed learning ≈ 30 hours
- Assessment, review & revision ≈ 30 hours

ASSESSMENT
Formative assessment: Four (fortnightly) short answer exercises will be provided to help students consolidate and assess their understanding of basic concepts. Solutions to exercises will be made available for self-assessment upon electronic submission of a completed exercise. Electronic submissions will allow tutors to monitor students' work for common errors or misconceptions which can be reviewed in later class sessions.
Summative assessment: Students will be required to write a critical review (max 2000 words) of a selected peer-reviewed scientific paper addressing a one-health issue. The paper and assessment task will be provided early in the module to allow and encourage progressive development of understanding as the module progresses.

ASSESSMENT DATE

Critical review submission on the last day of the module.

MODULE CREDIT**:** 15 M-level credits

Economics of One Health

ORGANISER: Prof Jonathan Rushton

TIMETABLE SLOT: Monday mornings to Wednesday mornings in Term 2

TEACHING LOCATION**:** Camden Campus of Royal Veterinary College

AIM

To introduce students to the principles of economics as applied to One Health and to the practical use of economic methods.

OBJECTIVES

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

- Describe the losses and expenses of human and animal diseases and the link between health expenditure and direct losses
- Interpret economic data using gross margin analysis, partial budgeting, cost-benefit analysis, cost-effectiveness analysis and decision tree analysis
- Understand the linkage between food system analysis and risk analysis
- Discuss the role of economics in decision making in One Health problems and their control at individual, local, national levels levels
- Give a critical evaluation of the application of economics to One Health problems, recognising underlying assumptions and limitations.

CONSTITUENCY

The module is intended for students interested in the control of One Health problems at every level from the individual, local to national, in developed or less developed countries. No prior knowledge of economics is required, but students should be familiar with basic epidemiology, and familiarity with spreadsheet software is expected. The study module is compulsory for the MSc courses in Veterinary Epidemiology and One Health.

CONCEPTUAL OUTLINE

The application of economics to One Health is to assist in:

- Understanding why people have made health decisions in the past
- Predicting how people will make health decisions in the future
- Guiding people on how to improve future health decisions for the benefit of individuals and society in general.
- Where sufficient data and modelling expertise are available the application of economic methods and concepts can help in making optimal health decisions.
- The Study Module addresses three areas:
- The quantification of the economic effects of One Health problems
- The use of economic methods to aid decisions at individual level either human or animal, local and national levels
- The economic evaluation of specific One Health interventions and wider control programmes.
- The module will complement students' understanding of diseases and One Health problems from an epidemiological perspective and how this is influenced by the socio-economic impact of the problem and its management and control.

TEACHING STRATEGY

The study module will be based upon class activities that are a combination of lectures and discussion with individual and group exercises. This is reinforced by a marked in-course assignment and selected readings.

LEARNING TIME

Total learning time is 150 hours, composed of:

- contact time = 51 hours
- reading time = 50 hours
- assessment/assignment time = 49 hours

ASSESSMENT

Written report In-course assessment with 4 questions (each to the maximum of 1000 words, 3-4 hours each) and the open book examination on the last day of module.

MODULE CREDIT: 15 M-level credits

One Health Skills Development

ORGANISERS: Prof Richard Kock and Dr Jo Lines

TIMETABLE SLOT: Wednesday afternoons to Friday afternoons in Term 2

AIM

To provide students with an understanding of the main skills needed for the practice of One Health.

OBJECTIVES

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

- Approach infectious disease scenarios using a systems approach, balancing different value and ethical perspectives, and moral dilemmas involving humans, animals and the environment
- Be aware of disease investigation, surveillance and control methods that use modern technical and participatory approaches based around social capital
- Approach infectious disease problems using effective analysis, planning, procedural skills, communication and use of information. This will include the use of technical knowledge and the ability to cope with conflict and crisis in disease emergence scenarios.
- Understand the importance of interdisciplinary teams, how to influence and lead them and how to create the environment for and trust in change in health systems and for sustaining ecosystem health

CONSTITUENCY

This is a compulsory module for postgraduate students seeking a career using One Health principles in the medical and veterinary and environmental health sectors.

CONCEPTUAL OUTLINE

The module will include sessions addressing the following topics:

- complexity in disease ecology from biomedical, socio-ecological, behavioural, epidemiological and management perspectives and application of systems analysis using a modelling approach, syndemics and an ecosystem approach, taking into account values, morals and ethics.
- The interaction between (a) technical and biological facts (including constraints and opportunities) and (b) policies and the process of policy development.
- communication, informatics and analytical tools available and their appropriate use and limitations in support of One Health best practice and outcomes,
- scenario planning, anticipating the future and contingency for unexpected consequences;

- research skills and understanding research design and methodology appropriate to One Health
- change theory,
- inter-disciplinary team building and use of social capital in disease control

The discussion of these topics will be largely mediated though case studies and scenario analysis (see below)

TEACHING STRATEGY

Teaching methods emphasise group/team-centred learning and the power of small group, discussion and debate, and importance of building trust, systems approach and a strong informed non-discriminatory set of values for applying interventions to prevent or control infectious diseases: timetabled classes are limited to 11 lectures lasting 1hours and five facilitated small-group interdisciplinary exercises in; systems modelling (3 x 2 hours), team building (1 x 2 hours) and part facilitated role playing scenarios and presentation (3x6 hours) and self-directed (facilitated) whole group debates (1x 2 hours). The exercises are the principal arena for students to explore the One Health approach (as opposed to its fundamentals) and prepare and present their learnt skills on issues scenarios under discussion that week. The class is divided into small groups with a member of staff facilitating the discussion. Roles and areas to focus on will be given to group members and attendance is compulsory. The roles will change for each student in each session. The rest of the available time (reading) will be devoted to preparation for the exercises, exploring the various theories, suggested methods, tools and advised practices and competencies recommended for One Health approach. Willingness to read widely is crucial to effective learning in this module. Exercises will not be assessed so as to allow students to freely develop and express their own thoughts and ideas.

LEARNING TIME

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

- Contact time ≈ 23 hours
- Directed unfacilitated small group session time ≈ 9 hours
- Directed self-study ≈ 34
- Self-directed learning ≈ 40 hours
- Assessment, review and revision ≈ 44 hours

ASSESSMENT

Formative assessment will include: group work interdisciplinary principles assessed (PBL).

Summative Assessment is based on preparation of a written One Health policy or strategy paper (up to 2500 words) for dealing with a particular disease scenario and achieving the best possible outcome for all the hosts and the environment (100%).

ASSESSMENT DATES
Assessments are due for submission on the last day

MODULE CREDIT: 15 M-level credits

Medical Anthropology and Public Health

ORGANISERS: Dr Clare Chandler and Dr Shelley Lees (LSHTM)

TIMETABLE SLOT: Monday mornings to Wednesday mornings in Term 3

AIM

To provide an introduction to concepts, perspectives, theories and methods in medical anthropology, and illustrate their relevance to public health issues.

OBJECTIVES

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

- Demonstrate an analytical understanding of a range of concepts, principles and definitions used in medical and social anthropology;
- Apply these concepts and principles in the analysis of particular public health issues;
- Evaluate the role of anthropological inquiry and analysis in public health arenas;
- Critically evaluate, from an anthropological perspective, epidemiological, medical and public health approaches.

CONSTITUENCY

Any MSc student regardless of specialisation and previous training.

CONCEPTUAL OUTLINE

The module is expected to include sessions addressing the following topics (though please note that these may be subject to change):

- The way anthropologists have problematized public health and have responded to public health issues;
- Anthropological conceptualisations of health, medicine and public health, including those around illness and disease, personhood, risk, structural violence, medicalization, citizenship, research participation and bioethics;
- Introduction to anthropological methodologies and how to apply these issues in public health.

TEACHING STRATEGY

The course is delivered through lectures (10 contact hours), seminars (13.5 contact hours), one session "doing ethnography" (2 hours) two film and discussion sessions (5 hours)'two 'conversations with anthropologists' sessions (3.0 hours) and one debate (2 hours). The module has a textbook (Pool, R. and Geissler, W., 2005, Medical Anthropology, Open University Press) which students are recommended to purchase. Students are required to read the relevant chapters of the module textbook prior to the lectures and seminars. Other essential references (1-2 per lecture topic) are provided in a course reader. A library box for the course contains additional references and students are encouraged to consult the library for further readings listed for those interested in the topic.

Lectures: The lectures will build on key concepts and debates introduced in the module textbook (Pool and Geissler 2005), illustrating their relevance and application through examples from anthropological research in the fields of public health and medicine.

Seminars: The seminars encourage discussion around the issues raised in the lecture and associated readings. Some entail practical exercises, where students will work with other resources that highlight central themes from the lectures and readings.

LEARNING TIME

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

- Contact time ≈ 36 hours
- Directed self-study ≈ 38 hours
- Self-directed learning ≈ 31 hours
- Assessment, review and revision ≈ 45 hours.

ASSESSMENT

The module will be assessed through a take home essay-based assignment (100%) to be submitted at the end of the module. For the assignment, students are required to write an essay (2,500 words) on a subject.

ASSESSMENT DATES

For 2014-15, the module will start on Monday 23 February 2014 and finish on Wednesday 25 March 2015.

MODULE CREDIT: 15 M-level credits

Epidemiology and Control of Communicable Diseases (LSHTM Choice Module A)

ORGANISERS: Prof Paul Fine and Dr Daniela Manno (LSHTM)

TIMETABLE SLOT: Wednesday afternoon to Friday afternoon in Term 3

AIM

To provide four perspectives on the epidemiology of communicable diseases: basic concepts and methods; epidemiological aspects of vaccination; surveillance and outbreak investigation; and detailed discussion of the epidemiology of important representative infectious diseases.

OBJECTIVES

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

- Demonstrate understanding of the factors determining the temporal, spatial and social distributions of infectious diseases;
- State and explain the principles underlying simple mathematical models of communicable diseases;
- Design, carry out, analyse, interpret and report an outbreak investigation;
- Interpret and evaluate surveillance systems for communicable diseases;
- Plan, conduct and evaluate immunization programmes, including estimation of vaccine efficacy and effectiveness, and identification of reasons for programme failure;
- Critically assess practical applications of epidemiological methods employed in the study of particular infectious diseases.

CONSTITUENCY

This module is intended for students interested in the epidemiology and control of infectious diseases in either developing or developed countries.

CONCEPTUAL OUTLINE

The module is expected to include sessions addressing the following topics (though please note that these may be subject to change):

- Methods and concepts: incubation periods, epidemic patterns, modes of transmission, transmission dynamics, measures of infectiousness, secondary attack rates, mathematical models of infection dynamics and sero-epidemiology.
- Outbreak investigation and surveillance: includes a simulated outbreak which students investigate, analyse and write-up.
- Vaccination: includes technical and clinical/immunological aspects, schedules, adverse reactions, contraindications, vaccine efficacy, impact assessment, UK and EPI programme issues.
- Specific diseases: will include some or all of TB, Malaria, Polio, STIs, AIDS, Meningococcal meningitis, Hepatitis B, and Measles.

TEACHING STRATEGY

A variety of teaching methods will be used, including traditional didactic lectures, problem solving practicals, group work (outbreak investigation), demonstration, debate and a field trip to Public Health England Colindale, Centre for Infections (CfI). Note: this is a busy study module!

LEARNING TIME

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

- Contact time ≈ 65 hours
- Directed self-study ≈ 40 hours
- Self-directed learning ≈ 3 hours
- Assessment, review and revision ≈ 42 hours

ASSESSMENT

Assessment will be based upon a group-written outbreak investigation report (20%) and a multiple choice question examination (80%).

ASSESSMENT DATES

The module choice question examination will take place on the last day of module; the outbreak investigation report will be due at the end of Week 3 of the module.

MODULE CREDIT: 15 M-level credits.

Environmental Epidemiology (LSHTM Choice Module B)

ORGANISERS: Prof Paul Wilkinson (LSHTM)

TIMETABLE SLOT: Wednesday afternoon to Friday afternoon in Term 3

AIM

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.

OBJECTIVES

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

- 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;
- Assess and critically interpret scientific data relating to potential environmental hazards to health; Plan, conduct and interpret the initial investigation into a putative disease cluster;
- 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;
- Describe the principal issues relating to waste water and excreta re-use, and the epidemiological investigation of associated health effects;
- Describe the methods of quantitative risk assessment.

CONSTITUENCY

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 course on epidemiology. There is a focus on methods and principles. The course is relevant to both high- and low-income settings, but there is greater emphasis on examples and methods from higher income settings.

CONCEPTUAL OUTLINE

The module is expected to include sessions addressing the following topics (though please note that these may be subject to change):

- Key issues in environmental epidemiology.
- Methods for investigating environmental hazards.
- Climate change.
- Estimation of exposure and problems of measurement.
- Analysis of health and exposure data using Geographical Information Systems and time-series methods (computer-based practical).
- Disease clusters.
- Investigation of health effects of air pollution, electromagnetic fields, hazardous waste, stratospheric ozone depletion.

- Water-related health risks.
- Risk assessment.
- Critical review of key papers on air pollution epidemiology and case studies of other environmental hazards to health.

TEACHING STRATEGY

Series of lectures/seminars and guided reading; case studies and critical review of the literature (individual, small group and class work); private study.

LEARNING TIME

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

- Contact time ≈ 30 hours
- Directed self-study ≈ 20 hours
- Self-directed learning ≈ 60 hours
- Assessment, review and revision ≈ 40 hours

ASSESSMENT

The assessment will take the form of a multiple-choice test covering all aspects of the module (100% of the assessment marks for this module).

ASSESSMENT DATES

The assessment will take place on Thursday 26 March 2015 or Friday 27 March 2015.

MODULE CREDIT: 15 M-level credits.

Globalisation & Health (LSHTM Choice Module C)

ORGANISER: Johanna Hanefeld (LSHTM)

TIMETABLE SLOT: Wednesday afternoon to Friday afternoon in Term 3

AIM

To give students a conceptual and practical understanding of the multiple and complex links between various forms of global change (i.e. environmental, economic, political, technological and social) and human health worldwide.

OBJECTIVES

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

- Define key concepts such as global change, globalization, global health and governance;
- Understand the various drivers and forms of global change (e.g. environmental, economic), and their relationship with globalization processes;
- Assess the existing empirical evidence of the links between global change and health, and the methodological tools available to measure such links;
- Cite a range of examples of global health issues in terms of their impacts on human health through case studies on environmental change, communicable and noncommunicable disease control, and multilateral trade agreements;
- Understand, the role of different actors, such as commercial companies, multilateral organisations like the WHO, and Public Private Partnerships, as well as Foundations in global health; and
- Describe the main challenges for responding effectively to global health challenges through improved global health governance in the form of effective health policies, institutional reforms, and international law and other forms of cooperation.

CONSTITUENCY

This module is recommended for students with an interest in global health from the perspective of understanding broad and interrelated determinants of health within and across countries. Specific attention is on forms of governance which have emerged in global health in response to health challenges arising from processes of globalisation.

CONCEPTUAL OUTLINE

The module is expected to include sessions addressing the following topics (though please note that these may be subject to change):

- Key issues in global health
- Definitions and conceptual frameworks
- Forms of global change related to health
- Theoretical and methodological challenges of measuring links between global change and health
- Major issues in global health such as transborder health risks, global health inequalities, changing determinants of health
- Key actors and issues in global health governance.

- A critical review of key papers on global health and case studies on selected issues in global health including global climate change, population mobility, tobacco control, multilateral trade agreements.

TEACHING STRATEGY
Series of lectures/seminars and guided reading; case studies and critical review of the literature (individual, small group and class work); private study.

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

- Contact time ≈ 36 hours
- Directed self-study ≈ 36 hours
- Self-directed learning ≈ 20 hours
- Assessment, review and revision ≈ 58 hours

ASSESSMENT
The assessment will take the form of a written assignment that brings together the conceptual and empirical content of the module to address a practical policy problem using an empirical case study (3000 words).

ASSESSMENT DATES
Assessments will be due no later than 2.00 p.m. on 27 March 2013; 2 hard copies of your document should be provided.

MODULE CREDIT: 15 M-level credits.

Vector Biology and Vector-Parasite Interactions (LSHTM Choice Module D)

ORGINISERS: Mark Rowland and Dr Matthew Rogers (LSHTM)

TIMETABLE SLOT: Wednesday afternoon to Friday afternoon in Term 3

AIM

To provide students with a broad understanding of the key aspects of insect vector behaviour, vector ecology and vector-parasite interactions relevant to the epidemiology and control of vector-borne diseases.

OBJECTIVES

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

- Demonstrate knowledge and understanding of key aspects of vector behaviour, vector ecology and vector-parasite interactions;
- Demonstrate an understanding of how these features impact on the epidemiology and control of vector-borne diseases;
- Apply a range of practical entomological techniques and tools used in research on vector competence and ecology;
- Demonstrate the ability to critically evaluate the relevant scientific literature;
- Demonstrate some of the skills required to design a research project related to vector biology or competence.

CONSTITUENCY

This module is intended primarily for entomologists and parasitologists who wish to develop an active research interest in this discipline in field or laboratory, or apply it within the context of a control programme.

CONCEPTUAL OUTLINE

The module is expected to include sessions addressing the following topics (though please note that these may be subject to change):

- Vector nutrition;
- Blood-feeding behaviour;
- Host seeking and selection;
- Anthropophily and zoophily;
- Endophily-exophily;
- Sugar feeding behaviour;
- Dispersal and learning;
- Sexual (mating) behaviour and pheromones;
- Vector saliva;
- Larval competition;
- Serology;
- Seasonality and diapause;
- Circadian activity rhythms and the gonotrophic cycle;
- Genetic and physiological determinants of vector competence and vector-parasite specificity;

- Effects of parasites on vector behaviour, survival and parasite transmission;
- Host-parasite interactions with reference to mosquitoes and Plasmodium, sandflies and Leishmania, blackflies and Onchocerca, ticks and viral pathogens.

LEARNING TIME

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

- Contact time ≈ 40 hours
- Directed self-study ≈ 30 hours
- Self-directed learning ≈ 40 hours
- Assessment, review and revision ≈ 40 hours.

ASSESSMENT

Short test of multiple choice questions on the module (33%); written presentation of a research proposal in the form suitable to submit to a named grant funding agency (67%).

ASSESSMENT DATE

A multiple choice question exam will take place on 25 March 2015. The assessment will be due on 27 March 2015.

MODULE CREDITS: 15 M-level credits.