

One Health Regional Network for the Horn of Africa

One Health Masterclass



25th November – 6th December 2019
Nairobi, Kenya

One Health Masterclass

The HORN One Health *Masterclass* is an intensive, residential training course for early career researchers based in the Horn of Africa (Kenya, Ethiopia, Eritrea, Somalia and Somaliland). Focussed on One Health topics, the masterclass provides in-depth learning opportunities to increase knowledge in quantitative skills in epidemiology, social science approaches, laboratory skills and techniques, and transferable research skills.

The masterclass is open to attendees from partner institutes within the HORN project, and is focused upon improving One Health research capacity of both individuals and institutes, through a mixture of taught sessions, practical exercises and training of 'One Health champions'.

Dates: 25th November to 6th December 2019

Location, masterclass: International Livestock Research Institute, Nairobi

Location, accommodation & evening sessions: Pride Inn, Rhapta Road, Nairobi

Eligibility & Application

Early career researchers with an interest in One Health and some experience of undertaking research are eligible to attend the masterclass. Full sponsorship will be provided by the HORN project, including travel, subsistence and accommodation.

HORN sandpit fellows are eligible to attend the masterclass event.

Individuals from HORN partner institutions listed below are eligible to apply to attend the masterclass:

- University of Nairobi, Kenya
- Addis Ababa University, Ethiopia
- Jimma University, Ethiopia
- Mekelle University, Ethiopia
- IGAD Sheikh Technical Veterinary School, Somaliland
- Amoud University, Somaliland
- Hamelmalo Agricultural College, Eritrea
- International Livestock Research Institute, Ethiopia and Kenya

To apply, please complete a short application form here: <http://onehealthhorn.net/masterclass-2019-application-form>.

If you are unable to complete an application form online, a Word version is available on request. Please email HORN@liverpool.ac.uk.

Application process closes at midnight (GMT) on Sunday 27th October.

Timetable

Due to the high interest in this event, we are only considering applications for at least one full week at a time. When registering you will be asked to select the week(s) you are able to attend and the stream that you would like to attend. Note, it is not possible to attend for part of a stream, and full attendance is essential. Attendance for both weeks is possible.

Teaching will follow three themes: Quantitative Skills in Epidemiology, Social Science Approaches, and Laboratory Skills and Techniques. Each stream covers one or more of these areas. Additional generic research training sessions will also be provided in the evenings, and you will be able to register for these at the event.

Please be aware that some courses require e-learning to be completed prior to the masterclass. Full descriptions of each course are provided below.

Programme & Streams: Week 1

Code	Topic	Course	Duration	M	T	W	T	F
				25	26	27	28	29
Week 1 Courses: Monday 25 th to Friday 29 th November 2019								
Stream 1								
LST101	Laboratory Skills and Techniques	Infectious pathogen diagnostics	5 days					
Stream 2								
QSE105	Quantitative Skills in Epidemiology	Introduction to mapping and spatial analysis	2 days					
SSA101	Social Science Approaches	Qualitative interviewing	2 days					
SSA103	Social Science Approaches	Ethics: principles, field ethics and ethical review	1 day					
Stream 3								
QSE105	Quantitative Skills in Epidemiology	Introduction to mapping and spatial analysis	2 days					
QSE104	Quantitative Skills in Epidemiology	Epidemiological methods	3 days					
Stream 4								
SSA105	Social Science Approaches	Questionnaire design and administration	2 days					
SSA101	Social Science Approaches	Qualitative interviewing	2 days					
SSA103	Social Science Approaches	Ethics: principles, field ethics and ethical review	1 day					
Stream 5								
SSA105	Social Science Approaches	Questionnaire design and administration	2 days					
QSE104	Quantitative Skills in Epidemiology	Epidemiological methods	3 days					

Code	Topic	Course	Duration	M	T	W	T	F
				2	3	4	5	6
Week 2 Courses: Monday 2 nd December to Friday 6 th December								
Stream 6								
QSE103	Quantitative Skills in Epidemiology	Introduction to statistical modelling	3 days					
QSE106	Quantitative Skills in Epidemiology	Introduction to mathematical modelling of infectious disease	2 days					
Stream 7								
QSE103	Quantitative Skills in Epidemiology	Introduction to statistical modelling	3 days					
SSA104	Social Science Approaches	Concepts and theory of the economics of One Health	2 days					
Stream 8								
SSA102	Social Science Approaches	Participatory epidemiology	3 days					
QSE106	Quantitative Skills in Epidemiology	Introduction to mathematical modelling of infectious disease	2 days					
Stream 9								
SSA102	Social Science Approaches	Participatory epidemiology	3 days					
SSA104	Social Science Approaches	Concepts and theory of the economics of One Health	2 days					
Stream 10								
LST103	Laboratory Skills and Techniques	Antimicrobial Resistance, including diagnosis	2 days					
LST102	Laboratory Skills and Techniques	Bioinformatics analysis	3 days					
Stream 11								
LST103	Laboratory Skills and Techniques	Antimicrobial Resistance, including diagnosis	2 days					
QSE106	Quantitative Skills in Epidemiology	Introduction to mathematical modelling of infectious disease	2 days					
Stream 12								
LST103	Laboratory Skills and Techniques	Antimicrobial Resistance, including diagnosis	2 days					
SSA104	Social Science Approaches	Concepts and theory of the economics of One Health	2 days					

For those who select to attend both week 1 and week 2, there will be an additional session on an 'Outbreak Scenario' on Saturday 1st December.

Full Course Descriptions

QSE101: Introduction to quantitative data analysis

Course Description

An eLearning module providing an introduction to quantitative data analysis including terminology; understanding statistical software packages; structuring data for analysis; data exploration; and drawing graphs.

Learning outcomes

At the end of the course, learners will be able to:

1. Describe the terminology for basic statistical, measurement and descriptive analytical terms.
2. Interpret common statistical outputs.
3. Discuss the strengths and weaknesses of different software packages.
4. Using predefined learning materials, use data frames to explore and analyse data, draw graphs and basic maps.

QSE102: Bite-size eLearning for epidemiology

Course Description

This eLearning module introduces basic concepts in epidemiology - in bite-size chunks.

Learning outcomes

At the end of the course, learners will be able to:

1. Understand common terminology used in epidemiology.
2. Discuss the differences between measures of disease frequency.
3. Describe relative measures of association and absolute measures of impact.
4. Interpret the sensitivity, specificity and predictive values of diagnostic tests.

QSE103: Basic statistical modelling

Course Description

Following the pre-requisite Introduction to quantitative data analysis (PH101), the workshop will focus on implementing statistical procedures including checking model assumptions, rather than discussion of statistical theory. Delegates include those with a non-statistical background.

Learning outcomes

At the end of the course, learners will be able to:

1. Identify the appropriate statistical procedure for analysis based on the research question and the best model fit to the data.
2. Using predefined learning materials, implement statistical procedures e.g. generalised linear models (logistic, Poisson, negative binomial), ANOVA, survival analysis, time series, and mixed-effects models.
3. Appraise model outputs for statistical robustness and identify freely available resources to solve issues associated with poor model fit.
4. Interpret common statistical outputs.

QSE104: Epidemiological methods

Course Description

Following the pre-requisite Bite-size eLearning for epidemiology (PH102), this workshop will focussing on approaches to sampling, and the design and interpretation of observational studies.

Learning outcomes

At the end of the course, learners will be able to:

1. Describe the role of epidemiology in One Health research.
2. Explain epidemiological concepts and techniques including: study designs; bias and confounding; sample size calculations, samplings strategies and surveillance for field studies; and performance characteristics of diagnostic tests.
3. Develop appropriate study designs for specific research questions.
4. Identify bias and confounding in epidemiological studies.
5. Implement basic sample size calculations for field studies.
6. Interpret the results of diagnostic tests, accounting for their performance characteristics.

QSE105: Introduction to mapping and spatial analysis

Course Description

This workshop will alternate between short presentations, practical use of GIS software, and performing mapping exercises. Day 1 will focus on presenting mapping concepts and producing basic maps with QGIS. Day 2 will introduce delegates to mapping with R and provide tools to perform spatial analysis.

Learning outcomes

At the end of the course, learners will be able to:

1. Describe why GIS application is useful for One Health and zoonosis research, and policy development.
2. Discuss the advantages and disadvantages of different open data sources and mapping tools.
3. Use simple calculations and spatial data manipulation to improve GIS outputs.
4. Using predefined learning materials, apply GIS software to create high quality maps visualising One Health information.

QSE106: Introduction to mathematical modelling of infectious disease

Course Description

This workshop will demonstrate how mathematical models can improve understanding and control of infectious disease outbreaks including: introducing SER/SEIR models; deterministic and stochastic modelling; the basic reproduction number; and the effects of heterogeneity and contact networks on infection dynamics.

Learning outcomes

At the end of the course, learners will be able to:

1. Describe why and how mathematical models are used to improve understanding of infectious disease outbreaks.
2. Summarise the steps involved in building a simple deterministic model and the limitations of such models.
3. Discuss the advantages and disadvantages of more complex models including incorporating stochasticity, heterogeneity, and contact networks.
4. Describe what the basic reproduction number is and how it can be used to help control infectious diseases.

SSA101: Qualitative interviewing

Course Description

This workshop draws on the rich methodological literature to introduce delegates to theories of why and when to use interviews. It will provide opportunities to develop research questions and learn how to conduct interviews, as well as demonstrating how to approach the preparation, analysis and writing up of data. The workshop design aims to provide delegates with an enhanced critical understanding of how different forms of interviews can be used to elicit different kinds of data and how observations in the field can enhance an interview study. Through taught elements, discussions and practical exercises, delegates will develop skills to design and conduct interviews and engage in observations.

Learning outcomes

At the end of the course, learners will be able to:

1. Actively and critically discuss the theories of interviews.
2. Describe different approaches to interviewing.
3. Conduct an observation to inform a study design.
4. Design an interview study.

SSA102: Participatory epidemiology

Course Description

This workshop will familiarise delegates with common applications and methods used in participatory epidemiology (PE) using short lectures, demonstrations, and practical sessions. Learners will have the opportunity to practise specific methods including ranking; proportional piling; matrix scoring; participatory mapping; and seasonal calendar. Planning and preparations for fieldwork, including ethical review, will also be discussed.

Learning outcomes

At the end of the course, learners will be able to:

1. Describe the origins, key principles and methods of PE.
2. Apply a range of PE methods correctly.
3. Summarise, analyse and present data derived from PE.
4. Describe strengths and weaknesses of PE.

SSA103: Ethics: principles, field ethics and ethical review

Course Description

This workshop aims to explore One Health research ethics using participant-led reflective learning, and sharing of good ethical practice at the review-stage and in the field. Discussion and awareness of philosophical theories and principles underpinning ethical processes for research on animals and humans in different contexts and environments will be provided, including sensitive topics and issues requiring skills to balance dilemmas.

Learning outcomes

At the end of the course, learners will be able to:

1. Describe the theoretical and regulatory issues supporting good ethical research practice.
2. Discuss ethical principles and practices relevant to animal and laboratory research.
3. Demonstrate critical assessment of ethical issues related to One Health research investigations involving public participation.
4. Demonstrate skills in balancing dilemmas in research ethics.

SSA104: Concepts and theory of the economics of One Health

Course Description

This workshop provides an introduction to the economics of One Health, including identification of costs and benefits in One Health projects; estimation of disease impact in populations; and application of economic analysis tools in control and prevention of diseases.

Learning outcomes

At the end of the course, learners will be able to:

1. Explain the sources of benefits and costs for interventions in One Health projects.
2. Explain the concepts of direct and indirect costs of disease in populations.
3. Apply these costs to estimate impact of disease in populations.
4. Discuss the conventional tools used to support decision-making in disease control.

SSA105: Questionnaire design and administration

Course Description

This workshop introduces questionnaire usage in research, including methods of questionnaire administration; designing open- and closed-ended questionnaires; and types of questions e.g. check list, two choice/multiple choice, rating-scale, and ranking questions.

Learning outcomes

At the end of the course, learners will be able to:

1. Plan a questionnaire with appropriate content.
2. Write well-crafted questions.
3. Format questionnaires for ease of administration and coding.
4. Administer a questionnaire using ODK web-based platform.

LST101: Infectious pathogen diagnostics

Course Description

This workshop aims to equip delegates with traditional and advanced infectious pathogen diagnostic skills using a mixture of lectures and hands-on training, and utilising Brucellosis as an example.

Learning outcomes

At the end of the course, learners will be able to:

1. Describe the uses and limitations of infectious diagnostic techniques which can be used in One Health research, including traditional diagnostic techniques e.g. microscopy, culture, biochemical testing and serology, and advanced techniques e.g. ELISA assays, DNA/RNA extraction and quantification, polymerase chain reaction (PCR) and quantitative PCR assays.
2. Explain good laboratory practice, including Quality Assurance and safety controls.
3. Report the steps and consumables involved in sample collection and handling.
4. Apply traditional and advanced diagnostic techniques to ascertain the infectious aetiology of samples.
5. Disseminate the advanced understanding gained to colleagues in their home institutions.

LST102: Bioinformatics analysis

Course Description

This workshop aims to provide delegates with understanding of the concepts behind and practical skills in implementing advanced diagnostic techniques e.g. nucleic acid sequencing and bioinformatics analysis.

Learning outcomes

At the end of the course, learners will be able to:

1. Describe the uses of sample preparation methods, including DNA/RNA extraction for sequencing.
2. Describe and apply sequencing techniques e.g. Sanger, to laboratory samples.
3. Demonstrate a basic understanding of Next Generation Sequencing and its applications.
4. Undertake nucleotide database searches, and perform basic bioinformatic analysis on samples submitted for sequencing.

LST103: Antimicrobial Resistance, including diagnosis

Course Description

Using a blend of classroom teaching, group and laboratory work, this workshop will provide an introduction to antimicrobial resistance (AMR): how it is defined, transferred and selected for, and how it is detected using phenotypic and genotypic methods. Further learning includes surveillance for antimicrobial use and AMR; AMR as a social issue; and why One Health approaches are necessary to tackle this important global issue. Whilst learning will broadly cover antimicrobials, the focus will primarily be on antibacterial drugs.

Learning outcomes

At the end of the course, learners will be able to:

1. Explain how AMR develops and is transmitted.
2. Describe different methods for detecting and under-taking surveillance for antimicrobial use and resistance.
3. Undertake laboratory detection of AMR and interpret the results, including for key resistance traits/organisms, such as MRSA and ESBL-producing bacteria.
4. Explain the importance of a One Health approach in tackling AMR.