Module 2 (undertaken in Year 1 if completing the MRes as a part time student)

Title:	**Epidemiological analyses, modelling, and data handling**
Module/Unit Coordinator(s):	Dr Roger Humphry

Module/Unit Summary

Module/Unit Aims:
This Quantitative Epidemiology module aims to introduce and provide hands on practice of modelling and data handling in epidemiology. This module will provide students with an understanding of the difference types of models, basic statistical distributions, and different statistical tests available to address real world epidemiological problems. Throughout this module students will have the opportunity to develop and apply these skills in examples of research. This module aims to provide knowledge of the fundamental analytical and research skills essential for modern epidemiology.
Module/Unit Intended Learning Outcomes (MLO):
On successful completion of this module/unit, learners will be able to: MLO1: Identify and evaluate appropriate literature and different data types to be able to solve epidemiological problems. MLO2: Classify and distinguish suitable statistical tests, recognising and justifying when and where to apply appropriate analytical techniques MLO3: Manage, curate, and archive different types of epidemiological data. MLO4: Evaluate the application and outputs of epidemiological modelling in epidemiology, recognising their use and process.
Module/Unit Content:
Provide a synopsis of module/unit content. This module will provide students with knowledge of the fundamentals for modelling in Epidemiology. It will begin with an overview of using literature and how to record data. The module will cover the philosophy of hypothesis-based

science and corresponding Type I and II errors, and statistical power. Students will learn about the differences between frequentist and Bayesian statistics. The module will explore some simple process-based models, consider sources of uncertainty and validation. The module will describe different types of data visualisation including mapping in Epidemiology. The empirical/statistical modelling component will cover linear regression, General Linear Models, Logistic regression, multivariable modelling. An overview of multivariate models will be provided. The module will introduce bioinformatic techniques including population genetics and phylogenetic analyses as applied to epidemiological problems. Consideration will also be given to the importance of ethics and gaining ethical approval in epidemiological and associated scientific research.

Expected Learning Hours:*	
Total number of hours of learning[3]	150
Classroom learning[4]	32
Practical learning	20
Work-based learning	0
Directed online learning	20
Independent learning	78