- **Lecture 1: Using simulation studies to evaluate statistical methods**
    - **Speaker:** Tim P Morris, MRC Clinical Trials Unit at UCL
    - **Abstract:** For a given epidemiological question, there may be several competing methods that we would consider for design and statistical analysis. How can we compare these methods in a principled way and decide which we will use? Trying each approach in turn is usually impossible for alternative study designs and in any case it cannot tell us which analysis method is more reliable. A more principled way to choose methods is to use simulation studies. I will introduce a structured framework for planning simulation studies which considers in turn the aims, data-generating mechanisms, methods, estimands and performance measures. These concepts will be illustrated with a running example based on handling missing values in propensity score estimation.

- **Lecture 2: Propensity scores – over-hyped or underused?**
    - **Speaker:** Elizabeth Williamson, London School of Hygiene and Tropical Medicine
    - **Abstract**: Confounding is an inevitable complication in any analysis attempting to identify effects of non-randomised exposures. Propensity scores have attracted a large following, primarily due to the highly publicized analogy between the covariate balance achieved by randomization and the balance achieved by propensity score methods. It is now common for reviewers to request that authors replace more traditional outcome regression analyses using propensity score approaches, in order to "better account for confounding". This talk will give a brief overview of propensity score methods and the assumptions underlying them before exploring the benefits and limitations of these approaches, particularly in contrast to alternative analysis strategies.

- **Lecture 3: What to do when data are going missing?**
    - **Speakers:** Irene Petersen and Tra Pham, Department of Primary Care & Population Health, UCL
    - **Abstract:** Missing data are a common problem in pharmacoepidemiological studies and can constitute considerable challenges in the analyses and interpretation of results. A number of methods have been developed for dealing with missing data. In this lecture we will first discuss the pros and cons of different methods for dealing with missing data and we will then introduce new methods for multiple imputation based on information from external data sources, when the missing data are likely to be missing not at random.

- **Lecture 4: Using the parametric Waiting Time Distribution to estimate prescription durations**
    - **Speakers:** Henrik Stovring, Aarhus University and Anton Pottegaard, University of Southern Denmark
    - **Abstract:** Determining prescription durations is a prerequisite in many pharmacoepidemiologic studies. In this lecture we present new approaches which allows direct estimation based only upon observed prescription dates, package size and patient characteristics. The approaches are based on the ordinary and reverse Waiting Time Distributions (WTD). We demonstrate how estimation of the parameters of the WTD allows circumvention of externally or a priori defined decision rules. In applied examples we show how the method can be used to investigate drug utilization and define exposure status in a study of side-effects due to NSAID use.