# Introduction to Longitudinal Data Analysis: a CPD module

**Course overview**

Real world datasets often contain data measured repeatedly over time, termed longitudinal data. Unlike data measured at a single time point, longitudinal data allows examination not only of outcomes at a particular time point but also trends over time. However, because individuals in the dataset are being repeatedly measured, data is clustered within individuals. Specialist methods are required to account for this clustering of data, and to model the trends over time present in longitudinal data. This course aims to provide grounding in the statistical concepts and methods for the longitudinal data analysis. Course participants will also learn to apply these methods using R software, as well as find out how to interpret their results. Course participants are requested to have access to a computer with R pre-installed so that they can take part in the R computer practical sessions.

**Who should attend? Is it right for me?**

This course is aimed at health and research professionals and postdoctoral students. It is suitable for those who have some background knowledge of statistical modelling (for example, through attending the Department of Health Data Science's "Introduction to Logistic Regression" courses). Some experience in R (e.g. through the Department of Health Data Science's "Introduction to R" course) would also be beneficial.

**What is the course schedule?**

This course runs online. The lecture videos will be available online and can be watched at any time (from two weeks before to two weeks after the course is scheduled to take place). A suggested timetable is given in the table below, which highlights the live sessions provided for participants to ask questions.

**What will delegates learn?**

By the end of this course delegates will:

- Be able to use various statistical methods to summarise and visualise longitudinal data
- Have an appreciation of how to analyse longitudinal data and interpret their results
- Have an understanding of how to use the R statistical software in this analysis

**What does the course cover?**

- Introduction to longitudinal data, including design of longitudinal studies
- Data visualisation techniques for longitudinal data
- Reduced and summary measures, and repeated measures ANOVA
- Linear Mixed Effects Modelling
- Generalised Linear Mixed Effects Modelling
- Introduction to R software packages for longitudinal modelling

**Timetable**

| Time | Session |
|---|---|
| **9:15-9:30** | Welcome and Introduction to longitudinal data **(recorded video)** |
| **9:30-10:00** | Designing longitudinal studies **(recorded video)** |
| **10:00-10:30** | Visualisation of longitudinal data **(recorded video)** |
| **10:30-10:45** | **Live Q&A – TEAMS link to be provided** |
| **10:45-11:00** | **BREAK** |
| **11:00-11:25** | Reduced and summary data **(recorded video)** |
| **11:25-11:50** | Repeated measures ANOVA **(recorded video)** |
| **11:50-12:00** | **Live Q&A – TEAMS link to be provided** |
| **12:00-13:00** | **BREAK** |
| **13:00-13:45** | Linear mixed effects models **(recorded video)** |
| **13:45-14:00** | **Live Q&A – TEAMS link to be provided** |
| **14:00-14:15** | **BREAK** |
| **14:15-15:15** | GLMMs and model assessment **(recorded video)** |
| **15:15-15:30** | Extensions **(recorded video)** |
| **15:30-16:30** | R Computer Session<br>**Independent working with Live Q&A – TEAMS link to be provided** |

**To find out more**

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Alternatively, visit the department's website at https://www.liverpool.ac.uk/population-health/about/healthdatascience/.