

General Modern R Training Course Options

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Content	Participant Learning
Core R	participants learn about key topics in how R operates and peak under the hood to better understand how to faster, more robust code.
Thinking in R	a dive into how R behaves and the common R idioms to help develop your skills in knowing how to approach and problem and where to look and what to ask for help.
Data manipulations in base R	understand the key data manipulation techniques and functions offered in base R. Discuss some commonly used 'dangerous practices' and the better way of performing these tasks.
Advanced data manipulations with dplyr	Introduction to the successor of the data manipulation package plyr. dplyr offers a robust, easy-to-read, and fast (up to 1000x faster) functions to perform common statistical summaries and data manipulations.
Data visualization to ggplot2	an introduction to ggplot2. For participants that have already been exposed to ggplot2, a more advanced side challenge will be presented.
Introduction to Function Writing	function writing is a key component of writing clear, maintainable code. Participants will learn to stop copying-and-pasting scripts and learn to encapsulate their work in powerful functions.
tidying data with stringr and tidyr	participants will be introduced to the libraries stringr and tidyr to dramatically reduce the time required to turn messy clinical datasets into clean modelling-ready data.
advanced function writing	building on the previous introduction to function writing, advanced topics such as function scope, debugging techniques, and common pitfalls will prepare participants in how to write more powerful and generalizable functions.
introduction to pharmacometrics packages PKPmisc and VPC	participants will be introduced two recently developed libraries specifically for pharmacometric applications.
Project Organization Tips and Reproducible Research	In this module, some fundamental techniques to better design analyses will be presented, including a short case study. Finally, rmarkdown notebooks will be introduced to demonstrate how participants can create reproducible analyses that are easily transferable into reports and presentations.

Hands-on exercises will be intertwined with didactic lectures, and through the data manipulation, visualization, and function writing sections, hands-on material will focus around an analysis case study that builds on each topic.

Sample day 1 project: Creating a reproducible exploratory analysis report and prepare data for modeling in R using newly covered tools

- Key learning objectives
 - Create reproducible and automated report templates
 - Perform data munging using stringr/tidyr and dplyr to get data analysis-ready
 - Visualize data with ggplot2
 - Calculate summary statistics and noncompartmental analysis
 - Prepare dataset for nonmem analysis based on observed compartmental structure from exploratory analysis

Sample day 2 project: Implement a clinical trial simulator in R

- Key learning objectives
 - Focus on best practices in developing a project outline and psuedo-code implementation to identify key design decisions.
 - Evaluate various resampling techniques to get data from heterogeneous sources
 - Working with input and output from multiple data sources and programs such as R and NONMEM, together
 - empirical power evaluations from stochastic simulation and re-estimation
 - visualization of effect of sample size and study design on outcome
 - evaluate impact of various titration schemes on treatment success under multiple trial designs