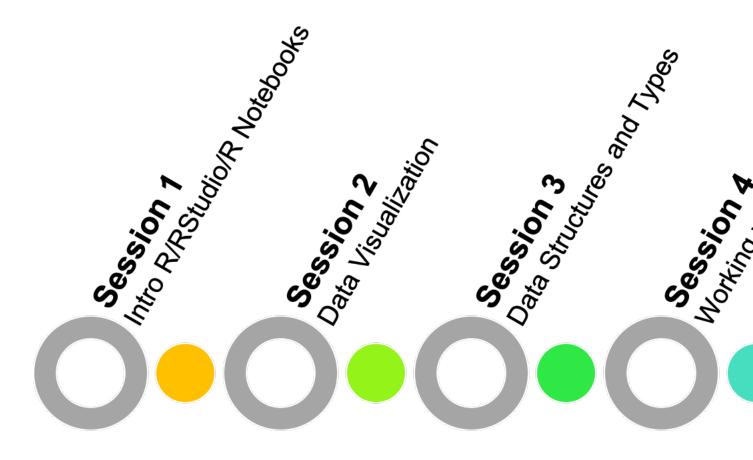# WELCOME

NU Pathology LearnR! Fall 2020
Series Overview

Contents

Welcome to NU Pathology Learn R! series, session overview! This outlines the plans for the multi-week series.

Session 1
Intro R/RStudio/R Notebooks

Session 2
Data Visualization

Session 3
Data Structures and Types

Session 4
Working

Each 2 hour session will be conducted via Zoom and will include instruction with interactive coding examples and quizzes. Between sessions there will be opportunities to practice and enhance your `R` skills through exercises.

Requirements

- `R` installed
- RStudio installed

Useful resources

- Cheatsheets https://www.rstudio.com/resources/cheatsheets/
- R for Data Science book https://r4ds.had.co.nz/

NU Pathology Learn R! Series Objectives

- Discuss best practices for reproducible data analyses.

- Write reproducible `R` code for data preparation, analysis, and visualization.

- Create sharable, customized reports using `R`.

- Perform basic troubleshooting of `R` coding errors.

Session Schedule

- Session 1 **Introduction R/RStudio/R Notebooks**
- Session 2 **Data Visualization**
- Session 3 **Data Structures and Types**
- Session 4 **Working with Data**
- Session 5 **Reproducible Workflows and Sharing Analyses/Results**
- Session 6 **Putting it All Together**

Lesson Objectives

Lesson: Introduction to R/RStudio/R Notebooks

- Describe `R`, RStudio, and R Notebooks.
- Navigate around the key features of RStudio.
- Interact with `R` by writing and executing code and reviewing output.
- Manage your `R` environment.
- Discuss concepts of base `R` and its extended packages.
- Install and invoke `R` packages.
- Seek help for questions or troubleshooting.

Lesson: Data Visualization with `ggplot2`

- Create publication-quality graphics using the `ggplot2` package.
- Describe what types of customizations are possible with `ggplot2`.
- Discuss `ggplot2` syntax and components.
- Save plots in different output formats.

Lesson: Data Structures and Types

- Read data into `R`.
- Compare/contrast the basic data types in `R`.
- Describe the concept of data type coercion.
- Discuss how to represent categorical information.
- Create new data files.

Lesson: Working with Data

- Change the format of data.
- Manipulate data and data frames.

- Subset data using base `R` syntax and `tidyverse` functions.
- Create quick summaries of data.
- Discuss how to handle missing data or NA values.
- Apply special functions to work with dates.
- Apply special functions to work with text data.
- Apply special functions to work with categorical data.

Lesson: R Markdown and Reproducible Workflows

- Describe the benefits of using R Projects.
- Create an R Project and organized file structure.
- Generate sharable reports using `R`.
- Customize R Markdown output.

Lesson: Putting it All Together

- Utilize skills learned in previous sessions to perform data analysis, visualization, and report creation.

Acknowledgements