1.3.5: Statistical Tests and Models

(In Person)

Session Objectives

1. Develop linear and logistic regression models.
2. (Use a survey sampling weight to generate more representative descriptive and inferential statistical values.) - Currently, this objective is under the Module 1.3.4: Missing data and sampling weight.
3. Interpret a model output.

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0. Prework - Before You Begin

A. Install packages

If you do not have them already, install the following packages from CRAN (using the RStudio Menu "Tools/Install" Packages interface):

- `VIM` and `VIM` package website
- (Optional) `skimr` and `skimr` website
- (Optional) `modelsummary` and `modelsummary` website
- (Optional) `summarytools` and `summarytools` on Github
- `palmerpenguins` and `palmerpenguins` website
- `ggplot2` and `ggplot2` website
- `naniar` and `naniar` website
- dplyr and `dplyr` website
- `gtsummary` and `gtsummary` website
- `Hmisc` and `Hmisc` website
- `mice` and mice website

B. Review these online Book Chapters:

- BOOK: Flexible Imputation of Missing Data, 2nd ed., by Stef van Buuren (`mice` package author) - Chapter 1 "Introduction", Sections 1.1-1.4
- BOOK: The Epidemiologist R Handbook - Chapter 20 "Missing Data"

C. Open/create an RStudio project for this lesson

Let's start with the `myfirstRproject` RStudio project you created in Module 1.3.2 - part 1. If you have not yet created this `myfirstRproject` RStudio project, go ahead and create a new RStudio Project for this lesson. *Feel free to name your project whatever you want, it does not need to be named* `myfirstRproject`.

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1. Develop linear and logistic regression models.

Linear Regression

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Logistic Regression

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2. Linear and Logistic Regression Models with complex survey sampling weights

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3. Interpret a model output

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R Code For This Module

- `module_135.R`

References

R Core Team. 2025. *R: A Language and Environment for Statistical Computing*. Vienna, Austria: R Foundation for Statistical Computing. https://www.R-project.org/.

Other Helpful Resources

Missing Data Resources

- CRAN Task View for Missing Data
- R-miss-tastic Website
- Flexible Imputation of Missing Data (online book for 2nd edition) by Stef van Buuren
- Blog post on Missing Data Visualization in R using ggplot2
- Missing data R tutorial
- CRAN Task View on Missing Data
- A resource website on missing values
- Handling missing values with R - tutorial
- Blog post "My favourite R package for: summarising data"

and

Other Helpful Resources