

For participants to read before workshops

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DESCRIPTIONS FOR SESSIONS

Session 1: This session will lay a coding foundation for R beginners. We will familiarize you with using the RStudio interface, RScripts and RMarkdown. Students will learn basic commands in the ever-changing R language, how to interpret errors and package installation. We will use these tools to wrangle and visualize data using Tidyverse packages.

Session 2: Here, we will cover how to run linear models (LMs; e.g., Gaussian/Normal distribution), generalized linear models (GLMs; e.g., binomial, Poisson for count data), and mixed models (LMMs/GLMMs; e.g., fixed vs. random effects). We will also expand on models using Poisson-distributed data by evaluating how to deal with common issues such as when your count data are over-dispersed/under-dispersed (e.g., Poisson vs. Negative Binomial vs. Conway-Maxwell-Poisson), when counts should be represented as rates (e.g., counts per unit time using Poisson offsets), and when your count data are zero-inflated (e.g., 0-inflated regression vs hurdle models). Finally, we will finish the session on appropriate ways to run model selection techniques for finding a winning model from a set of candidate models, using Akaike Information Criteria (AIC) or likelihood ratio tests (LRT) for nested models. This course will not be a statistics course, so people will need to be familiar with most of these models.

FOR BOTH SESSIONS

Before reviewing the workshop content for both sessions. You will have to have both Program R and R Studio downloaded.

For session 1 and 2, you will need at least R version 3.6.2 or higher. To check your R Version, you can run the following code in your R console:

```
R.Version()
```

Or navigate to “Tools -> Global Options -> General” and under *R Version*, it will tell you the version that you currently have installed on your computer. If your R version is outdated for our sessions, you can follow the instructions here to avoid having to re-install all of your existing packages. You will only need to update program R, not R Studio.

You can update R using the following “installr” package and code:

```
install.packages("installr")
require(installr)
updateR()
```

SESSION 2 ONLY

Before continuing to session 2 on frequentist models. You will need the following packages installed.

- here
- tidyverse
- pscl
- glmmTMB
- lme4
- car
- lmttest
- bbmle
- boot

To install these packages, you can either navigate to the “*Files/Plots/Packages/Help/Viewer*” panel, click on “*Packages*” tab, then “*Install*” and type in each of the packages. Or you can use the following R code:

```
install.packages("here")
```

If you have some of these packages already installed, it might be good to also update these by going to the same panel and clicking “*Packages*” tab, then “*Update*” and click the relevant packages. This may take some time, so it is important that you do this prior to the workshop.