

1) Why R?

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9/17/2021

What is R?

- R is **Open Source** and **free**!
- It is a full-featured programming language, in particular a scripting language.
 - This makes it similar in many ways to MATLAB and Python
- It can be run interactively or as a batch/background job
- It is designed by statisticians for statisticians - great at the same sort of tasks as STATA and SAS
- R is being actively developed with ongoing updates/new releases
- The community of R users make a bunch of tools available for tasks like:
 - graphing
 - advanced/specialized statistical models
 - making websites
 - writing books
 - making LaTeX documents like this one!
- Available for Windows, Mac OS X, and Linux

Why should I use R?

- R is widely used (statisticians, scientists, social scientists) and has the widest statistical functionality of any software
- R has tools for pharmacometrics! Examples:
 - **nlmixr**: nonlinear mixed effects modelling in R
 - **PKPDsim** ODE solver/concentration time curve simulations
 - **mrqsolve** ODE solver/concentration time curve simulations
 - **mapbayr** MAP Bayesian estimation of PK parameters
 - **vpc** visual predictive checks of NLMEM/NONMEM results
 - **PKNCA** pharmacokinetic non-compartmental analysis
 - And many, many more tools! Check out more here: <https://cran.r-project.org/web/views/Pharmacokinetics.html>
- Users add functionality via packages all the time
- R is free and available on all major platforms
 - works well with other collaboration tools like git
- R is very powerful, flexible, and easy to use
- R allows for reproducibility and automating tasks
- R can do essentially anything!

- For a particularly creative use, check out this repo: github.com/cutterkom/generativeart
- Wide usage helps to improve quality and reduce bugs
- Wide usage means there's a lot of tools available online for help

Why Should I Not Use R?

- Other software is better than R at various tasks
- The *exact* task you need to do was already solved by someone else in some other language.
- R can be much slower than compiled languages (but is often quite fast with good coding practices!)
- R's packages are only as good as the person who wrote them; no explicit quality control
 - Validation tools to vet package quality exist! Check out: github.com/pharmaR/riskmetric
- R is a sprawling and unstandardized ecosystem
 - conventions can vary between packages
 - over the last ~5 years, increased adoption of “tidy”/“tidyverse” conventions (more about this later!)

What are my other options? Get me out of here!

- Python
- Matlab/Octave
- Julia (for pharmacometrics, see `pumas`)
- C/C++
- SAS
- Stata

Administrative Info

One day work shop! Today! 9am-5pm

Microcredit Program

A microcredit in “R for data science” is available!

Requirements:

- Participate in the workshop (so far, great start!)
- Complete the assignment
- Email the assignment to Professor Krzyzanski; wk@buffalo.edu

Course Format

- Presentation of material, with example code
- Please ask questions at any time!
- Mini break-out sessions to try writing your own code

Course material

- All course material is available on github!
- The course material should also have been emailed to you ahead of time.
- For questions, message me at: jasminehannahhughes AT gmail.com

Take a moment now to open the course material in R Studio.

The Legal Stuff

- This workshop includes material from a workshop prepared by Chris Paciorek with contributions from Kellie Ottoboni, Nima Hejazi, Rochelle Terman, Chris Krogslund, and Jarrod Millman; originally presented at UC Berkeley (D-Lab, Dept of Statistics).
- Some of this material was drawn from Jared Knowles R bootcamp.
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