

Biostatistics & Epidemiological Data Analysis using R

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Introduction to R Markdown

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November 4, 2021

Learning objective

- Learn how an R Markdown script can be created, why it is useful, and how a simple html/pdf report can be generated.

1 Documentation with R

- R Scripts
- R Markdown

Documentation with R

Review: What is an R Script? Why use it?

- R script = text file where R code can be written, saved, and read into R.
- Can write code to remember it, to document it, and to run it from there.
- Can also add comments: everything after '#' is treated as a comment (marked in green) and is not run.
- Run code by highlighting some parts of the code and clicking on "Run" (or pressing Ctrl+Enter).
- Save as .R (or .r) file.
- Example: `R_1_homework.R`

R Markdown

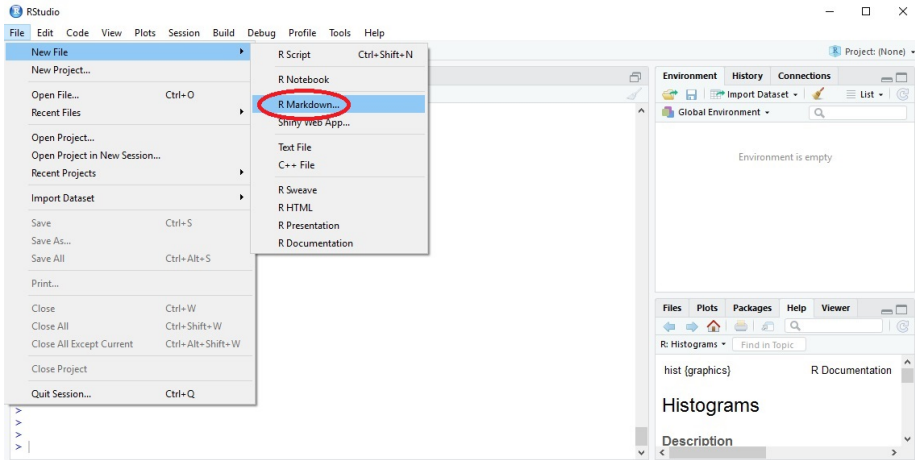
What is Markdown?

- Simple language for formatting text input and creating HTML, PDF, and MS Word documents.

What is R Markdown?

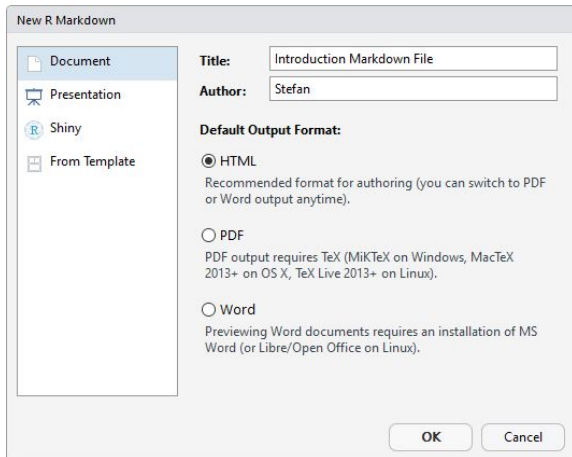
- "Enhanced" R script.
- Interface of R with Markdown, to combine text with pieces of R code ("chunks") in one document.
- Directly integrated in RStudio, open new R Markdown file:
File ► New File ► R Markdown.
- From this R Markdown file, a formatted pdf/html/word file can be generated by "knitting" the file through "knit", which contains the text, R code, and the results from these analyses.

Create new R Markdown file



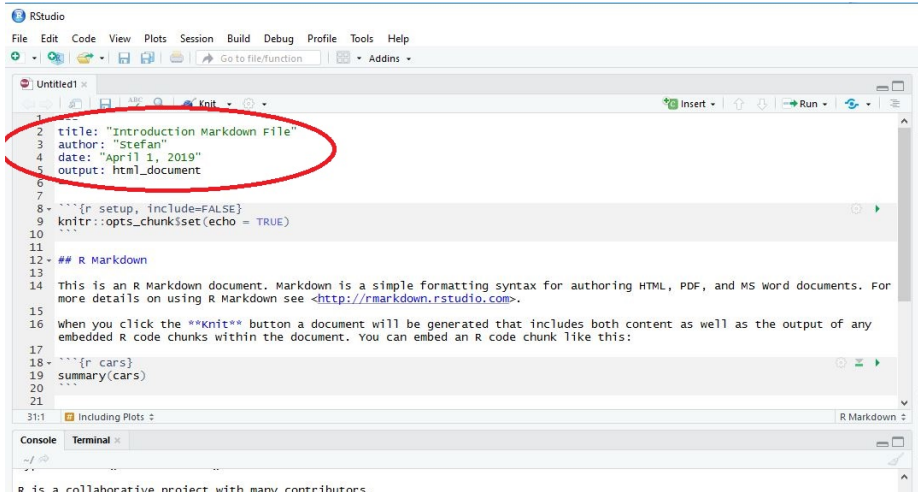
Create new R Markdown file

Set temporarily the title, author, output format of the R Markdown file (can change later):



Example of a simple R Markdown file

The header contains the temporary title, author, output format:

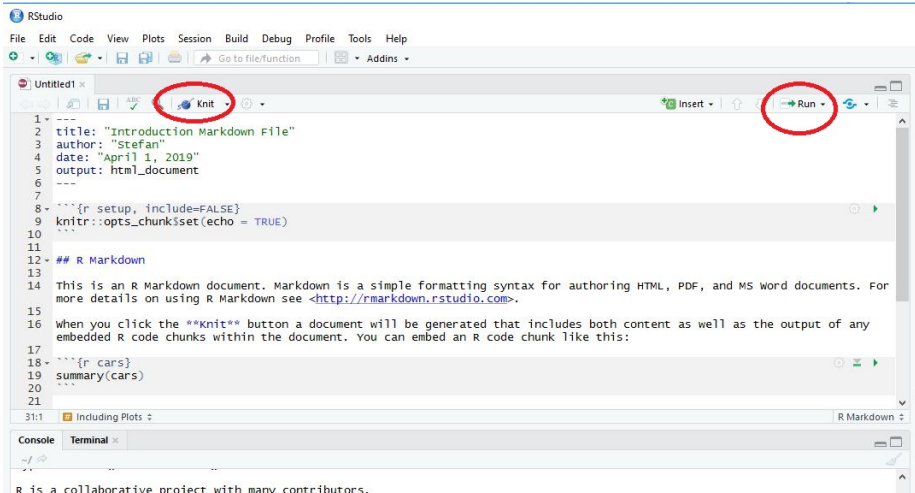


```
1 # Introduction Markdown File
2 title: "Introduction Markdown File"
3 author: "Stefan"
4 date: "April 1, 2019"
5 output: html_document
6
7
8 ```{r setup, include=FALSE}
9 knitr::opts_chunk$set(echo = TRUE)
10 ```
11
12 ## R Markdown
13
14 This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS word documents. For more details on using R Markdown see <http://rmarkdown.rstudio.com>.
15
16 when you click the Knit button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:
17
18 ```{r cars}
19 summary(cars)
20 ```
21
22
23 R is a collaborative project with many contributors.
```

Example of a simple R Markdown file

Run R code by highlighting it and clicking run (as in R script).

Knit full document by saving the file (as .Rmd) and clicking knit.



R is a collaborative project with many contributors.

Most important elements of R Markdown files I

Header with html output

```
---  
title: "Untitled"  
author: "Stefan Konigorski"  
date: "November 12, 2020"  
output: html_document  
---
```

Alternative output as pdf or word file

Replace the line which determines the output format with:

```
output: pdf_document  
output: word_document
```

Example

See solution of homework 1: `R_1_homework_solution.Rmd`

Most important elements of R Markdown files II

Header

```
# Header level 1  
## Header level 2
```

Lists

```
* Item 1  
* Item 2  
  + Subitem 1  
  + Subitem 2
```

Numbered lists

```
1. Item 1  
2. Item 2  
  + Subitem 1  
  + Subitem 2
```

Most important elements of R Markdown files III

R chunk: computed, show code & results

```
```{r}  
1+1
```
```

R chunk: not computed, show code

```
```{r, eval=FALSE}  
1+1
```
```

R chunk: computed, only show results

```
```{r, echo=FALSE}  
1+1
```
```

R Markdown

References

- Markdown tutorial:
<https://commonmark.org/help/tutorial/>
- Xie (2005)
- <http://rmarkdown.rstudio.com>
- <https://www.rstudio.com/wp-content/uploads/2015/02/rmarkdown-cheatsheet.pdf>
- <https://www.rstudio.com/wp-content/uploads/2016/03/rmarkdown-cheatsheet-2.0.pdf>

R Markdown

If you want to create a pdf from Rmd file in RStudio, you need some Rmd→pdf converter.

- Option 1: Download and install MiKTeX, e.g. from <https://miktex.org/download>.
- Option 2: Install TinyTeX directly through R with
`install.packages("tinytex")`
`tinytex::install_tinytex()`

R Markdown

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If you want to try further cool things in R Markdown:

- Try to create presentation slides by using
output: `ioslides_presentation`
or
output: `beamer_presentation`
(if you have installed tinytex/miktex) in Rmd file header.

Questions?