Biostatistics & Epidemiological Data Analysis using R

2

Introduction to R Markdown

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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

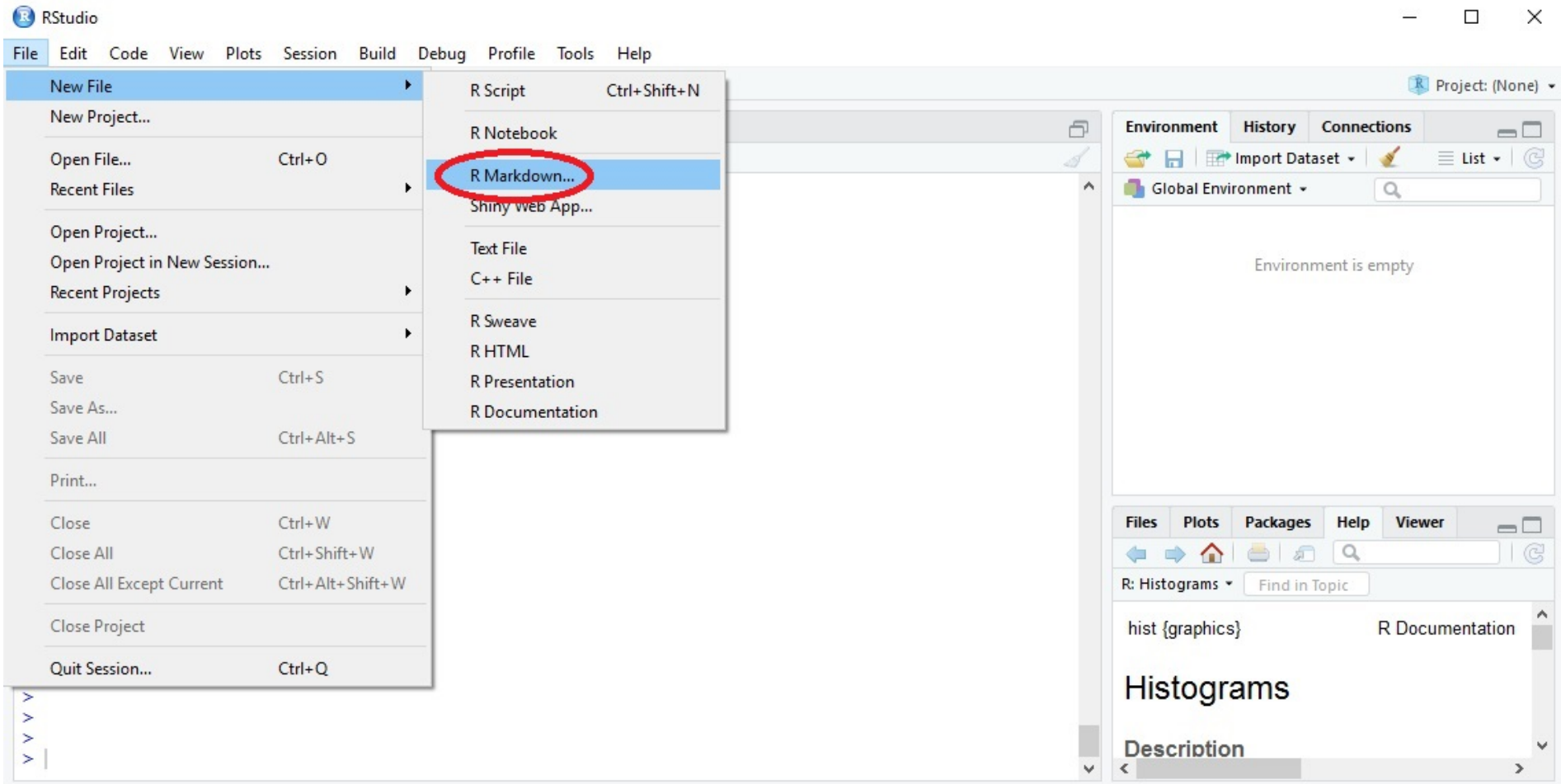
What is Markdown?

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

What is R Markdown?

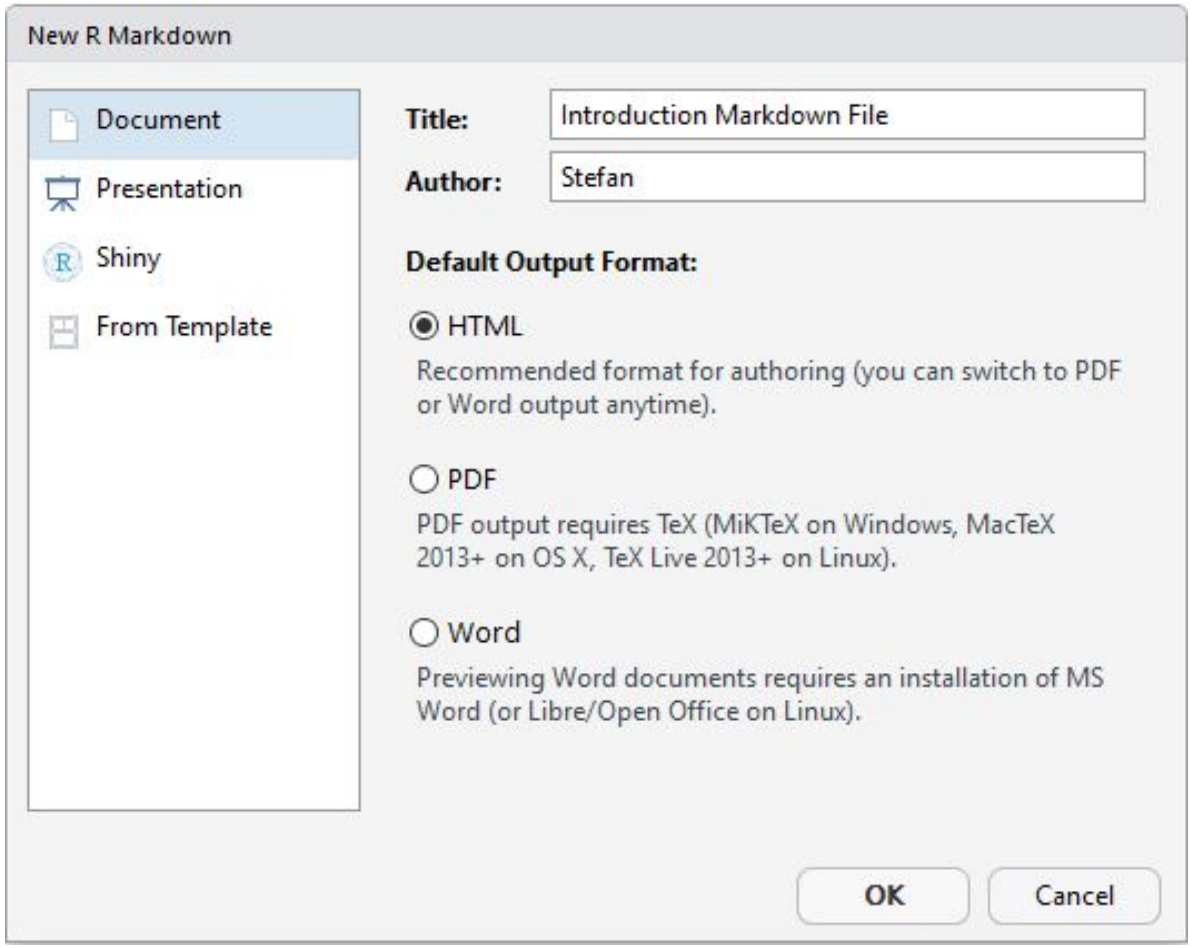
- "Enhanced" R script.
- Interface of R with Markdown, to combine text with pieces of R code ("chunks") in one document.
- Directly integrated in RStudio, open new R Markdown file: `File` ▶ `New File` ▶ `R Markdown`.
- From this R Markdown file, a formatted pdf/html/word file can be generated by "knitting"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

Create new R Markdown file



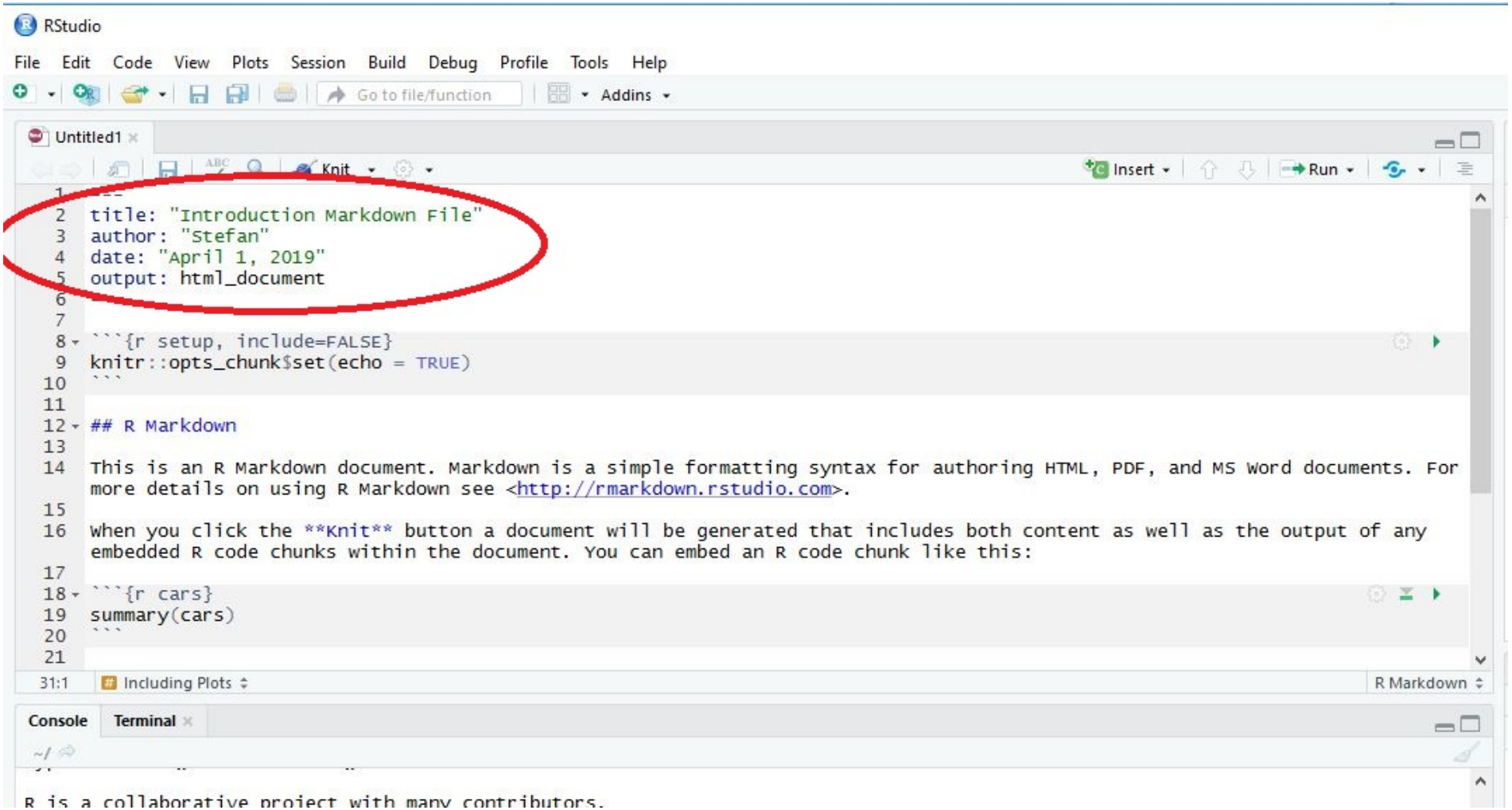
Create new R Markdown file

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



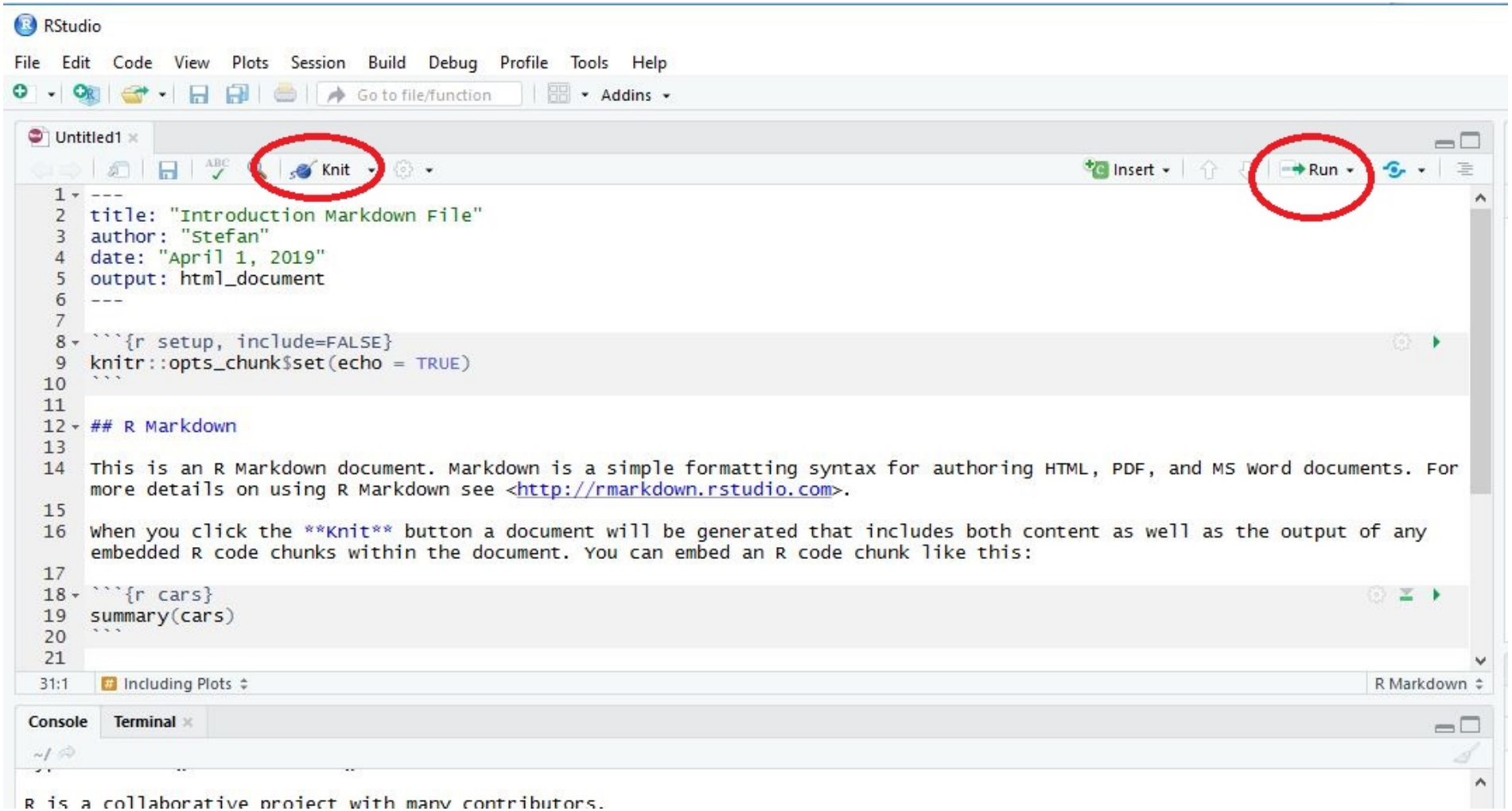
Example of a simple R Markdown file

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



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.



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()`

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?