````
---
title: "R-ladies 21.08.2019"
author: "Gunn-Helen Moen"
output: html_document
---

```{r setup, include=FALSE}
knitr::opts_chunk$set(echo = TRUE)
```


# Quick introduction to Rmarkdown
You write your document in plain text and you can include *italics* and **bold**
formats in addition to superscript^2^ and [links](www.rstudio.com). When you
want a new paragraph you end the line with two spaces.

You can insert a header by using one or more hashtags:

# Header 1

## Header 2

### and so on

>block quotes

* unordered lists

* with several items

  + and sub-items
  + more sub-items

1. Ordered lists

2. Like this

  + with adidional sub-items

You can also make tables:

Table header 1 | Table header 2
---------------| --------------
Cell 1         | Cell 2
Cell 3         | Cell 4


To add a code chunck to your document write three back ticks followed by {r}. To
end the code chunck add three more back ticks.
```{r}
paste("Hello", "R-ladies!")
```
````

Within the braces you can add chuck options, `echo=FALSE` will prevent the source code from being displayed and the code will look like this:
```{r echo=FALSE}
paste("Hello", "R-ladies!")
```

Another usefull one is `eval=TRUE` for running the code in the code chunk and `eval=FALSE` for not running the code in the code chunk.

To add comments to your code just use # withing the code chuck window
```{r eval=FALSE}
paste("Hello", "R-ladies!") #Add comment
```
*Here I've used `eval=FALSE` so that the code won't start running.

  - [Rmarkdown cheetsheet is a useful resource](https://www.rstudio.com/wp-content/uploads/2016/03/rmarkdown-cheatsheet-2.0.pdf)
  - [As well as the Rmarkdown reference](https://www.rstudio.com/wp-content/uploads/2015/03/rmarkdown-reference.pdf)

  ---

ggplot2
GGplot2 is one of the graphing library's in R.

```{r}
#install.packages("ggplot2")
library("ggplot2")
```


ggplot2 graphing consists of three parts

1. **aesthetic**
+ An aesthetic that tells ggplot which variables are being mapped to the x axis, y axis, (and often other attributes of the graph, such as the color fill). Intuitively, the aesthetic can be thought of as what you are graphing.

2. **geom**
+ A geom or geometry that tells ggplot about the basic structure of the graph. Intuitively, the geom can be thought of as how you are graphing it.

3. **options**
+ Other options, such as a graph title, axis labels and overall theme for the graph.

````
##### For this demonstration I will use the R example data mtcars.
Loading the data and having a look:
```{r}
data(mtcars)
head(mtcars)
```


  ---

The structure of building a ggplot consist of a `aesthetic` + `one or more
geoms` + `optional elements`.
```{r}
ggplot(mtcars, #my dataset
       aes(x=mpg)) +  #what I am graphing - here miles per gallon from mtcars
dataset
  geom_histogram(fill="blue", #how is it being graphed
                 color="black",
                 bins = 20)
```


  From here you can start adding labels
```{r}
ggplot(mtcars, #my dataset
       aes(x=mpg)) +  #what I am graphing - here miles per gallon from mtcars
dataset
  geom_histogram(fill="blue", #how is it being graphed
                 color="black",
                 bins = 20) +
  labs(title = "Miles per gallon",
       subtitle = "Subtitle",
       caption = "mtcars dataset",
       x = "mpg",
       y = "count")
```


##### Assigning the aesthetic to an plot
You can assign your basic ggplot function to a plot so that you wont have to
call it everytime. For instance:
```{r}
 p<- ggplot(mtcars, aes(x=mpg))
```


#### The different geoms
There are lot of different geoms you can use.


##### For one variable you can use plots like:

+ `+ geom_dotplot()` To add a dotplot geometry to the graph.

+ `+ geom_histogram()` To add a histogram geometry to the graph.
````

+ `+ geom_density()` To add a density plot to the graph.

+ `+ geom_qq()` To add a QQ plot ot the graph

Example of plot:
```{r}
 p + geom_dotplot()
```

For two variable you can use plots like:

+ `+ geom_point()` To add a point (scatterplot) geometry to the graph.

+ `+ geom_smooth()` To add a smoother to the graph.

+ `+ geom_boxplot()` To add a boxplot to the graph.

To vizualise we need a aesthetic with two variables
```{r}
 p2<- ggplot(mtcars, aes(x=mpg, y=hp)) #two continous variables (miles per gallon and horsepower)
```

Examples of plots:
Scatterplot:
```{r}
 p2 + geom_point()
```

Scatterplot with Smoother:
```{r}
 p2 + geom_smooth()
```

Combining the two:
```{r}
 p2 + geom_smooth() + geom_point()
```

Saving your plot

Save your plot by using `ggsave("plot.png", width = 5, height = 5)`

[ggplot2 cheetsheet is a usefull resourse](https://github.com/rstudio/cheatsheets/blob/master/data-visualization-2.1.pdf)