

Public Health Class with R Markdown

subtitle here

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Target Audience

Aim: Introductory

- Teaching Staff
- Student

Disclaimer

- Very simple slide
 - short learning curve
- Be creative!
- Try, try, try

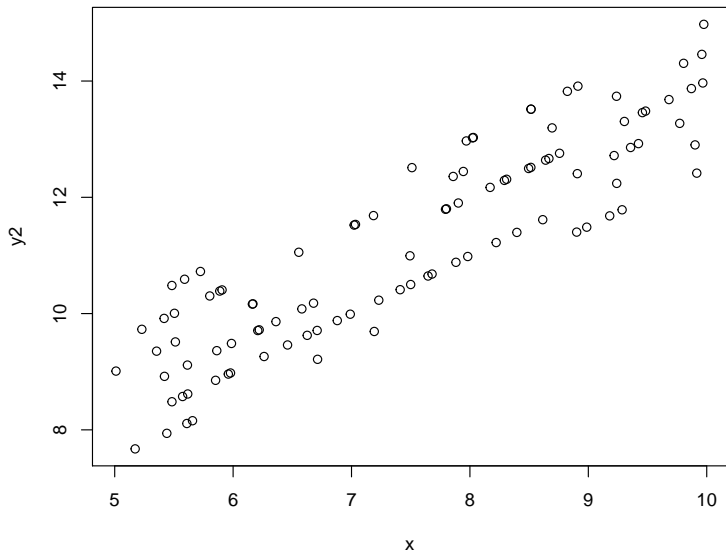
Motivation

- Statistic and Public Health
- Multiple output file for same purpose

Teaching Statistic

- fast, reproducible

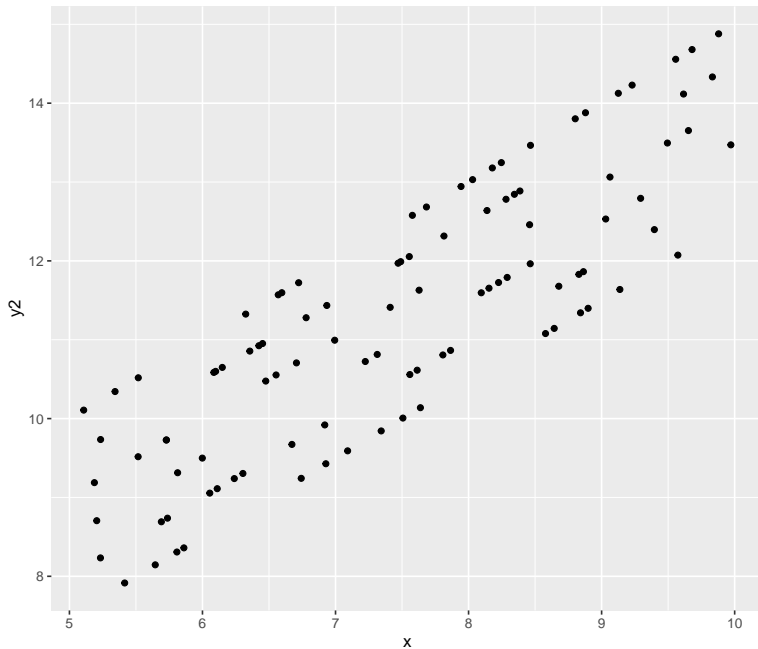
```
x <- runif(100, 5, 10)
y <- sample(5:10, 100, replace = T)
y2 <- (x+y/2)
fake <- data.frame(x,y,y2)
with(fake, plot(x,y2))
```



Tidyverse

- example using tidyverse

```
tibble(x=runif(100, 5, 10), y2=(x+sample(5:10, 100, replace = T))/2)  
  
%>%  
  
ggplot(aes(x,y2)) + geom_point()
```



One file, various output

Rmarkdown file

The screenshot displays the RStudio interface with the following components:

- Editor:** Shows an R Markdown file named `PHClassWRMd.Rmd`. The code includes a plot of pressure and a mediation model example.
- Console:** Shows the rendered HTML output, including a plot and a table of results.
- Files Panel:** Shows the file structure of the project, including `.gitignore`, `PHClassWRMd.html`, `PHClassWRMd.Rproj`, `PHClassWRMd.Rmd`, `PHClassWRMd.pdf`, `test pdf.Rmd`, and `test-pdf.pdf`.

```
[r] pressure, echo=FALSE
plot(pressure)

Note that the 'echo = FALSE' parameter was added to the code
chunk to prevent printing of the R code that generated the
plot.

## Example - Mediation and confounder

Among important concept in disease causation is bias and
confounding. Confounders can be due to a noncausal association
between a given exposure and an outcome observed as a result of
the influence of third variable.



```
{r}
grid.newpage()
exposure <- "
 Exposure
 (e.g., Coffee)"
expbox <- boxGrob(exposure, x=.2, y=.8)
outcome <- "
 Outcome
 (e.g., Lung Ca)"
outbox <- boxGrob(outcome, x=.8, y=.8)
confounder <- "
 Confounder
 (e.g., Smoking)"
confbox <- boxGrob(confounder, x=.5, y=.2)
connectGrob(expbox, outbox, "horizontal")
connectGrob(expbox, confbox, "vertical")
connectGrob(confbox, expbox, "vertical")
connectGrob(confbox, outbox, "vertical")

expbox
outbox
confbox
```


```

```
+ "outcome"
+ "(e.g., Lung Ca)"
> outbox <- boxGrob(outcome, x=.8, y=.8)
> confounder <- "
+ "Confounder"
+ "(e.g., Smoking)"
> confbox <- boxGrob(confounder, x=.5, y=.2)
> connectGrob(expbox, outbox, "horizontal")
> connectGrob(expbox, confbox, "vertical")
> connectGrob(confbox, expbox, "vertical")
> connectGrob(confbox, outbox, "vertical")
>
> expbox
> outbox
> confbox
> |
```

Name	Size
..	
.gitignore	52 B
PHClassWRMd.html	364.6 KB
PHClassWRMd.Rproj	217 B
PHClassWRMd.Rmd	1.4 KB
PHClassWRMd.pdf	94.6 KB
test pdf.Rmd	1.8 KB
test-pdf.pdf	181.7 KB

One file, various output

HTML output

The screenshot shows a web browser window displaying an R Markdown document. The browser's address bar shows the file path `C:/Users/Mohd%20Azmi/Do...`. On the left, a sidebar menu lists 'R Markdown', 'Including Plots', and 'Example - Mediation and confounder' (which is highlighted). The main content area features a line plot with 'temperature' on the x-axis (ranging from 0 to 350) and an unlabeled y-axis. Below the plot, a text note states: 'Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.'

Example - Mediation and confounder

Among important concept in disease causation is bias and confounding. Confounders can be due to a noncausal association between a given exposure and an outcome observed as a result of the influence of third variable

Code

```
graph LR; C[Confounder] --> E[Exposure  
(e.g. Coffee)]; C --> O[Outcome  
(e.g. Lung Ca)]; E --> O;
```

The diagram illustrates a causal model where a confounder (represented by a box at the bottom) influences both the exposure (e.g., Coffee) and the outcome (e.g., Lung Ca). The exposure then leads to the outcome, forming a causal chain from exposure to outcome, with the confounder acting as a common cause for both.

One file, various output

pdf output

The screenshot shows a PDF viewer window titled "test-pdf.pdf". The left sidebar contains a "Bookmarks" panel with the following entries: "R Markdown", "Including Plots", and "Example - Mediation and confounder". The main content area displays R code for creating a causal diagram. The code is as follows:

```
outcome <-  
  "Outcome  
  (e.g. Lung Ca)"  
outbox <- boxGrob(outcome, x=.8, y=.8)  
confounder <-  
  "Confounder  
  (e.g. Smoking)"  
confbox <- boxGrob(confounder, x=.5, y=.2)  
connectGrob(expbox, outbox, "horizontal")  
connectGrob(expbox, confbox, "vertical")  
connectGrob(confbox, expbox, "vertical")
```

Below the code, a diagram is shown with three nodes: "Exposure (e.g. Coffee)", "Outcome (e.g. Lung Ca)", and "Confounder (e.g. Smoking)". The diagram illustrates a causal relationship where the Confounder influences both the Exposure and the Outcome, and the Exposure influences the Outcome.

```
graph LR  
  C["Confounder  
(e.g. Smoking)"] --> E["Exposure  
(e.g. Coffee)"]  
  C --> O["Outcome  
(e.g. Lung Ca)"]  
  E --> O
```

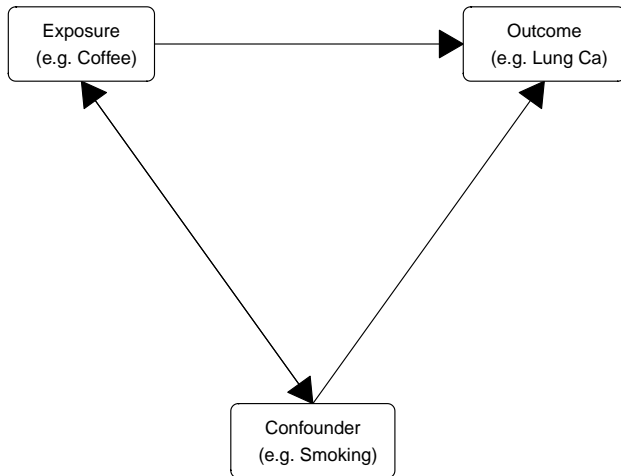
Generate simple chart directly

- Gmisc and grid package

source: https://cran.r-project.org/web/packages/Gmisc/vignettes/Grid-based_flowcharts.html

```
grid.newpage()
exposure <- "Exposure (e.g. Coffee)" expbox <- boxGrob(exposure, x=.2,
y=.8)
outcome <- "Outcome (e.g. Lung Ca)" outbox <- boxGrob(outcome,
x=.8, y=.8)
confounder <- "Confounder (e.g. Smoking)" confbox <-
boxGrob(confounder, x=.5, y=.2)
connectGrob(expbox, outbox, "horizontal") connectGrob(expbox, confbox,
"vertical") connectGrob(confbox, expbox, "vertical")
connectGrob(confbox, outbox, "vertical")
expbox outbox confbox
```

Generate simple chart directly



Generate simple chart directly

Other option - ggplot

source: <https://rpubs.com/phiggins/461686>

Student

- of course!
 - reproducible

Submit assignment

- RPubS
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