

# Public Health Class with R Markdown

subtitle here

Dr Mohd Azmi (MBBS, MPH)

Universiti Sains Malaysia, DrPH (Epidemiology) Candidate

# Target Audience

Aim: Introductory

- ▶ Teaching Staff
- ▶ Student

Disclaimer

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

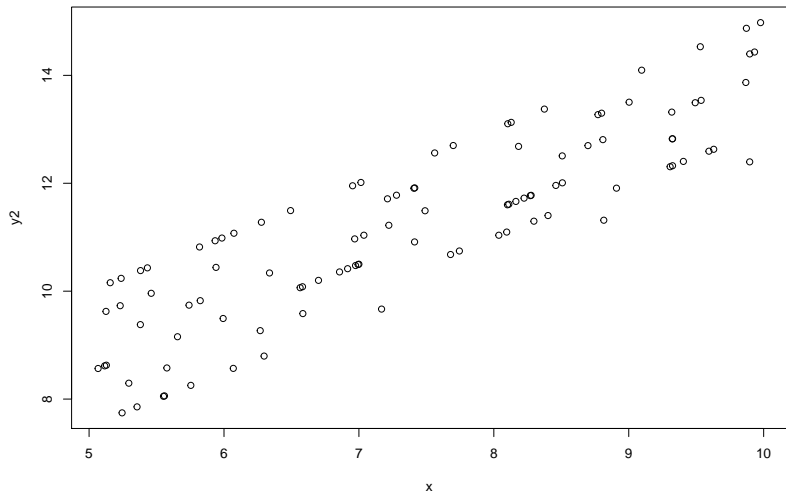
# Motivation

- ▶ 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))
```



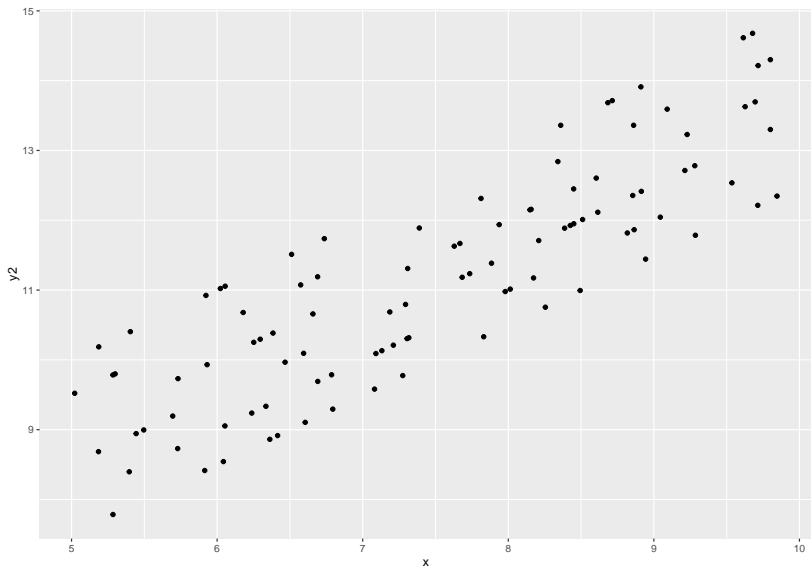
# Tidyverse

## ► example using tidyverse

```
tibble(x=runif(100, 5, 10), y2=(x+sample(5:10, 100, replace =  
T))/2)
```

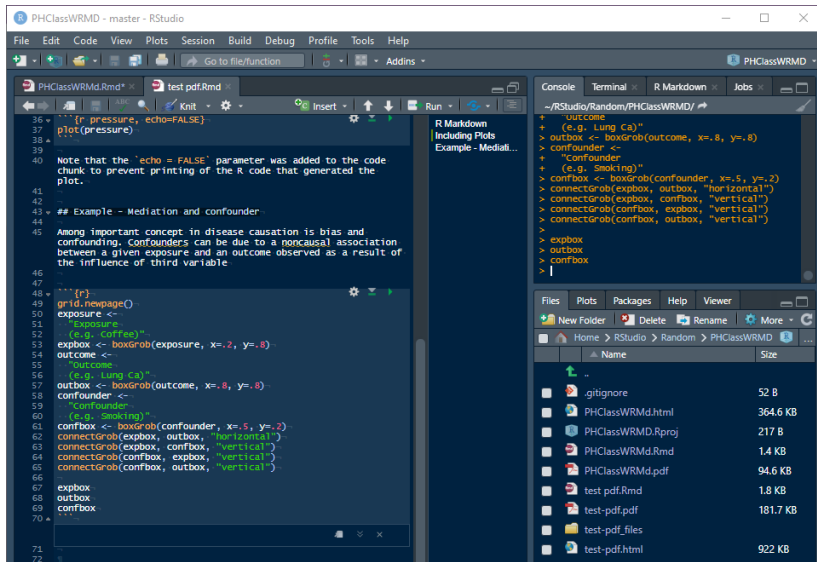
```
%>%
```

```
ggplot(aes(x,y2)) + geom_point()
```



# One file, various output

## Rmarkdown file



The screenshot displays the RStudio interface with the following components:

- Editor:** Shows the R Markdown file `PHClassWRMD.Rmd`. The code includes a plot of `pressure` and a text block explaining the concept of confounding in disease causation. The code for the plot is as follows:

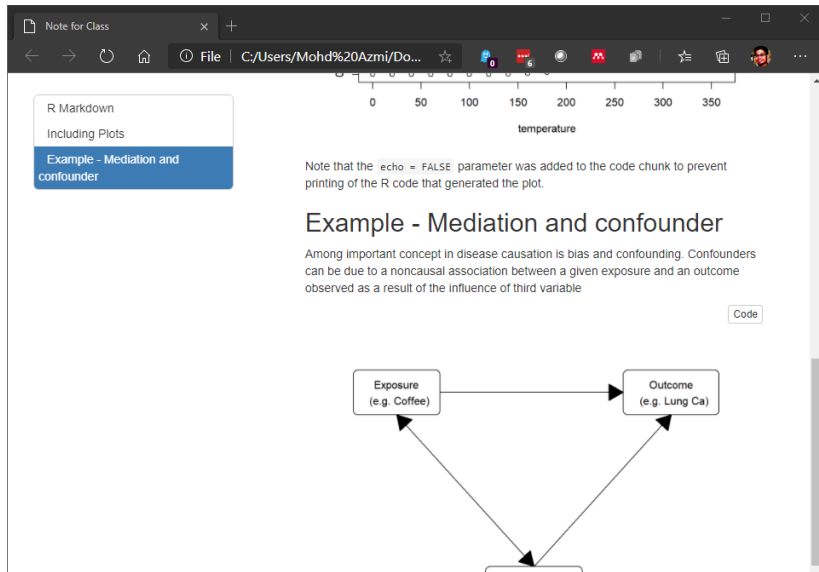
```
36 {r pressure, echo=FALSE}
37 plot(pressure)
38
39
40 Note that the 'echo = FALSE' parameter was added to the code
41 chunk to prevent printing of the R code that generated the
42 plot.
43
44 ## Example - Mediation and confounder
45
46 Among important concept in disease causation is bias and
47 confounding. Confounders can be due to a noncausal association
48 between a given exposure and an outcome observed as a result of
49 the influence of third variable
50
51
52 {r}
53 grid.newpage()
54 exposure <-
55   (e.g. Coffee)
56 expbox <- boxGrob(exposure, x=.2, y=.8)
57 outcome <-
58   (e.g. Lung Ca)
59 outbox <- boxGrob(outcome, x=.8, y=.8)
60 confounder <-
61   (e.g. Smoking)
62 confbox <- boxGrob(confounder, x=.5, y=.2)
63 connectGrob(expbox, outbox, "horizontal")
64 connectGrob(expbox, confbox, "vertical")
65 connectGrob(confbox, expbox, "vertical")
66 connectGrob(confbox, outbox, "vertical")
67
68 expbox
69 outbox
70 confbox
```
- Console:** Shows the execution of the R code, including the creation of the plot and the generation of the box grobs.

```
~/RStudio/Random/PHClassWRMD/
+ outcome
+ (e.g. Lung Ca)
+ outbox <- boxGrob(outcome, x=.8, y=.8)
+ 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
+ |
```
- File Explorer:** Shows the files generated by the R Markdown document, including `PHClassWRMD.html`, `PHClassWRMD.Rproj`, `PHClassWRMD.Rmd`, `PHClassWRMD.pdf`, `test.pdf.Rmd`, `test-pdf.pdf`, `test-pdf_files`, and `test-pdf.html`.



# 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...`. The document's sidebar on the left contains a list of sections: "R Markdown", "Including Plots", and "Example - Mediation and confounder", with the latter being the active section. The main content area displays a plot of "temperature" on the x-axis, ranging from 0 to 350. 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[ ] --> E["Exposure  
(e.g. Coffee)"];
    C --> O["Outcome  
(e.g. Lung Ca)"];
    E --> O;
```

The diagram illustrates a causal model where a common cause (the confounder) influences both an exposure (e.g., Coffee) and an outcome (e.g., Lung Ca). The exposure then influences the outcome.

# One file, various output

## pdf output

test-pdf.pdf

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Find:

Bookmarks

- R Markdown
- Including Plots
- Example - Mediation and confounder

```
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")
```

2

```
connectGrob(confbox, outbox, "vertical")  
  
expbox  
outbox  
confbox
```

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

## Generate simple chart directly

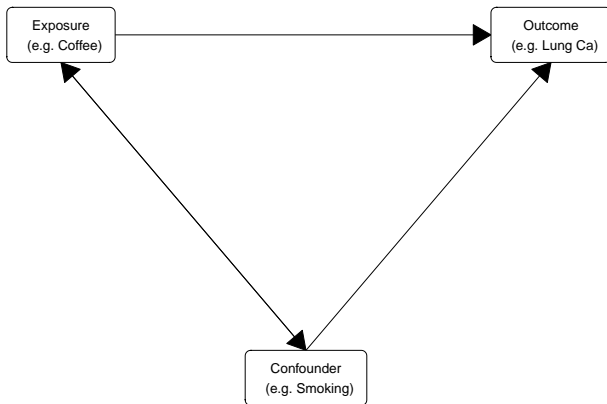
- Gmisc and grid package

source:

[https://cran.r-project.org/web/packages/Gmisc/vignettes/Grid-based\\_flowcharts.html](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

