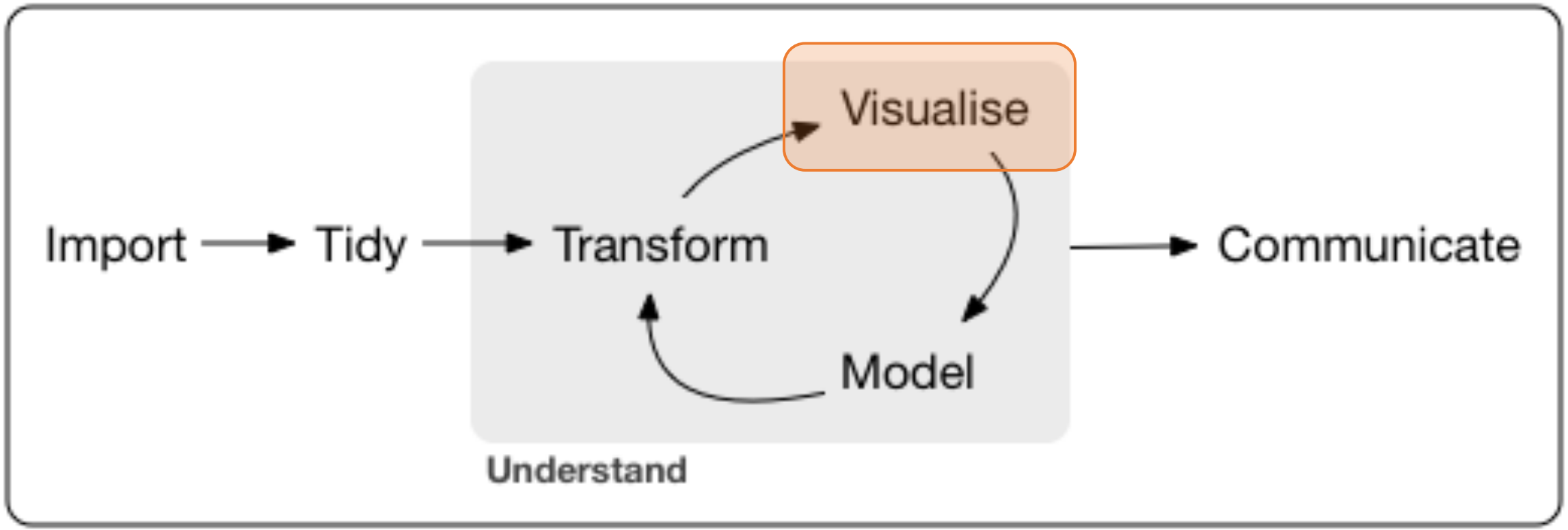
Week 9: Plotting with ggplot2 (III)


Visualise
Import
Tidy
Transform
Communicate
Model
Understand

Let’s recap

- How can we add a smooth line to a plot?
- When would you use scale_color_manual ( )?
- How can you create subplots?
- How would you add a title?
- What would happen to your plot if you add + theme_bw?

Today

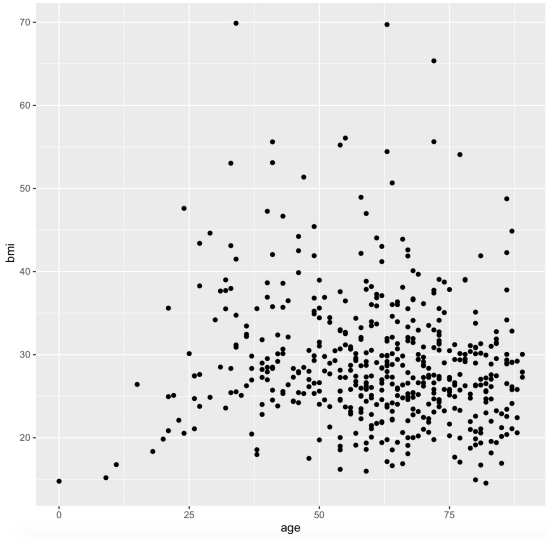
- **Visualize**
  - Coordinate system
    - coord_flip()
    - coord_polar
  - Themes
  - Arranging plots
  - Jitter
  - Other geometrics
    - geom_line()
    - geom_density
    - geom_violin()
  - Limits
  - Add vertical line

Let's get set

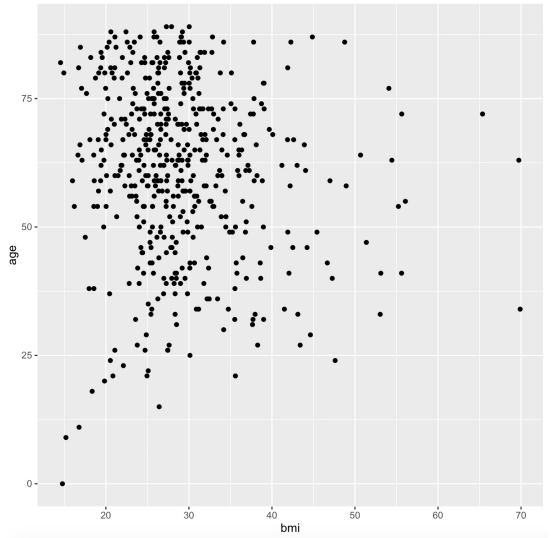
- Create an R project for this session and name it “week_9”
- Open the script file and rename it
- Place the files Sinai_covid.csv and covid2.csv in the week_9 folder
- Load the tidyverse package
- Join the 2 datasets using full_join()

Coordinate system

```
ggplot(sinai_covid,
       aes(x = age, y = bmi)) +
  geom_point() +
```

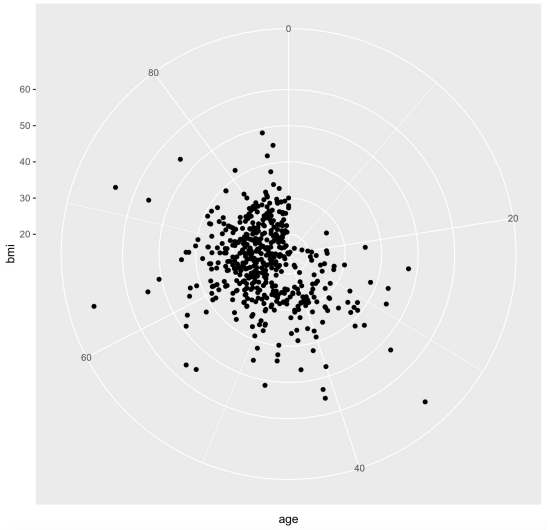



```
ggplot(sinai_covid,
       aes(x = age, y = bmi)) +
  geom_point() +
  coord_flip()
```

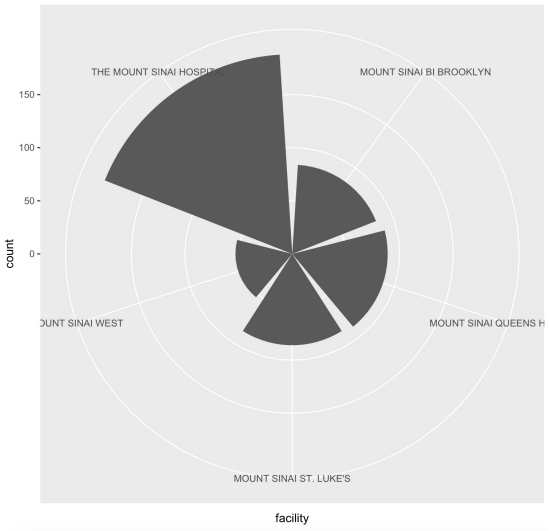


Coordinate system

```
ggplot(sinai_covid,
       aes(x = age, y = bmi)) +
  geom_point() +
  coord_polar()
```

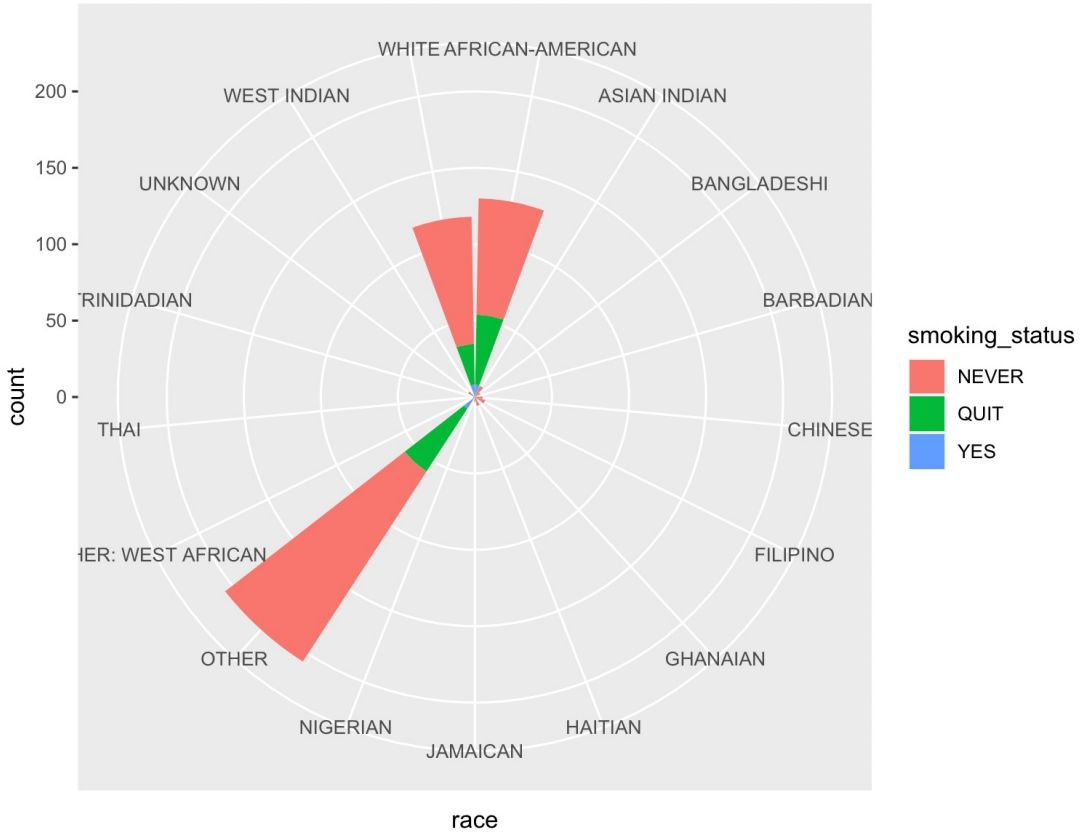



```
ggplot(sinai_covid,
       aes(x = facility)) +
  geom_bar() +
  coord_polar()
```



Your turn! Exercise 1

- Recreate the R code necessary to generate this plot:



Modifying theme components

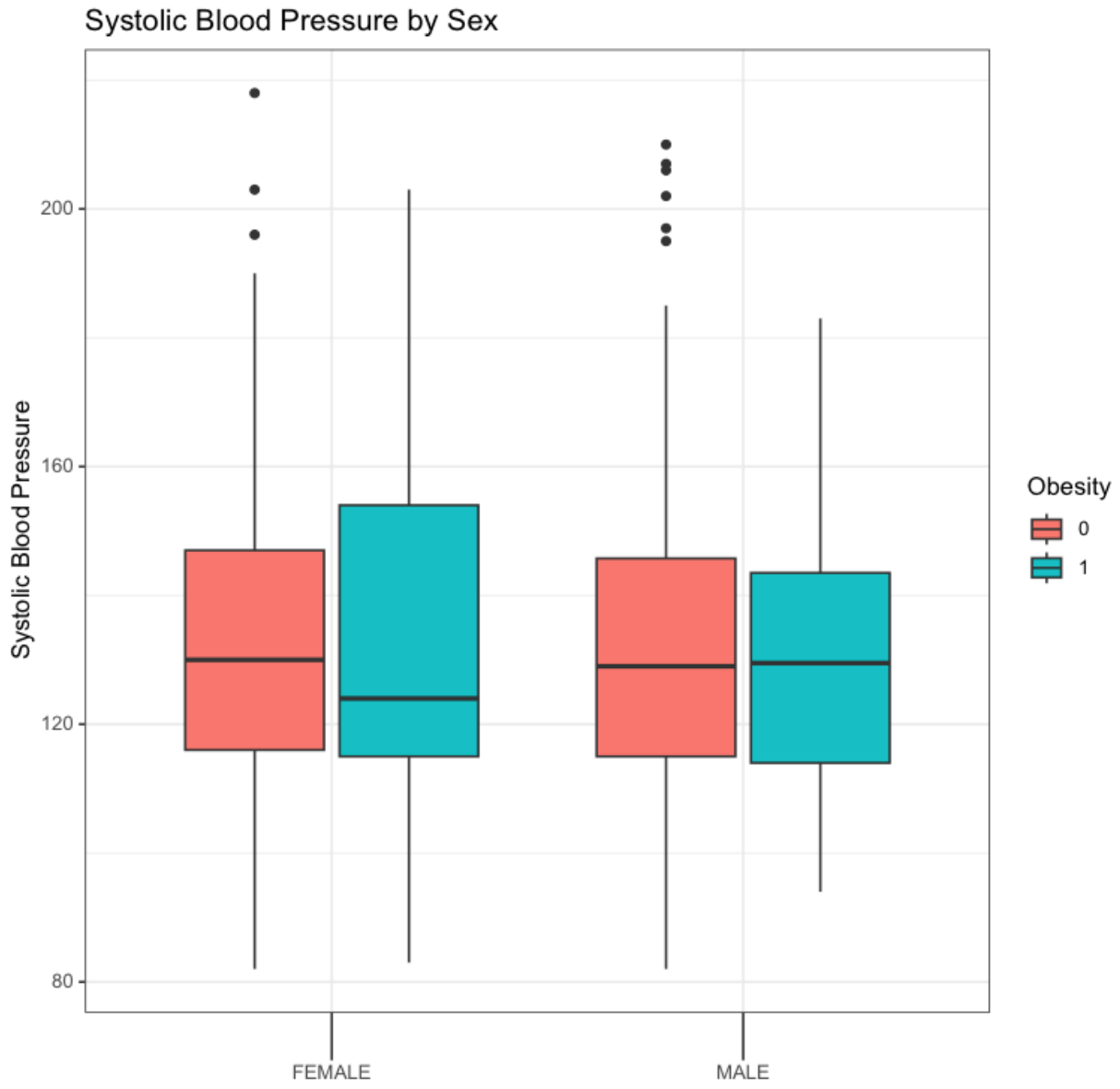
```
p1 <- ggplot(sinai_covid,
             aes(x = age, y = bmi,
                 color = facility)) +
  geom_point() +
  labs(title = "BMI as a function of age",
                  x = "",
                  y = "BMI",
                  color = "Hospital")
```

Modifying theme components

```
p1 +
  theme_bw() +
  theme(plot.title = element_text(face = "bold", size = 15),
        axis.text.x = element_text(angle = 90),
        axis.ticks = element_line(colour = "grey70", size = 0.2),
        panel.grid.major = element_line(colour = "grey70", size = 0.2),
        panel.grid.minor = element_blank())
```

Your turn! Exercise 2

- Recreate the R code necessary to generate this plot:



Arranging plots

```
library(patchwork)

p1 <- ggplot(sinai_covid,
             aes(x = age, y = bmi,
                 color = sex)) +
  geom_point()

p2 <- ggplot(sinai_covid,
             aes(x = sex, y = bmi))+
  geom_boxplot()

p3 <- ggplot(sinai_covid,
             aes(x = age)) +
  geom_histogram() +
  theme_classic()

p1 + p2 + p3
p1 / p2 / p3
p3 | (p2 / p1)
p1 + p2 + p3 + plot_layout(ncol = 2)
```

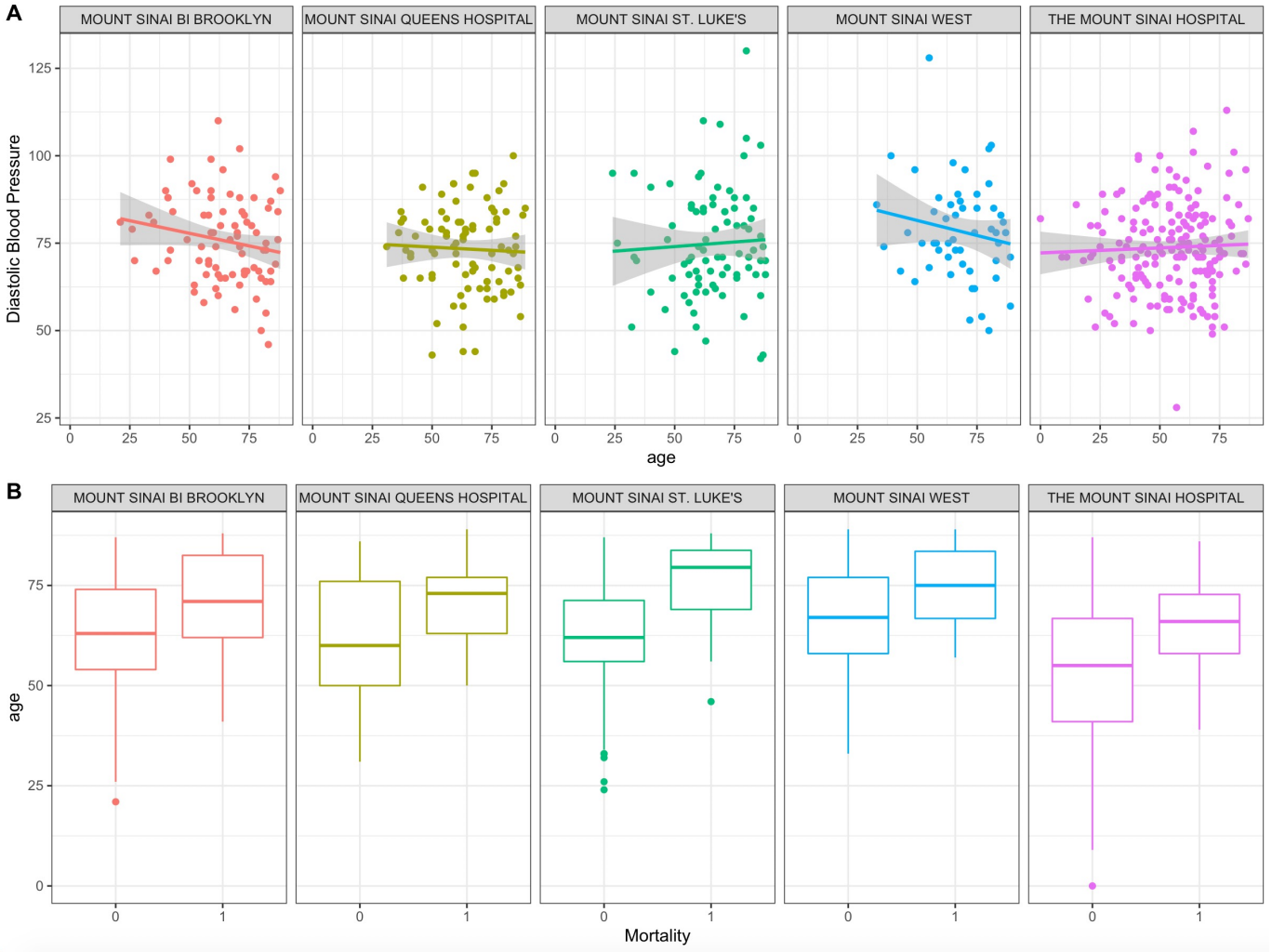
Arranging plots

ggarrange()

```
ggarrange(p1, p2, p3, ncol=1, labels = "AUTO")
```

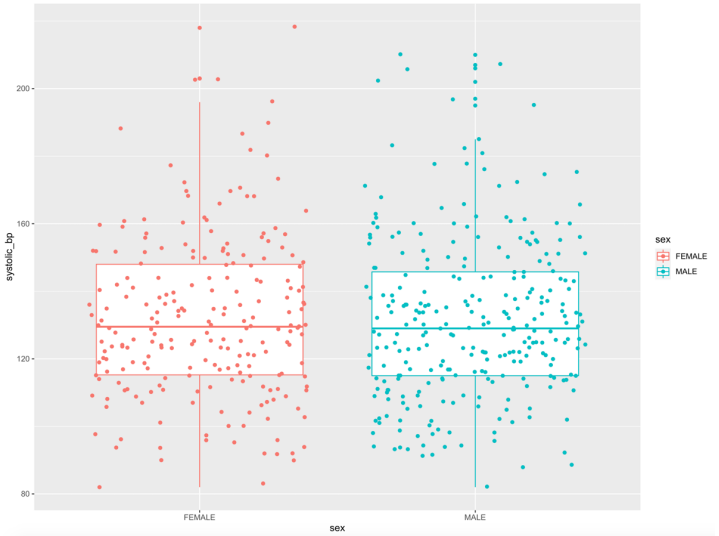
Your turn! Exercise 3

- Recreate the R code necessary to generate this plot:

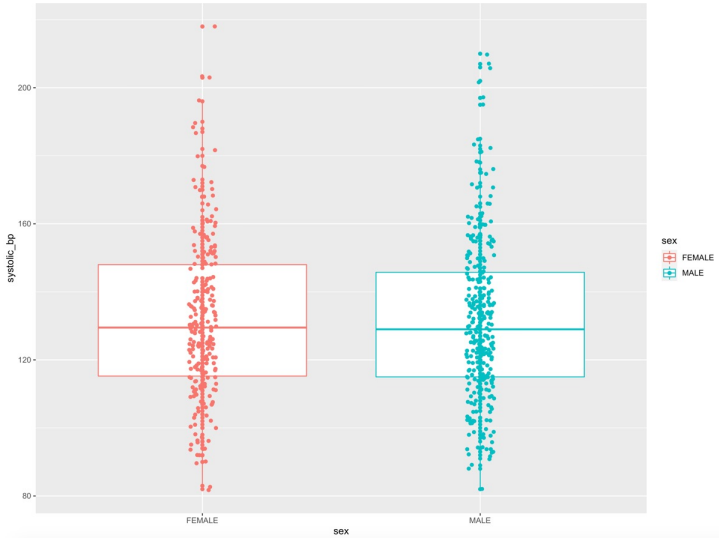


Jitter

```
ggplot(sinai_covid,
       aes(x = sex, y = systolic_bp, color = sex)) +
  geom_boxplot() +
  geom_point(position = position_jitter())
```




```
ggplot(sinai_covid,
       aes(x = sex, y = systolic_bp, color = sex)) +
  geom_boxplot() +
  geom_point(position = position_jitter(width = .05))
```

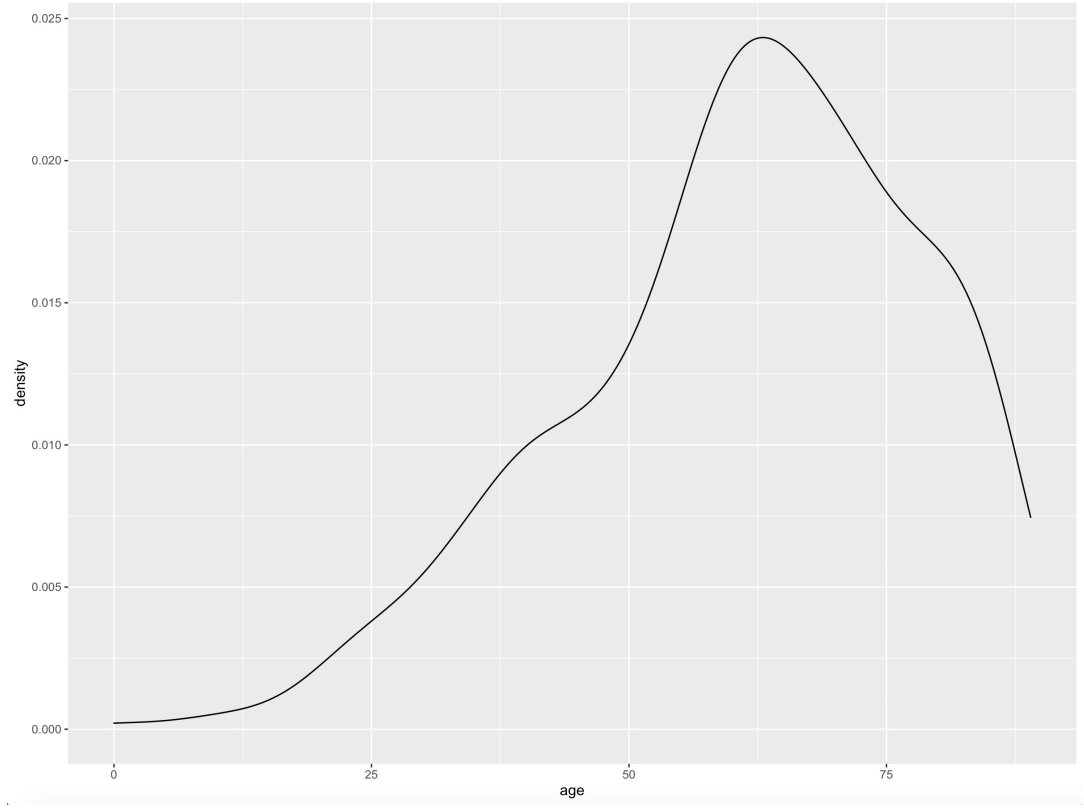


Other geometrics - geom_line()

```
ggplot(sinai_covid, aes(id, bmi)) +
  geom_line()
```

Other geometrics - geom_density()

```
ggplot(sinai_covid, aes(age)) +
  geom_density()
```



Other geometrics - geom_violin()

```
ggplot(sinai_covid,
       aes(x = sex, y = bmi, fill = sex)) +
  geom_violin()
```

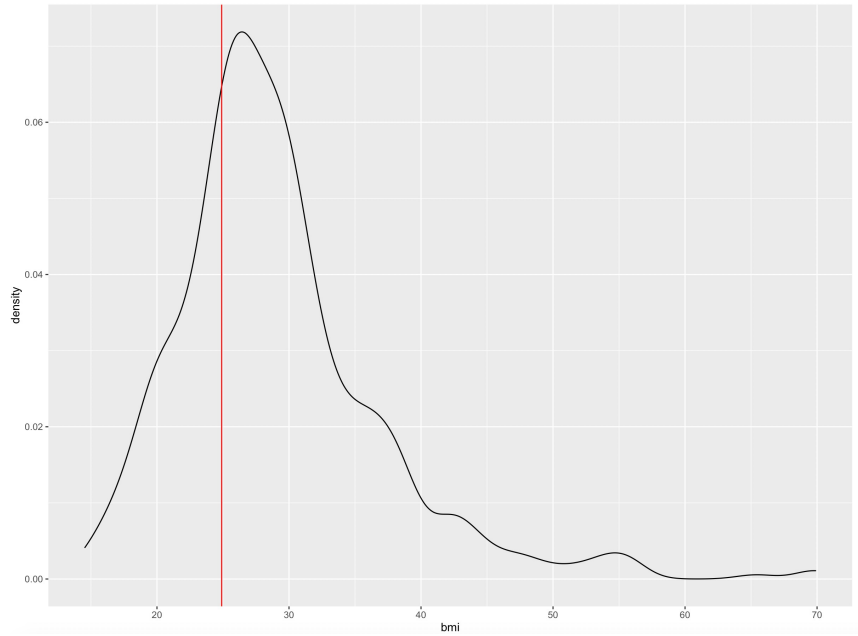
Limits

```
ggplot(sinai_covid,
       aes(x = sex, y = bmi, fill = sex)) +
  geom_violin() +
  geom_point(position = position_jitter()) +
  scale_y_continuous(limits = c(30, 50))

ggplot(sinai_covid,
       aes(x = sex, y = bmi, fill = sex)) +
  geom_violin() +
  geom_point(position = position_jitter()) +
  scale_y_continuous(limits = c(30, 50)) +
  ylim(30, 50)
```

Add vertical line

```
ggplot(sinai_covid, aes(bmi)) +
  geom_density() +
  geom_vline(xintercept = 24.9, colour = "red")
```



Saving your output

```
pdf("output.pdf", width = 6, height = 6)
p1
dev.off()
```

Your turn! Exercise 4

- Create a violin plot to visualize iq scores by facility
- Add jittered points
- Change the theme
- Create subplots by sex
- Store this plot in an object called “violin”

Your turn! Exercise 5

- Create a density plot to visualize the diastolic bp
- Color by smoking status
- Use a different color scale than the default
- Change the theme
- Create subplots by sex
- Store this plot in an object called “dens”

Your turn! Exercise 6

- Combine plots “violin” and “dense”, one under the other
- Export it as pdf
- What can you do to improve this plot?