

# STA 440 Final Project: Code Script

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## Package Import & Data Cleaning

```
library(dplyr)
```

Attaching package: 'dplyr'

The following objects are masked from 'package:stats':

filter, lag

The following objects are masked from 'package:base':

intersect, setdiff, setequal, union

```
library(tidyr)
library(readr)
library(ggplot2)
```

```
load("REE.RData")
```

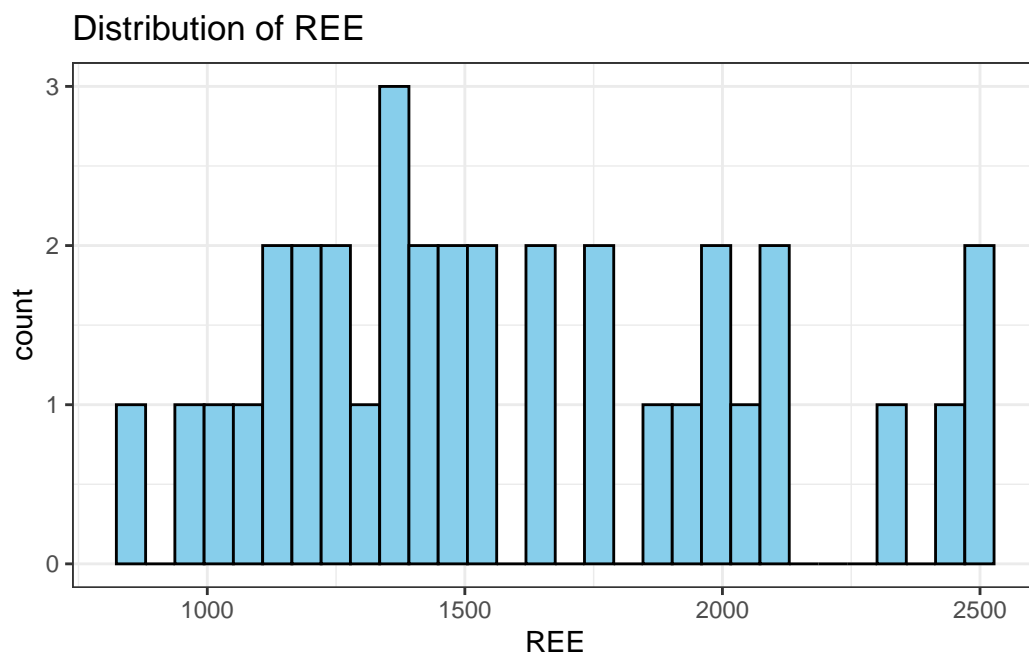
```
REE <- REE %>%
  mutate(
    ID = factor(ID),
    Obese = factor(Obese, levels = c(0, 1)),
    Ventilator = factor(Ventilator, levels = c(0, 1)),
    ICUorSDU = factor(ICUorSDU, levels = c("ICU", "SDU")),
    Measurement = as.numeric(Measurement)
  )
```



## EDA

```
# Histogram of REE
ggplot(REE, aes(x = REE)) +
  geom_histogram(fill = "skyblue", color = "black") +
  labs(title = "Distribution of REE") +
  theme_bw()
```

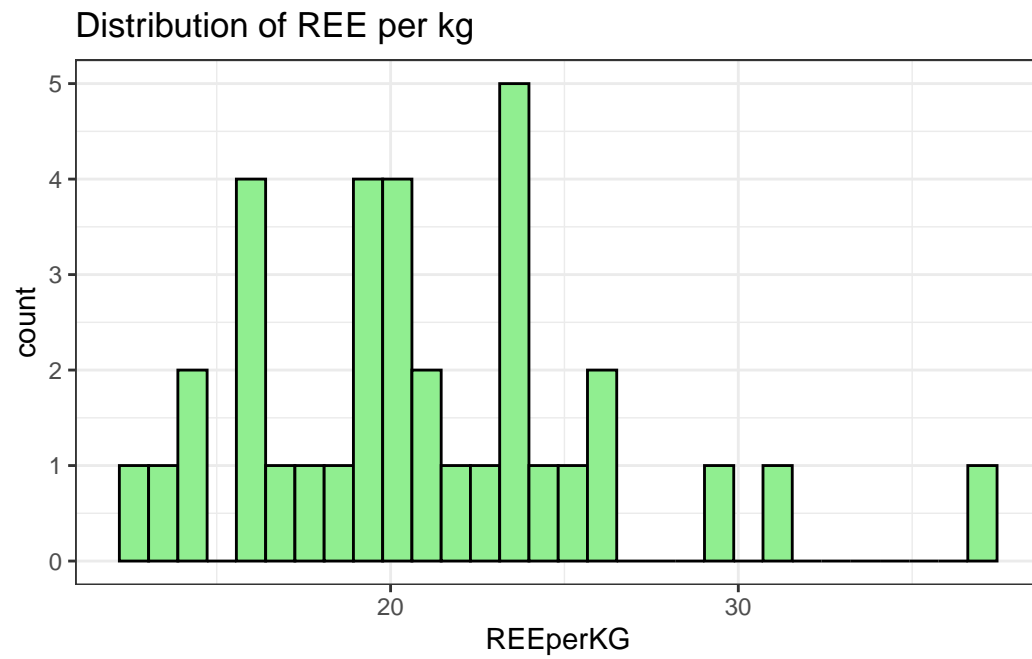
`stat\_bin()` using `bins = 30`. Pick better value with `binwidth`.



```
# Histogram of REE/kg
ggplot(REE, aes(x = REEperKG)) +
  geom_histogram(fill = "lightgreen", color = "black") +
  labs(title = "Distribution of REE per kg") +
  theme_bw()
```

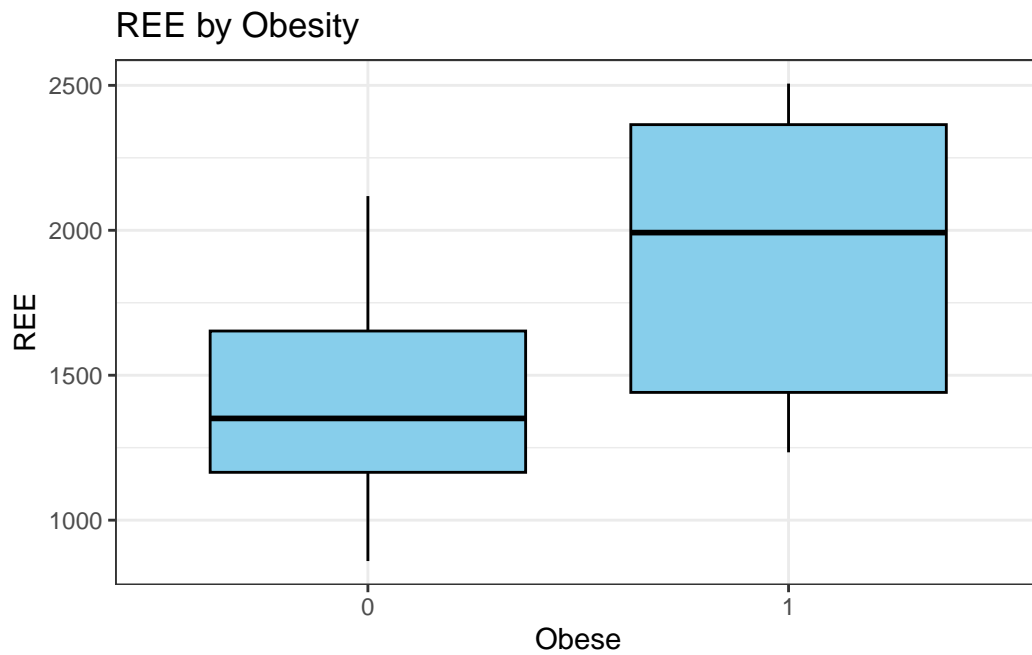
`stat\_bin()` using `bins = 30`. Pick better value with `binwidth`.





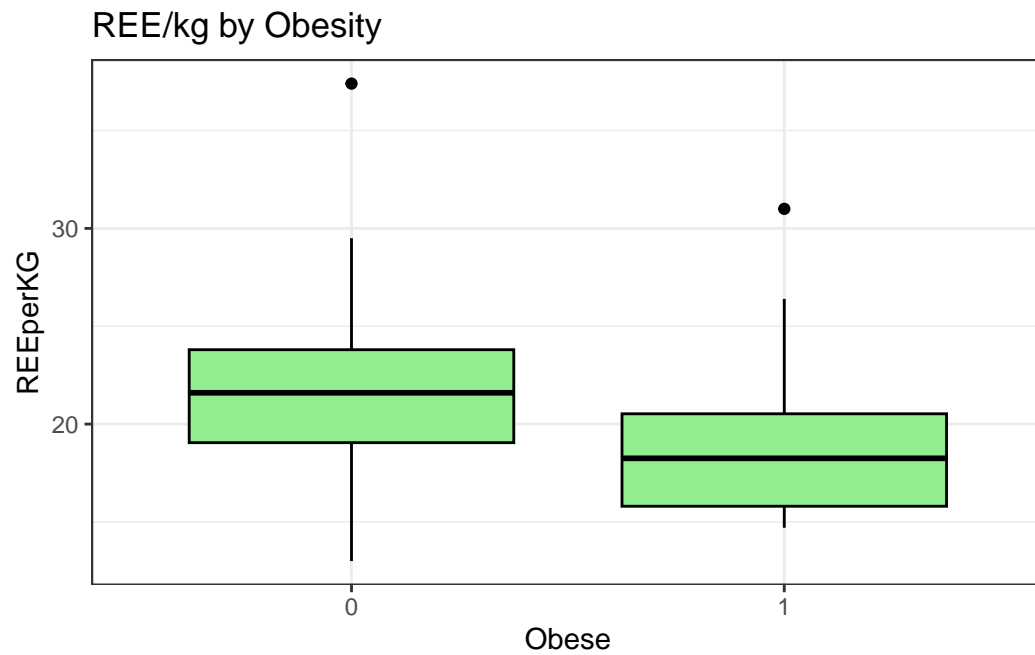
```
ggplot(REE, aes(x = Obese, y = REE)) +  
  geom_boxplot(fill = "skyblue", color = "black") +  
  labs(title = "REE by Obesity") +  
  theme_bw()
```





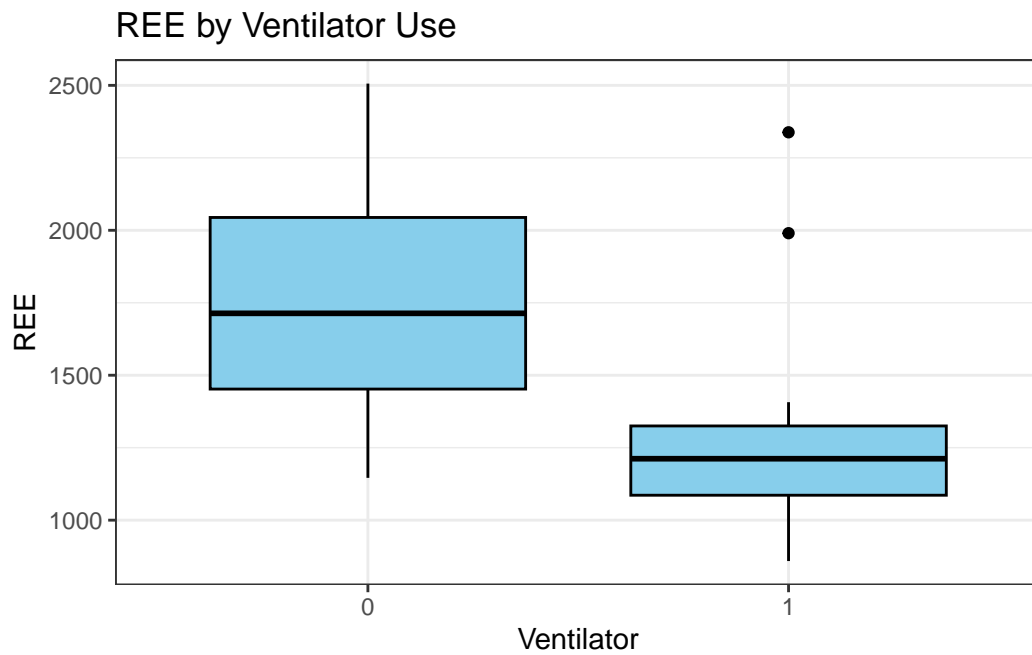
```
ggplot(REE, aes(x = Obese, y = REEperKG)) +  
  geom_boxplot(fill = "lightgreen", color = "black") +  
  labs(title = "REE/kg by Obesity") +  
  theme_bw()
```





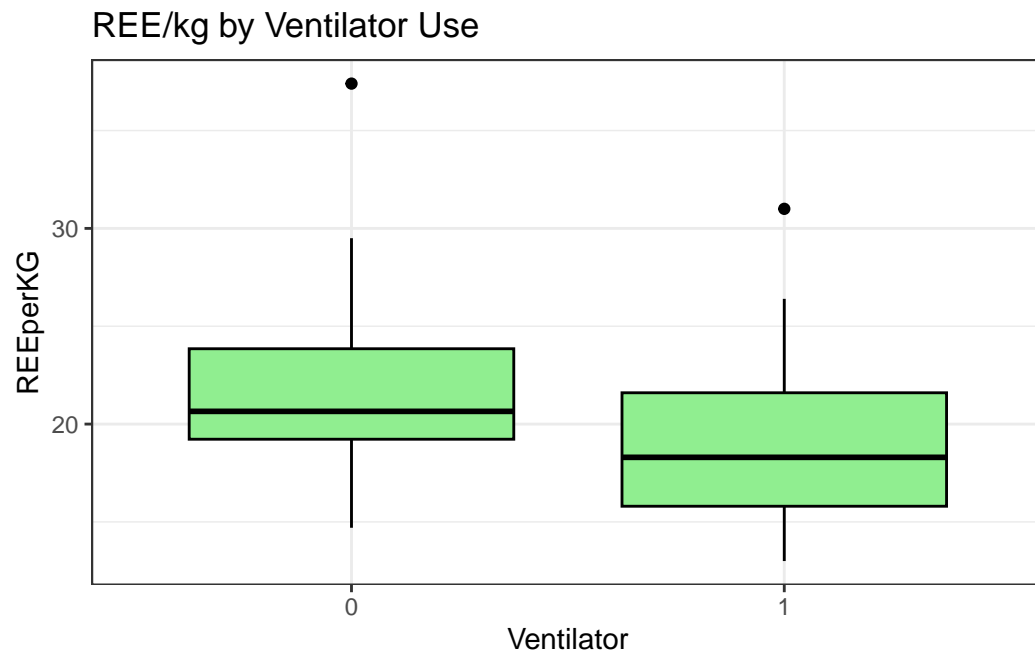
```
ggplot(REE, aes(x = Ventilator, y = REE)) +  
  geom_boxplot(fill = "skyblue", color = "black") +  
  labs(title = "REE by Ventilator Use") +  
  theme_bw()
```





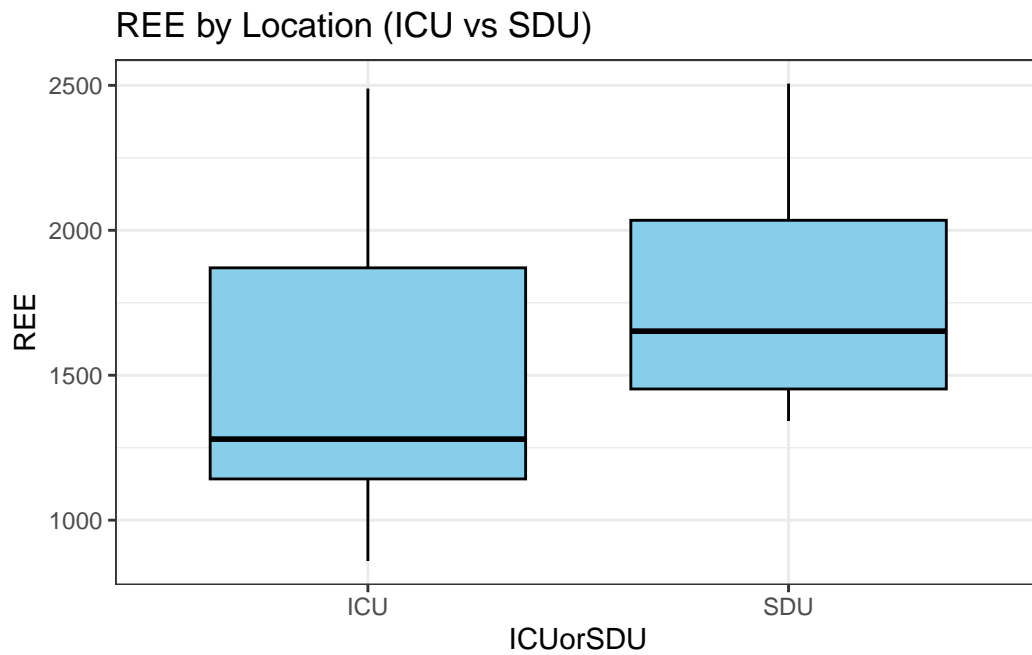
```
ggplot(REE, aes(x = Ventilator, y = REEperKG)) +  
  geom_boxplot(fill = "lightgreen", color = "black") +  
  labs(title = "REE/kg by Ventilator Use") +  
  theme_bw()
```





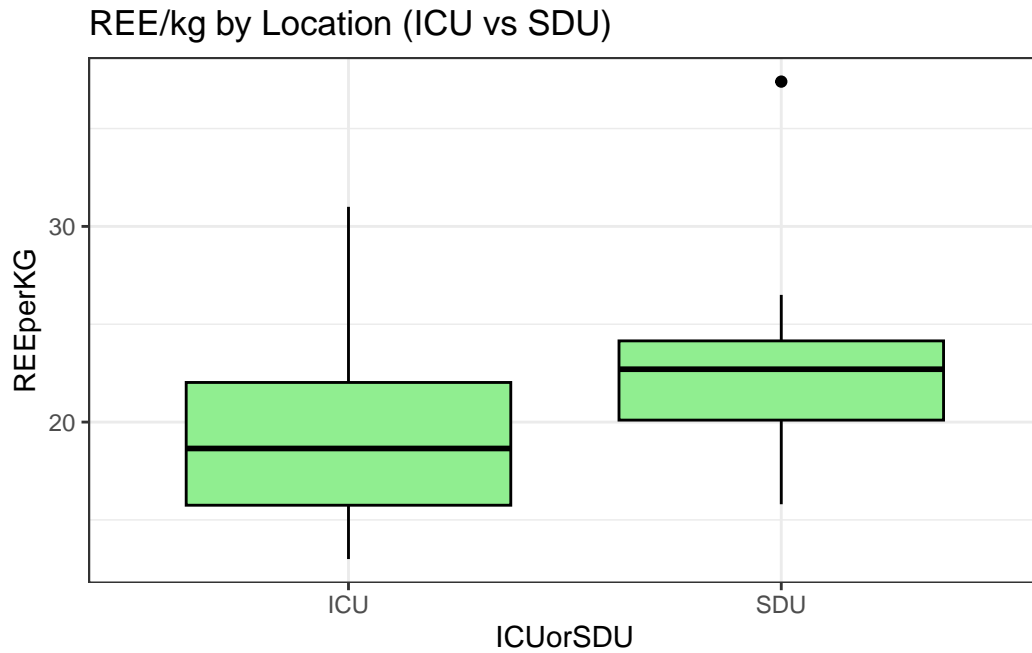
```
ggplot(REE, aes(x = ICUorSDU, y = REE)) +  
  geom_boxplot(fill = "skyblue", color = "black") +  
  labs(title = "REE by Location (ICU vs SDU)") +  
  theme_bw()
```





```
ggplot(REE, aes(x = ICUorSDU, y = REEperKG)) +  
  geom_boxplot(fill = "lightgreen", color = "black") +  
  labs(title = "REE/kg by Location (ICU vs SDU)") +  
  theme_bw()
```

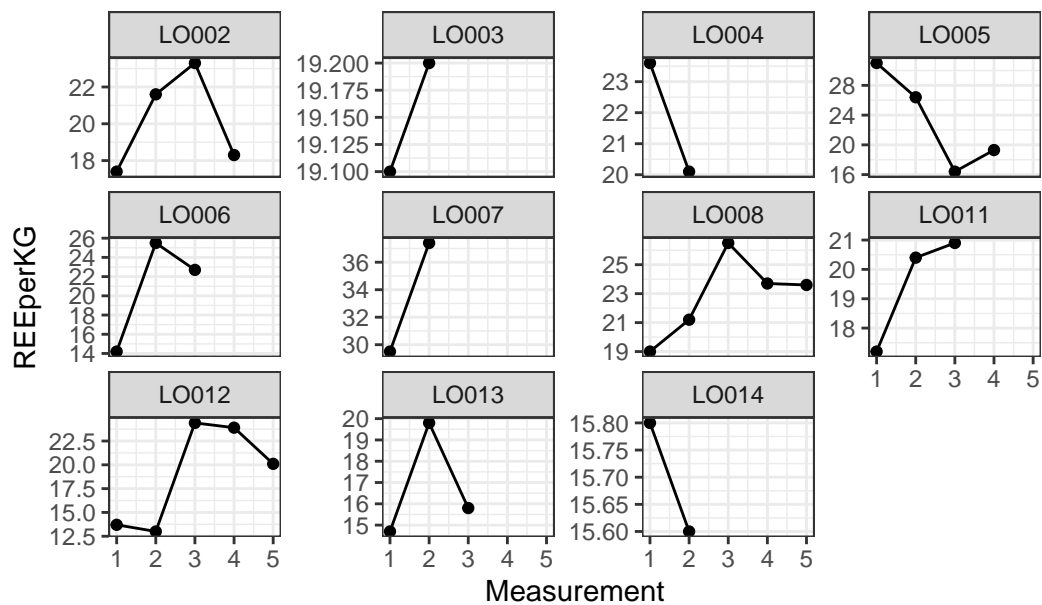




```
# Facet by patient: slope patterns
ggplot(REE, aes(x = Measurement, y = REEperKG)) +
  geom_line() +
  geom_point() +
  facet_wrap(~ ID, scales = "free_y") +
  labs(title = "REE per kg over Time for Each Patient") +
  theme_bw()
```

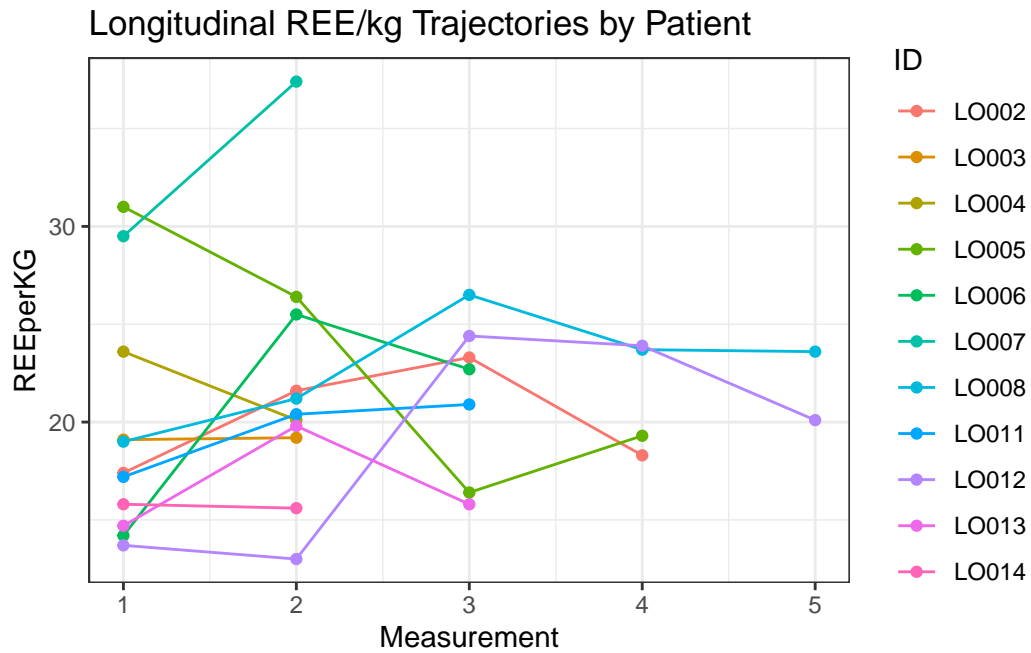


REE per kg over Time for Each Patient



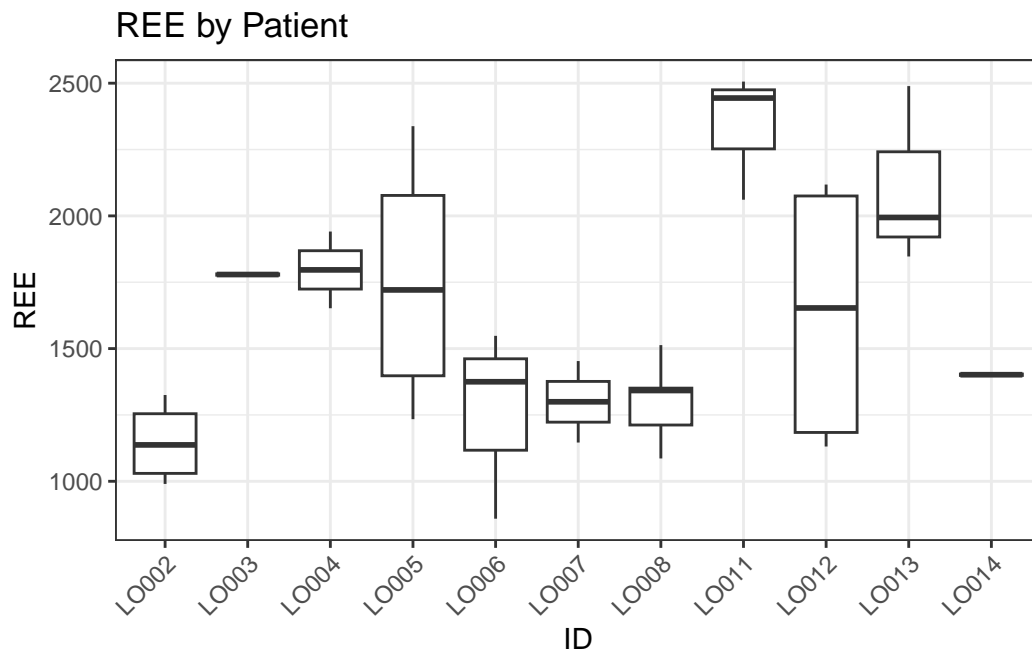
```
# Patient trajectories (spaghetti plot)
ggplot(REE, aes(x = Measurement, y = REEperKG, group = ID, color = ID)) +
  geom_line() +
  geom_point() +
  labs(title = "Longitudinal REE/kg Trajectories by Patient") +
  theme_bw() +
  theme(legend.position = "right")
```





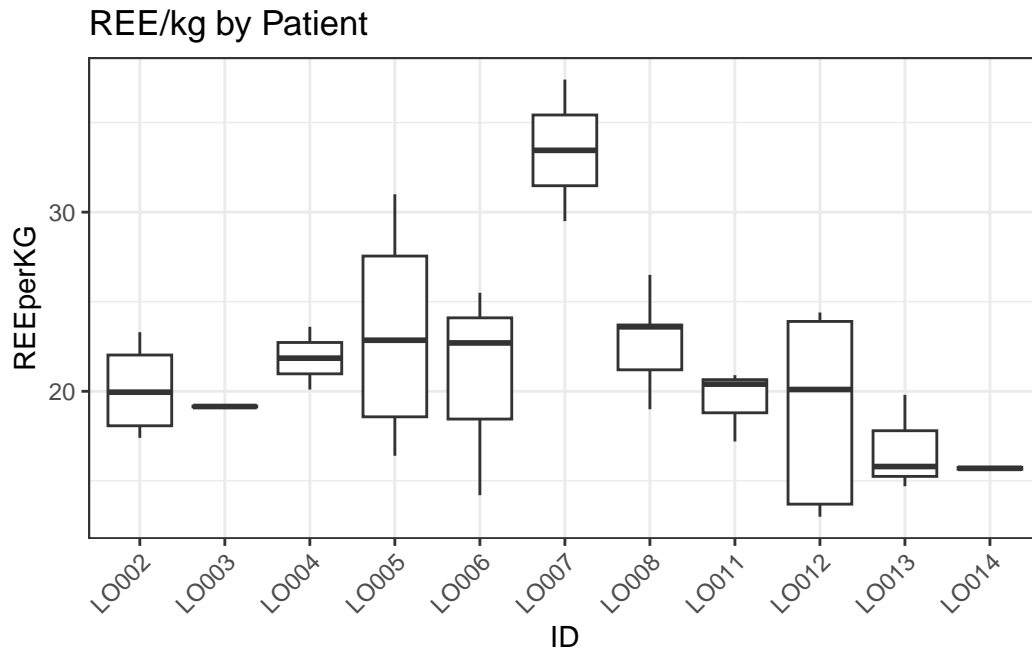
```
# Boxplot by patient
ggplot(REE, aes(x = ID, y = REE)) +
  geom_boxplot(outlier.colour = "red") +
  labs(title = "REE by Patient") +
  theme_bw() +
  theme(axis.text.x = element_text(angle = 45, hjust = 1))
```





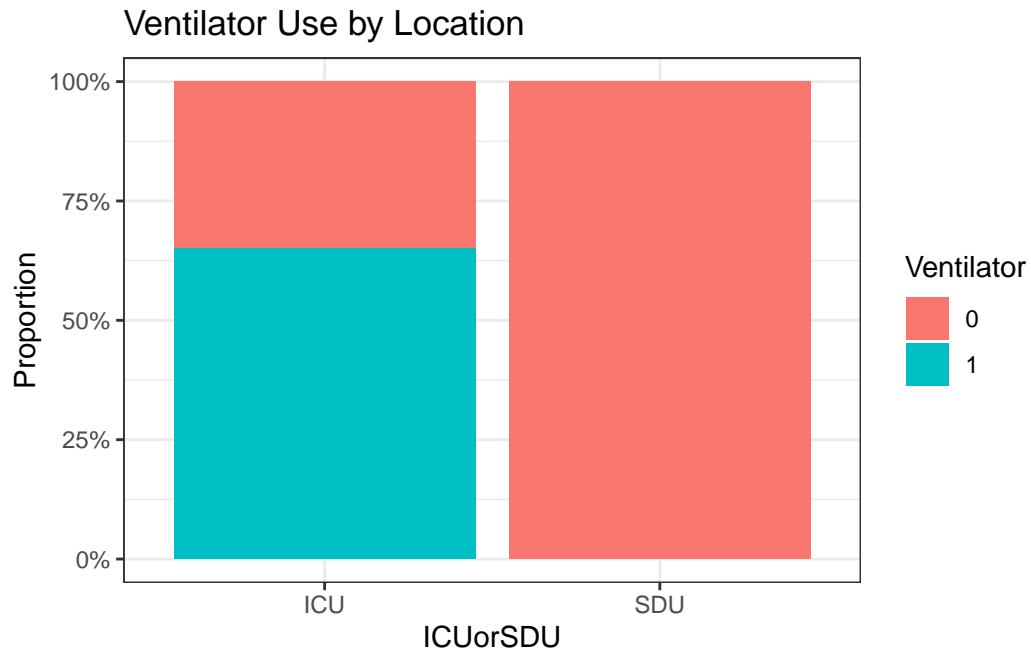
```
# Boxplot by patient
ggplot(REE, aes(x = ID, y = REEperKG)) +
  geom_boxplot(outlier.colour = "red") +
  labs(title = "REE/kg by Patient") +
  theme_bw() +
  theme(axis.text.x = element_text(angle = 45, hjust = 1))
```





```
# Proportion of Ventilation by Location
ggplot(REE, aes(x = ICUorSDU, fill = Ventilator)) +
  geom_bar(position = "fill") +
  scale_y_continuous(labels = scales::percent) +
  labs(y = "Proportion", title = "Ventilator Use by Location") +
  theme_bw()
```

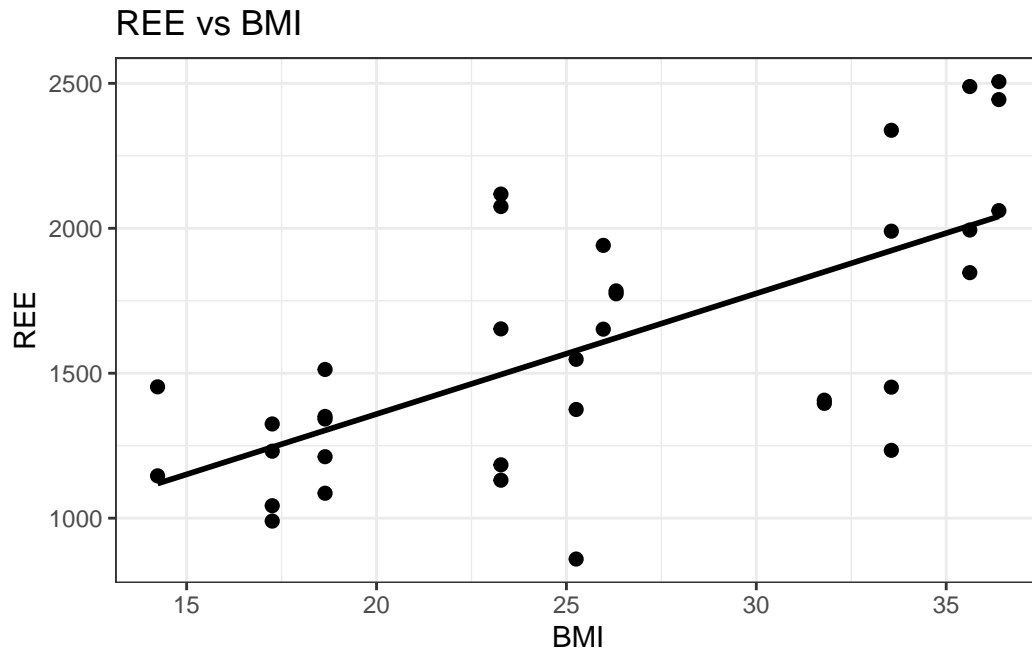




```
# REE vs BMI
ggplot(REE, aes(x = BMI, y = REE)) +
  geom_point(size = 2) +
  geom_smooth(method = "lm", se = FALSE, colour = "black") +
  labs(title = "REE vs BMI") +
  theme_bw()
```

``geom_smooth()`` using formula = 'y ~ x'





```
# REE/kg vs BMI
ggplot(REE, aes(x = BMI, y = REEperKG, colour = Obese)) +
  geom_point(size = 2) +
  geom_smooth(method = "lm", se = FALSE, linetype = "dashed") +
  labs(title = "REE/kg vs BMI") +
  theme_bw()
```

``geom_smooth()`` using formula = 'y ~ x'



