

Name: Yuhui Wang
UID: 606332401

1.

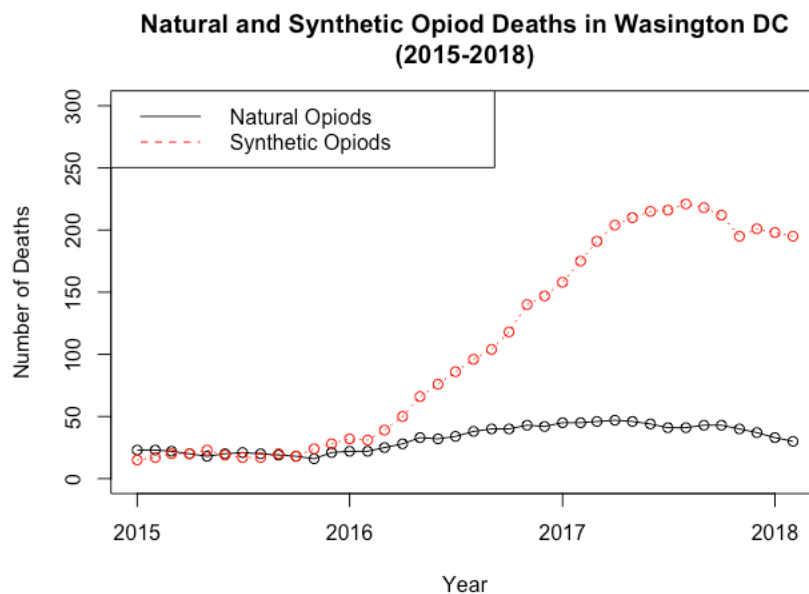
#1

```
dc <- ods[ods$STATE == "DC",]  
dc <- dc[order(dc$DATA_DATE),]
```

```
plot(dc$DATA_DATE, dc$NUMBER_NATURAL_OPIOID_DEATHS,  
     type = "o",  
     main = "Natural and Synthetic Opiod Deaths in Wasington DC\n(2015-2018)",  
     xlab = "Year",  
     ylim = c(0,300),  
     ylab = "Number of Deaths",  
     col = "black")
```

```
lines(dc$DATA_DATE, dc$NUMBER_SYNTHETIC_OPIOID_DEATHS, type="o", lty=3, col="red")
```

```
legend("topleft", as.Date("01/01/2017", format="%m/%d/%Y"),  
      legend = c("Natural Opiods", "Synthetic Opiods"),  
      col=c("black", "red"),  
      lty=1:3)
```



2.

#2

```
data2 <- droplevels(ods[ods$STATE %in% c('VT','NH','ME','CT','RI'),])
```

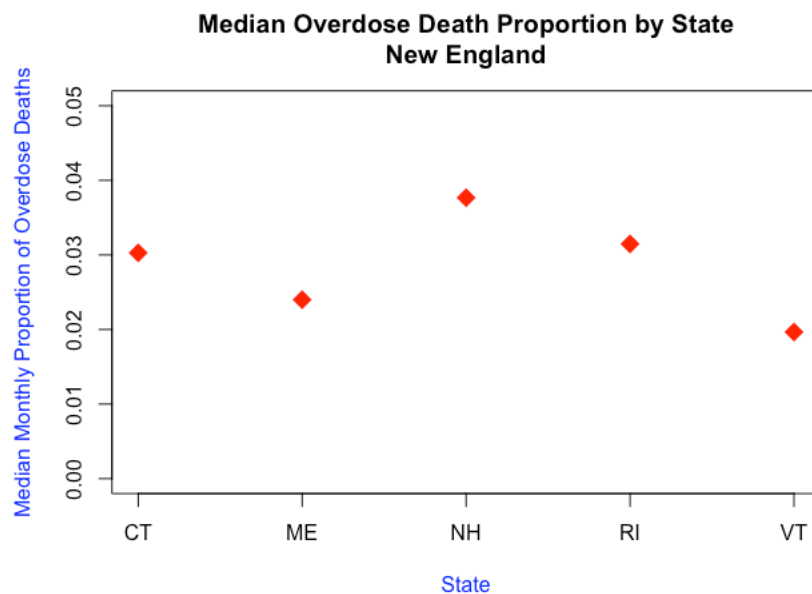
```
proportion <- tapply(data2$NUMBER_DRUG_OVERDOSE_DEATHS/data2$NUMBER_DEATHS,
  data2$STATE,
  median, na.rm=T)
```

```
plot(proportion,
  type = "p",
  pch = 18,
  col = "red",
  cex = 2,
  axes = FALSE,
  ann = FALSE,
  ylim = c(0.00, 0.05) )
```

```
axis(1, at=1:5, lab = names(proportion))
axis(2,seq(0.00, 0.05, by = 0.01))
```

```
box()
```

```
title (main = "Median Overdose Death Proportion by State\nNew England", col.lab = "black")
title (ylab = "Median Monthly Proportion of Overdose Deaths", col.lab = "blue")
title (xlab = "State", col.lab = "blue")
```



3.
#3

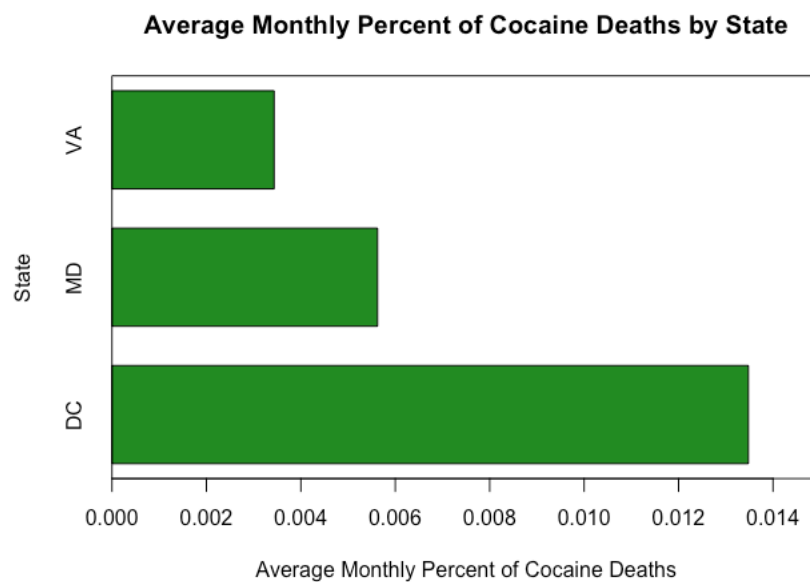
```

new <- droplevels(ods[ods$STATE %in% c('DC','MD','VA'),])

newmean <- tapply(new$NUMBER_COCAINE_DEATHS/new$NUMBER_DEATHS,
  new$STATE,
  mean, na.rm=T)
newmean

barplot(newmean,
  main="Average Monthly Percent of Cocaine Deaths by State",
  ylab="State",
  xlab="Average Monthly Percent of Cocaine Deaths",
  col = "forestgreen",
  xlim = c(0,0.015),
  width = 0.4,
  space = 0.4,
  horiz = TRUE)
box()

```



4.

#4

```

north <- c('CT', 'DC', 'MD', 'ME', 'NH', 'NY', 'OR', 'RI', 'VT', 'WA')
south <- c('NC', 'NM', 'NV', 'OK', 'SC', 'UT', 'VA', 'WV')

```

```

fall <- c('September', 'October', 'November')

```

```

spring <- c('March', 'April', 'May')

```

```

winter <- c('December', 'January', 'February')

```

```
summer <- c('June', 'July', 'August')
```

```
data4 <- ods %>%
```

```
  mutate(REGION = 1*(STATE %in% north) + 2*(STATE %in% south),
```

```
    SEASON = 1*(MONTH %in% spring) + 2*(MONTH %in% summer) + 3*(MONTH %in% fall) +  
4*(MONTH %in% winter),
```

```
    PROP = NUMBER_DRUG_OVERDOSE_DEATHS/NUMBER_DEATHS) %>%
```

```
  group_by(SEASON,REGION) %>%
```

```
  summarize(AVGPROP = mean(PROP))
```

```
data4
```

```
matrix <- matrix(as.matrix(data4[,3]),nrow = 2,ncol = 4, byrow = FALSE)
```

```
colnames(matrix) <- c("Spring", "Summer", "Fall", "Winter")
```

```
row.names(matrix) <- c("Northern States", "Southern States")
```

```
matrix
```

```
barplot(matrix,
```

```
  beside= TRUE,
```

```
  main = "Mean Proportion Drug Overdose Deaths\nby Region and Season",
```

```
  xlab = "Season",
```

```
  ylab = "Mean Proportion Drug Overdose Deaths",
```

```
  col = c("blue", "yellow"),
```

```
  ylim = c(0.020,0.030),
```

```
  xpd = FALSE)
```

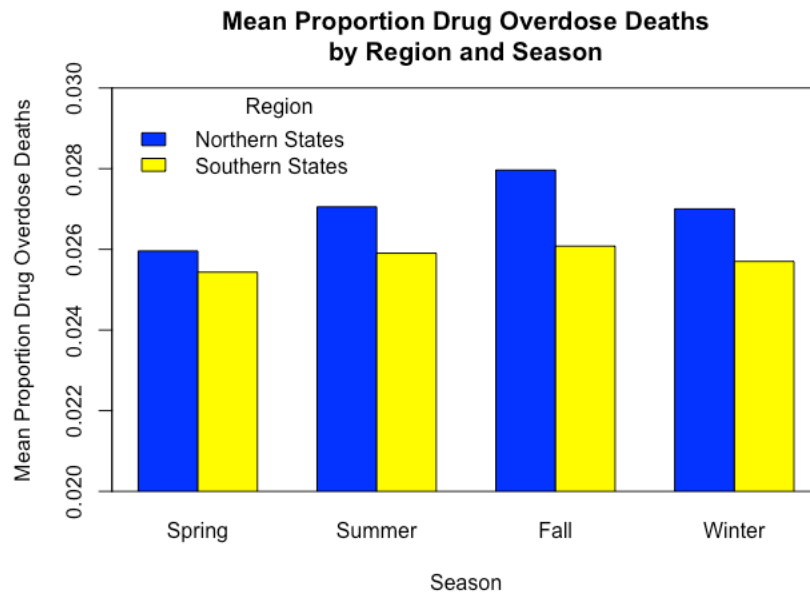
```
box()
```

```
legend("topleft", legend=c("Northern States", "Southern States"),
```

```
  bty="n",
```

```
  title = c("Region"),
```

```
  fill=c("blue", "yellow"))
```



5.

#5

```
opiod <- ods %>%
  filter(YEAR %in% c(2015,2016,2017), STATE == "NC" ) %>%
  group_by(YEAR) %>%
  summarize(natural = sum(NUMBER_NATURAL_OPIOID_DEATHS), synthetic =
sum(NUMBER_SYNTHETIC_OPIOID_DEATHS))
```

opiod

```
m <- matrix(as.matrix(opiod[,2:3]),nrow = 2,ncol = 3, byrow = TRUE)
```

```
colnames(m) <- c("2015","2016","2017")
```

```
row.names(m) <- c("Natural","Synthetic")
```

m

```
barplot(m,
  beside = FALSE,
  main = "Count of Opioid Overdose Deaths by Year and Opioid Type",
  xlab = "Year",
  ylab = "Count of Opioid Overdose Deaths",
  col = c("blue","grey"),
  ylim = c(0,20000))
box()
```

```
legend("topleft", legend=c("Natural","Synthetic"),  
      bty="n",  
      title = c("Opiod Type"),  
      fill=c("blue","grey"))
```

