Assignment 2: Data transformation

Due Sunday, October 4, 2020 @ 11:59pm

Public Health 280.346, Fall 2020

Your assignment for this module is to explore the full National Medical Expenditures Survey (NMES) dataset using the functions in the `dplyr` package. You will also re-create the graph you reproduced in Module 1 to make use of what you've learned about data transformation. Your assignment has three parts:

(1) Use the functions in the `dplyr` package to answer the following questions about our NMES data set:

- How many people in the dataset have an MSCD?
- What was the highest medical expenditure in this data?
- What was the highest medical expenditure for someone without an MSCD?
- How old is the youngest person with an MSCD?
- How old is the oldest person without an MSCD?

(2) Write R code to reproduce the following tables that compare people with and without an MSCD for the variables `age`, `bmi`, `educate`, `poor`, and `female`.

```
## `summarise()` ungrouping output (override with `.groups` argument)
```

```
## # A tibble: 2 x 4
##   mscd      n mean_age sd_age
##   <chr> <int>    <dbl>  <dbl>
## 1 No     3801     45.7   18.1
## 2 Yes     277     67.3   12.8
```

```
## `summarise()` ungrouping output (override with `.groups` argument)
```

```
## # A tibble: 2 x 4
##   mscd      n mean_bmi sd_bmi
##   <chr> <int>    <dbl>  <dbl>
## 1 No     3684     25.5   5.06
## 2 Yes     270     25.5   4.40
```

```
## `summarise()` regrouping output by 'mscd' (override with `.groups` argument)
```

```
## # A tibble: 8 x 4
## # Groups:   mscd [2]
##   mscd  educate      n percent
##   <chr> <fct>    <int>   <dbl>
## 1 No    CollGrad   650    17.1
## 2 No    SomeColl   753    19.8
## 3 No    HSGrad    1906    50.1
## 4 No    Other      492    12.9
## 5 Yes   CollGrad    30    10.8
## 6 Yes   SomeColl    39    14.1
## 7 Yes   HSGrad     148    53.4
## 8 Yes   Other       60    21.7
```

```
## `summarise()` regrouping output by 'mscd' (override with `.groups` argument)
```

```
## # A tibble: 4 x 4
## # Groups:   mscd [2]
##   mscd  poor         n percent
##   <chr> <fct>    <int>   <dbl>
## 1 No    Not Poor  2988    78.6
## 2 No    Poor       813    21.4
```

```
## 3 Yes   Not Poor   116    41.9
## 4 Yes   Poor       161    58.1
```

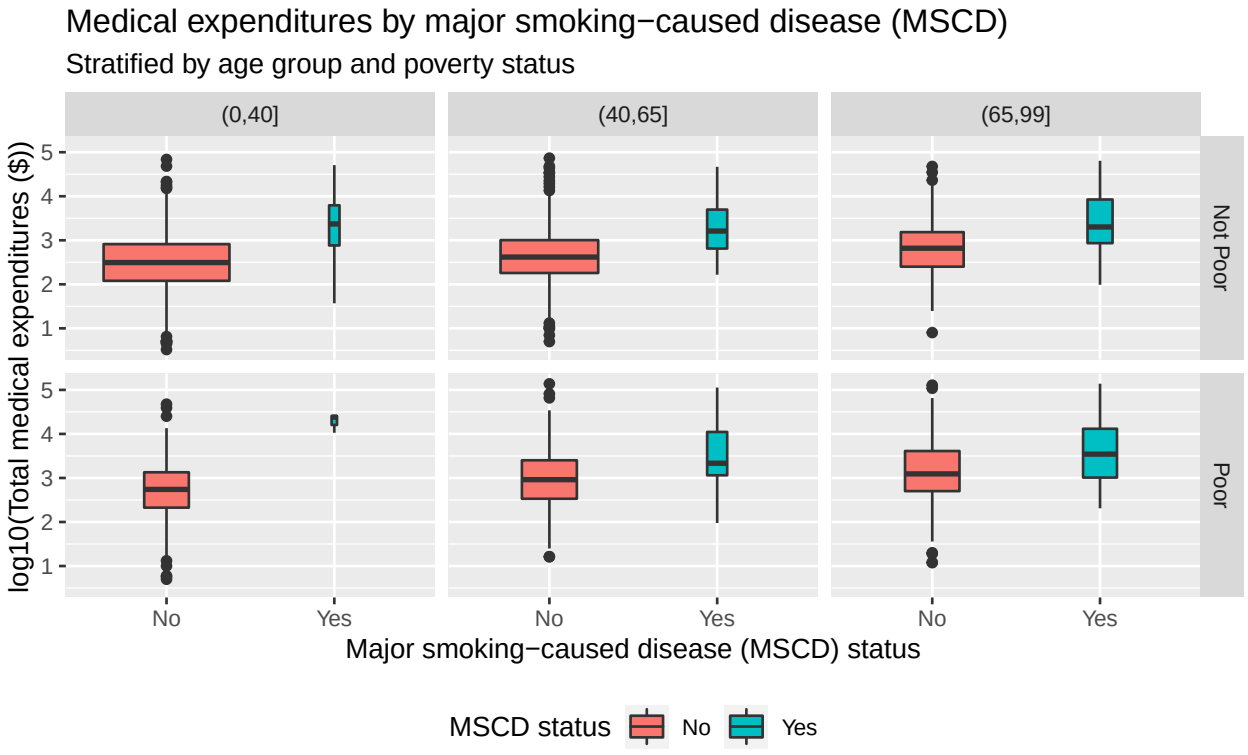
```
## `summarise()` regrouping output by 'mscd' (override with `.groups` argument)
```

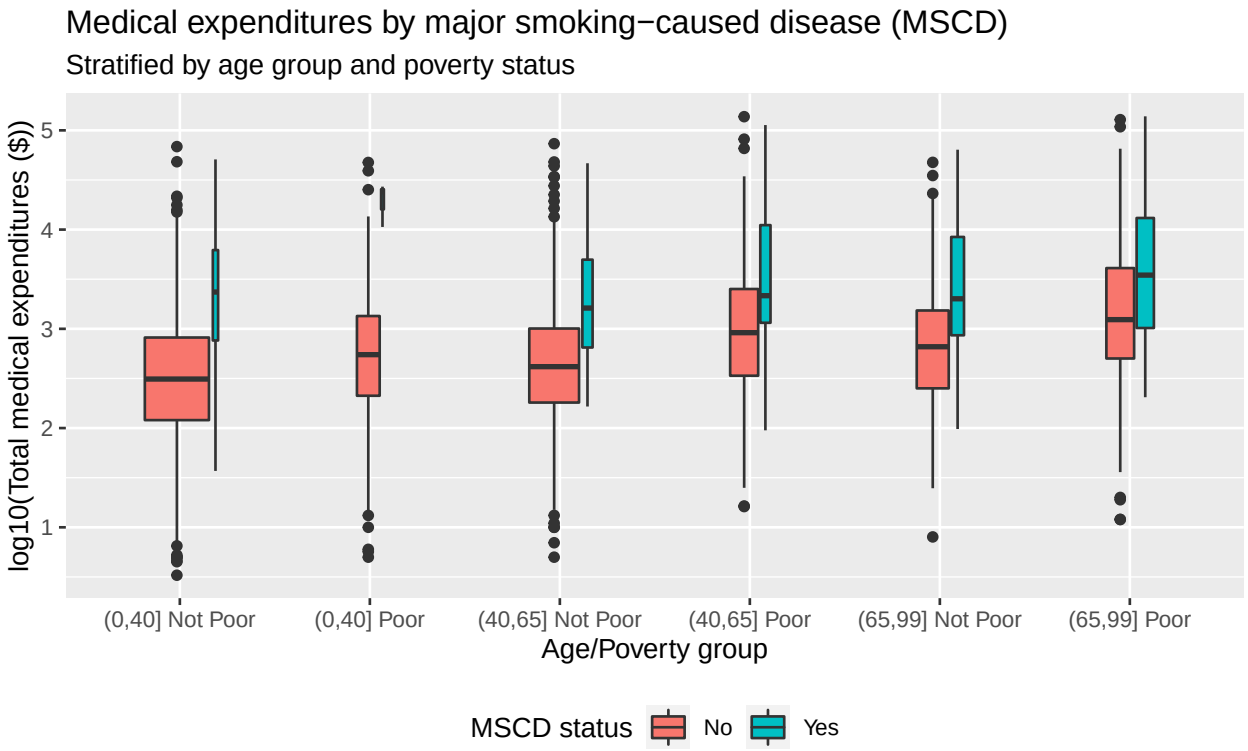
```
## # A tibble: 4 x 4
## # Groups:   mscd [2]
##   mscd  female     n percent
##   <chr> <fct>  <int>   <dbl>
## 1 No    Male    1446    38.0
## 2 No    Female  2355    62.0
## 3 Yes   Male     137    49.5
## 4 Yes   Female   140    50.5
```

(3) Now that we've learned how to transform our data, we can improve our boxplot from Module 1 that shows the relationship between medical expenditure and MSCD status by working the log10-transformed expenditures rather than medical expendures on the dollar scale. Reproduce the two plots below **exactly** using the `dplyr` and `ggplot2` packages in `R`. Which of these two plots makes it the easiest for you to compare individuals with MSCD to "otherwise similar" individuals without MSCD? Explain your choice.

Hint: For the second plot, you will need to create a new variable that combines the information from the `ageCat` variable and the `poor` variable. The following code will help you do this. You can also type `?paste` to learn more about this paste function.

```
age_poor_cat = paste(ageCat, poor, sep=" ")
```




Medical expenditures by major smoking−caused disease (MSCD)
Stratified by age group and poverty status
log10(Total medical expenditures ($))
5
4
3
2
1
(0,40] Not Poor
(0,40] Poor
(40,65] Not Poor
(40,65] Poor
(65,99] Not Poor
(65,99] Poor
Age/Poverty group
MSCD status
No
Yes