Project Proposal

due October 11, 2021 by 11:59 PM

Your names and team name here

Load Packages

```
library(dplyr)
library(tidyverse)
library(sf)
library(viridis)
library(ggspatial) #for scale annotation
```

Load Data

```
data <- read.csv(file = '../data/COVID_raw_12.8.csv')
tidy_data <- select(data, c('Participant_ID', 'age',"usres", "state", "race", "sex", "localsip", "locals
tidy_data$race[is.na(tidy_data$race) == TRUE] <- "6"
number_of_hours <- tidy_data %>%
  group_by(race) %>%
 # summarize(localsiphours) %>%
  summarise_at(vars(localsiphours), list(hours = mean),na.rm = TRUE) %>% #to summarize count
  print()
```

```
## # A tibble: 7 x 2
##   race  hours
##   <chr> <dbl>
## 1 0      21.8
## 2 1      21.9
## 3 2      21.3
## 4 3      21.7
## 5 4      21.2
## 6 5      21.2
## 7 6      20.3
```

Introduction and Data, including Research Questions

(The introduction should introduce your general research question and your data (where it came from, how it was collected, what are the cases, what are the variables, etc.). Your research questions should be clearly specified. The motivation for your research question should be clear, with citations to relevant literature as appropriate.)

Glimpse

```
glimpse(data)
```

```
## Rows: 2,441
## Columns: 66
## $ Key_ID                <int> 916, 1377, 1372, 40, 1005, 1632, 629, 1764, 236,~
## $ Participant_ID        <int> 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, ~
## $ zip                   <int> 75233, 75001, 75002, 97702, 75204, 27517, 77025,~
## $ Classification        <fct> Urban, Urban, Suburban, Rural, Urban, Rural, Urb~
## $ age                   <int> 27, 26, 27, 23, 24, 40, 36, 35, 28, 36, 31, 31, ~
## $ usres                 <int> 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, ~
## $ state                 <int> 44, 44, 44, 38, 44, 34, 44, 7, 44, 26, 48, 44, 4~
## $ ethnicity             <int> 2, 1, 2, 2, 2, 2, 1, 2, 2, 1, 2, 2, 2, 2, 2, 2, ~
## $ race                  <int> 5, 4, 4, 5, 1, 4, 5, 4, 4, 4, 4, 4, 4, 1, 6, 4, ~
## $ sex                   <int> 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 1, 2, ~
## $ hhchildren            <int> 0, 0, 1, 0, 0, 0, 1, 1, 0, 0, 0, 1, 0, 0, 0, 0, ~
## $ covidtest             <int> 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, ~
## $ covidtestresult       <int> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, ~
## $ covidsick             <int> 2, 2, 2, 2, 2, 2, 3, 2, 2, 2, 2, 2, 2, 2, 2, 2, ~
## $ covidsickoutcome      <int> NA, NA, NA, NA, NA, NA, 1, NA, NA, NA, NA, NA, N~
## $ hhcovidsick           <int> 2, 2, 2, 2, 2, 2, 3, 2, 2, 2, 2, 2, 2, 2, 2, 2, ~
## $ hhcovidsickoutcome    <int> NA, NA, NA, NA, NA, NA, 2, NA, NA, NA, NA, NA, N~
## $ ffcovidsick           <int> 2, 3, 1, 2, 3, 1, 1, 4, 3, 4, 2, 2, 4, 1, 4, 2, ~
## $ hhcovidsickoutcome_2  <int> NA, 1, 2, NA, 1, 2, 1, NA, 1, NA, NA, NA, NA, 2,~
## $ dis_any               <int> 2, 2, 2, 2, 2, 1, 2, 2, 2, 2, 2, 2, 2, 2, 2, 1, ~
## $ dis_mobility          <int> NA, NA, NA, NA, NA, 2, NA, NA, NA, NA, NA, NA, N~
## $ dis_alone             <int> NA, NA, NA, NA, NA, 2, NA, NA, NA, NA, NA, NA, N~
## $ comorbid              <int> 2, 1, 2, 2, 2, 1, 1, 1, 1, 2, 2, 2, 2, 1, 2, 2, ~
## $ comborbid_heartattack <int> NA, 0, NA, NA, NA, 0, 0, 0, 0, NA, NA, NA, NA, 0~
## $ comborbid_chd         <int> NA, 0, NA, NA, NA, 0, 0, 0, 0, NA, NA, NA, NA, 0~
## $ comborbid_stroke      <int> NA, 0, NA, NA, NA, 0, 0, 0, 0, NA, NA, NA, NA, 0~
## $ comborbid_asthma      <int> NA, 1, NA, NA, NA, 1, 0, 0, 0, NA, NA, NA, NA, 1~
## $ comborbid_skincancer  <int> NA, 0, NA, NA, NA, 0, 0, 1, 0, NA, NA, NA, NA, 0~
## $ comborbid_othcancer   <int> NA, 0, NA, NA, NA, 0, 0, 0, 0, NA, NA, NA, NA, 0~
## $ comborbid_copd        <int> NA, 0, NA, NA, NA, 0, 0, 0, 0, NA, NA, NA, NA, 0~
## $ comborbid_arthritis   <int> NA, 0, NA, NA, NA, 1, 0, 0, 0, NA, NA, NA, NA, 0~
## $ comborbid_depression  <int> NA, 1, NA, NA, NA, 1, 1, 1, 1, NA, NA, NA, NA, 0~
## $ comborbid_kidneydis   <int> NA, 0, NA, NA, NA, 0, 0, 0, 0, NA, NA, NA, NA, 0~
## $ comborbid_diabetes    <int> NA, 0, NA, NA, NA, 0, 0, 0, 0, NA, NA, NA, NA, 0~
## $ comborbid_obesity     <int> NA, 0, NA, NA, NA, 0, 0, 0, 0, NA, NA, NA, NA, 0~
## $ comborbid_parkinsons  <int> NA, 0, NA, NA, NA, 0, 0, 0, 0, NA, NA, NA, NA, 0~
## $ comborbid_alzheimers  <int> NA, 0, NA, NA, NA, 0, 0, 0, 0, NA, NA, NA, NA, 0~
## $ educ                  <int> 6, 6, 6, 6, 6, 6, 6, 6, 6, 6, 6, 6, 4, 6, 6, 6, ~
## $ hhincome              <int> 12, 11, 11, 5, 3, 7, 3, 6, 12, 12, 12, 12, 12, 1~
## $ employ1               <int> 1, 1, 1, 6, 1, 1, 1, 1, 1, 1, 1, 1, 1, 6, 2, 1, ~
## $ localsip              <int> 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, ~
## $ localsipweeks         <fct> "5", "3", "4", "I don't know", "2", "5", "2", "i~
## $ localsip2             <int> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, ~
## $ localsip3             <int> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, ~
## $ leavehomeact___1      <int> 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 0, 1, 1, 1, ~
## $ leavehomeact___2      <int> 0, 1, 1, 0, 1, 1, 1, 0, 1, 1, 0, 1, 1, 0, 0, 1, ~
## $ leavehomeact___3      <int> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, ~
## $ leavehomeact___4      <int> 1, 1, 1, 0, 1, 1, 0, 0, 1, 1, 0, 0, 0, 1, 1, 1, ~
```

```
## $ leavehomeact___5      <int> 1, 1, 0, 0, 1, 1, 0, 0, 0, 0, 0, 0, 0, 1, 1, 0, ~
## $ leavehomeact___6      <int> 1, 1, 1, 0, 1, 1, 1, 1, 1, 1, 1, 1, 0, 1, 1, 0, ~
## $ leavehomeact___7      <int> 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, ~
## $ leavehomeactother     <fct> "", "", "", "", "", "", "", "", "", "", "", "", ~
## $ leavehomereason___1   <int> 1, 0, 0, 1, 0, 0, 0, 0, 1, 0, 0, 0, 1, 1, 1, 0, ~
## $ leavehomereason___2   <int> 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 1, 0, ~
## $ leavehomereason___3   <int> 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 0, 1, 1, 0, 1, 0, ~
## $ leavehomereason___4   <int> 0, 1, 1, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, ~
## $ leavehomereason___5   <int> 0, 0, 0, 1, 0, 1, 1, 0, 1, 0, 0, 1, 0, 0, 0, 1, ~
## $ leavehomereason___6   <int> 0, 1, 0, 0, 0, 0, 0, 1, 0, 1, 0, 0, 1, 0, 0, 0, ~
## $ leavehomereason___7   <int> 0, 0, 0, 0, 0, 1, 0, 0, 0, 1, 1, 0, 0, 0, 0, 1, ~
## $ leavehomereasonother  <fct> "", "", "", "", "", "Going for a drive", "", "",~
## $ essntlsrvcs           <fct> "1", NA, NA, "1", NA, NA, NA, NA, "1", NA, NA, N~
## $ essntlsrvcstype       <int> 1, NA, NA, 1, NA, NA, NA, NA, 1, NA, NA, NA, NA,~
## $ localsiphours         <int> 14, 23, 24, 14, 24, 24, 23, 24, 24, 22, 24, 20, ~
## $ phq_sum               <int> 4, 18, 12, 2, 6, 16, 12, 18, 16, 8, 0, 6, 23, 0,~
## $ X                     <int> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, ~
## $ X.1                   <int> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, ~
```

```
glimpse(tidy_data)
```

```
## Rows: 2,441
## Columns: 31
## $ Participant_ID      <int> 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16~
## $ age                 <int> 27, 26, 27, 23, 24, 40, 36, 35, 28, 36, 31, 31, 55~
## $ usres               <int> 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,~
## $ state               <int> 44, 44, 44, 38, 44, 34, 44, 7, 44, 26, 48, 44, 44,~
## $ race                <chr> "5", "4", "4", "5", "1", "4", "5", "4", "4", "4", ~
## $ sex                 <int> 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 1, 2, 1,~
## $ localsip            <int> 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,~
## $ localsip2           <int> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
## $ localsip3           <int> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
## $ leavehomeact___1    <int> 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 0, 1, 1, 1, 1,~
## $ leavehomeact___2    <int> 0, 1, 1, 0, 1, 1, 1, 0, 1, 1, 0, 1, 1, 0, 0, 1, 0,~
## $ leavehomeact___3    <int> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,~
## $ leavehomeact___4    <int> 1, 1, 1, 0, 1, 1, 0, 0, 1, 1, 0, 0, 0, 1, 1, 1, 1,~
## $ leavehomeact___5    <int> 1, 1, 0, 0, 1, 1, 0, 0, 0, 0, 0, 0, 0, 1, 1, 0, 0,~
## $ leavehomeact___6    <int> 1, 1, 1, 0, 1, 1, 1, 1, 1, 1, 1, 1, 0, 1, 1, 0, 1,~
## $ leavehomeact___7    <int> 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,~
## $ leavehomereason___1 <int> 1, 0, 0, 1, 0, 0, 0, 0, 1, 0, 0, 0, 1, 1, 1, 0, 0,~
## $ leavehomereason___2 <int> 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0,~
## $ leavehomereason___3 <int> 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 0, 1, 1, 0, 1, 0, 1,~
## $ leavehomereason___4 <int> 0, 1, 1, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 1,~
## $ leavehomereason___5 <int> 0, 0, 0, 1, 0, 1, 1, 0, 1, 0, 0, 1, 0, 0, 0, 1, 0,~
## $ leavehomereason___6 <int> 0, 1, 0, 0, 0, 0, 0, 1, 0, 1, 0, 0, 1, 0, 0, 0, 1,~
## $ leavehomereason___7 <int> 0, 0, 0, 0, 0, 1, 0, 0, 0, 1, 1, 0, 0, 0, 0, 1, 0,~
## $ localsiphours       <int> 14, 23, 24, 14, 24, 24, 23, 24, 24, 22, 24, 20, 22~
## $ covidsick           <int> 2, 2, 2, 2, 2, 2, 3, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,~
## $ hhcovidsick         <int> 2, 2, 2, 2, 2, 2, 3, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,~
## $ ffcovidsick         <int> 2, 3, 1, 2, 3, 1, 1, 4, 3, 4, 2, 2, 4, 1, 4, 2, 2,~
## $ Classification      <fct> Urban, Urban, Suburban, Rural, Urban, Rural, Urban~
## $ covidtest           <int> 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,~
## $ educ                <int> 6, 6, 6, 6, 6, 6, 6, 6, 6, 6, 6, 6, 4, 6, 6, 6, 6,~
## $ hhincome            <int> 12, 11, 11, 5, 3, 7, 3, 6, 12, 12, 12, 12, 12, 12,~
```

```r
summary(tidy_data)
```

```
##  Participant_ID      age            usres       state           race
##  Min.   :   1   Min.   :18.00   Min.   :1   Min.   : 1.00   Length:2441
##  1st Qu.: 673   1st Qu.:32.00   1st Qu.:1   1st Qu.:37.00   Class :character
##  Median :1371   Median :40.00   Median :1   Median :44.00   Mode  :character
##  Mean   :1377   Mean   :41.91   Mean   :1   Mean   :36.97
##  3rd Qu.:2082   3rd Qu.:51.00   3rd Qu.:1   3rd Qu.:44.00
##  Max.   :2789   Max.   :86.00   Max.   :1   Max.   :51.00
##                                             NA's   :266
##       sex           localsip       localsip2       localsip3
##  Min.   :1.000   Min.   :1.000   Min.   :1.000   Min.   :1.000
##  1st Qu.:1.000   1st Qu.:1.000   1st Qu.:1.000   1st Qu.:1.000
##  Median :2.000   Median :1.000   Median :1.000   Median :1.000
##  Mean   :1.674   Mean   :1.117   Mean   :1.063   Mean   :1.042
##  3rd Qu.:2.000   3rd Qu.:1.000   3rd Qu.:1.000   3rd Qu.:1.000
##  Max.   :2.000   Max.   :7.000   Max.   :2.000   Max.   :2.000
##  NA's   :248     NA's   :478     NA's   :2362    NA's   :2417
##  leavehomeact___1 leavehomeact___2 leavehomeact___3 leavehomeact___4
##  Min.   :0.0000   Min.   :0.0000   Min.   :0.000    Min.   :0.0000
##  1st Qu.:1.0000   1st Qu.:0.0000   1st Qu.:0.000    1st Qu.:0.0000
##  Median :1.0000   Median :1.0000   Median :0.000    Median :1.0000
##  Mean   :0.7841   Mean   :0.5449   Mean   :0.186    Mean   :0.6436
##  3rd Qu.:1.0000   3rd Qu.:1.0000   3rd Qu.:0.000    3rd Qu.:1.0000
##  Max.   :1.0000   Max.   :1.0000   Max.   :1.000    Max.   :1.0000
##
##  leavehomeact___5 leavehomeact___6 leavehomeact___7 leavehomereason___1
##  Min.   :0.0000   Min.   :0.0000   Min.   :0.0000   Min.   :0.0000
##  1st Qu.:0.0000   1st Qu.:0.0000   1st Qu.:0.0000   1st Qu.:0.0000
##  Median :0.0000   Median :1.0000   Median :0.0000   Median :0.0000
##  Mean   :0.4441   Mean   :0.7395   Mean   :0.1266   Mean   :0.2962
##  3rd Qu.:1.0000   3rd Qu.:1.0000   3rd Qu.:0.0000   3rd Qu.:1.0000
##  Max.   :1.0000   Max.   :1.0000   Max.   :1.0000   Max.   :1.0000
##                                                     NA's   :608
##  leavehomereason___2 leavehomereason___3 leavehomereason___4
##  Min.   :0.00000     Min.   :0.0000      Min.   :0.0000
##  1st Qu.:0.00000     1st Qu.:0.0000      1st Qu.:0.0000
##  Median :0.00000     Median :1.0000      Median :0.0000
##  Mean   :0.08808     Mean   :0.6731      Mean   :0.3322
##  3rd Qu.:0.00000     3rd Qu.:1.0000      3rd Qu.:1.0000
##  Max.   :1.00000     Max.   :1.0000      Max.   :1.0000
##
##  leavehomereason___5 leavehomereason___6 leavehomereason___7 localsiphours
##  Min.   :0.0000      Min.   :0.0000      Min.   :0.0000      Min.   :  0.00
##  1st Qu.:0.0000      1st Qu.:0.0000      1st Qu.:0.0000      1st Qu.: 21.00
##  Median :1.0000      Median :0.0000      Median :0.0000      Median : 23.00
##  Mean   :0.5268      Mean   :0.3437      Mean   :0.1053      Mean   : 21.19
##  3rd Qu.:1.0000      3rd Qu.:1.0000      3rd Qu.:0.0000      3rd Qu.: 23.00
##  Max.   :1.0000      Max.   :1.0000      Max.   :1.0000      Max.   :528.00
##                                                              NA's   :563
##    covidsick      hhcovidsick     ffcovidsick     Classification
##  Min.   :1.000   Min.   :1.000   Min.   :1.000   Rural   :539
##  1st Qu.:2.000   1st Qu.:2.000   1st Qu.:2.000   Suburban:694
##  Median :2.000   Median :2.000   Median :2.000   Urban   :895
```

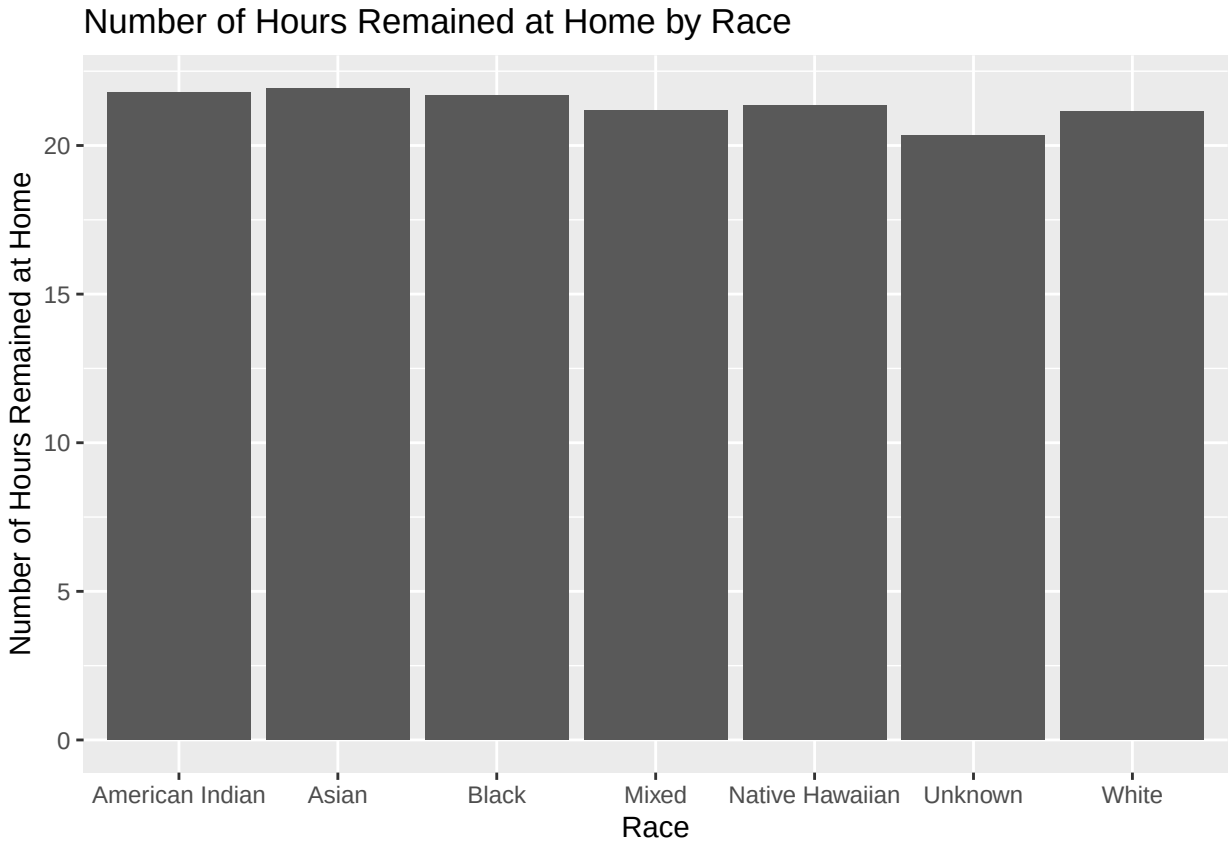
```
##  Mean   :2.113   Mean   :2.065   Mean   :2.221   NA's    :313
##  3rd Qu.:2.000   3rd Qu.:2.000   3rd Qu.:2.000
##  Max.   :3.000   Max.   :3.000   Max.   :4.000
##  NA's   :244     NA's   :247     NA's   :247
##    covidtest          educ          hhincome
##  Min.   :1.000   Min.   :3.000   Min.   : 1.000
##  1st Qu.:2.000   1st Qu.:6.000   1st Qu.: 8.000
##  Median :2.000   Median :6.000   Median :11.000
##  Mean   :1.982   Mean   :5.812   Mean   : 9.848
##  3rd Qu.:2.000   3rd Qu.:6.000   3rd Qu.:12.000
##  Max.   :2.000   Max.   :7.000   Max.   :12.000
##  NA's   :250     NA's   :246     NA's   :281
```

Data Analysis Plan

(Specify the outcome (response, Y) and predictor (explanatory, X) variables you will use to answer your question, as well as the comparison groups you will use, if applicable. You may include very preliminary exploratory data analysis, including some summary statistics and visualizations, along with some explanation on how they help you learn more about your data. Note the statistical method(s) that you believe will be useful in answering your question(s). What results from these specific statistical methods are needed to support your hypothesized answer?)

```
number_of_hours$race[number_of_hours$race == 0] <- "American Indian"
number_of_hours$race[number_of_hours$race == 1] <- "Asian"
number_of_hours$race[number_of_hours$race == 2] <- "Native Hawaiian"
number_of_hours$race[number_of_hours$race == 3] <- "Black"
number_of_hours$race[number_of_hours$race == 4] <- "White"
number_of_hours$race[number_of_hours$race == 5] <- "Mixed"
number_of_hours$race[number_of_hours$race == 6] <- "Unknown"

ggplot(data=number_of_hours, aes(x=race, y=hours)) +
  geom_bar(stat="identity") +
  labs (
    y = "Number of Hours Remained at Home",
    x = "Race",
    title = "Number of Hours Remained at Home by Race",
    )
```


Number of Hours Remained at Home by Race
Number of Hours Remained at Home
0
5
10
15
20
American Indian
Asian
Black
Mixed
Native Hawaiian
Unknown
White
Race