Raven Analytics Team

```
#Read CSV files into R.
read.csv("https://raw.githubusercontent.com/suarezmr/Raven-Analytics-Practicum/main/flinfo2021.csv")
```

```
##       X  FIPS       Admin2 Province_State Country_Region         Last_Update
## 1  1007 12001      Alachua        Florida             US 2021-09-28 04:21:28
## 2  1008 12003        Baker        Florida             US 2021-09-28 04:21:28
## 3  1009 12005          Bay        Florida             US 2021-09-28 04:21:28
## 4  1010 12007     Bradford        Florida             US 2021-09-28 04:21:28
## 5  1011 12009      Brevard        Florida             US 2021-09-28 04:21:28
## 6  1012 12011      Broward        Florida             US 2021-09-28 04:21:28
## 7  1013 12013      Calhoun        Florida             US 2021-09-28 04:21:28
## 8  1014 12015    Charlotte        Florida             US 2021-09-28 04:21:28
## 9  1015 12017       Citrus        Florida             US 2021-09-28 04:21:28
## 10 1016 12019         Clay        Florida             US 2021-09-28 04:21:28
## 11 1017 12021      Collier        Florida             US 2021-09-28 04:21:28
## 12 1018 12023     Columbia        Florida             US 2021-09-28 04:21:28
## 13 1019 12027       DeSoto        Florida             US 2021-09-28 04:21:28
## 14 1020 12029        Dixie        Florida             US 2021-09-28 04:21:28
## 15 1021 12031        Duval        Florida             US 2021-09-28 04:21:28
## 16 1022 12033     Escambia        Florida             US 2021-09-28 04:21:28
## 17 1023 12035      Flagler        Florida             US 2021-09-28 04:21:28
## 18 1024 12037     Franklin        Florida             US 2021-09-28 04:21:28
## 19 1025 12039      Gadsden        Florida             US 2021-09-28 04:21:28
## 20 1026 12041    Gilchrist        Florida             US 2021-09-28 04:21:28
## 21 1027 12043       Glades        Florida             US 2021-09-28 04:21:28
## 22 1028 12045         Gulf        Florida             US 2021-09-28 04:21:28
## 23 1029 12047     Hamilton        Florida             US 2021-09-28 04:21:28
## 24 1030 12049       Hardee        Florida             US 2021-09-28 04:21:28
## 25 1031 12051       Hendry        Florida             US 2021-09-28 04:21:28
## 26 1032 12053     Hernando        Florida             US 2021-09-28 04:21:28
## 27 1033 12055    Highlands        Florida             US 2021-09-28 04:21:28
## 28 1034 12057 Hillsborough        Florida             US 2021-09-28 04:21:28
## 29 1035 12059       Holmes        Florida             US 2021-09-28 04:21:28
## 30 1036 12061 Indian River        Florida             US 2021-09-28 04:21:28
## 31 1037 12063      Jackson        Florida             US 2021-09-28 04:21:28
## 32 1038 12065    Jefferson        Florida             US 2021-09-28 04:21:28
## 33 1039 12067    Lafayette        Florida             US 2021-09-28 04:21:28
## 34 1040 12069         Lake        Florida             US 2021-09-28 04:21:28
## 35 1041 12071          Lee        Florida             US 2021-09-28 04:21:28
## 36 1042 12073         Leon        Florida             US 2021-09-28 04:21:28
## 37 1043 12075         Levy        Florida             US 2021-09-28 04:21:28
## 38 1044 12077      Liberty        Florida             US 2021-09-28 04:21:28
## 39 1045 12079      Madison        Florida             US 2021-09-28 04:21:28
## 40 1046 12081      Manatee        Florida             US 2021-09-28 04:21:28
## 41 1047 12083       Marion        Florida             US 2021-09-28 04:21:28
## 42 1048 12085       Martin        Florida             US 2021-09-28 04:21:28
```

```
## 43 1049 12086   Miami-Dade        Florida             US 2021-09-28 04:21:28
## 44 1050 12087       Monroe        Florida             US 2021-09-28 04:21:28
## 45 1051 12089       Nassau        Florida             US 2021-09-28 04:21:28
## 46 1052 12091     Okaloosa        Florida             US 2021-09-28 04:21:28
## 47 1053 12093   Okeechobee        Florida             US 2021-09-28 04:21:28
## 48 1054 12095       Orange        Florida             US 2021-09-28 04:21:28
## 49 1055 12097      Osceola        Florida             US 2021-09-28 04:21:28
## 50 1056 12099   Palm Beach        Florida             US 2021-09-28 04:21:28
## 51 1057 12101        Pasco        Florida             US 2021-09-28 04:21:28
## 52 1058 12103    Pinellas        Florida             US 2021-09-28 04:21:28
## 53 1059 12105         Polk        Florida             US 2021-09-28 04:21:28
## 54 1060 12107       Putnam        Florida             US 2021-09-28 04:21:28
## 55 1061 12113   Santa Rosa        Florida             US 2021-09-28 04:21:28
## 56 1062 12115     Sarasota        Florida             US 2021-09-28 04:21:28
## 57 1063 12117     Seminole        Florida             US 2021-09-28 04:21:28
## 58 1064 12109    St. Johns        Florida             US 2021-09-28 04:21:28
## 59 1065 12111    St. Lucie        Florida             US 2021-09-28 04:21:28
## 60 1066 12119       Sumter        Florida             US 2021-09-28 04:21:28
## 61 1067 12121     Suwannee        Florida             US 2021-09-28 04:21:28
## 62 1068 12123       Taylor        Florida             US 2021-09-28 04:21:28
## 63 1070 12125        Union        Florida             US 2021-09-28 04:21:28
## 64 1071 12127      Volusia        Florida             US 2021-09-28 04:21:28
## 65 1072 12129      Wakulla        Florida             US 2021-09-28 04:21:28
## 66 1073 12131       Walton        Florida             US 2021-09-28 04:21:28
## 67 1074 12133   Washington        Florida             US 2021-09-28 04:21:28
##    Latitude Longitude Confirmed Deaths              Combined_Key Incident_Rate
## 1  29.67867 -82.35928     38477    285      Alachua, Florida, US      14301.43
## 2  30.33060 -82.28467      5914     62        Baker, Florida, US      20246.49
## 3  30.26549 -85.62123     31777    394          Bay, Florida, US      18188.95
## 4  29.95080 -82.16612      5260     58     Bradford, Florida, US      18651.82
## 5  28.29410 -80.73091     79224    914      Brevard, Florida, US      13161.40
## 6  26.15185 -80.48726    349394   3079      Broward, Florida, US      17892.15
## 7  30.40667 -85.19394      2937     45      Calhoun, Florida, US      20822.40
## 8  26.90131 -81.92949     22350    437    Charlotte, Florida, US      11831.03
## 9  28.84804 -82.47615     19865    463       Citrus, Florida, US      13273.69
## 10 29.98319 -81.85610     32769    352         Clay, Florida, US      14945.82
## 11 26.11092 -81.34687     56489    551      Collier, Florida, US      14676.20
## 12 30.22510 -82.62160     14622    170     Columbia, Florida, US      20397.29
## 13 27.18678 -81.80941      6716     97       DeSoto, Florida, US      17673.22
## 14 29.60631 -83.15725      2855     24        Dixie, Florida, US      16967.79
## 15 30.33226 -81.66976    162195   1483        Duval, Florida, US      16934.92
## 16 30.67653 -87.37285     55875    706     Escambia, Florida, US      17553.31
## 17 29.45934 -81.31509     14032    114      Flagler, Florida, US      12193.15
## 18 29.83791 -84.82732      2226     20     Franklin, Florida, US      18358.76
## 19 30.57796 -84.61916      8431     99      Gadsden, Florida, US      18464.74
## 20 29.72857 -82.79881      3056     44    Gilchrist, Florida, US      16446.02
## 21 26.95636 -81.18996      1389     19       Glades, Florida, US      10057.20
## 22 29.93543 -85.24271      2955     45         Gulf, Florida, US      21665.81
## 23 30.49674 -82.94999      2664     25     Hamilton, Florida, US      18464.10
## 24 27.49294 -81.80957      5867     45       Hardee, Florida, US      21780.45
## 25 26.55387 -81.16469      7830     87       Hendry, Florida, US      18633.10
## 26 28.55364 -82.42700     27760    482     Hernando, Florida, US      14315.18
## 27 27.34255 -81.34072     15417    366    Highlands, Florida, US      14514.08
## 28 27.92766 -82.32013    234084   1832 Hillsborough, Florida, US      15902.79
```

```
## 29 30.86747 -85.81319      3754     49       Holmes, Florida, US      19136.46
## 30 27.69309 -80.60557     21676    306 Indian River, Florida, US      13554.02
## 31 30.79546 -85.21500      9873    158      Jackson, Florida, US      21271.60
## 32 30.43669 -83.89442      2426     28    Jefferson, Florida, US      17029.34
## 33 29.98484 -83.18167      2155     26    Lafayette, Florida, US      25587.75
## 34 28.76202 -81.71251     52496    663         Lake, Florida, US      14299.49
## 35 26.58410 -81.88399    123627   1009          Lee, Florida, US      16043.43
## 36 30.45956 -84.27491     50031    332         Leon, Florida, US      17041.58
## 37 29.31830 -82.74007      6781     56         Levy, Florida, US      16338.58
## 38 30.23766 -84.88293      1775     16      Liberty, Florida, US      21247.31
## 39 30.44397 -83.47399      3523     45      Madison, Florida, US      19050.45
## 40 27.47197 -82.31831     63668    689      Manatee, Florida, US      15788.60
## 41 29.21227 -82.05804     55171    996       Marion, Florida, US      15091.40
## 42 27.07721 -80.43110     19686    335       Martin, Florida, US      12227.33
## 43 25.61124 -80.55171    663737   6472   Miami-Dade, Florida, US      24429.58
## 44 25.20905 -81.07812     10543     52       Monroe, Florida, US      14203.54
## 45 30.61037 -81.80298     15137    127       Nassau, Florida, US      17079.83
## 46 30.69143 -86.59267     33617    367     Okaloosa, Florida, US      15952.04
## 47 27.38634 -80.88944      7270     89   Okeechobee, Florida, US      17240.56
## 48 28.51368 -81.31799    223253   1310      Orange, Florida, US      16021.58
## 49 28.06312 -81.14883     70213    529      Osceola, Florida, US      18686.04
## 50 26.64676 -80.46536    220394   2883   Palm Beach, Florida, US      14724.64
## 51 28.30811 -82.40228     76920    802        Pasco, Florida, US      13885.80
## 52 27.93130 -82.72240    132039   1671     Pinellas, Florida, US      13542.52
## 53 27.95027 -81.69733    124944   1387         Polk, Florida, US      17238.96
## 54 29.60780 -81.74230     12443    160       Putnam, Florida, US      16697.31
## 55 30.69341 -87.02458     31705    291   Santa Rosa, Florida, US      17201.72
## 56 27.18546 -82.33174     55274    844     Sarasota, Florida, US      12743.52
## 57 28.71586 -81.24060     60324    516     Seminole, Florida, US      12785.22
## 58 29.90097 -81.43590     39419    221    St. Johns, Florida, US      14893.53
## 59 27.37764 -80.47107     46439    657    St. Lucie, Florida, US      14145.42
## 60 28.70182 -82.07943     14101    284       Sumter, Florida, US      10648.69
## 61 30.19746 -82.99100      9012    140     Suwannee, Florida, US      20289.53
## 62 30.04848 -83.60445      4428     48       Taylor, Florida, US      20529.46
## 63 30.04413 -82.37497      3015     74        Union, Florida, US      19787.36
## 64 29.05859 -81.18263     73353    846      Volusia, Florida, US      13257.75
## 65 30.16549 -84.39895      6252     56      Wakulla, Florida, US      18530.48
## 66 30.64204 -86.16936     12460     89       Walton, Florida, US      16821.70
## 67 30.61359 -85.66002      4479     52   Washington, Florida, US      17583.32
##    population   lethality
## 1      269043 0.007407022
## 2       29210 0.010483598
## 3      174705 0.012398905
## 4       28201 0.011026616
## 5      601942 0.011536908
## 6     1952778 0.008812401
## 7       14105 0.015321757
## 8      188910 0.019552573
## 9      149657 0.023307324
## 10     219252 0.010741860
## 11     384902 0.009754111
## 12      71686 0.011626317
## 13      38001 0.014443121
## 14      16826 0.008406305
```

```
## 15     957755 0.009143315
## 16     318316 0.012635347
## 17     115081 0.008124287
## 18      12125 0.008984726
## 19      45660 0.011742379
## 20      18582 0.014397906
## 21      13811 0.013678906
## 22      13639 0.015228426
## 23      14428 0.009384384
## 24      26937 0.007670019
## 25      42022 0.011111111
## 26     193920 0.017363112
## 27     106221 0.023740027
## 28    1471968 0.007826250
## 29      19617 0.013052744
## 30     159923 0.014116996
## 31      46414 0.016003241
## 32      14246 0.011541632
## 33       8422 0.012064965
## 34     367118 0.012629534
## 35     770577 0.008161648
## 36     293582 0.006635886
## 37      41503 0.008258369
## 38       8354 0.009014085
## 39      18493 0.012773205
## 40     403253 0.010821763
## 41     365579 0.018052963
## 42     161000 0.017017170
## 43    2716940 0.009750850
## 44      74228 0.004932182
## 45      88625 0.008390038
## 46     210738 0.010917096
## 47      42168 0.012242091
## 48    1393452 0.005867782
## 49     375751 0.007534217
## 50    1496770 0.013081118
## 51     553947 0.010426417
## 52     974996 0.012655352
## 53     724777 0.011100973
## 54      74521 0.012858635
## 55     184313 0.009178363
## 56     433742 0.015269385
## 57     471826 0.008553809
## 58     264672 0.005606433
## 59     328297 0.014147591
## 60     132420 0.020140416
## 61      44417 0.015534842
## 62      21569 0.010840108
## 63      15237 0.024543947
## 64     553284 0.011533271
## 65      33739 0.008957134
## 66      74071 0.007142857
## 67      25473 0.011609734
```

```r
#Turn CSV into data frame
FL2021 <- read.csv("https://raw.githubusercontent.com/suarezmr/Raven-Analytics-Practicum/main/flinfo202
summary(FL2021)
```

```
##        X             FIPS          Admin2          Province_State
##  Min.   :1007   Min.   :12001   Length:67          Length:67
##  1st Qu.:1024   1st Qu.:12036   Class :character   Class :character
##  Median :1040   Median :12069   Mode  :character   Mode  :character
##  Mean   :1040   Mean   :12068
##  3rd Qu.:1056   3rd Qu.:12100
##  Max.   :1074   Max.   :12133
##  Country_Region     Last_Update           Latitude       Longitude
##  Length:67          Length:67          Min.   :25.21   Min.   :-87.37
##  Class :character   Class :character   1st Qu.:27.59   1st Qu.:-83.54
##  Mode  :character   Mode  :character   Median :29.46   Median :-82.32
##                                        Mean   :28.94   Mean   :-82.70
##                                        3rd Qu.:30.25   3rd Qu.:-81.34
##                                        Max.   :30.87   Max.   :-80.43
##    Confirmed          Deaths       Combined_Key       Incident_Rate
##  Min.   :  1389   Min.   :  16.0   Length:67          Min.   :10057
##  1st Qu.:  5890   1st Qu.:  56.0   Class :character   1st Qu.:14308
##  Median : 15417   Median : 284.0   Mode  :character   Median :16935
##  Mean   : 53431   Mean   : 551.8                      Mean   :16730
##  3rd Qu.: 55575   3rd Qu.: 660.0                      3rd Qu.:18582
##  Max.   :663737   Max.   :6472.0                      Max.   :25588
##    population        lethality
##  Min.   :   8354   Min.   :0.004932
##  1st Qu.:  28706   1st Qu.:0.008971
##  Median : 132420   Median :0.011533
##  Mean   : 320563   Mean   :0.011923
##  3rd Qu.: 371435   3rd Qu.:0.013898
##  Max.   :2716940   Max.   :0.024544
```

```r
#Import libraries to be used
library(car)
```

```
## Loading required package: carData
```

```r
library(psych)
```

```
##
## Attaching package: 'psych'

## The following object is masked from 'package:car':
##
##     logit
```

```r
library(ggplot2)
```

```
## Warning: package 'ggplot2' was built under R version 4.0.5
```

```
##
## Attaching package: 'ggplot2'

## The following objects are masked from 'package:psych':
##
##     %+%, alpha
```

```
library(lmtest)
```

```
## Loading required package: zoo

##
## Attaching package: 'zoo'

## The following objects are masked from 'package:base':
##
##     as.Date, as.Date.numeric
```

```
library(nortest)
library(dplyr)
```

```
## Warning: package 'dplyr' was built under R version 4.0.5

##
## Attaching package: 'dplyr'

## The following object is masked from 'package:car':
##
##     recode

## The following objects are masked from 'package:stats':
##
##     filter, lag

## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
library(rvest)
```

```
## Warning: package 'rvest' was built under R version 4.0.5
```

```
library(readxl)
```

```
## Warning: package 'readxl' was built under R version 4.0.5
```

```r
library(stringr)
library(interactions)
```

```
## Warning: package 'interactions' was built under R version 4.0.2
```

```r
#Column number sequence vector
colNum <- (seq_len(ncol(FL2021)))
#Turn column vector into a data frame.
names_df <- as.data.frame(colNum)
#Add column Name column to names_df data frame.
names_df$colname <- (colnames(FL2021))
#Add variable type to names_df data frame as a column.
names_df$type <- (sapply(FL2021, class))
View(names_df)
#Change variable types as needed.
FL2021$population <- as.numeric(FL2021$population)
FL2021$Deaths <- as.numeric(FL2021$Deaths)
#Change column names as needed.
FL2021 <- FL2021 %>% rename(County = Admin2)
View(FL2021)
```

```r
#scraping the median household income for each of the florida counties. Data is from the
#2010 United States Census Data and the 2006-2010 American Community Survey 5-Year Estimates

#saving the URL#

fl_income_URL <- "https://en.wikipedia.org/wiki/List_of_Florida_locations_by_per_capita_income"

#extracting the HTML contents of the page into an object with the read_html function

fl_income_html <- read_html(fl_income_URL)

#extracting all elements that have the HTML tag "table"

html_nodes(fl_income_html, "table")
```

```
## {xml_nodeset (4)}
## [1] <table class="sidebar sidebar-collapse nomobile nowraplinks vcard hlist"> ...
## [2] <table class="wikitable sortable"><tbody>\n<tr valign="bottom">\n<th>Rank ...
## [3] <table class="nowraplinks mw-collapsible autocollapse navbox-inner" style ...
## [4] <table class="nowraplinks mw-collapsible autocollapse navbox-inner" style ...
```

```r
#the income table is a table of class wikitable. Selecting this source with html node:

flincome_html <- html_node(fl_income_html, ".wikitable")

#converting to a data frame#

flincome_table <- html_table(flincome_html)

#we can see that we need to change some variables, including their type
print(flincome_table)
```

```
## # A tibble: 69 x 7
##     Rank County       'Per capitainco~ Medianhousehold~ Medianfamilyinc~ Population
##    <int> <chr>        <chr>            <chr>            <chr>            <chr>
##  1     1 Collier      $37,046          $58,106          $68,556          321,520
##  2     2 St. Johns    $36,027          $62,663          $79,080          190,039
##  3     3 Martin       $35,772          $53,210          $70,271          146,318
##  4     4 Monroe       $35,516          $53,821          $66,152          73,090
##  5     5 Palm Beach   $33,610          $53,242          $64,445          1,320,134
##  6     6 Sarasota     $33,045          $49,388          $62,326          379,448
##  7     7 Indian River $31,918          $47,341          $57,477          138,028
##  8     8 Seminole     $29,795          $58,971          $70,597          422,718
##  9     9 Lee          $29,445          $50,014          $58,950          618,754
## 10    10 Nassau       $29,089          $58,712          $66,233          73,314
## # ... with 59 more rows, and 1 more variable: Number ofhouseholds <chr>
```

```
#we just need the county and median income columns, thus let's exclude the other columns#

flincome_table <- flincome_table[, -1]
flincome_table <- flincome_table[, -2]
flincome_table <- flincome_table[, -3:-5]

#renaming the column of median income

colnames(flincome_table) <- c("County", "medianincome")

flincome_table$medianincome <- as.character((gsub("[\\$]", "", flincome_table$medianincome)))
flincome_table$medianincome <- as.character((gsub(",", "", flincome_table$medianincome)))
flincome_table$medianincome <- as.numeric(flincome_table$medianincome)

#merging everything - inner join because county names are all consistent!

FL2021 <- inner_join(FL2021, flincome_table, by = "County")
```

```
#adding variables from the Behavioral Risk Factor Surveillance System
#(http://www.floridahealth.gov/statistics-and-data/survey-data/behavioral-risk-factor-surveillance-syst
#data could only be download individually. data were joined and then uploaded to github

#reading the data and adjusting column names

brfss <- read.csv("https://raw.githubusercontent.com/suarezmr/Raven-Analytics-Practicum/main/BRFSS.csv")
brfss <- brfss[-68, ]
colnames(brfss) <- c("County", "Overweight", "Obese", "Asthma", "Pulmonary", "HealthCare", "FluShot", "S
head(brfss)
```

```
##     County Overweight Obese Asthma Pulmonary HealthCare FluShot Sedentary
## 1  Alachua       27.5  29.8   13.8       4.0       86.8    44.3      21.8
## 2    Baker       34.3  36.4   16.4      15.5       78.8    35.1      34.9
## 3      Bay       36.4  29.9   12.0      10.6       84.0    33.7      29.7
## 4 Bradford       34.3  36.4   16.4      15.5       78.8    35.1      34.9
## 5  Brevard       36.6  30.7   12.9      10.5       84.7    38.4      27.9
## 6  Broward       37.9  27.1   13.9       6.1       82.3    30.6      24.1
```

```r
FL2021 <- inner_join(FL2021, brfss, by = "County")

#adding data: Projections of Florida Population by County, 2025-2045, with Estimates for 2020 https://w

popinfo <- read.csv("https://raw.githubusercontent.com/suarezmr/Raven-Analytics-Practicum/main/popinfo.
head(popinfo)
```

```
##   ï..COUNTY aged65more.      men.
## 1   ALACHUA   0.1512254 0.4834971
## 2     BAKER   0.1422964 0.5335413
## 3       BAY   0.1771802 0.4949143
## 4  BRADFORD   0.1855178 0.5539077
## 5   BREVARD   0.2404928 0.4885152
## 6   BROWARD   0.1723760 0.4838206
```

```r
colnames(popinfo) <- c("County", "Aged65More", "Men")
str(popinfo)
```

```
## 'data.frame':    68 obs. of  3 variables:
##  $ County    : chr  "ALACHUA" "BAKER" "BAY" "BRADFORD" ...
##  $ Aged65More: num  0.151 0.142 0.177 0.186 0.24 ...
##  $ Men       : num  0.483 0.534 0.495 0.554 0.489 ...
```

```r
#all fine except that there's an additional row for the entire state and everything is uppercase#

popinfo <- popinfo[-68, ]
popinfo
```

```
##          County Aged65More       Men
## 1       ALACHUA  0.1512254 0.4834971
## 2         BAKER  0.1422964 0.5335413
## 3           BAY  0.1771802 0.4949143
## 4      BRADFORD  0.1855178 0.5539077
## 5       BREVARD  0.2404928 0.4885152
## 6       BROWARD  0.1723760 0.4838206
## 7       CALHOUN  0.1919387 0.5439299
## 8     CHARLOTTE  0.3764263 0.4837843
## 9        CITRUS  0.3494173 0.4798337
## 10         CLAY  0.1579734 0.4877696
## 11      COLLIER  0.2887934 0.4897638
## 12     COLUMBIA  0.1981817 0.5147061
## 13       DESOTO  0.1940564 0.5630764
## 14        DIXIE  0.2381924 0.5457601
## 15        DUVAL  0.1491549 0.4863504
## 16     ESCAMBIA  0.1819816 0.4939298
## 17      FLAGLER  0.2838937 0.4785632
## 18     FRANKLIN  0.2271578 0.5537761
## 19     GADSDEN*  0.1819322 0.4724398
## 20    GILCHRIST  0.2225628 0.5165581
## 21       GLADES  0.2515247 0.5605849
## 22         GULF  0.2402880 0.5273703
## 23     HAMILTON  0.1970487 0.5694578
```

```
## 24       HARDEE  0.1470685 0.5413402
## 25       HENDRY  0.1427978 0.5255537
## 26     HERNANDO  0.2850988 0.4764655
## 27    HIGHLANDS  0.3441250 0.4859588
## 28 HILLSBOROUGH  0.1414159 0.4881735
## 29       HOLMES  0.2130393 0.5329234
## 30 INDIAN RIVER  0.3083597 0.4822393
## 31      JACKSON  0.2043274 0.5414386
## 32    JEFFERSON  0.2319022 0.5145199
## 33    LAFAYETTE  0.1594937 0.5823936
## 34       LAKE**  0.2598339 0.4837379
## 35          LEE  0.2612949 0.4906122
## 36         LEON  0.1397370 0.4756114
## 37         LEVY  0.2381832 0.4883570
## 38      LIBERTY  0.1272303 0.6057143
## 39      MADISON  0.2080827 0.5204179
## 40      MANATEE  0.2673556 0.4829023
## 41     MARION**  0.2930528 0.4780230
## 42       MARTIN  0.3089751 0.4975357
## 43 MIAMI-DADE**  0.1666665 0.4851535
## 44       MONROE  0.2394151 0.5310512
## 45       NASSAU  0.2272513 0.4912053
## 46     OKALOOSA  0.1729778 0.5043662
## 47   OKEECHOBEE  0.1890435 0.5384926
## 48       ORANGE  0.1231562 0.4911281
## 49      OSCEOLA  0.1366498 0.4878325
## 50   PALM BEACH  0.2385731 0.4844507
## 51        PASCO  0.2322230 0.4869692
## 52     PINELLAS  0.2574086 0.4811697
## 53         POLK  0.2076494 0.4903341
## 54       PUTNAM  0.2268220 0.4959375
## 55    ST. JOHNS  0.1990607 0.4869645
## 56    ST. LUCIE  0.2191675 0.4888679
## 57   SANTA ROSA  0.1620174 0.5064201
## 58     SARASOTA  0.3520678 0.4763272
## 59     SEMINOLE  0.1574507 0.4829598
## 60       SUMTER  0.5369674 0.4869115
## 61     SUWANNEE  0.2233685 0.5157381
## 62       TAYLOR  0.2222767 0.5389552
## 63        UNION  0.1338092 0.6482154
## 64      VOLUSIA  0.2474492 0.4896499
## 65      WAKULLA  0.1465819 0.5374180
## 66       WALTON  0.1941411 0.5085782
## 67   WASHINGTON  0.1854030 0.5339859
```

```
#cleaning and fixing the county names
popinfo$County = as.character(gsub("\\*", "", popinfo$County))

popinfo$County <- str_to_title(popinfo$County)

popinfo$County[popinfo$County == "Desoto"] <-"DeSoto"

FL2021 <- full_join(FL2021, popinfo)
```

```
## Joining, by = "County"
```

```
head(FL2021)
```

```
##      X  FIPS   County Province_State Country_Region         Last_Update
## 1 1007 12001  Alachua        Florida             US 2021-09-28 04:21:28
## 2 1008 12003    Baker        Florida             US 2021-09-28 04:21:28
## 3 1009 12005      Bay        Florida             US 2021-09-28 04:21:28
## 4 1010 12007 Bradford        Florida             US 2021-09-28 04:21:28
## 5 1011 12009  Brevard        Florida             US 2021-09-28 04:21:28
## 6 1012 12011  Broward        Florida             US 2021-09-28 04:21:28
##   Latitude Longitude Confirmed Deaths          Combined_Key Incident_Rate
## 1 29.67867 -82.35928     38477    285  Alachua, Florida, US      14301.43
## 2 30.33060 -82.28467      5914     62    Baker, Florida, US      20246.49
## 3 30.26549 -85.62123     31777    394      Bay, Florida, US      18188.95
## 4 29.95080 -82.16612      5260     58 Bradford, Florida, US      18651.82
## 5 28.29410 -80.73091     79224    914  Brevard, Florida, US      13161.40
## 6 26.15185 -80.48726    349394   3079  Broward, Florida, US      17892.15
##   population   lethality medianincome Overweight Obese Asthma Pulmonary
## 1     269043 0.007407022        40644       27.5  29.8   13.8       4.0
## 2      29210 0.010483598        47276       34.3  36.4   16.4      15.5
## 3     174705 0.012398905        47770       36.4  29.9   12.0      10.6
## 4      28201 0.011026616        41126       34.3  36.4   16.4      15.5
## 5     601942 0.011536908        49523       36.6  30.7   12.9      10.5
## 6    1952778 0.008812401        51694       37.9  27.1   13.9       6.1
##   HealthCare FluShot Sedentary Aged65More       Men
## 1       86.8    44.3      21.8  0.1512254 0.4834971
## 2       78.8    35.1      34.9  0.1422964 0.5335413
## 3       84.0    33.7      29.7  0.1771802 0.4949143
## 4       78.8    35.1      34.9  0.1855178 0.5539077
## 5       84.7    38.4      27.9  0.2404928 0.4885152
## 6       82.3    30.6      24.1  0.1723760 0.4838206
```

```
#running some models#

model1 <- lm(lethality ~ medianincome + Aged65More + Men + Men*Aged65More, data=FL2021)
summary(model1)
```

```
##
## Call:
## lm(formula = lethality ~ medianincome + Aged65More + Men + Men *
##     Aged65More, data = FL2021)
##
## Residuals:
##        Min         1Q     Median         3Q        Max
## -0.0069467 -0.0014766 -0.0001487  0.0020955  0.0067921
##
## Coefficients:
##                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -6.985e-02  1.848e-02  -3.779 0.000355 ***
## medianincome   -1.767e-07  5.341e-08  -3.308 0.001567 **
## Aged65More      4.401e-01  1.036e-01   4.249 7.35e-05 ***
## Men             1.662e-01  3.737e-02   4.447 3.68e-05 ***
```

```
## Aged65More:Men -8.259e-01  2.117e-01  -3.901 0.000238 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.002864 on 62 degrees of freedom
## Multiple R-squared:  0.5576, Adjusted R-squared:  0.529
## F-statistic: 19.53 on 4 and 62 DF,  p-value: 1.921e-10
```

```
model2 <- lm(lethality ~ medianincome + Obese + Pulmonary + Men + Men*Obese, data=FL2021)
summary(model2)
```

```
##
## Call:
## lm(formula = lethality ~ medianincome + Obese + Pulmonary + Men +
##     Men * Obese, data = FL2021)
##
## Residuals:
##        Min         1Q     Median         3Q        Max
## -0.0078902 -0.0023168 -0.0000565  0.0022457  0.0087023
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)   1.713e-01  5.312e-02   3.225  0.00203 **
## medianincome -2.371e-07  7.480e-08  -3.169  0.00239 **
## Obese        -4.279e-03  1.457e-03  -2.937  0.00467 **
## Pulmonary     5.606e-04  1.527e-04   3.671  0.00051 ***
## Men          -2.965e-01  1.053e-01  -2.815  0.00657 **
## Obese:Men     8.144e-03  2.896e-03   2.812  0.00662 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.003451 on 61 degrees of freedom
## Multiple R-squared:  0.3683, Adjusted R-squared:  0.3165
## F-statistic: 7.113 on 5 and 61 DF,  p-value: 2.683e-05
```

```
model3 <- lm(lethality ~ medianincome + Obese + Pulmonary + Aged65More + Aged65More*Obese, data=FL2021)
summary(model3)
```

```
##
## Call:
## lm(formula = lethality ~ medianincome + Obese + Pulmonary + Aged65More +
##     Aged65More * Obese, data = FL2021)
##
## Residuals:
##        Min         1Q     Median         3Q        Max
## -0.0070557 -0.0016046 -0.0001427  0.0017668  0.0119000
##
## Coefficients:
##                   Estimate Std. Error t value Pr(>|t|)
## (Intercept)      -6.354e-03  9.571e-03  -0.664   0.5093
## medianincome     -1.385e-07  7.168e-08  -1.932   0.0580 .
## Obese             4.964e-04  2.773e-04   1.790   0.0784 .
## Pulmonary         3.424e-04  1.444e-04   2.372   0.0209 *
```

```
## Aged65More        9.605e-02  3.783e-02   2.539   0.0137 *
## Obese:Aged65More -2.325e-03  1.304e-03  -1.782   0.0797 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.003121 on 61 degrees of freedom
## Multiple R-squared:  0.4832, Adjusted R-squared:  0.4408
## F-statistic: 11.41 on 5 and 61 DF,  p-value: 8.587e-08
```

```
#model 1 accounts for the fact that the coronavirus is most deadly if you are OLDER AND MALE
#https://www.nature.com/articles/d41586-020-02483-2#

#model 1 has an adjusted R squared of .53, which is quite high. Further, this was achieved with only 3
#hence, this is a great model - albeit intuitive - to predict COVID-19 deaths: counties with lower medi
#are more likely to have greater lethality. some ethnic variables are correlated with COVID-19 deaths,
#thus median income is a very good predictor. Surprisingly, the health-related variables (which are sam
```

```
#visualizing model 1#
head(FL2021)
```

```
##      X  FIPS   County Province_State Country_Region         Last_Update
## 1 1007 12001  Alachua        Florida             US 2021-09-28 04:21:28
## 2 1008 12003    Baker        Florida             US 2021-09-28 04:21:28
## 3 1009 12005      Bay        Florida             US 2021-09-28 04:21:28
## 4 1010 12007 Bradford        Florida             US 2021-09-28 04:21:28
## 5 1011 12009  Brevard        Florida             US 2021-09-28 04:21:28
## 6 1012 12011  Broward        Florida             US 2021-09-28 04:21:28
##   Latitude Longitude Confirmed Deaths          Combined_Key Incident_Rate
## 1 29.67867 -82.35928     38477    285  Alachua, Florida, US      14301.43
## 2 30.33060 -82.28467      5914     62    Baker, Florida, US      20246.49
## 3 30.26549 -85.62123     31777    394      Bay, Florida, US      18188.95
## 4 29.95080 -82.16612      5260     58 Bradford, Florida, US      18651.82
## 5 28.29410 -80.73091     79224    914  Brevard, Florida, US      13161.40
## 6 26.15185 -80.48726    349394   3079  Broward, Florida, US      17892.15
##   population   lethality medianincome Overweight Obese Asthma Pulmonary
## 1     269043 0.007407022        40644       27.5  29.8   13.8       4.0
## 2      29210 0.010483598        47276       34.3  36.4   16.4      15.5
## 3     174705 0.012398905        47770       36.4  29.9   12.0      10.6
## 4      28201 0.011026616        41126       34.3  36.4   16.4      15.5
## 5     601942 0.011536908        49523       36.6  30.7   12.9      10.5
## 6    1952778 0.008812401        51694       37.9  27.1   13.9       6.1
##   HealthCare FluShot Sedentary Aged65More       Men
## 1       86.8    44.3      21.8  0.1512254 0.4834971
## 2       78.8    35.1      34.9  0.1422964 0.5335413
## 3       84.0    33.7      29.7  0.1771802 0.4949143
## 4       78.8    35.1      34.9  0.1855178 0.5539077
## 5       84.7    38.4      27.9  0.2404928 0.4885152
## 6       82.3    30.6      24.1  0.1723760 0.4838206
```

```
FL2021X <- FL2021[, -1:-13]
FL2021X <- FL2021X[, -3:-9]

pairs.panels(FL2021X, method = "pearson",
```

```
            hist.col = "red",
            density = TRUE, ellipses = TRUE)
```