

Project 1: Wrangling, Exploration, Visualization

SDS322E

Data Wrangling, Exploration, Visualization

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Introduction Paragraph or two introducing your datasets and variables, why they are interesting to you, etc.

```
# read your datasets in here, e.g., with read_csv()
library(tidyverse)
library(readr)
library(fivethirtyeight)
data1 <- bad_drivers
data2 <- read_csv("~/project1/2021 County Health Rankings Data - v1.csv",
  skip = 1)
```

As I was looking through the different datasets, I saw the bad_drivers dataset. This was interesting because I also wanted to look at how the different factors tied into traffic deaths like speeding and the insurance costs associated with these accidents. These were interesting to me because I drive a lot in both my hometown of Houston and here in Austin. There are many times when I'll see people driving while texting or seeing news articles of people experiencing car accidents because they were under the influence or distracted while driving. Furthermore, I wanted to look at the different health indicators in each state, and how this is different. I was really interested in taking a look at how these health indicators tie into other aspects like transportation statistics. I was able to find a county dataset that essentially listed out all of the health indicators for specific counties in each state, which is under the "Count_Health_Rankings" dataset.

Some of the variables in my first dataset of "bad_drivers" include number of drivers involved in fatal collisions, percentage of those speeding, alcohol-impaired, not distracted, no prior accidents before this collision, cost of car insurance, and losses experienced by insurance companies across all 50 states. I found the "bad_drivers" dataset from the "fivethirtyeight" package. Furthermore, I wanted to tie this into how the different life stages differed across states. Some of the variables for my second dataset of "County_Health_Rankings" include life expectancy, deaths, percent of ethnicities, number of people insured, and more across counties in the 50 states in the United States. I found this dataset from Countyhealthratings.org under the Rankings data and documentation page. ***** I would expect to see that if there were more traffic accidents in one place, we may see a slight decrease/difference in life expectancy and a slight increase in death rate.

I chose the bad_drivers dataset from the fivethirtyeight package and the county health ratings from Countyhealthratings.org (under the Rankings data and document page). I wanted to look at these datasets because I am very big on keeping up with the news. One thing that I always see are news articles on drunk driving, speeding, or just not paying attention lead to people losing their lives due to these accidents. I know that these are just a few factors; therefore, I wanted to bring in the County health rankings data because the data provides more insight into the health aspect of these various counties in each state of the United States. I would expect to see that if there were more traffic accidents in one place, we may see a slight decrease/difference in life expectancy and a slight increase in death rate.

Some of the variables in my first dataset of "bad_drivers" include number of drivers involved in fatal collisions, percentage of those speeding, alcohol-impaired, not distracted, no prior accidents before this collision, cost of

car insurance, and losses experienced by insurance companies across all 50 states. Furthermore, some of the variables for my second dataset of “County_Health_Rankings” include life expectancy, deaths, percent of ethnicities, number of people insured, and more across counties in the 50 states in the United States.

Expand on potential associations you may expect, if any.

```
# your joining code
joineddata <- full_join(data1, data2, by = c(state = "State"))

# your joining code
not_in_data1 <- anti_join(data1, data2, by = c(state = "State"))
not_in_data2 <- anti_join(data2, data1, by = c(State = "state"))
```

Joining/Merging I combined both of my datasets by the common variable of “states.” To do this, I utilized the `full_join` function to retain all of my rows, which is why there was 3,193 rows, one row for each county in each state. Furthermore, the two datasets were joined by the common ID of “state.” When fully joined, there were 3,193 rows with 72 columns. Before the full join, the `bad_drivers` dataset had 51 rows of the 50 states in the U.S. as well as D.C. with 8 variables. Also before the join, the County health ratings data had 3,193 rows, for each county in the each state of the U.S. along with 65 variables. There were 51 unique IDs, or states, for both the `bad_drivers` and county health rating datasets. Since both had only unique IDs of the 51 states, there were no IDs that were different from each other in both datasets. Since both datasets were joined by the common function of states, all 50 states in the United States including D.C. were included in both datasets. No observations were dropped and were actually retained by the full join function as well as the common ID being the same for each dataset. The NAs that are located in the full join and extra columns will be tidied. which will be shown above in the tidying section.

Tidying: Reshaping If your datasets are tidy already, demonstrate that you can reshape data with pivot wider/longer here (e.g., `untidy` and then `retidy`). Alternatively, it may be easier to wait until the wrangling section so you can reshape your summary statistics. Note here if you are going to do this.

```
# your tidying code (if applicable; can also wait until
# wrangling section)
clean_joineddata <- joineddata %>% select(state, num_drivers,
  perc_alcohol, insurance_premiums, County, `Life Expectancy`,
  `# Deaths`, `Frequent Physical Distress`, `# Uninsured`,
  `Median Household Income`, `Homicide Rate`, `# Asian`, `# American Indian & Alaska Native`,
  `# Native Hawaiian/Other Pacific Islander`, `# Hispanic`,
  `# Black`, `# Non-Hispanic White`, `Rural`)

clean_joineddata <- clean_joineddata %>% rename(DriverDeaths = num_drivers,
  AlcoholRelated = perc_alcohol, LE = `Life Expectancy`, Deaths = `# Deaths`,
  PhysicalDistress = `Frequent Physical Distress`, Uninsured = `# Uninsured`,
  HouseholdIncome = `Median Household Income`, Homicide = `Homicide Rate`,
  Asian = `# Asian`, AmericanIndianAlaskaNative = `# American Indian & Alaska Native`,
  PacificIslander = `# Native Hawaiian/Other Pacific Islander`,
  Hispanic = `# Hispanic`, Black = `# Black`, White = `# Non-Hispanic White`,
  PercRural = `Rural`, Premiums = insurance_premiums)

clean_joineddata <- clean_joineddata %>% group_by(state) %>%
  summarize_at(c("LE", "Deaths", "DriverDeaths", "AlcoholRelated",
    "PhysicalDistress", "Uninsured", "HouseholdIncome", "Homicide",
    "PercRural", "Premiums", "Asian", "AmericanIndianAlaskaNative",
    "PacificIslander", "Hispanic", "Black", "White"), na.rm = TRUE,
```

```

    .funs = list(mean = mean))

clean_joineddata2 <- clean_joineddata %>% pivot_longer(-1) %>%
  separate(name, into = c("name", "stat")) %>% pivot_wider(names_from = "name",
    values_from = "value") %>% select(-stat)

```

Since there were so many different variables, I wanted to just select 10 different unique variables and then variables of different ethnicities. I wanted to untidy and tidy my data first before I started on the wrangling portion, and I just wanted to clean up the names before moving on. In this case, I had to first select the columns I wanted and then remove the extraneous ones like percent of the population over 65, graduation rate, GPA, child mortality rate, infant mortality, etc. There were over 72 columns with the data joined. With this, I made a cleaner version of the joineddata (clean_joineddata). I then wanted to just make another column of whether the county was rural or not, so I mutated the % rural with the ifelse function. If the percentage was greater than 50%, I put that as rural and if it was less, than I didn't consider it to be rural. I then renamed all of the columns because I was having difficulty when it came to tidying the data with the special characters like %, _, and # signs. I then used the pivot_longer and pivot_wider functions to show that I know how to tidy. With these, I found the mean and standards of each state with just the variables of life expectancy, deaths, driver fatalities, and alcohol related traffic deaths.

```

# % of BIPOC in each county
clean_joineddata2 <- clean_joineddata2 %>% group_by(state) %>%
  mutate(`% BIPOC` = (sum(Asian, AmericanIndianAlaskaNative,
    PacificIslander, Hispanic, Black))/(sum(Asian, AmericanIndianAlaskaNative,
    PacificIslander, Hispanic, Black, White)) * 100)

clean_joineddata2 <- clean_joineddata2 %>% mutate(Diverse = ifelse(`% BIPOC` >
  50, "high", "low"))

# Summary statistics for 10 numeric variables
clean_joineddata2 %>% summarize_at(c("DriverDeaths", "AlcoholRelated",
  "Premiums", "LE", "Deaths", "PhysicalDistress", "Uninsured",
  "HouseholdIncome", "Homicide", "PercRural", "Asian", "AmericanIndianAlaskaNative",
  "PacificIslander", "Hispanic", "Black", "White"), na.rm = TRUE,
  .funs = list(mean = mean, sd = sd, max = max, min = min,
    n = n_distinct)) %>% pivot_longer(contains("_")) %>%
  separate(name, into = c("variable", "stat")) %>% pivot_wider(names_from = "variable",
    values_from = "value") %>% knitr::kable()

```

Wrangling

state	stat	DriverDeaths	AlcoholRelated	Premiums	Deaths	PhysicalDistress	HouseholdIncome	PercRural	Asian	AmericanIndianAlaskaNative	PacificIslander	Hispanic	Black	White
Alabama	mean	18.8	30	784.574	697.069	0.857	205062.44	6229.11	0.436660256	0.8823	0.5000	150.294	6267.08	169.8412
Alabama	sd	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alabama	max	18.8	30	784.574	697.069	0.857	205062.44	6229.11	0.436660256	0.8823	0.5000	150.294	6267.08	169.8412
Alabama	min	18.8	30	784.574	697.069	0.857	205062.44	6229.11	0.436660256	0.8823	0.5000	150.294	6267.08	169.8412
Alabama	n	1.0	1	1.00	1.0000	1.0000	1.0000	1.00	1.0000	1.0000	1.0000	1.0000	1.0000	1.00
Alaska	mean	18.1	25	1053.78	434.38	0.1154	33338124.06	66924.17	1.666667388	0.6700	0.8667	699.866	65747.46	12.6263
Alaska	sd	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alaska	max	18.1	25	1053.78	434.38	0.1154	33338124.06	66924.17	1.666667388	0.6700	0.8667	699.866	65747.46	12.6263
Alaska	min	18.1	25	1053.78	434.38	0.1154	33338124.06	66924.17	1.666667388	0.6700	0.8667	699.866	65747.46	12.6263
Alaska	n	1.0	1	1.00	1.0000	1.0000	1.0000	1.00	1.0000	1.0000	1.0000	1.0000	1.0000	1.00

state	stat	Driver	Deaths	Physical	Disability	Health	Blind	Deaf	American Indian	Alaskan	Hispanic	Black	White
Arizona	mea	18.6	28	899.478.6625204.75087507881.520074.1640032061837590.487237.87502521.123882340722.422461.25									
Arizona	sd	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arizona	max	18.6	28	899.478.6625204.75087507881.520074.1640032061837590.487237.87502521.123882340722.422461.25									
Arizona	min	18.6	28	899.478.6625204.75087507881.520074.1640032061837590.487237.87502521.123882340722.422461.25									
Arizona	n	1.0	1	1.001.0000000001.000001.00001.00	1.0000000000000000	1.0000	1.0000	1.0000	1.0000	1.000001.000	1.00001.00		
Arkansas	mea	22.4	26	827.375.015769.8168184828.34241155.2986842.598626.3908.3421	310.1576227.112242.34206.53								
Arkansas	sd	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arkansas	max	22.4	26	827.375.015769.8168184828.34241155.2986842.598626.3908.3421	310.1576227.112242.34206.53								
Arkansas	min	22.4	26	827.375.015769.8168184828.34241155.2986842.598626.3908.3421	310.1576227.112242.34206.53								
Arkansas	n	1.0	1	1.001.0000000001.000001.00001.00	1.0000000000000000	1.0000	1.0000	1.0000	1.0000	1.000001.000	1.00001.00		
California	mea	2.0	28	878.480.537085.13257680038.81867.4311784.29267315020720.22036773.056279675390.4389740.61									
California	sd	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
California	max	2.0	28	878.480.537085.13257680038.81867.4311784.29267315020720.22036773.056279675390.4389740.61									
California	min	2.0	28	878.480.537085.13257680038.81867.4311784.29267315020720.22036773.056279675390.4389740.61									
California	n	1.0	1	1.001.0000000001.000001.00001.00	1.0000000000000000	1.0000	1.0000	1.0000	1.0000	1.000001.000	1.00001.00		
Colorado	mea	3.6	28	835.581.081766.52145385922.862882.6817637.996735.82860.9846	348.58432673.7685.3289880.09								
Colorado	sd	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Colorado	max	3.6	28	835.581.081766.52145385922.862882.6817637.996735.82860.9846	348.58432673.7685.3289880.09								
Colorado	min	3.6	28	835.581.081766.52145385922.862882.6817637.996735.82860.9846	348.58432673.7685.3289880.09								
Colorado	n	1.0	1	1.001.0000000001.000001.00001.00	1.0000000000000000	1.0000	1.0000	1.0000	1.0000	1.000001.000	1.00001.00		
Connecticut	mea	10.8	36	1068.80567638.60622222362.222251.22333333.139239.4778.4444	862.0000835485963.522249.56								
Connecticut	sd	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Connecticut	max	10.8	36	1068.80567638.60622222362.222251.22333333.139239.4778.4444	862.0000835485963.522249.56								
Connecticut	min	10.8	36	1068.80567638.60622222362.222251.22333333.139239.4778.4444	862.0000835485963.522249.56								
Connecticut	n	1.0	1	1.001.0000000001.000001.00001.00	1.0000000000000000	1.0000	1.0000	1.0000	1.0000	1.000001.000	1.00001.00		
Delaware	mea	6.2	30	1137.88356028.5122500831.560516.75250224100031.3282.0000	529.50006695.507323000074.50								
Delaware	sd	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Delaware	max	6.2	30	1137.88356028.5122500831.560516.75250224100031.3282.0000	529.50006695.507323000074.50								
Delaware	min	6.2	30	1137.88356028.5122500831.560516.75250224100031.3282.0000	529.50006695.507323000074.50								
Delaware	n	1.0	1	1.001.0000000001.000001.00001.00	1.0000000000000000	1.0000	1.0000	1.0000	1.0000	1.000001.000	1.00001.00		
District of Columbia	mea	5.9	27	1273.89008280.0000002220.000895.018.00000030502.0130.0000	923.00070477.30329260400.00								
District of Columbia	sd	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
District of Columbia	max	5.9	27	1273.89008280.0000002220.000895.018.00000030502.0130.0000	923.00070477.30329260400.00								
District of Columbia	min	5.9	27	1273.89008280.0000002220.000895.018.00000030502.0130.0000	923.00070477.30329260400.00								
District of Columbia	n	1.0	1	1.001.0000000001.000001.00001.00	1.0000000000000000	1.0000	1.0000	1.0000	1.0000	1.000001.000	1.00001.00		
Florida	mea	17.9	29	1160.78137822.85254419740.644362.16033333.798671.3324.4118	724.7352565848085.376673.09								
Florida	sd	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Florida	max	17.9	29	1160.78137822.85254419740.644362.16033333.798671.3324.4118	724.7352565848085.376673.09								
Florida	min	17.9	29	1160.78137822.85254419740.644362.16033333.798671.3324.4118	724.7352565848085.376673.09								
Florida	n	1.0	1	1.001.0000000001.000001.00001.00	1.0000000000000000	1.0000	1.0000	1.0000	1.0000	1.000001.000	1.00001.00		
Georgia	mea	15.6	25	913.17630863.56257812583.02592.2818626759.5750.1000	155.13753109.45993.69251.98								
Georgia	sd	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

state	stat	Driver	Deaths	Physical	Disse	Health	Blm	Pol	Amer	Indian	Al	Hispan	Black	White
Georgia	max	5.6	25	913.176	308	143.562	7812	2583.026	282.278	818	1826	7709.579	1000	155.13753109.45093.69241.98
Georgia	min	5.6	25	913.176	308	143.562	7812	2583.026	282.278	818	1826	7709.579	1000	155.13753109.45093.69241.98
Georgia	n	1.0	1	1.00	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Hawaii	mea	7.5	41	861.182	065	766.000	8333	3320.870	202.62	200	200	8373396.856	7667	47849.65628.9260.000207.33
Hawaii	sd	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hawaii	max	7.5	41	861.182	065	766.000	8333	3320.870	202.62	200	200	8373396.856	7667	47849.65628.9260.000207.33
Hawaii	min	7.5	41	861.182	065	766.000	8333	3320.870	202.62	200	200	8373396.856	7667	47849.65628.9260.000207.33
Hawaii	n	1.0	1	1.00	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Idaho	mea	5.3	29	641.979	228	338.295	530000	248.458	955.73	250	600	753231.608	83.1111	175.28889199.668.73348.12.31
Idaho	sd	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Idaho	max	5.3	29	641.979	228	338.295	530000	248.458	955.73	250	600	753231.608	83.1111	175.28889199.668.73348.12.31
Idaho	min	5.3	29	641.979	228	338.295	530000	248.458	955.73	250	600	753231.608	83.1111	175.28889199.668.73348.12.31
Idaho	n	1.0	1	1.00	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Illinois	mea	2.8	34	803.177	992	300.602	45631	927.259	944.76	323	529	7068018.250	1.0194	162.81543104.30629.90326.04
Illinois	sd	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Illinois	max	2.8	34	803.177	992	300.602	45631	927.259	944.76	323	529	7068018.250	1.0194	162.81543104.30629.90326.04
Illinois	min	2.8	34	803.177	992	300.602	45631	927.259	944.76	323	529	7068018.250	1.0194	162.81543104.30629.90326.04
Illinois	n	1.0	1	1.00	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Indiana	mea	4.5	29	710.466	997	853.463	20432	286.759	735.41	843	741	63752.060	9.4624	97.61290523.73879.03326.49
Indiana	sd	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indiana	max	4.5	29	710.466	997	853.463	20432	286.759	735.41	843	741	63752.060	9.4624	97.61290523.73879.03326.49
Indiana	min	4.5	29	710.466	997	853.463	20432	286.759	735.41	843	741	63752.060	9.4624	97.61290523.73879.03326.49
Indiana	n	1.0	1	1.00	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Iowa	mea	5.7	25	649.079	137	005.580	24000	408.285	9755.53	666	667	706082.330	2.0000	96.08008971.02047.759653.92
Iowa	sd	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iowa	max	5.7	25	649.079	137	005.580	24000	408.285	9755.53	666	667	706082.330	2.0000	96.08008971.02047.759653.92
Iowa	min	5.7	25	649.079	137	005.580	24000	408.285	9755.53	666	667	706082.330	2.0000	96.08008971.02047.759653.92
Iowa	n	1.0	1	1.00	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Kansas	mea	7.8	24	780.477	580	658.523	80943	485.415	1039.05	388	865	01892.166	2.5660	69.56600718.33857.07550.25
Kansas	sd	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Kansas	max	7.8	24	780.477	580	658.523	80943	485.415	1039.05	388	865	01892.166	2.5660	69.56600718.33857.07550.25
Kansas	min	7.8	24	780.477	580	658.523	80943	485.415	1039.05	388	865	01892.166	2.5660	69.56600718.33857.07550.25
Kansas	n	1.0	1	1.00	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Kentucky	mea	21.4	23	872.514	633	228.776	24796	339.834	7490.45	647	705	100081.821	3.5537	69.28922887.70080.963239.88
Kentucky	sd	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Kentucky	max	21.4	23	872.514	633	228.776	24796	339.834	7490.45	647	705	100081.821	3.5537	69.28922887.70080.963239.88
Kentucky	min	21.4	23	872.514	633	228.776	24796	339.834	7490.45	647	705	100081.821	3.5537	69.28922887.70080.963239.88
Kentucky	n	1.0	1	1.00	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Louisiana	mea	20.5	33	1281.75	542	328.435	83077	148.038	826.60	1.08	303	732590.523	2.6308	87.81538599.146184.83547.14
Louisiana	sd	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Louisiana	max	20.5	33	1281.75	542	328.435	83077	148.038	826.60	1.08	303	732590.523	2.6308	87.81538599.146184.83547.14
Louisiana	min	20.5	33	1281.75	542	328.435	83077	148.038	826.60	1.08	303	732590.523	2.6308	87.81538599.146184.83547.14
Louisiana	n	1.0	1	1.00	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Maine	mea	5.1	30	661.888	378	178.823	54118	715.524	490.12	000	704	32049.411	49.0588	53.52942788.22535.76470.11.41
Maine	sd	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Maine	max	5.1	30	661.888	378	178.823	54118	715.524	490.12	000	704	32049.411	49.0588	53.52942788.22535.76470.11.41
Maine	min	5.1	30	661.888	378	178.823	54118	715.524	490.12	000	704	32049.411	49.0588	53.52942788.22535.76470.11.41
Maine	n	1.0	1	1.00	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Maryland	mea	2.5	32	1048.78	512	601.840	20000	3542.560	916.06	444	434	732504.290	2.0000	536.40060505.74082.232062.48
Maryland	sd	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Maryland	max	2.5	32	1048.78	512	601.840	20000	3542.560	916.06	444	434	732504.290	2.0000	536.40060505.74082.232062.48
Maryland	min	2.5	32	1048.78	512	601.840	20000	3542.560	916.06	444	434	732504.290	2.0000	536.40060505.74082.232062.48

state	statDriver	Deaths	Physical	Disability	Health	Home	Public	Asian	American	Indian	Alaskan	Hispanic	Black	White
Maryland	1.0	1	1.00	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Massachusetts	1.2	35	1011.84	4406679.7	BB33332260.183379.07	3636361666835.6570	46667	988.0000	1039876404.2567	40.00				
Massachusetts	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Massachusetts	1.2	35	1011.84	4406679.7	BB33332260.183379.07	3636361666835.6570	46667	988.0000	1039876404.2567	40.00				
Massachusetts	1.2	35	1011.84	4406679.7	BB33332260.183379.07	3636361666835.6570	46667	988.0000	1039876404.2567	40.00				
Massachusetts	1.0	1	1.00	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Michigan	1.1	28	1110.73	108008.11	409048779.698695.44	30769218909.11738.6905	99.6666	72576.32735.3877	730.05					
Michigan	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Michigan	1.1	28	1110.73	108008.11	409048779.698695.44	30769218909.11738.6905	99.6666	72576.32735.3877	730.05					
Michigan	1.1	28	1110.73	108008.11	409048779.698695.44	30769218909.11738.6905	99.6666	72576.32735.3877	730.05					
Michigan	1.0	1	1.00	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Minnesota	1.6	29	777.180	180684.65	917500997.5969448.92	666667946457.8879	0.8864	95.7727	73162.08695.9818	367.02				
Minnesota	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Minnesota	1.6	29	777.180	180684.65	917500997.5969448.92	666667946457.8879	0.8864	95.7727	73162.08695.9818	367.02				
Minnesota	1.6	29	777.180	180684.65	917500997.5969448.92	666667946457.8879	0.8864	95.7727	73162.08695.9818	367.02				
Minnesota	1.0	1	1.00	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Mississippi	1.7	31	896.074	150002.6	653494813.0361753.664.5170	48795.95450.7229	43.5180	7412.226834.47439.33						
Mississippi	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mississippi	1.7	31	896.074	150002.6	653494813.0361753.664.5170	48795.95450.7229	43.5180	7412.226834.47439.33						
Mississippi	1.7	31	896.074	150002.6	653494813.0361753.664.5170	48795.95450.7229	43.5180	7412.226834.47439.33						
Mississippi	1.0	1	1.00	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Missouri	1.6	34	790.326	766581.37	433108404.469391.37	368401483228.4628.9138	169.948	2632.897270.83450.21						
Missouri	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Missouri	1.6	34	790.326	766581.37	433108404.469391.37	368401483228.4628.9138	169.948	2632.897270.83450.21						
Missouri	1.6	34	790.326	766581.37	433108404.469391.37	368401483228.4628.9138	169.948	2632.897270.83450.21						
Missouri	1.0	1	1.00	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Montana	1.4	44	816.278	97990.75	522631510.4551629.21	8187437368.017494.5965	32.2807	7518.9202.3132	200.39					
Montana	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Montana	1.4	44	816.278	97990.75	522631510.4551629.21	8187437368.017494.5965	32.2807	7518.9202.3132	200.39					
Montana	1.4	44	816.278	97990.75	522631510.4551629.21	8187437368.017494.5965	32.2807	7518.9202.3132	200.39					
Montana	1.0	1	1.00	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Nebraska	1.9	35	732.289	25877.36	5531927.8723105.53	250700141631.6633.0851	49.9787	4673.29817.639695.15						
Nebraska	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nebraska	1.9	35	732.289	25877.36	5531927.8723105.53	250700141631.6633.0851	49.9787	4673.29817.639695.15						
Nebraska	1.9	35	732.289	25877.36	5531927.8723105.53	250700141631.6633.0851	49.9787	4673.29817.639695.15						
Nebraska	1.0	1	1.00	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Nevada	1.7	32	1029.88	423534.35	2900006360.666713.15	125070722296.5222.7778	2731.66	6070636879.56581.44						
Nevada	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nevada	1.7	32	1029.88	423534.35	2900006360.666713.15	125070722296.5222.7778	2731.66	6070636879.56581.44						
Nevada	1.7	32	1029.88	423534.35	2900006360.666713.15	125070722296.5222.7778	2731.66	6070636879.56581.44						
Nevada	1.0	1	1.00	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
New Hampshire	1.6	30	746.549	26288.90	9090909142.000350.00	714336945327.2748.0000	122.1818	925.27646.1818	897.64					
New Hampshire	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
New Hampshire	1.6	30	746.549	26288.90	9090909142.000350.00	714336945327.2748.0000	122.1818	925.27646.1818	897.64					
New Hampshire	1.6	30	746.549	26288.90	9090909142.000350.00	714336945327.2748.0000	122.1818	925.27646.1818	897.64					
New Hampshire	1.0	1	1.00	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

state	stat	Driver	Deaths	Police	Police	Deaths	Physical	Disrupt	Health	Police	Police	American	Police	Police	Police	Police	White
New Jersey	mea	1.2	28	1301.72	908.325	908.325	908.325	908.325	908.325	908.325	908.325	908.325	908.325	908.325	908.325	908.325	908.325
New Jersey	sd	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
New Jersey	max	1.2	28	1301.72	908.325	908.325	908.325	908.325	908.325	908.325	908.325	908.325	908.325	908.325	908.325	908.325	908.325
New Jersey	min	1.2	28	1301.72	908.325	908.325	908.325	908.325	908.325	908.325	908.325	908.325	908.325	908.325	908.325	908.325	908.325
New Jersey	n	1.0	1	1.00	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
New Mexico	mea	8.4	27	869.87	757.53	757.53	757.53	757.53	757.53	757.53	757.53	757.53	757.53	757.53	757.53	757.53	757.53
New Mexico	sd	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
New Mexico	max	8.4	27	869.87	757.53	757.53	757.53	757.53	757.53	757.53	757.53	757.53	757.53	757.53	757.53	757.53	757.53
New Mexico	min	8.4	27	869.87	757.53	757.53	757.53	757.53	757.53	757.53	757.53	757.53	757.53	757.53	757.53	757.53	757.53
New Mexico	n	1.0	1	1.00	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
New York	mea	2.3	29	1234.79	670.67	670.67	670.67	670.67	670.67	670.67	670.67	670.67	670.67	670.67	670.67	670.67	670.67
New York	sd	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
New York	max	2.3	29	1234.79	670.67	670.67	670.67	670.67	670.67	670.67	670.67	670.67	670.67	670.67	670.67	670.67	670.67
New York	min	2.3	29	1234.79	670.67	670.67	670.67	670.67	670.67	670.67	670.67	670.67	670.67	670.67	670.67	670.67	670.67
New York	n	1.0	1	1.00	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
North Carolina	mea	16.8	31	708.27	708.27	708.27	708.27	708.27	708.27	708.27	708.27	708.27	708.27	708.27	708.27	708.27	708.27
North Carolina	sd	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
North Carolina	max	16.8	31	708.27	708.27	708.27	708.27	708.27	708.27	708.27	708.27	708.27	708.27	708.27	708.27	708.27	708.27
North Carolina	min	16.8	31	708.27	708.27	708.27	708.27	708.27	708.27	708.27	708.27	708.27	708.27	708.27	708.27	708.27	708.27
North Carolina	n	1.0	1	1.00	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
North Dakota	mea	23.9	42	688.77	709.74	709.74	709.74	709.74	709.74	709.74	709.74	709.74	709.74	709.74	709.74	709.74	709.74
North Dakota	sd	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
North Dakota	max	23.9	42	688.77	709.74	709.74	709.74	709.74	709.74	709.74	709.74	709.74	709.74	709.74	709.74	709.74	709.74
North Dakota	min	23.9	42	688.77	709.74	709.74	709.74	709.74	709.74	709.74	709.74	709.74	709.74	709.74	709.74	709.74	709.74
North Dakota	n	1.0	1	1.00	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Ohio	mea	14.1	34	697.77	686.83	686.83	686.83	686.83	686.83	686.83	686.83	686.83	686.83	686.83	686.83	686.83	686.83
Ohio	sd	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

[illegible]

state	stat	DriverDeaths	Non-Occupant Deaths	Physical Injuries	Disturbances	Household	Police	Asian	American Indian	Alaskan	Hispanic	Black	White
Tennessee	mean	1.0	1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Texas	mean	19.4	38	1004.75	482.45	78.46	39.70	256.93	81.37	63.18	61.84	2332.95	338.91
Texas	sd	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Texas	max	19.4	38	1004.75	482.45	78.46	39.70	256.93	81.37	63.18	61.84	2332.95	338.91
Texas	min	19.4	38	1004.75	482.45	78.46	39.70	256.93	81.37	63.18	61.84	2332.95	338.91
Texas	n	1.0	1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Utah	mean	1.3	16	809.38	325.70	4.37	2.10	400.63	3.36	3.96	8.27	500.00	50.00
Utah	sd	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Utah	max	1.3	16	809.38	325.70	4.37	2.10	400.63	3.36	3.96	8.27	500.00	50.00
Utah	min	1.3	16	809.38	325.70	4.37	2.10	400.63	3.36	3.96	8.27	500.00	50.00
Utah	n	1.0	1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Vermont	mean	3.6	30	716.27	439.83	7.73	3.88	666.67	4.18	3.35	2.90	2.46	32.93
Vermont	sd	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vermont	max	3.6	30	716.27	439.83	7.73	3.88	666.67	4.18	3.35	2.90	2.46	32.93
Vermont	min	3.6	30	716.27	439.83	7.73	3.88	666.67	4.18	3.35	2.90	2.46	32.93
Vermont	n	1.0	1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Virginia	mean	2.7	27	768.97	408.22	3.01	2.98	507.43	2.49	2.53	4.67	1.64	150.62
Virginia	sd	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Virginia	max	2.7	27	768.97	408.22	3.01	2.98	507.43	2.49	2.53	4.67	1.64	150.62
Virginia	min	2.7	27	768.97	408.22	3.01	2.98	507.43	2.49	2.53	4.67	1.64	150.62
Virginia	n	1.0	1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Washington	mean	10.6	33	890.07	99.99	804.53	2.00	2405.60	9075.40	478.26	1.73	2689.73	3017.45
Washington	sd	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Washington	max	10.6	33	890.07	99.99	804.53	2.00	2405.60	9075.40	478.26	1.73	2689.73	3017.45
Washington	min	10.6	33	890.07	99.99	804.53	2.00	2405.60	9075.40	478.26	1.73	2689.73	3017.45
Washington	n	1.0	1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
West Virginia	mean	23.8	28	992.67	5.17	238.89	2.91	178.48	8.24	46.72	46.38	88.88	72.10
West Virginia	sd	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
West Virginia	max	23.8	28	992.67	5.17	238.89	2.91	178.48	8.24	46.72	46.38	88.88	72.10
West Virginia	min	23.8	28	992.67	5.17	238.89	2.91	178.48	8.24	46.72	46.38	88.88	72.10
West Virginia	n	1.0	1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Wisconsin	mean	3.8	33	670.37	9.31	273.83	2.05	483.89	2.60	0.84	95.00	59.69	38.02
Wisconsin	sd	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wisconsin	max	3.8	33	670.37	9.31	273.83	2.05	483.89	2.60	0.84	95.00	59.69	38.02
Wisconsin	min	3.8	33	670.37	9.31	273.83	2.05	483.89	2.60	0.84	95.00	59.69	38.02
Wisconsin	n	1.0	1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Wyoming	mean	7.4	32	791.17	9.37	580.66	5.75	833.78	9.58	63.30	75.75	40.88	33.58
Wyoming	sd	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wyoming	max	7.4	32	791.17	9.37	580.66	5.75	833.78	9.58	63.30	75.75	40.88	33.58
Wyoming	min	7.4	32	791.17	9.37	580.66	5.75	833.78	9.58	63.30	75.75	40.88	33.58
Wyoming	n	1.0	1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

```
# Some more summary statistics for my variables
clean_joineddata2 %>% summary(is.numeric)
```

```
##      state      LE      Deaths      DriverDeaths
## Length:51      Min.      :74.15      Min.      : 324.6      Min.      : 5.90
```

```
## Class :character 1st Qu.:77.04 1st Qu.: 1240.8 1st Qu.:12.75
## Mode :character Median :78.42 Median : 2218.4 Median :15.60
## Mean :78.19 Mean : 3232.9 Mean :15.79
## 3rd Qu.:79.40 3rd Qu.: 4219.3 3rd Qu.:18.50
## AlcoholRelated PhysicalDistress Uninsured HouseholdIncome
## Min. :16.00 Min. : 9.00 Min. : 248.1 Min. :41754
## 1st Qu.:28.00 1st Qu.:11.59 1st Qu.: 1030.0 1st Qu.:51664
## Median :30.00 Median :12.99 Median : 1715.5 Median :58569
## Mean :30.69 Mean :13.11 Mean : 2690.1 Mean :59998
## 3rd Qu.:33.00 3rd Qu.:14.57 3rd Qu.: 3078.1 3rd Qu.:64772
## Homicide PercRural Premiums Asian
## Min. : 1.714 Min. : 0.00 Min. : 642.0 Min. : 345
## 1st Qu.: 3.125 1st Qu.:43.93 1st Qu.: 768.4 1st Qu.: 1901
## Median : 5.250 Median :54.53 Median : 859.0 Median : 5800
## Mean : 5.766 Mean :51.91 Mean : 887.0 Mean : 19619
## 3rd Qu.: 7.093 3rd Qu.:66.29 3rd Qu.:1007.9 3rd Qu.: 16595
## AmericanIndianAlaskaNative PacificIslander Hispanic
## Min. : 163.8 Min. : 18.93 Min. : 1113
## 1st Qu.: 756.1 1st Qu.: 94.72 1st Qu.: 5556
## Median : 1760.9 Median : 175.29 Median : 12454
## Mean : 3917.9 Mean : 1540.42 Mean : 48860
## 3rd Qu.: 3973.8 3rd Qu.: 716.53 3rd Qu.: 50897
## Black White % BIPOC Diverse
## Min. : 202.3 Min. : 21524 Min. : 5.512 Length:51
## 1st Qu.: 2847.1 1st Qu.: 63476 1st Qu.:19.323 Class :character
## Median : 15211.2 Median :113526 Median :27.949 Mode :character
## Mean : 34948.7 Mean :166065 Mean :31.110
## 3rd Qu.: 41505.8 3rd Qu.:231980 3rd Qu.:41.914
## [ reached getOption("max.print") -- omitted 1 row ]
```

```
clean_joineddata2 %>% group_by(state, Diverse) %>% summarize(HouseholdIncome = mean(HouseholdIncome)) %>%
  arrange(desc((HouseholdIncome)))
```

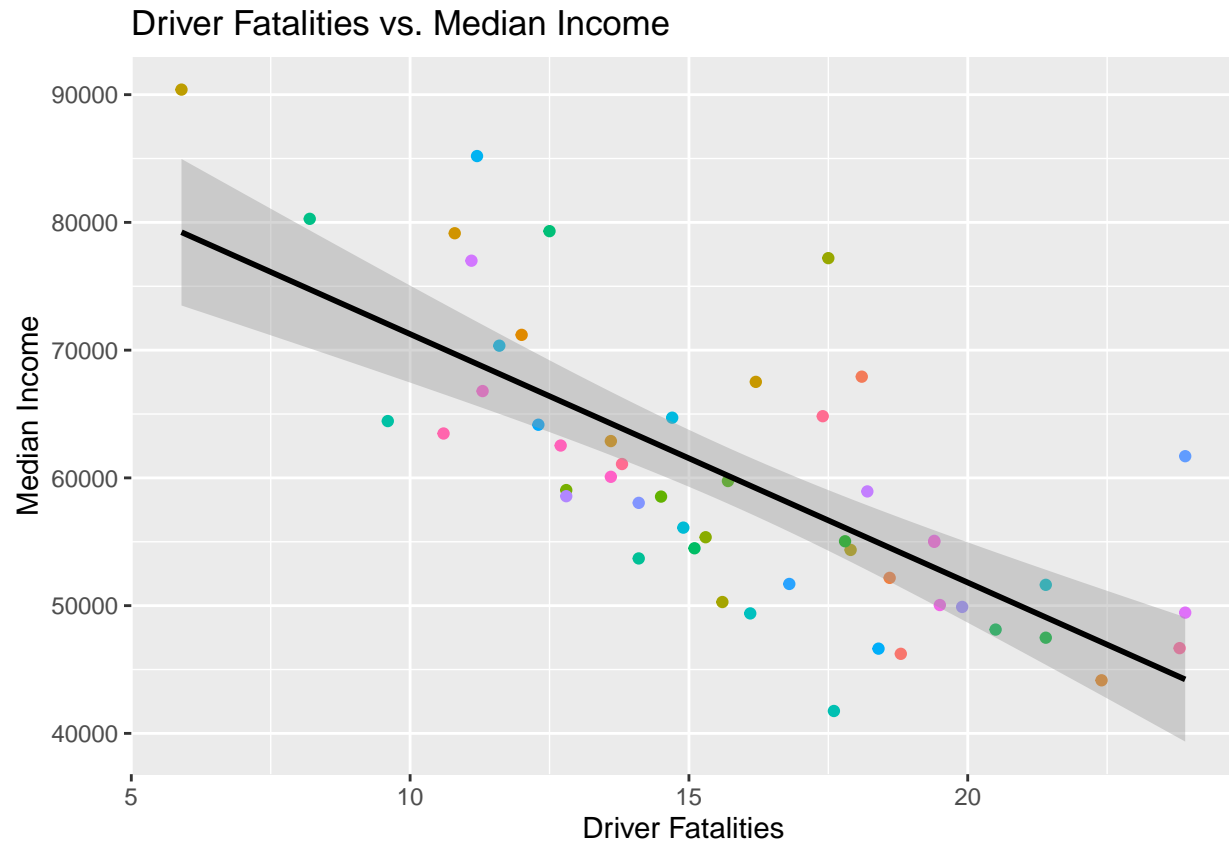
```
## # A tibble: 51 x 3
## # Groups:   state [51]
##   state Diverse HouseholdIncome
##   <chr> <chr> <dbl>
## 1 District of Columbia high 90395
## 2 New Jersey low 85193.
## 3 Massachusetts low 80279.
## 4 Maryland low 79316.
## 5 Connecticut low 79151.
## 6 Hawaii high 77203.
## 7 Rhode Island low 77003.
## 8 California high 71197.
## 9 New Hampshire low 70350
## 10 Alaska low 67924.
## # ... with 41 more rows
```

```
clean_joineddata2 <- clean_joineddata2 %>% mutate(Rural = ifelse(PercRural >
  50, "yes", "no"))
```

Your discussion of wrangling section here. Feel encouraged to break up into more than once code chunk and discuss each in turn.

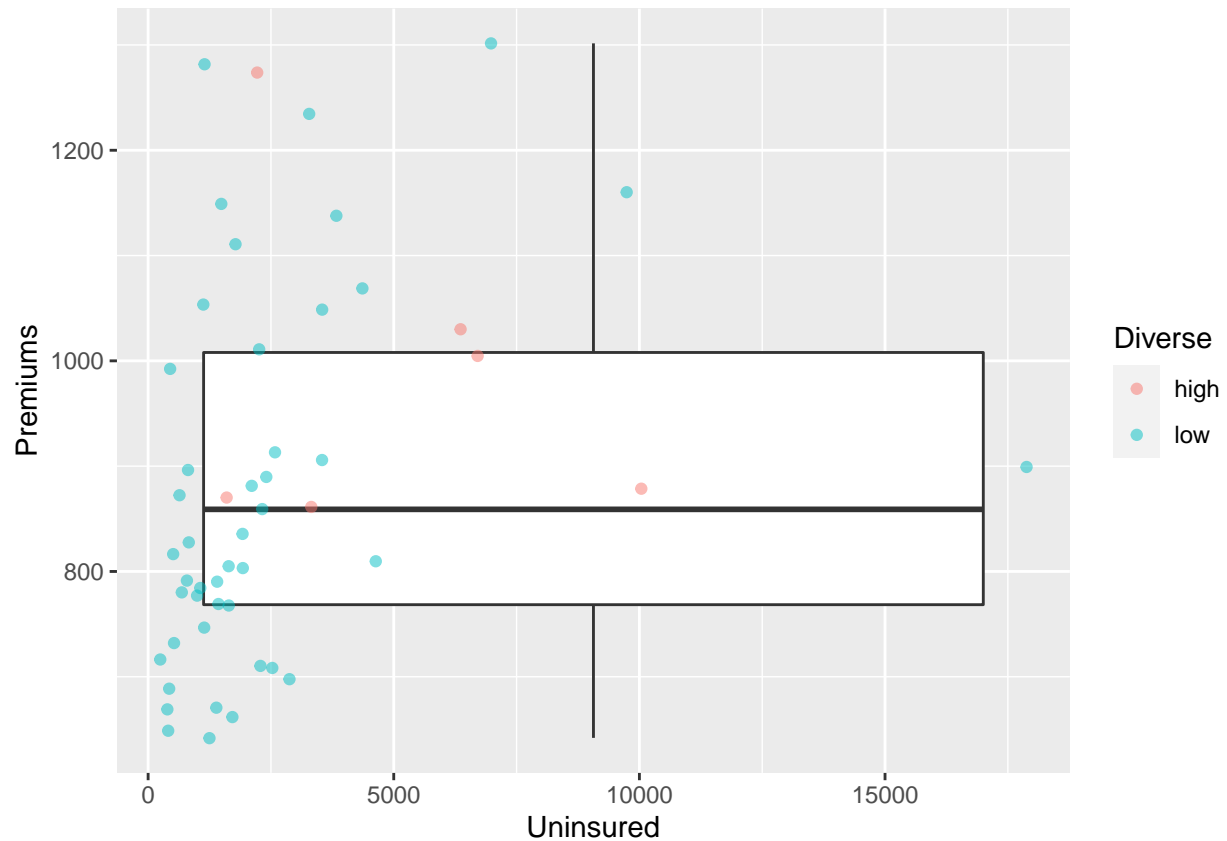
```
# Plot of driver fatalities vs. median household income
clean_joineddata2 %>% ggplot(aes(x = DriverDeaths, y = HouseholdIncome)) +
  geom_point(aes(color = state)) + geom_smooth(method = "lm",
  color = 1) + scale_x_continuous(breaks = seq(0, 25, 5)) +
  scale_y_continuous(breaks = seq(0, 1e+05, 10000)) + ggtitle("Driver Fatalities vs. Median Income")
  xlab("Driver Fatalities") + ylab("Median Income") + theme(legend.position = "none")
```

Visualizing



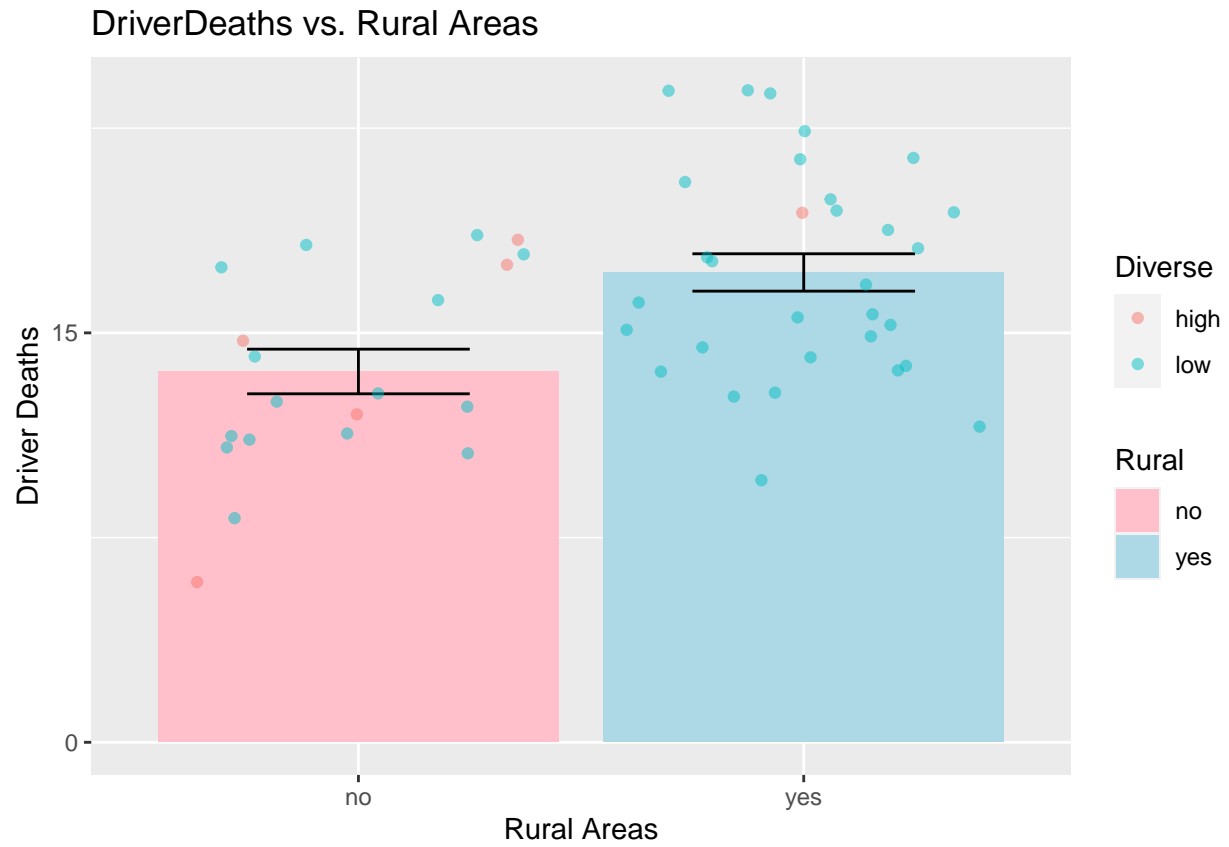
For the first ggplot, we're looking at the relationship between the number of drivers that have died from a car accident and median household income in each of the 50 U.S. states.

```
# Plot of driver fatalities in each state in the United States
clean_joineddata2 %>% ggplot(aes(x = Uninsured, y = Premiums)) +
  geom_boxplot() + geom_jitter(alpha = 0.5, aes(color = Diverse))
```



Your discussion of plot 2

```
# your plot 3
clean_joineddata2 %>% ggplot(aes(x = Rural, y = DriverDeaths)) +
  geom_bar(aes(fill = Rural), stat = "summary", fun = mean) +
  ggtitle("DriverDeaths vs. Rural Areas") + geom_errorbar(stat = "summary",
width = 0.5) + xlab("Rural Areas") + ylab("Driver Deaths") +
  scale_fill_manual(values = c("pink", "light blue")) + scale_y_continuous(breaks = seq(0,
85, 15)) + geom_jitter(alpha = 0.5, aes(color = Diverse))
```



Your discussion of plot 3

Concluding Remarks If any!