

Final Project: Analyzing Suicide Mortality Trends by Demographic Factors

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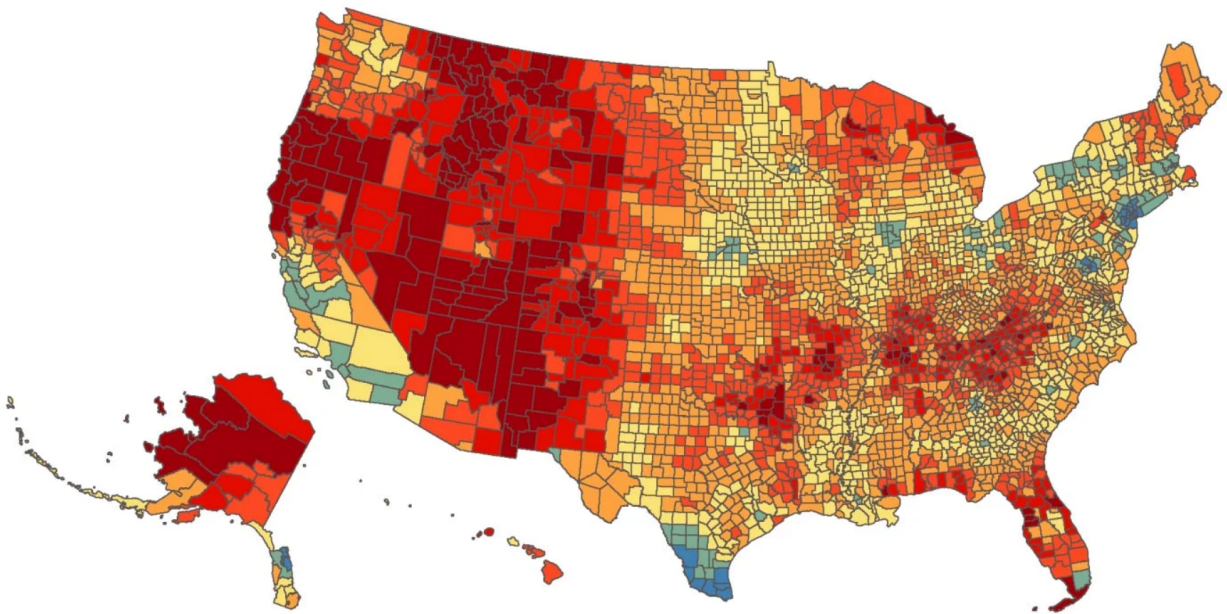


Figure 1: Suicide Rate by County in the United States in 2016.

Abstract

Introduction

Understanding the dynamics of suicide rates across demographic categories is paramount in addressing the complexities of mental health and societal well-being. Over the decades, the United States has witnessed fluctuations in suicide rates (increased trend), influenced by a multitude of factors including societal changes, economic conditions, and mental health awareness. The exploration of these trends sheds light on the historical patterns of suicide but also guides targeted interventions and awareness to mitigate risk factors associated with suicide.

Recent years we have seen a growing recognition of the urgency to address mental health issues, including suicide prevention, at both the nation and global level. With increasing awareness, there has been an increase in research efforts aimed to dissecting the interrelationship between demographic variables and suicide rates. This includes the examination of disparities across sex, race, Hispanic origin, and age groups, acknowledging the nuanced experiences and demographic categories that are the most vulnerable.

With a data set provided by the U.S. Department of Health & Human Services titled “Death rates for suicide, by sex, race, Hispanic origin, and age: United States”, this study seeks to contribute to this ongoing research by comprehensively analyzing death rates for suicide in the United States spanning nearly seven decades, from 1950 to 2018. By analyzing into historical data, we aim to discern long-term trends and identify significant shifts in suicide rates among different demographic groups. Moreover, we want to uncover potential underlying factors contributing to these trends, informing targeted interventions and policy initiatives tailored to address the unique needs of diverse populations like the United States. In essence, we aspire to contribute towards fostering a society that has increased mental health awareness through this research.

Data Analysis

```
data <- read_csv("Dataset/deathRates.csv", show_col_types = F)
demoCategory <- unique(data$STUB_LABEL)
ages <- unique(data$AGE)
years <- unique(data$YEAR)
demoFactor <- unique(data$STUB_NAME)

summaryDeathRate <- data %>%
  filter(STUB_NAME %in% demoFactor[1])

deathRate.summary <- ggplot(summaryDeathRate, aes(x = YEAR, y = ESTIMATE)) +
  geom_line() +
  labs(x = "Year", y = "Deaths per 100,000 Resident Population") +
  ggtitle("Death Rate Summary")

ggsave("deathSummary.pdf", deathRate.summary)

## Saving 6.5 x 4.5 in image

srDeathRate <- data %>%
  filter(STUB_NAME %in% demoFactor[3])
```

```
deathRate.sexRace <- ggplot(srDeathRate, aes(x = STUB_LABEL, y = ESTIMATE)) +
  geom_bar(stat = "identity") +
  scale_x_discrete(labels = function(x) gsub(" ", "\n", x)) +
  labs(x = "Sex-Race", y = "Deaths per 100,000 Resident Population") +
  ggtitle("Cumulative Death Count")

ggsave("CumulativeDeath.pdf", deathRate.sexRace)
```

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Warning: Removed 48 rows containing missing values or values outside the scale range
('geom_bar()').

```
srhDeathRate <- data %>%
  filter(STUB_NAME %in% demoFactor[4])

ageDeathRate <- data %>%
  filter(STUB_NAME %in% demoFactor[10])

hispanicOrigin<- c("Female: Hispanic or Latino: All races", "Male: Hispanic or Latino: All races")
HispanicMaleDeathRate <- srhDeathRate %>%
  filter(STUB_LABEL %in% hispanicOrigin[2])
HispanicFemaleDeathRate <- srhDeathRate %>%
  filter(STUB_LABEL %in% hispanicOrigin[1])

deathRate.hispanic <- ggplot() +
  geom_line(data = HispanicMaleDeathRate, aes(x = YEAR, y = ESTIMATE, color = "Male")) +
  geom_line(data = HispanicFemaleDeathRate, aes(x = YEAR, y = ESTIMATE, color = "Female")) +
  labs(x = "Year", y = "Deaths per 100,000 Resident Population") +
  ggtitle("Death Rate of Hispanic Origin")

ggsave("HispanicDeath.pdf", deathRate.hispanic)
```

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Warning: Removed 16 rows containing missing values or values outside the scale range
('geom_line()').

Warning: Removed 16 rows containing missing values or values outside the scale range
('geom_line()').

```
nonHispanicDeathRate <- srhDeathRate %>%
  filter(!(STUB_LABEL %in% hispanicOrigin))

deathRate.nonHispanic <- ggplot(nonHispanicDeathRate, aes(x = STUB_LABEL, y = ESTIMATE)) +
  geom_bar(stat = "identity") +
  scale_x_discrete(labels = function(x) gsub(" ", "\n", x)) +
  labs(x = "Sex-Race", y = "Deaths per 100,000 Resident Population") +
  ggtitle("Non-Hispanic Origin: Cumulative Death Count")

ggsave("NonHispanicDeath.pdf", deathRate.nonHispanic)
```

```
## Saving 6.5 x 4.5 in image
```

```
## Warning: Removed 120 rows containing missing values or values outside the scale range  
## ('geom_bar()').
```

```
deathRate.age <- ggplot(ageDeathRate, aes(x = AGE, y = ESTIMATE)) +  
  geom_bar(stat = "identity") +  
  scale_x_discrete(labels = function(x) gsub(" ", "\n", x)) +  
  labs(x = "Age", y = "Deaths per 100,000 Resident Population") +  
  ggtitle("Cumulative Deaths Count by Age Groups")  
  
ggsave("ageDeath.pdf", deathRate.age)
```

```
## Saving 6.5 x 4.5 in image
```

```
## Warning: Removed 376 rows containing missing values or values outside the scale range  
## ('geom_bar()').
```

```
sexDeathRate <- data %>%  
  filter(STUB_NAME %in% demoFactor[2])  
male_death_rates <- sexDeathRate %>%  
  filter(STUB_LABEL == "Male")  
female_death_rates <- sexDeathRate %>%  
  filter(STUB_LABEL == "Female")  
  
sex_death_rate_plot <- ggplot() +  
  geom_line(data = male_death_rates, aes(x = YEAR, y = ESTIMATE, color = "Male")) +  
  geom_line(data = female_death_rates, aes(x = YEAR, y = ESTIMATE, color = "Female")) +  
  labs(x = "Year", y = "Deaths per 100,000 resident population", color = "Sex") +  
  ggtitle("Male vs Female Death Rates from Suicide (1960-2018)") +  
  scale_color_manual(values = c("blue", "red")) +  
  theme_minimal()  
  
ggsave("deathByGender.pdf", sex_death_rate_plot)
```

```
## Saving 6.5 x 4.5 in image
```

```
df <- data.frame(age = character(), race = character(), hispanic_origin = character(), sex = character())  
  
for (i in 1:nrow(ageDeathRate)) {  
  row <- ageDeathRate[i, ]  
  df[i, "age"] <- row$AGE  
  string <- row$STUB_LABEL  
  split <- strsplit(string, ":")  
  df[i, "sex"] <- trimws(split[[1]][1])  
  df[i, "race"] <- trimws(split[[1]][3])  
  df[i, "hispanic_origin"] <- trimws(split[[1]][2])  
  df[i, "death"] <- row$ESTIMATE  
}  
  
df
```

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

## 810	65 years and over
## 811	65 years and over
## 812	65 years and over
## 813	65 years and over
## 814	65 years and over
## 815	65 years and over
## 816	65 years and over
## 817	65 years and over
## 818	65 years and over
## 819	65 years and over
## 820	65 years and over
## 821	65 years and over
## 822	65 years and over
## 823	65 years and over
## 824	65 years and over
## 825	15-24 years
## 826	15-24 years
## 827	15-24 years
## 828	15-24 years
## 829	15-24 years
## 830	15-24 years
## 831	15-24 years
## 832	15-24 years
## 833	15-24 years
## 834	15-24 years
## 835	15-24 years
## 836	15-24 years
## 837	15-24 years
## 838	15-24 years
## 839	15-24 years
## 840	15-24 years
## 841	15-24 years
## 842	15-24 years
## 843	15-24 years
## 844	15-24 years
## 845	15-24 years
## 846	15-24 years
## 847	15-24 years
## 848	15-24 years
## 849	15-24 years
## 850	15-24 years
## 851	15-24 years
## 852	15-24 years
## 853	15-24 years
## 854	15-24 years
## 855	15-24 years
## 856	15-24 years
## 857	15-24 years
## 858	15-24 years
## 859	15-24 years
## 860	15-24 years
## 861	15-24 years
## 862	15-24 years
## 863	15-24 years

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

## 1296	65 years and over	All races	Hispanic or Latino
## 1297	65 years and over	All races	Hispanic or Latino
## 1298	65 years and over	All races	Hispanic or Latino
## 1299	65 years and over	All races	Hispanic or Latino
## 1300	65 years and over	All races	Hispanic or Latino
## 1301	65 years and over	All races	Hispanic or Latino
## 1302	65 years and over	All races	Hispanic or Latino
## 1303	65 years and over	All races	Hispanic or Latino
## 1304	65 years and over	All races	Hispanic or Latino
## 1305	65 years and over	All races	Hispanic or Latino
## 1306	65 years and over	All races	Hispanic or Latino
## 1307	65 years and over	All races	Hispanic or Latino
## 1308	65 years and over	All races	Hispanic or Latino
## 1309	65 years and over	All races	Hispanic or Latino
## 1310	65 years and over	All races	Hispanic or Latino
## 1311	65 years and over	All races	Hispanic or Latino
## 1312	65 years and over	All races	Hispanic or Latino
## 1313	65 years and over	All races	Hispanic or Latino
## 1314	65 years and over	All races	Hispanic or Latino
## 1315	65 years and over	All races	Hispanic or Latino
## 1316	65 years and over	All races	Hispanic or Latino
## 1317	65 years and over	All races	Hispanic or Latino
## 1318	65 years and over	All races	Hispanic or Latino
## 1319	65 years and over	All races	Hispanic or Latino
## 1320	65 years and over	All races	Hispanic or Latino
## 1321	65 years and over	All races	Hispanic or Latino
## 1322	65 years and over	All races	Hispanic or Latino
## 1323	65 years and over	All races	Hispanic or Latino
## 1324	65 years and over	All races	Hispanic or Latino
## 1325	65 years and over	All races	Hispanic or Latino
## 1326	65 years and over	All races	Hispanic or Latino
## 1327	65 years and over	All races	Hispanic or Latino
## 1328	65 years and over	All races	Hispanic or Latino
##	sex death		
## 1	Male 39.1		
## 2	Male 33.0		
## 3	Male 29.2		
## 4	Male 18.8		
## 5	Male 36.0		
## 6	Male 35.4		
## 7	Male 40.2		
## 8	Male 41.3		
## 9	Male 44.4		
## 10	Male 41.2		
## 11	Male 44.6		
## 12	Male 47.3		
## 13	Male 51.9		
## 14	Male 46.1		
## 15	Male 48.5		
## 16	Male 47.5		
## 17	Male 38.2		
## 18	Male 49.2		
## 19	Male 51.7		
## 20	Male 53.7		

## 21	Male	58.4
## 22	Male	30.0
## 23	Male	30.1
## 24	Male	36.4
## 25	Male	35.5
## 26	Male	41.5
## 27	Male	41.1
## 28	Male	39.8
## 29	Male	36.9
## 30	Male	39.6
## 31	Male	38.8
## 32	Male	35.2
## 33	Male	36.5
## 34	Male	40.8
## 35	Male	43.7
## 36	Male	46.9
## 37	Male	48.0
## 38	Male	46.1
## 39	Male	57.5
## 40	Male	58.1
## 41	Male	59.7
## 42	Male	14.9
## 43	Male	18.2
## 44	Male	19.7
## 45	Male	16.8
## 46	Male	11.6
## 47	Male	18.7
## 48	Male	19.2
## 49	Male	20.1
## 50	Male	17.3
## 51	Male	14.8
## 52	Male	21.2
## 53	Male	24.6
## 54	Male	20.1
## 55	Male	26.9
## 56	Male	26.4
## 57	Male	22.7
## 58	Male	31.3
## 59	Male	30.5
## 60	Male	29.5
## 61	Male	28.0
## 62	Male	NA
## 63	Male	NA
## 64	Male	NA
## 65	Male	NA
## 66	Male	NA
## 67	Male	NA
## 68	Male	NA
## 69	Male	NA
## 70	Male	NA
## 71	Male	NA
## 72	Male	NA
## 73	Male	NA
## 74	Male	NA

## 75	Male	NA
## 76	Male	NA
## 77	Male	17.6
## 78	Male	16.6
## 79	Male	NA
## 80	Male	15.6
## 81	Male	17.0
## 82	Male	9.5
## 83	Male	9.2
## 84	Male	9.0
## 85	Male	8.3
## 86	Male	8.4
## 87	Male	8.7
## 88	Male	6.7
## 89	Male	11.0
## 90	Male	11.7
## 91	Male	7.2
## 92	Male	7.9
## 93	Male	10.4
## 94	Male	9.9
## 95	Male	10.0
## 96	Male	12.0
## 97	Male	12.8
## 98	Male	15.5
## 99	Male	16.9
## 100	Male	16.9
## 101	Male	16.0
## 102	Male	10.8
## 103	Male	10.0
## 104	Male	9.4
## 105	Male	9.3
## 106	Male	9.4
## 107	Male	8.7
## 108	Male	9.8
## 109	Male	9.4
## 110	Male	10.0
## 111	Male	8.6
## 112	Male	9.6
## 113	Male	10.6
## 114	Male	10.9
## 115	Male	12.0
## 116	Male	12.2
## 117	Male	9.9
## 118	Male	9.8
## 119	Male	12.1
## 120	Male	11.5
## 121	Male	12.0
## 122	Male	11.5
## 123	Male	9.7
## 124	Male	8.2
## 125	Male	9.2
## 126	Male	10.1
## 127	Male	11.3
## 128	Male	8.8

## 129	Male	9.9
## 130	Male	10.6
## 131	Male	11.1
## 132	Male	12.2
## 133	Male	12.7
## 134	Male	11.4
## 135	Male	12.2
## 136	Male	11.0
## 137	Male	12.2
## 138	Male	10.9
## 139	Male	11.8
## 140	Male	11.2
## 141	Male	12.5
## 142	Male	13.6
## 143	Male	15.6
## 144	Male	18.2
## 145	Male	14.7
## 146	Male	17.3
## 147	Male	15.1
## 148	Male	11.2
## 149	Male	10.6
## 150	Male	12.9
## 151	Male	14.9
## 152	Male	15.5
## 153	Male	15.2
## 154	Male	13.4
## 155	Male	13.1
## 156	Male	10.9
## 157	Male	11.6
## 158	Male	12.8
## 159	Male	12.1
## 160	Male	12.7
## 161	Male	13.5
## 162	Female	NA
## 163	Female	NA
## 164	Female	NA
## 165	Female	NA
## 166	Female	10.0
## 167	Female	13.5
## 168	Female	12.9
## 169	Female	11.4
## 170	Female	10.0
## 171	Female	12.3
## 172	Female	17.5
## 173	Female	16.7
## 174	Female	12.0
## 175	Female	16.1
## 176	Female	15.1
## 177	Female	15.6
## 178	Female	18.5
## 179	Female	19.7
## 180	Female	20.5
## 181	Female	16.4
## 182	Female	8.2

## 183	Female	9.1
## 184	Female	7.6
## 185	Female	7.1
## 186	Female	6.0
## 187	Female	12.7
## 188	Female	9.6
## 189	Female	10.7
## 190	Female	9.0
## 191	Female	9.8
## 192	Female	11.3
## 193	Female	11.8
## 194	Female	12.9
## 195	Female	10.0
## 196	Female	11.3
## 197	Female	15.7
## 198	Female	14.1
## 199	Female	17.5
## 200	Female	20.7
## 201	Female	17.2
## 202	Female	NA
## 203	Female	NA
## 204	Female	NA
## 205	Female	NA
## 206	Female	NA
## 207	Female	NA
## 208	Female	NA
## 209	Female	NA
## 210	Female	NA
## 211	Female	8.4
## 212	Female	8.2
## 213	Female	8.6
## 214	Female	7.8
## 215	Female	NA
## 216	Female	8.6
## 217	Female	NA
## 218	Female	9.7
## 219	Female	5.8
## 220	Female	7.3
## 221	Female	8.2
## 222	Female	NA
## 223	Female	NA
## 224	Female	NA
## 225	Female	NA
## 226	Female	NA
## 227	Female	NA
## 228	Female	NA
## 229	Female	NA
## 230	Female	NA
## 231	Female	NA
## 232	Female	NA
## 233	Female	NA
## 234	Female	NA
## 235	Female	NA
## 236	Female	NA

##	237	Female	NA
##	238	Female	NA
##	239	Female	NA
##	240	Female	NA
##	241	Female	NA
##	242	Female	4.1
##	243	Female	2.9
##	244	Female	3.5
##	245	Female	NA
##	246	Female	3.2
##	247	Female	2.6
##	248	Female	3.4
##	249	Female	3.6
##	250	Female	3.4
##	251	Female	3.9
##	252	Female	4.6
##	253	Female	3.4
##	254	Female	3.0
##	255	Female	5.5
##	256	Female	3.6
##	257	Female	4.3
##	258	Female	4.9
##	259	Female	6.4
##	260	Female	6.6
##	261	Female	7.0
##	262	Female	3.8
##	263	Female	3.2
##	264	Female	2.9
##	265	Female	3.4
##	266	Female	3.4
##	267	Female	4.2
##	268	Female	3.2
##	269	Female	3.3
##	270	Female	4.4
##	271	Female	4.6
##	272	Female	3.8
##	273	Female	4.3
##	274	Female	4.4
##	275	Female	4.0
##	276	Female	3.8
##	277	Female	4.1
##	278	Female	4.6
##	279	Female	3.7
##	280	Female	4.2
##	281	Female	4.3
##	282	Female	3.9
##	283	Female	3.2
##	284	Female	3.9
##	285	Female	3.9
##	286	Female	4.2
##	287	Female	4.5
##	288	Female	3.8
##	289	Female	4.2
##	290	Female	3.9

##	291	Female	3.7
##	292	Female	4.8
##	293	Female	4.9
##	294	Female	4.6
##	295	Female	4.3
##	296	Female	4.0
##	297	Female	4.3
##	298	Female	5.3
##	299	Female	4.6
##	300	Female	4.2
##	301	Female	5.0
##	302	Female	6.4
##	303	Female	5.1
##	304	Female	4.9
##	305	Female	7.0
##	306	Female	4.6
##	307	Female	6.6
##	308	Female	7.1
##	309	Female	7.1
##	310	Female	5.4
##	311	Female	5.9
##	312	Female	4.9
##	313	Female	4.3
##	314	Female	5.3
##	315	Female	5.3
##	316	Female	3.4
##	317	Female	5.3
##	318	Female	5.3
##	319	Female	4.8
##	320	Female	5.2
##	321	Female	3.6
##	322	Male	NA
##	323	Male	NA
##	324	Male	NA
##	325	Male	NA
##	326	Male	NA
##	327	Male	NA
##	328	Male	NA
##	329	Male	NA
##	330	Male	22.6
##	331	Male	22.3
##	332	Male	20.5
##	333	Male	22.2
##	334	Male	23.2
##	335	Male	24.4
##	336	Male	24.0
##	337	Male	23.3
##	338	Male	23.5
##	339	Male	24.6
##	340	Male	24.0
##	341	Male	21.7
##	342	Male	20.5
##	343	Male	20.5
##	344	Male	19.2

##	345	Male	19.5
##	346	Male	19.6
##	347	Male	19.4
##	348	Male	18.4
##	349	Male	19.2
##	350	Male	18.8
##	351	Male	18.6
##	352	Male	19.2
##	353	Male	19.4
##	354	Male	20.4
##	355	Male	21.9
##	356	Male	21.2
##	357	Male	21.4
##	358	Male	22.4
##	359	Male	23.4
##	360	Male	24.5
##	361	Male	27.2
##	362	Male	27.0
##	363	Male	NA
##	364	Male	NA
##	365	Male	NA
##	366	Male	NA
##	367	Male	NA
##	368	Male	NA
##	369	Male	NA
##	370	Male	NA
##	371	Male	25.1
##	372	Male	25.6
##	373	Male	24.0
##	374	Male	25.0
##	375	Male	25.4
##	376	Male	26.4
##	377	Male	25.9
##	378	Male	25.7
##	379	Male	26.2
##	380	Male	26.7
##	381	Male	27.1
##	382	Male	26.8
##	383	Male	26.5
##	384	Male	26.5
##	385	Male	25.2
##	386	Male	25.1
##	387	Male	26.4
##	388	Male	27.0
##	389	Male	27.1
##	390	Male	27.2
##	391	Male	27.1
##	392	Male	27.4
##	393	Male	28.6
##	394	Male	29.1
##	395	Male	29.5
##	396	Male	30.3
##	397	Male	31.0
##	398	Male	31.7

## 399	Male	31.2
## 400	Male	31.8
## 401	Male	33.5
## 402	Male	33.5
## 403	Male	35.9
## 404	Male	35.6
## 405	Male	NA
## 406	Male	NA
## 407	Male	NA
## 408	Male	NA
## 409	Male	NA
## 410	Male	NA
## 411	Male	NA
## 412	Male	NA
## 413	Male	27.3
## 414	Male	26.3
## 415	Male	25.8
## 416	Male	24.7
## 417	Male	25.9
## 418	Male	26.8
## 419	Male	26.2
## 420	Male	25.0
## 421	Male	24.9
## 422	Male	24.2
## 423	Male	24.5
## 424	Male	25.3
## 425	Male	24.8
## 426	Male	24.7
## 427	Male	23.4
## 428	Male	24.0
## 429	Male	25.9
## 430	Male	27.1
## 431	Male	27.4
## 432	Male	27.4
## 433	Male	28.2
## 434	Male	29.3
## 435	Male	30.5
## 436	Male	33.0
## 437	Male	33.6
## 438	Male	35.4
## 439	Male	35.5
## 440	Male	36.3
## 441	Male	36.1
## 442	Male	37.2
## 443	Male	37.2
## 444	Male	36.5
## 445	Male	38.2
## 446	Male	39.3
## 447	Male	NA
## 448	Male	NA
## 449	Male	NA
## 450	Male	NA
## 451	Male	NA
## 452	Male	NA

##	453	Male	NA
##	454	Male	NA
##	455	Male	46.4
##	456	Male	46.4
##	457	Male	46.9
##	458	Male	47.2
##	459	Male	44.6
##	460	Male	45.4
##	461	Male	42.8
##	462	Male	40.9
##	463	Male	41.0
##	464	Male	39.5
##	465	Male	39.0
##	466	Male	38.2
##	467	Male	36.5
##	468	Male	37.0
##	469	Male	35.0
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##	472	Male	35.0
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##	475	Male	33.0
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##	477	Male	31.8
##	478	Male	32.5
##	479	Male	32.5
##	480	Male	32.7
##	481	Male	33.4
##	482	Male	33.6
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##	486	Male	36.1
##	487	Male	36.8
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## 519	Male	10.5
## 520	Male	12.6
## 521	Male	10.8
## 522	Male	11.5
## 523	Male	12.0
## 524	Male	12.0
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## 568	Male	15.1
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## 604	Male	9.9
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## 607	Male	9.8
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## 609	Male	10.1
## 610	Male	9.8
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## 639	Male	11.4
## 640	Male	11.5
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## 648	Male	8.4
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## 653	Male	8.8
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## 672	Male	15.4
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## 691	Male	10.7
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## 719	Male	13.0
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## 759	Male	14.2
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## 762	Male	11.5
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## 767	Male	12.1
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## 770	Male	10.4
## 771	Male	13.1
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## 773	Male	12.6
## 774	Male	12.9
## 775	Male	11.6
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## 799	Male	23.1
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## 805	Male	19.5
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## 808	Male	17.9
## 809	Male	15.9
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## 812	Male	12.7
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## 1117 Female	2.7
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## 1146 Female	NA
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##	1266	Female	2.7
##	1267	Female	2.5
##	1268	Female	2.5
##	1269	Female	2.3
##	1270	Female	2.6
##	1271	Female	2.4
##	1272	Female	3.1
##	1273	Female	2.1
##	1274	Female	2.4
##	1275	Female	2.7
##	1276	Female	2.7
##	1277	Female	2.5
##	1278	Female	2.8
##	1279	Female	2.7
##	1280	Female	3.2
##	1281	Female	3.2
##	1282	Female	3.5
##	1283	Female	3.8
##	1284	Female	3.3
##	1285	Female	3.2
##	1286	Female	3.2
##	1287	Female	NA
##	1288	Female	NA
##	1289	Female	NA
##	1290	Female	NA
##	1291	Female	NA
##	1292	Female	NA
##	1293	Female	NA
##	1294	Female	NA
##	1295	Female	NA
##	1296	Female	NA
##	1297	Female	NA
##	1298	Female	NA
##	1299	Female	NA
##	1300	Female	NA
##	1301	Female	NA
##	1302	Female	3.7
##	1303	Female	NA
##	1304	Female	2.5
##	1305	Female	NA
##	1306	Female	2.7
##	1307	Female	NA
##	1308	Female	2.8
##	1309	Female	2.4
##	1310	Female	NA
##	1311	Female	NA
##	1312	Female	2.0
##	1313	Female	NA
##	1314	Female	1.8
##	1315	Female	2.0
##	1316	Female	1.7

```
## 1317 Female    NA
## 1318 Female    1.6
## 1319 Female    2.3
## 1320 Female    2.2
## 1321 Female    1.6
## 1322 Female    2.1
## 1323 Female    1.2
## 1324 Female    2.1
## 1325 Female    1.9
## 1326 Female    1.8
## 1327 Female    1.7
## 1328 Female    1.6
```

```
anova_result <- aov(death ~ age + race + hispanic_origin + sex, data = df)
summary(anova_result)
```

```
##           Df Sum Sq Mean Sq  F value    Pr(>F)
## age         3     664      221    6.968 0.000122 ***
## race        4    37582     9396   295.621 < 2e-16 ***
## sex         1    51688    51688  1626.317 < 2e-16 ***
## Residuals   943    29971        32
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 376 observations deleted due to missingness
```

```
df_numeric <- df %>%
  mutate_if(is.character, as.factor) %>%
  mutate_all(as.numeric)
correlation_matrix <- cor(select(df_numeric, -death))
correlation_matrix
```

```
##           age      race hispanic_origin sex
## age         1 0.0000000      0.0000000  0
## race        0 1.0000000      0.8044853  0
## hispanic_origin 0 0.8044853      1.0000000  0
## sex         0 0.0000000      0.0000000  1
```

Conclusion

Team Contribution Statement