

# Suicide Rates in U.S. Presidential Election Years: 2008, 2012 and 2016

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## Abstract

The author examines age-group specific suicide rates by state in the United States presidential election years of 2008, 2012 and 2016. For each election year, the states are divided into blue states (whose voters chose the Democratic Party presidential candidate) and red states (whose voters chose the Republican Party presidential candidate). While suicide rates have trended higher in all states, the differences in mean suicide rates in 2012 (when Democrat Barack Obama was re-elected) were significantly higher in red states than they were in blue states for every age group but adults 55 to 64 years of age. In 2016, when the Republican Party re-captured the White House late in the year, mean differences were notably higher in red states than in blue states among adults between 25 and 54 years of age.

## Keywords

Suicide Rates, Presidential Elections, Red and Blue States

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## 1. Introduction

In 2008, 2012 and 2016, the last three U.S. presidential election years, the highest suicide rates—18.70, 20.00 and 19.75 per 100,000 people respectively—were among American middle-aged adults, between 45 and 54 years of age (American Foundation for Suicide Prevention [1]). There is significant variation in suicide rates among states, in part due to access to firearms (the most common method of death by suicide) and in part due to low population density, notably the isolation associated with sparsely populated mostly land-locked states in the West (see, for example, Cohn [2]). Suicide has been associated with stressful economic conditions (see, for example, Hamermesh and Soss [3]). But, no one has examined whether suicide in presidential election years is related to states whose voters predominantly choose either the Republican Party (red) or Democratic

Party (blue) presidential candidate. If the incumbent president is a Democrat, suicide rates may be higher in red states than in blue states, especially if (as in 2012) the Democratic incumbent is re-elected. The growing divide between red and blue states may manifest itself in different average suicide rates.

Barack Obama (Democrat) was the first African American elected President of the United States in 2008. He was re-elected in 2012 by defeating Republican opponent Mitt Romney. In 2016, Donald Trump (Republican), the oldest person ever elected president, defeated the Democratic presidential nominee Hillary Clinton in arguably one of the most contentious and nastiest presidential campaigns in American history.<sup>1</sup> One might think that red states in 2012 were angrier and possibly more suicidal than blue states following Obama's re-election. In 2016, one might think that red states were angrier and possibly more suicidal than blue states until Trump's surprising victory in early November.

In this short research note, we examine state specific suicide rates over the last three presidential election years across six age groups, ranging from 20- to 24-year-olds to adults 65 years of age or older. And, for each of the presidential election years (2008, 2012 and 2016), we propose to test for any differences in age-group specific suicide rates in blue and red states among adults over 20 years of age. Some may argue that suicide rates are invariably higher in red states only because of their geography, despite the fact that the location of "red" states has changed as several states have flipped from blue to red.

## 2. Literature Review

Levandusky and Pope [4] argued in 2011 that the degree of polarization between red and blue states was probably overstated. Based on survey data they used from 2006, the authors concluded that there was much common ground between the two groups. In 2016, however, Aisch, Pearce and Yourish [5] observed that the divide between red and blue America had become "pretty wide" and was growing. The authors speculated that the degree of polarization would continue in the 2016 presidential election. The ever-deepening divide between red and blue states before and after Donald Trump's victory in 2016 reflects strong differences in ideology. Some people (see, for example, Jacobson [6]) observed that the rift is evident in how state legislatures handle "hot-button social issues" such as gun control, abortion, and immigration. Blue states tend to approve more gun control legislation and make life easier for undocumented residents in sanctuary cities; red states have passed legislation making abortions more difficult to obtain.

No one, however, has suggested that there might be a link between the territorial separation into red and blue states across the United States and rising suicide rates. Some deeply despondent voters who complained that they had lost

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<sup>1</sup>Donald J. Trump joined four other U.S. presidential winners who also lost the popular vote: John Q. Adams (1824); Rutherford B. Hayes (1876); Benjamin Harrison (1888); and George W. Bush (2000).

control of their country might have regarded suicide as a preferable solution to waiting to vote to bring about change.

### 3. Data

The Centers for Disease Control and Prevention (CDC) in June 2018 released the latest figures (as of 2016) on age-specific death rates for suicide per 100,000 people by state. Suicide death rates by state for six age groups—20 - 24, 35 - 44, 45 - 54, 55 - 64, and 65 or over—in years 2008, 2012 and 2016 were obtained from the CDC WONDER's online database for mortality [7]. In cases where the number of deaths by suicide was less than 10 (or deemed by the CDC to be “unreliable”), the CDC's figures were suppressed.

For each election year, we divide the U.S. into red and blue states. **Table 1** shows age-group specific suicide rates by state and blue/red designations for the years 2008, 2012 and 2016. In 2012, two states—Indiana and North Carolina—flipped from blue to red. Four years later, in 2016, six more states—Florida, Iowa, Michigan, Ohio, Pennsylvania, and Wisconsin—flipped from blue to red. No state in either 2012 or 2016 flipped from red to blue. Presidential election maps for 2008, 2012 and 2016 [8] showing the blue/red split appear in **Figures 1-3**.

In 2008 and 2012, no red state and no blue state (save for Florida) was completely surrounded by rival blue/red states; in 2016, again no red state was completely surrounded by blue states, but the blue states of Minnesota and Illinois were completely surrounded by red states. The three election maps clearly show the tendency for like-minded Americans to live near one another, that is, to sort themselves geographically, a point made by Bishop [9] in 2008.

**Table 2** and **Table 3** summarize for blue states and red states, respectively, the number of observations for each age group, the mean, standard deviation, minimum and maximum suicide rates in 2008, 2012 and 2016. The highest average suicide rate in all three presidential election years was among adults between 45 and 54 years of age in both blue and red states. For blue states, the mean suicide rate was lowest for 20- to 24-year-olds all three years; for red states, the mean suicide rate was lowest for 20- to 24-year-olds in only 2012, while in 2008 and 2016, the mean suicide rate was lowest for the oldest age group, 65 years of age or older. Blue (red) states with the lowest suicide rates were New Jersey, Massachusetts, and New York (Nebraska, Georgia, and Louisiana); blue (red) states with the highest suicide rates were New Mexico, Nevada, and Colorado (Wyoming, Alaska, and Montana). In 2016 alone, the lowest suicide rate was 7.9 suicides per 100,000 25- to 34-year-olds in New Jersey (a blue state) and the highest suicide rate was 61.0 suicides per 100,000 20- to 24-year-olds in Alaska (a red state). Among adults 65 years of age or older in blue states, Massachusetts had the lowest suicide rate all three years; Nevada had the highest (or tied for the highest) suicide rate all three years. Among 20- to 24-year-olds (45- to 55-year-olds) in red states, Alaska (Wyoming) had the highest suicide rate all three years.

**Table 1.** Age Group Suicide Rates per 100,000 by State, 2008, 2012 and 2016<sup>a</sup>.

State	Red/Blue <sup>b</sup>	Age Groups					
		20 - 24	25 - 34	35 - 44	45 - 54	55 - 64	65+
Alabama							
2008	red	17.0	17.4	16.8	19.6	16.2	14.0
2012	red	10.8	17.2	22.4	23.2	19.7	18.6
2016	red	17.7	20.4	19.5	24.7	20.0	19.9
Alaska							
2008	red	46.0	31.5	27.6	29.7	30.8	—
2012	red	43.3	36	30.4	28.2	—	—
2016	red	61.0	42.3	38	23.4	21.0	—
Arizona							
2008	red	15.2	14.7	18.9	25.7	23.5	22.5
2012	red	17.1	21.3	20.0	28.5	29.3	20.4
2016	red	19.8	22.2	19.3	27.5	26.3	24.6
Arkansas							
2008	red	18.4	22.9	20.8	22.4	18.2	17.7
2012	red	19.1	20.3	23.1	24.2	24.7	15.8
2016	red	19.2	25.5	26.9	20.6	24.8	24
California							
2008	blue	9.5	9.3	12.5	16.8	17.6	17.1
2012	blue	9.7	9.9	11.9	15.5	17.3	16.3
2016	blue	10.8	11.6	12.2	15.1	16.7	16.8
Colorado							
2008	blue	18.6	15.3	19.2	29.6	21.7	21.0
2012	blue	23.8	24.4	24.9	32.3	28.8	21.4
2016	blue	25.9	26.4	26.0	29.4	27.5	22.9
Connecticut							
2008	blue	9.5	9.5	11.7	13.6	13.4	8.3
2012	blue	9.2	11.0	15.9	16.4	13	10.3
2016	blue	8.9	12.2	11.1	17.0	19.0	12.8
Delaware							
2008	blue	—	—	—	26.1	—	—
2012	blue	—	23.2	—	23.4	—	14.2
2016	blue	—	—	—	19.6	20.7	15.0
Florida							
2008	blue	12.7	15.0	18.7	24.1	21.6	18.4
2012	blue	12.8	13.2	19.5	24.5	23.4	19.4
2016	red	13.2	15.6	17.9	21.6	21.5	20.0
Georgia							
2008	red	11.7	11.3	11.9	16.9	15.3	15.9

**Continued**

2012	red	12.2	15.1	14.1	17.6	17.3	16.5
2016	red	20.3	16.3	15	19.9	19.2	16.1
Hawaii							
2008	blue	—	—	15.1	16.5	—	10.8
2012	blue	—	15.6	17.2	19.9	21.0	13.8
2016	blue	20.5	19.7	18.6	12.3	11.9	10.2
Idaho							
2008	red	—	12.7	20.2	24.9	26.2	28.4
2012	red	27.6	18.0	24.2	33.5	22.9	19.3
2016	red	26.8	15.8	32.5	39.8	21.1	27.5
Illinois							
2008	blue	8.7	10.0	13.5	14.2	13.5	11.8
2012	blue	10.7	10.6	14.2	16.1	13.7	11.4
2016	blue	12.1	12.0	15.2	16.2	15.6	12.5
Indiana							
2008	blue	9.9	16.0	19.4	17.0	16.7	16.5
2012	red	14.3	17.0	21.3	23.1	18.5	14.8
2016	red	20.9	18.8	21	24.1	19.3	16.9
Iowa							
2008	blue	12.6	15.7	21.2	18.1	14.7	12.3
2012	blue	14.8	17.2	20.3	18.4	13.0	10.4
2016	red	17.8	20.8	20.1	25.7	16.1	11.9
Kansas							
2008	red	22.7	15.5	17.1	15.7	12.3	13.3
2012	red	22.0	22.2	23.0	28.0	19.9	18.8
2016	red	20.8	27.8	26.2	24.3	21.2	16.5
Kentucky							
2008	red	10.1	16.6	20.5	22.9	16.3	19.4
2012	red	19.7	20.8	22.4	24.7	19.7	18.9
2016	red	17.3	21.4	22.6	26.3	19.6	19.1
Louisiana							
2008	red	17.1	15.9	18.7	15.5	13.8	14.5
2012	red	10.8	15.0	20.2	17.8	14.8	15.0
2016	red	20.2	19.2	18.6	19.6	18.7	16.2
Maine							
2008	blue	—	15.3	17.5	22.7	12.7	18.2
2012	blue	—	—	21.0	29.0	18.9	15.9
2016	blue	25.9	17.8	21.9	19.4	22.4	17.5
Maryland							
2008	blue	10.5	10.2	10.9	13.4	11.8	11.9

**Continued**

2012	blue	12.4	9.6	12.0	15.1	14.3	12.7
2016	blue	10.4	11.3	11.3	14.2	12.6	12.8
Massachusetts							
2008	blue	5.7	7.3	12.8	14.2	9.7	7.6
2012	blue	10.5	10.2	13.2	14.7	12.4	7.0
2016	blue	11.2	11.3	12.4	12.5	13.0	8.6
Michigan							
2008	blue	12.6	15.8	18.1	18.9	12.6	12.6
2012	blue	15.5	16.2	17.4	18.9	15.3	12.4
2016	red	17.3	16.1	18.1	19.1	18.2	14.0
Minnesota							
2008	blue	16.6	12.7	17.1	17.3	14.4	11.1
2012	blue	12.9	12.1	19.2	18.7	17.0	11.2
2016	blue	17.2	18.2	17.6	19.2	18.7	12.1
Mississippi							
2008	red	13.8	18.1	17.9	18	18.6	21.1
2012	red	14.3	16.7	22.7	23.1	16.0	16.3
2016	red	16.4	17.5	17.0	17.6	16.3	14.4
Missouri							
2008	red	17.3	15.1	17.5	21.0	14.1	15.0
2012	red	18.2	19.2	21.1	22.3	18.7	17.2
2016	red	23.0	26.2	24.5	27.9	21.0	18.4
Montana							
2008	red	29.0	36.1	26.5	24.2	22.5	22.1
2012	red	—	38.8	34.5	26.4	32.7	22.1
2016	red	27.2	44.4	36.8	30.2	28.2	19.5
Nebraska							
2008	red	—	14.1	12.4	18.5	11.6	9.6
2012	red	15.2	13.9	16.8	17.6	17.2	15.2
2016	red	20.8	20.6	16.1	18.3	15.8	9.8
Nevada							
2008	blue	23.8	17.9	23.2	35.0	31.1	31.4
2012	blue	13.7	18.9	24.5	31.1	35.0	23.6
2016	blue	18.3	22.7	26.8	30.3	27.3	37.6
New Hampshire							
2008	blue	—	14.6	21.9	21.5	—	18.7
2012	blue	—	18.1	18.5	28.6	18.5	13.9
2016	blue	—	17.4	28.3	22.4	20.4	23.8
New Jersey							
2008	blue	8.2	7.8	9.3	10.6	10.0	8.7

**Continued**

2012	blue	12.1	8.6	10.8	11.0	10.7	7.6
2016	blue	8.8	7.9	8.5	12.3	11.0	9.2
New Mexico							
2008	blue	25.5	23.0	27.0	35.1	19.6	24.8
2012	blue	22	24.2	31.0	34.0	25.4	23.4
2016	blue	25.4	30.4	34.2	30.6	26.7	27.5
New York							
2008	blue	7.3	7.6	10.3	11.7	9.3	9.4
2012	blue	8.9	9.2	10	14.1	12.4	10.2
2016	blue	9.6	8.5	10.8	12.2	12.1	9.9
North Carolina							
2008	blue	14.4	14.9	17.4	19.2	16.0	15.0
2012	red	13.8	15.3	14	23.0	18.4	16.2
2016	red	15.9	14.2	17.7	18.7	19.4	16.1
North Dakota							
2008	red	—	—	—	—	—	—
2012	red	—	—	26.0	23.6	—	—
2016	red	—	25.5	25.5	35.1	—	—
Ohio							
2008	blue	13.7	16.0	19.0	17.8	13.8	12.0
2012	blue	13.9	16.5	18.1	19.7	17.3	15.1
2016	red	16.2	20.1	18.2	19.7	20.4	16.2
Oklahoma							
2008	red	16.4	19.4	22.6	26.0	18.2	17.5
2012	red	22.7	23	26.8	20.3	22.7	18.9
2016	red	30.1	28.4	29.4	29.8	26.4	21.2
Oregon							
2008	blue	13.9	14.7	20.5	25.9	21.4	16.9
2012	blue	13.9	20.6	20.0	36.1	21.4	23.6
2016	blue	22.4	16.5	22.7	27.7	25	25.8
Pennsylvania							
2008	blue	12.9	15.6	17.1	19.8	14.3	12.7
2012	blue	15.4	15.4	17.8	19.6	17.0	12.8
2016	red	17.2	17.5	19.6	23.6	20.7	16.2
Rhode Island							
2008	blue	—	—	17.9	22.2	16.3	—
2012	blue	—	—	—	20.9	—	—
2016	blue	—	—	17.1	20.4	19.7	—
South Carolina							
2008	red	16.9	11.9	14.1	19.6	18.5	15.2
2012	red	13.2	16.6	16.4	23.9	19.6	17.8
2016	red	21	18.3	18.9	25.5	22.3	19
South Dakota							
2008	red	—	—	22.0	18.8	—	—

**Continued**

2012	red	—	23.6	—	29.3	19.7	—
2016	red	—	24.9	39.6	22.5	—	—
<b>Tennessee</b>							
2008	red	17.4	17.2	23.1	23.3	24.4	16.4
2012	red	12.1	17.1	19	24.4	20.4	20.4
2016	red	14.9	20.6	22.4	25	20.7	19.5
<b>Texas</b>							
2008	red	11.6	12.8	13.8	17	14.4	15.2
2012	red	14.1	13.7	14.7	17.6	16.7	16.7
2016	red	15.8	16.3	15.2	17.8	17	15.7
<b>Utah</b>							
2008	red	22.3	16.8	20.8	30.4	22.6	13.6
2012	red	19.9	25.6	28.6	40.2	26	20.6
2016	red	23.7	27.2	31.4	35	26.1	22.4
<b>Vermont</b>							
2008	blue	—	—	—	26.1	—	—
2012	blue	—	—	—	23.5	—	—
2016	blue	—	30.3	—	24.3	25.8	22.1
<b>Virginia</b>							
2008	blue	13.1	13.1	15.1	17.9	15.4	16.7
2012	blue	14	15	17.4	18.2	17	16.8
2016	blue	18	17.3	15.1	16.8	18.4	18.7
<b>Washington</b>							
2008	blue	15.1	14.5	17.4	21.5	18	17.9
2012	blue	16.3	18.1	17	22.2	20.8	18.2
2016	blue	20.3	17.8	17.3	20.6	23.4	19.1
<b>West Virginia</b>							
2008	red	18.2	17.2	22.7	18.6	15.2	16.4
2012	red	21.7	24.1	25.8	26.5	21.3	13.8
2016	red	18.7	27.4	35.9	22.6	22.9	20.7
<b>Wisconsin</b>							
2008	blue	12.8	17	19.2	20.2	19.8	12.3
2012	blue	15.9	17.3	16.6	19.5	15.4	11
2016	red	19.4	18.4	20.8	21.7	17.6	14.5
<b>Wyoming</b>							
2008	red	—	29.4	34.4	30.6	—	—
2012	red	—	45.6	39.6	45.6	31.7	31.8
2016	red	—	25.6	39.3	40.5	—	36.4

<sup>a</sup>Data sources: Suicide rates per 100,000 population by state for residents 20 to 24 years of age in years 2008, 2012, 2016 are from: <https://wonder.cdc.gov/controller/saved/D76/D38F594>; suicide rates by state for residents between 25 and 64 years of age by ten-year age groups in years 2008, 2012, 2016 are from: <https://wonder.cdc.gov/controller/saved/D76/D38F595>; and suicide rates by state for residents 65 years of age or over in years 2008, 2012, 2016 are from: <https://wonder.cdc.gov/controller/saved/D76/D38F596>.

<sup>b</sup>Blue states (whose electoral votes or majority of electoral votes went to the Democratic presidential candidate) and red states (whose electoral votes went to the Republican presidential candidate) are from <https://www.270towin.com/maps/2008-election-state-winners>, <https://www.270towin.com/maps/2012-election-state-winners>, and <https://www.270towin.com/maps/2016-election-state-winners>.

**Table 2.** Age group suicide rates, blue states, 2008, 2012 and 2016, Summary statistics.

Age Groups	20 - 24	25 - 34	35 - 44	45 - 54	55 - 64	65+
2008						
Observations	22	24	26	28	24	25
Mean	13.07	13.7	17.04	20.25	16.06	14.96
Std. Dev.	4.84	3.76	4.21	6.23	4.85	5.46
Minimum	5.7	7.3	9.3	10.6	9.3	7.6
Maximum	Massachusetts	Massachusetts	New Jersey	New Jersey	New York	Massachusetts
	New Mexico	New Mexico	New Mexico	New Mexico	Nevada	Nevada
	25.5	23	27	35.1	31.1	31.4
2012						
Observations	20	23	23	26	23	24
Mean	13.92	15.44	17.76	21.59	18.22	14.69
Std. Dev.	3.79	4.84	4.84	6.62	5.78	4.85
Minimum	8.9	8.6	10	11	10.7	7
Maximum	New York	New Jersey	New York	New Jersey	New Jersey	Massachusetts
	Colorado	Colorado	New Mexico	Oregon	Nevada	Nevada, Oregon
	23.8	24.4	31	36.1	35	23.6
2016						
Observations	16	18	18	20	20	19
Mean	16.61	17.18	18.17	19.63	19.4	17.63
Std. Dev.	6.37	6.79	7.13	6.14	5.49	7.57
Minimum	8.8	7.9	8.5	12.2	11	8.6
Maximum	New Jersey	New Jersey	New Jersey	New York	New Jersey	Massachusetts
	Colorado, Maine	New Mexico	New Mexico	New Mexico	Colorado	Nevada
	25.9	30.4	34.2	30.6	27.5	37.6

Suicide rates have increased for all six age groups in blue as well as in red states since 2008. Among blue states, the percentage increase in the average suicide rate between 2008 and 2016 was highest (27.1 percent, from 13.07 to 16.61) for the youngest adults aged 20 to 24. Among red states, the corresponding percentage increase was highest (22.8 percent, from 18.33 to 22.51) for adults between 25 and 34 years of age. The average suicide rate between 2008 and 2016 actually fell 3.1 percent (from 20.25 to 19.63) in blue states among adults between 45 and 54 years of age.

#### 4. Methodology

In order to determine whether or not average suicide rates by age group have changed markedly between presidential election years for 1) blue states, 2) red

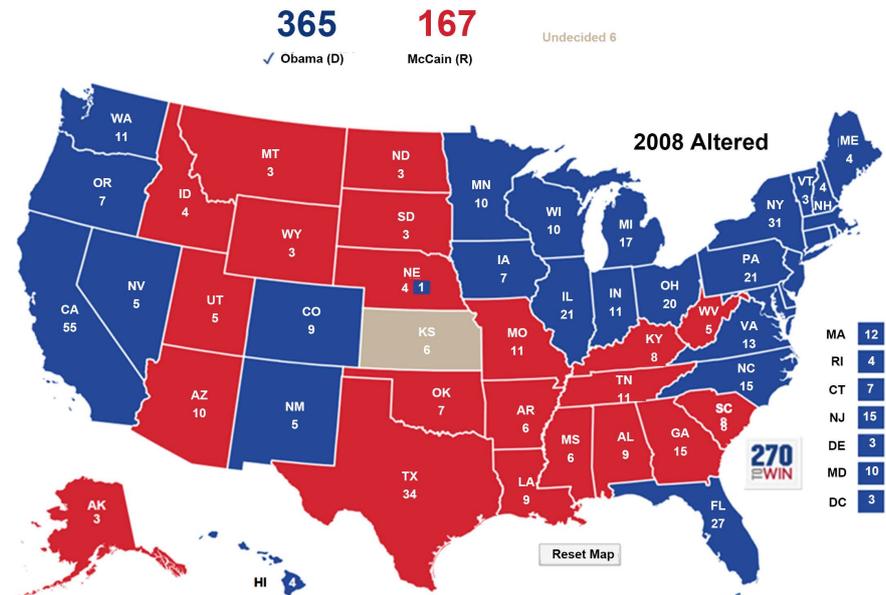
**Table 3.** Age group suicide rates, red states, 2008, 2012 and 2016, summary statistics.

Age Groups	20 - 24	25 - 34	35 - 44	45 - 54	55 - 64	65+
2008						
Observations	17	20	21	21	19	18
Mean	18.89	18.33	20.01	21.87	18.56	17.1
Std. Dev.	8.32	6.69	5.32	4.71	5.16	4.32
Minimum	10.1	11.3	11.9	15.5	11.6	9.6
	Kentucky	Georgia	Georgia	Louisiana	Nebraska	Nebraska
Maximum	46	36.1	34.4	30.6	30.8	28.4
	Alaska	Montana	Wyoming	Wyoming	Alaska	Idaho
2012						
Observations	20	23	23	24	22	21
Mean	18.11	21.57	22.92	25.53	21.27	18.34
Std. Dev.	7.45	8.22	6.32	6.72	4.88	3.79
Minimum	10.8	13.7	14	17.6	14.8	13.8
	Alabama, Louisiana	Texas	North Carolina	Georgia,	Louisiana	West Virginia
Maximum	43.3	45.6	39.6	45.6	32.7	31.8
	Alaska	Wyoming	Wyoming	Wyoming	Montana	Wyoming
2016						
Observations	27	30	30	30	27	27
Mean	21.21	22.51	24.13	24.94	20.81	18.77
Std. Dev.	8.85	7.04	7.7	6.15	3.28	5.24
Minimum	13.2	14.2	15	17.6	15.8	9.8
	Florida	North Carolina	Georgia	Mississippi	Nebraska	Nebraska
Maximum	61	44.4	39.6	40.5	28.2	36.4
	Alaska	Montana	South Dakota	Wyoming	Montana	Wyoming

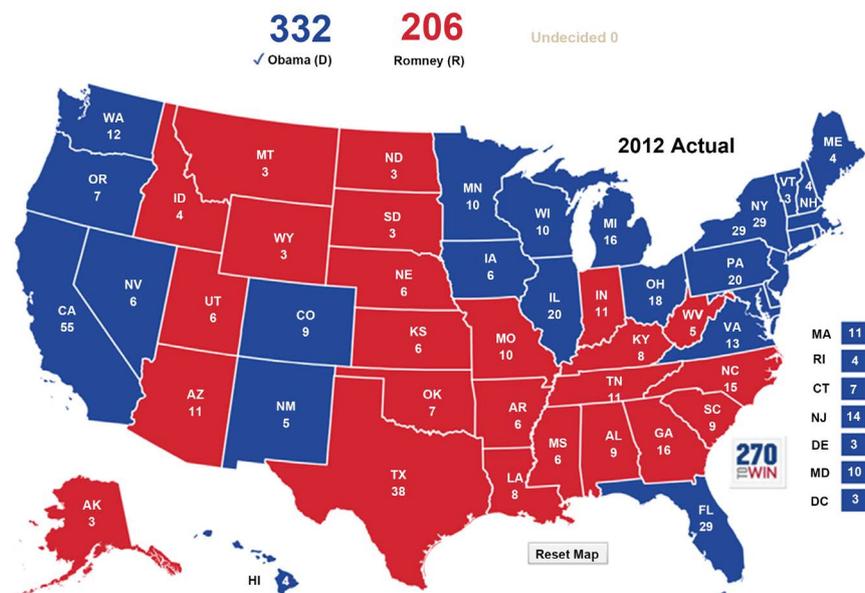
states, and 3) blue versus red states, three sets of  $t$ -tests are run. Because suicide rates have been rising across all states since 2008, the more surprising result in the comparisons we propose for the first two sets of  $t$ -tests might be *failure* to reject the null hypothesis of no difference in the average suicide rates from one election year to the next. The third set of  $t$ -tests might also appear to be pointless. After all, judging from the means reported in **Table 2** and **Table 3**, one might expect average suicide rates by age group in red states to be much greater than the corresponding average rates in blue states, in each of the three election years. Here again, failure to reject the null hypothesis of no difference between blue/red average suicide rates for any given age group might be the more surprising result.

## 5. Presentation of Results

**Table 4** shows the results of the two-sample  $t$ -tests involving the average suicide rates for each age group in blue states alone. Despite higher average suicide rates

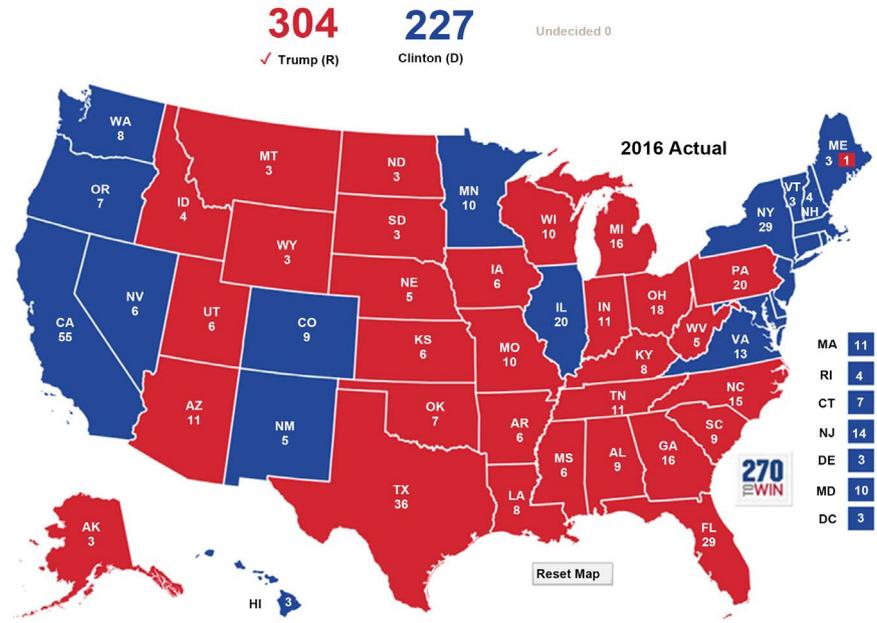


**Figure 1.** The 2008 election map showing the red-blue divide. Note: John McCain won all six electoral votes in Kansas (a red state). Source: [https://www.270towin.com/2008\\_Election/interactive\\_map](https://www.270towin.com/2008_Election/interactive_map).



**Figure 2.** The 2012 election map showing the red-blue divide. Source: [https://www.270towin.com/2012\\_Election/interactive\\_map](https://www.270towin.com/2012_Election/interactive_map).

for almost all age groups over time, in only two of the eighteen tests reported were the results statistically significant (using  $\alpha = 0.05$ ). In both cases, the comparisons involved the years 2008 and 2016. The higher average suicide rate in 2016 among adults between 25 and 34 years of age was discernible from the corresponding average in 2008 ( $p = 0.0402$ ). And, the higher 2016 average suicide rate among adults between 55 and 64 years of age was also discernible from the corresponding average in 2008 ( $p = 0.0382$ ).



**Figure 3.** The 2016 election map showing the red-blue divide. Source: [https://www.270towin.com/2016\\_Election/interactive\\_map](https://www.270towin.com/2016_Election/interactive_map).

**Table 4.** Average suicide rates in blue states, 2008, 2012, and 2016, by Age Group.

Age Group	Years		Averages		p-value on difference <sup>a</sup>
	Group 1	Group 2	Group 1	Group 2	
20 - 24	2008	2012	13.07	13.92	0.5345
	2012	2016	13.92	16.61	0.1251
	2008	2016	13.07	16.61	0.0597
25 - 34	2008	2012	13.7	15.44	0.1749
	2012	2016	15.44	17.18	0.343
	2008	2016	13.7	17.18	<b>0.0402</b>
35 - 44	2008	2012	17.04	17.76	0.5813
	2012	2016	17.76	18.17	0.8254
	2008	2016	17.04	18.17	0.5113
45 - 54	2008	2012	20.25	21.59	0.4461
	2012	2016	21.59	19.63	0.3081
	2008	2016	20.25	19.63	0.7319
55 - 64	2008	2012	16.06	18.22	0.1715
	2012	2016	18.22	19.4	0.4988
	2008	2016	16.06	19.4	<b>0.0382</b>
65+	2008	2012	14.96	14.69	0.8546
	2012	2016	14.69	17.63	0.1304
	2008	2016	14.96	17.63	0.1822

<sup>a</sup>The *p*-value is reported for a two-tailed two-sample *t*-test with equal variances.

**Table 5** shows the results of the two-sample  $t$ -tests involving the average suicide rates for each age group in red states alone. In only three of the eighteen tests reported were the results statistically significant. Two of these three results involved the years 2008 and 2016, significantly different (higher in 2016 than in 2008) for adults between 25 and 34 years of age ( $p = 0.0413$ ) as well as for adults between 35 and 44 years of age ( $p = 0.0392$ ). When in 2012 Mitt Romney failed to deny Barack Obama's bid for a second consecutive term, average suicide rates for adults in red states between 45 and 54 years of age spiked 16.7 percent ( $p = 0.0434$ ) from 21.87 to 25.53. In no other instance did average suicide rates by age group discernibly change between election years 2008 and 2012. Moreover, in no case, for either blue or red states, did average suicide rates by age group change between election years 2012 and 2016.

**Table 6** shows the results of the two-sample  $t$ -tests involving the average suicide rates between blue and red states for each age group. In 2008, Obama defeated Republican John McCain to win the presidency. In that same year, red states reported different (discernibly higher) suicide rates among the three youngest age groups, adults between 20 and 44 years of age. The Republican Party failed to win back the White House four years later. In 2012, average suicide rates in red states were significantly different (discernibly higher) for *all* age groups but adults between 55 and 64 years of age. Although the Republicans won back the White House in 2016 in a victory that surprised even so-called experts,<sup>2</sup> adults in red states were angrier and arguably more suicidal than their counterparts in blue states among adults between 25 and 54 years of age. In 2016, red rates were significantly different (discernibly higher) than blue rates among adults aged 25 to 34 ( $p = 0.0135$ ), 35 to 44 ( $p = 0.0105$ ), and 45 to 54 ( $p = 0.0043$ ).

## 6. Concluding Remarks

Age-group specific suicide rates per 100,000 people are used to measure the increasingly angry political mood in U.S. presidential election years 2008, 2012 and 2016. In each election year, the U.S. is divided into blue (Democratic) and red (Republican) states. For each of six age groups in each of the three election years, average suicide rates in blue states are compared to those in red states.

Among 25- to 34-year-olds and 55- to 64-year-olds in blue states, average suicide rates in 2016 were the highest relative to the corresponding average eight years earlier. But, among blue states, average suicide rates did *not* significantly change from one election year to the next for any age group. In red states, adults 45 to 54 years of age were arguably most despondent (suicidal) in 2012 when Barack Obama was re-elected for a second term than they were in 2008.

In direct comparisons between blue and red states in each age group in each election year, 2012 suicide rates in red states were significantly different (much

<sup>2</sup>The night before the November 8, 2016 presidential election, statistician and editor-in-chief of ESPN's *Five Thirty Eight* Nate Silver gave Donald Trump only a 28.6 percent chance of winning the presidency (Silver [10]).

**Table 5.** Average suicide rates in red states, 2008, 2012, and 2016, by age group.

Age Group	Years		Averages		<i>p</i> -value on difference <sup>a</sup>
	Group 1	Group 2	Group 1	Group 2	
20 - 24	2008	2012	18.89	18.11	0.7644
	2012	2016	18.11	21.21	0.2111
	2008	2016	18.89	21.21	0.3916
25 - 34	2008	2012	18.33	21.57	0.168
	2012	2016	21.57	22.51	0.6559
	2008	2016	18.33	22.51	<b>0.0413</b>
35 - 44	2008	2012	20.01	22.92	0.1083
	2012	2016	22.92	24.13	0.5416
	2008	2016	20.01	24.13	<b>0.0392</b>
45 - 54	2008	2012	21.87	25.53	<b>0.0434</b>
	2012	2016	25.53	24.94	0.7389
	2008	2016	21.87	24.94	0.0606
55 - 64	2008	2012	18.56	21.27	0.0928
	2012	2016	21.27	20.81	0.6957
	2008	2016	18.56	20.81	0.078
65+	2008	2012	17.1	18.34	0.3466
	2012	2016	18.34	18.77	0.7538
	2008	2016	17.1	18.77	0.2698

<sup>a</sup>The *p*-value is reported for a two-tailed two-sample *t*-test with equal variances.

**Table 6.** Difference in suicide rates between blue and red states, 2008, 2012, and 2016, by age group.

Age Group	Year	Averages		<i>p</i> -value on difference <sup>a</sup>
		Blue	Red	
20 - 24	2008	13.07	18.89	<b>0.0094</b>
	2012	13.92	18.11	<b>0.0312</b>
	2016	16.61	21.21	0.0768
25 - 34	2008	13.7	18.33	<b>0.0061</b>
	2012	15.44	21.57	<b>0.0035</b>
	2016	17.18	22.51	<b>0.0135</b>
35 - 44	2008	17.04	20.01	<b>0.0377</b>
	2012	17.76	22.92	<b>0.0033</b>
	2016	18.17	24.13	<b>0.0105</b>
45 - 54	2008	20.25	21.87	0.3241
	2012	21.59	25.53	<b>0.0425</b>
	2016	19.63	24.94	<b>0.0043</b>
55 - 64	2008	16.06	18.56	0.1097
	2012	18.22	21.27	0.063
	2016	19.4	20.81	0.2771
65+	2008	14.96	17.1	0.1761
	2012	14.69	18.34	<b>0.008</b>
	2016	17.63	18.77	0.5486

<sup>a</sup>The *p*-value is reported for a two-tailed two-sample *t*-test with equal variances.

higher) than they were in blue states for *every* age group but adults 55 to 64 years of age.

Future research might examine the spread in age-group specific average suicide rates between blue and red states in earlier election years or the off-election years before and after each election. The detailed age-specific death CDC data are available back to 1999. Readers might take issue with using suicide as a measure of polarization and despondency. Less drastic measures of the nation's mood, though, may be more difficult to quantify and hence may be less meaningful in making interpersonal comparisons among adults living in different states.

## Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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