

SUICIDE RATE AROUND THE WORLD FROM 1985-2016

Angelina Kiman | ISM 6356 – Data Mining Analytics & Visualization | Winter 2019

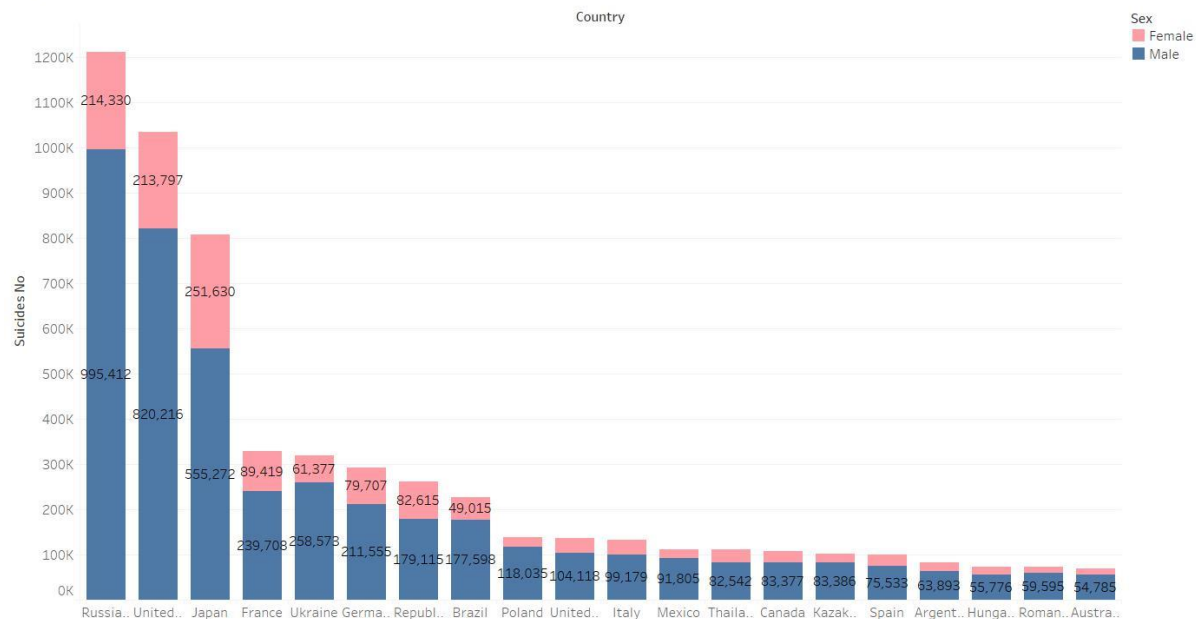
For this project, I use the same dataset from my data mining project “Suicide Rates from 1985 to 2016” and it is publicly available in Kaggle.com. According to World Health Organization, 10.7 per 100,000 population in 2015 dies by suicide every year. The global economic crisis can be contributing risk factors of suicide. The objective of this project is to observe the number of suicides from 1985 to 2016, to see if GDP per capita (\$) affects the number of suicides and come out with a call to action plan.

First, I want to get an overview the Top 20 country has the highest number of suicide rates and which gender is likely to get suicide (see Figure 1). I use stacked bar to visualize the total of number of suicides in each country and can give me the proportion which gender is likely to commit suicide. I am quite surprised with the results since the highest number of suicides come from developed countries instead of developing ones. Russia and United States are the two top countries that surpass 1 million suicide cases in the past 21 years. The result clearly shows men are likely to commit suicide than women.

The results make me question, why do men are likely to commit suicide? According Freeman & Freeman (2015) mentions women are more likely to suffer psychology problems (e.g. experience suicidal thoughts and attempt suicide). In fact, 7% of women and 4% men had attempted suicide at some point in their lives. Women who attempt suicide tend to use nonviolent means such as overdosing, whereas men often use firearms or hanging that are more

likely to result in death. Thus, men significantly have higher level of suicidal intent than women and are more impulsive than women.

Top 20 Suicide Rate Country From 1985 - 2016



Sum of Suicides No for each Country. Color shows details about Sex. The marks are labeled by sum of Suicides No. The data is filtered on Year, which keeps 32 of 32 members. The view is filtered on Country, which keeps 20 of 101 members.

Figure 1. Top 20 Suicide Rate Country From 1985-2016

As year goes by, the number of suicide changes. I want to get further insight which generation is likely to commit suicide. In this case, I use pie chart because it divides the generation into slices to illustrate numerical proportion. Using a country map allows me to get a glimpse the number of suicides between countries. I use 3rd party map applications, MapBox –an integrated world map that includes specific details (e.g. ocean, sea, etc.) compared to Tableau map. It is very good to employ motion and set ‘Year’ as the ‘pages’. Motion charts displays changes over time by showing the movement of data point. It is a smart feature and efficient as this will not require me to filter the year one-by-one. This creates “live trend” and carries stronger message to the audience (see Figure 2).

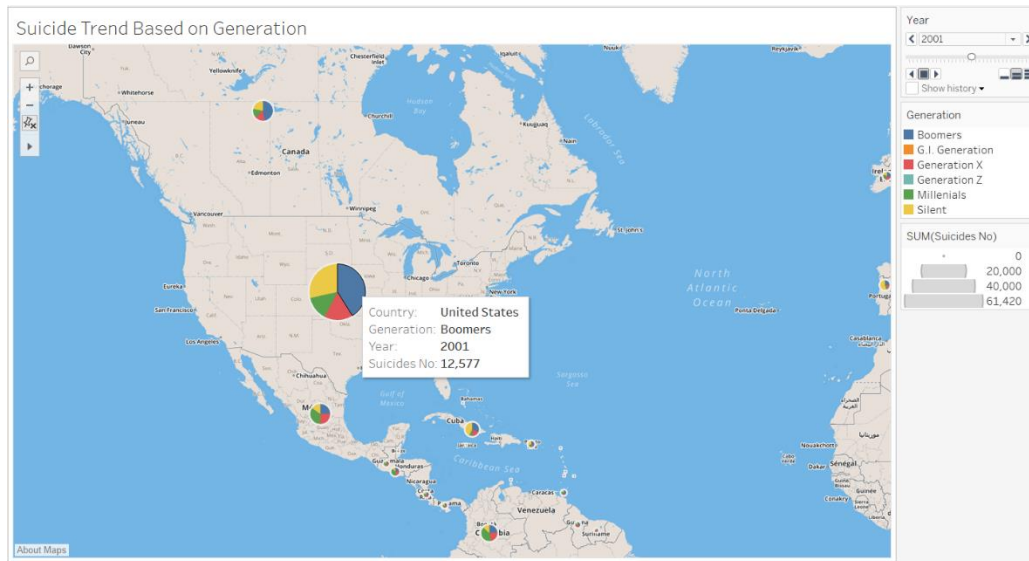


Figure 2. Generation Suicide Trend in Pie Chart details

On the contrary, motion map does not show the ratio between male and female. I want to know the suicide rate per 100,000 population and group by age, generation, sex. This will give me a deeper insight of suicide rate based on age and generation group. I create a new parameter called "Population Per" (see Figure 3). It allows me to adjust the number of populations that I want to input. Then, I create a new measurement called "Suicide Rate" (see Figure 4). Both parameter and measurement play a key role for my next experimental findings.

Figure 3 is a screenshot of the "Edit Parameter [Population Per]" dialog box. The "Name" field is "Population Per". The "Data type" is "Integer". The "Current value" is "100,000". The "Display format" is "Automatic". The "Allowable values" are set to "All". There are "OK" and "Cancel" buttons at the bottom.

Figure 3. Parameter: Population Per



Figure 4. Measurement: Suicide Rate

Here is the result after creating a new measure and parameter (see Figure 5). I stacked bar to observe the overall suicide rate and allow me to compare specifically between age and generation. The differences make them look powerful to interpret the findings. I am intentionally separate between men and women, so I can create dashboard later. As we can see, 41.25 per 100,000 G.I. generation men (born 1901-1924) and 35.27 per 100,000 Silent generation men (born 1925-1945), who are 75 and older are likely to commit suicide.

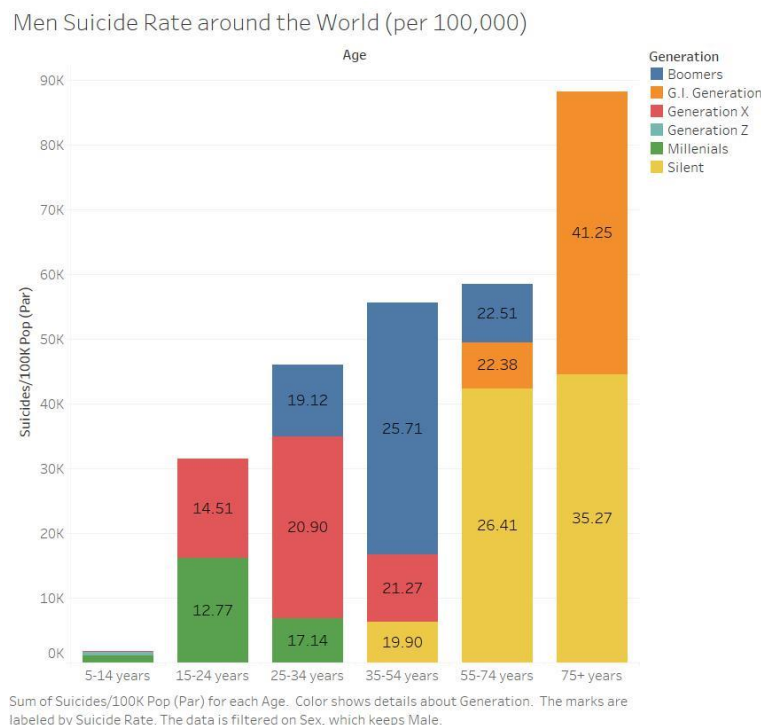


Figure 5. Men Suicide Rate based on Age and Generation

According to UnitedHealthcare Newsroom, public health practitioners call this “the silent epidemic” and the author mentions suicide rate in men 75 and older increase nearly 30-percent higher than any other age group. Two of the main factors are physical illnesses (e.g. cancer, chronic conditions, diabetes, schizophrenia, etc.) and divorced or widowed (Centers for Disease Control and Prevention, n.d.). People with two or more chronic illness are much more likely to both suffer from depression and die by suicide than those without chronic conditions. In fact, 86 percent of people over the age of 65 have at least one of six common chronic conditions, and 56 percent have two or more (Centers for Disease Control and Prevention, n.d.). To minimize the risk of suicide in men over 75 older, “connectedness” like regular social interaction and social engagement, are powerful and provide a protective force. The role of caregivers indeed is crucial in preventing suicide. Older men who receive tremendous support from their surroundings (e.g. spouse, adult child, home health aide, or close friends) on a regular basis will significantly reduce their risk of suicide (UnitedHealthcare Newsroom, n.d.).

In addition, men who are 55 to 74 years old are the second group who are likely to take their lives. It divides into three generation groups: Silent generation (26.41 per 100,000), G.I. generation men (22.38 per 100,000), and Boomers generation men (22.51 per 100,000). Apparently, older adults at greatest risk for suicide. McAshan (2018) mentions elder generations less inclined to talk about their struggles with mental health. Another factor deindustrialization in the 1980s and early 1990s, paradigm shifts affecting the workplace and family, appeared to have combined to put the generation at particular risk (Bingham, 2014).

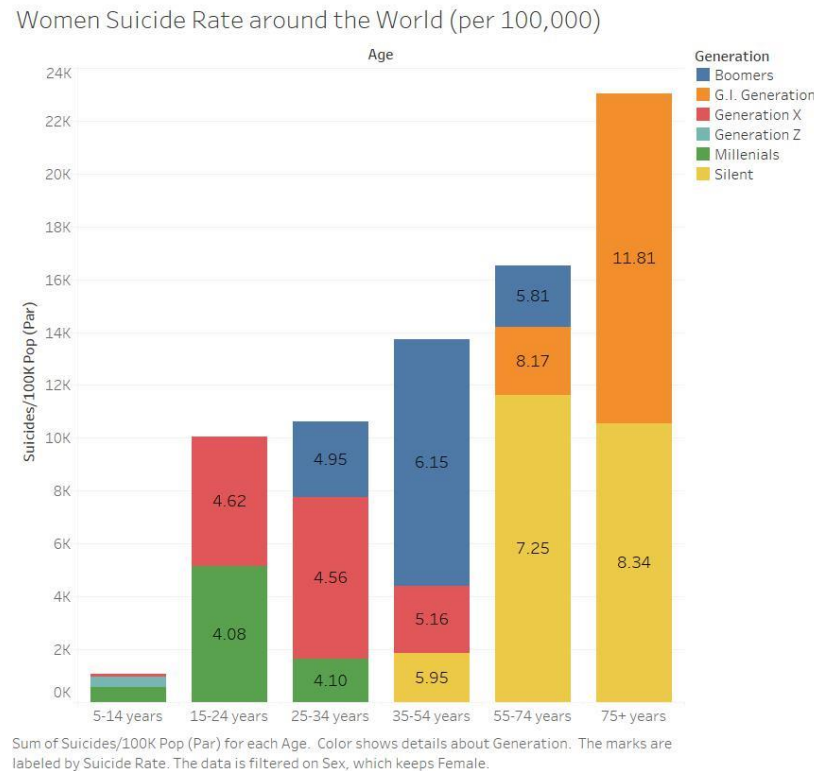


Figure 6. Women Suicide Rate based on Age and Generation

Based on the result above (Figure 6), I notice one thing in common compared to men suicide rate (see Figure 5). Women who are 75 and older are at greater risk to suicide in which 11.81 per 100,000 G.I. generation and 8.34 per 100,000 Silent generation. Despite men suicide rate is remarkably higher than women, it has been found that women are roughly three times more likely to attempt suicide, though men are around three times more likely to die from suicide. As I have stated earlier, men tend to choose more lethal (violent) such as firearms, hanging, and asphyxiation, whereas women are more likely to overdose on medication or drugs (Schimelpfening, 2019). Thus, women suicide rate is significantly lower compared to men.

Furthermore, I want to know the average suicide rate per 100,000 population in each country. I use MapBox country map since it is more interactive. This feature allows me to get quick details about the suicide rate of a country that I select as I drag my cursor and helps me to

compare easily between men and women suicide rate, rather than comparing by using text tables. For example, *Figure 7* shows in Russia, 11.60 per 100,000 women have committed suicide.

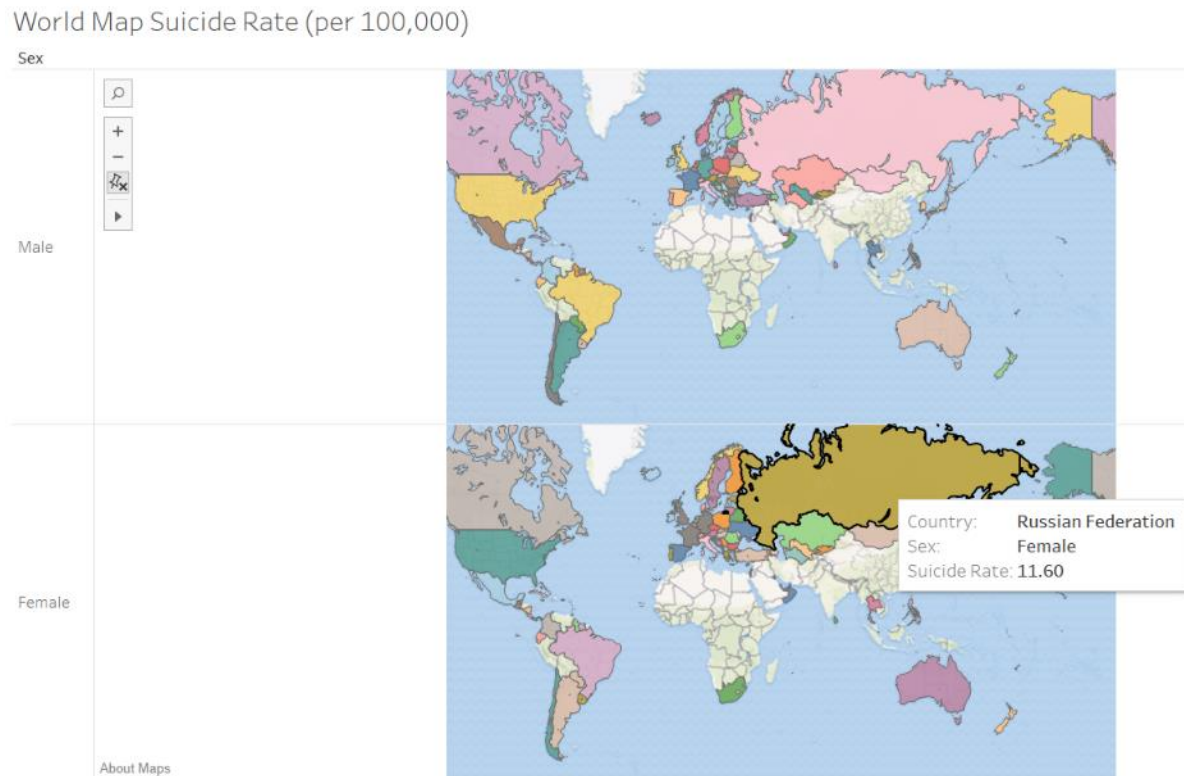
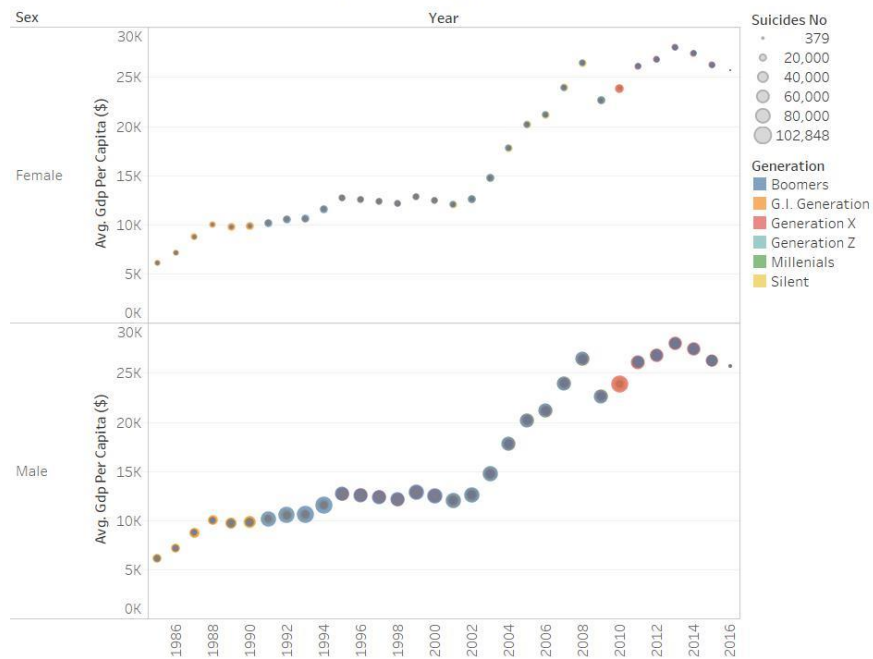


Figure 7. World Map Suicide Rate

After learning the suicide pattern in detail, I want to know if GDP per capita (\$) affects a certain generation to commit suicide. I will use scatter plot to observe the pattern as it shows how much one variable is affected by another and filter the generation (see Figure 8). We need to bear in mind each generation has its own distinct characteristics. As an example, I want to know which average GDP per capita (\$), Generation X is starting to commit suicide? The result shows that Boomers generation are likely to kill themselves (see Figure 9). Key (2016) mentions baby boomers have shorter lifespans amongst all generation and addiction is a symptom of bigger issues. This generation is known for questioning authority and seeking equality.

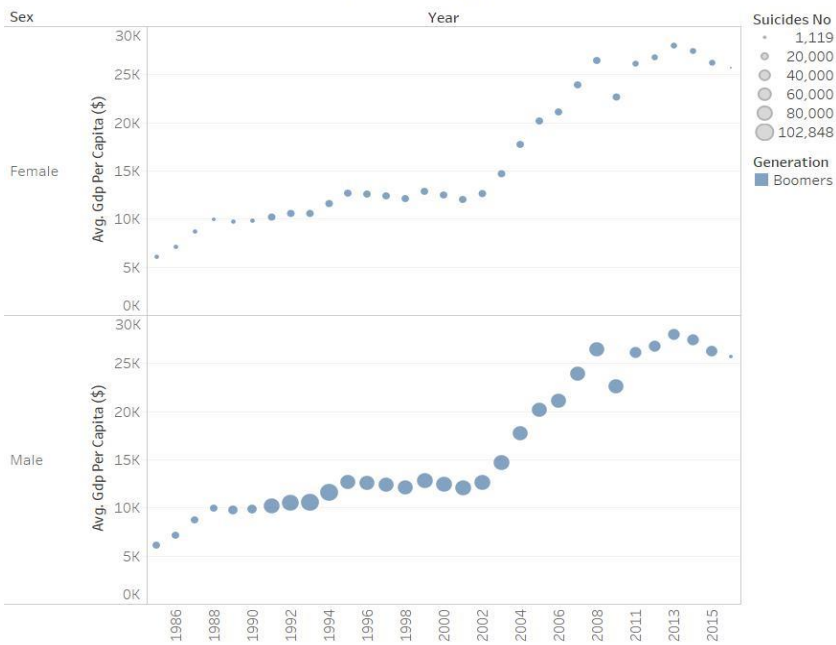
Number of Suicides based on GDP Per Capita in All Generations



Average of Gdp Per Capita (\$) for each Year broken down by Sex. Color shows details about Generation. Size shows sum of Suicides No. The view is filtered on Generation, which keeps 6 of 6 members.

Figure 8. Number of Suicides based on GDP per capita (\$) in all generations

Number of Suicides based on GDP Per Capita in All Generations



Average of Gdp Per Capita (\$) for each Year broken down by Sex. Color shows details about Generation. Size shows sum of Suicides No. The view is filtered on Generation, which keeps Boomers.

Figure 9. Number of Suicides in Boomers Generation

The dot color and size change every year. The bigger the dot is, the higher number of suicide rate, whereas the color indicates which generation commits suicide the most. If we take a closer look, the number of suicide rates jump from 2003-2004. It is probably the beginning of recession and peaks in 2008. Without surprise, during the global economic crisis, it is the highest number of suicide rates around the world.

In 2009, the number of suicides drop but it slowly rises again. There might be a couple factors that suppress the number of suicides. First, popular crisis hotlines have increased the general population's awareness of suicide. Second, some countries take actions on building suicide prevention plan. Third, International Association for Suicide Prevention and the World Health Organization have worked together to bring awareness to suicide and risk factors associated with suicide; thus, September 10 has been observed as World Suicide Prevention Day (Gregory, n.d.).

Moreover, I want to know if GDP per capita (\$) plays a key role on the number of suicide rates. I use an area chart, because it is basically a line chart where the area between the line and the axis are shaded with color. It is good to represent accumulated totals over time and it is conventional way to display stacked lines. I use parameter as well, in case I want to change the number of populations. I use dual axis, because it allows me to compare multiple measures and it is useful when I have two measures that have different scales. For now, I am using it 100,000 per population. The result shows the higher GDP per capita (\$), suicide rates decreases (see Figure 10). Before I conclude this statement as my conclusion, I want to explore further if this finding is true.

According to IMF (International Monetary Fund), there were six global recession since 1970s: 1974-75, 1980-83, 1990-93, 1998, 2001-02, and 2008-09. I can relate the sudden spikes that appears on the graph are likely to connected with the recessions. Indeed, during crisis period, some people cannot think clearly and see suicide as the only option to end their problems. Some contributing risk factors for suicide are previous suicide attempt(s), feeling of hopelessness, loss (relational, social, work, or financial), easy access to lethal methods, or physical illness (Centers for Disease Control and Prevention, n.d.). Many crisis hotlines are introduced in early 2000s and may play a primary role in helping people to change their suicidal thoughts. Apparently, there is one challenge that I see from *Figure 10*, the suicide rate decreased significantly from year 2014 and 2016. There is a chance that data is not updated yet.

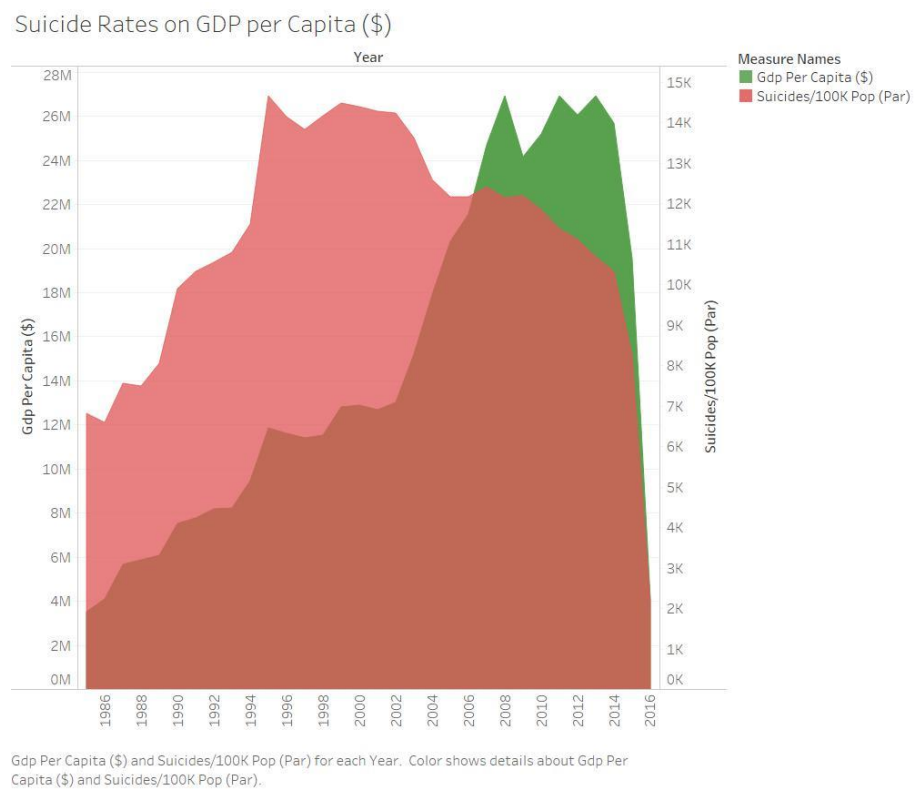


Figure 10. Suicide Rates on GDP per Capita (\$) around the World

I would like to close my findings with projected suicide rate. I need to create other measures called Projected Suicides (see Figure 11) and a parameter called Rate Change (see Figure 12). These two tools are great as it enables me to play along with my data and see the projected changes. Again, I will use dual axis and line chart, as it can show/compare the changes over the same period of time. The purpose of creating projected suicide rate is to get an overall idea of the projected increased/decreased number of suicides rates around the world. It is a great tool to encourage others who want to contribute and be a part of “suicide prevention” comradery. This tool can be useful specifically an activist who want to make a change in his/her country that still does not have a 24/7 national helpline.

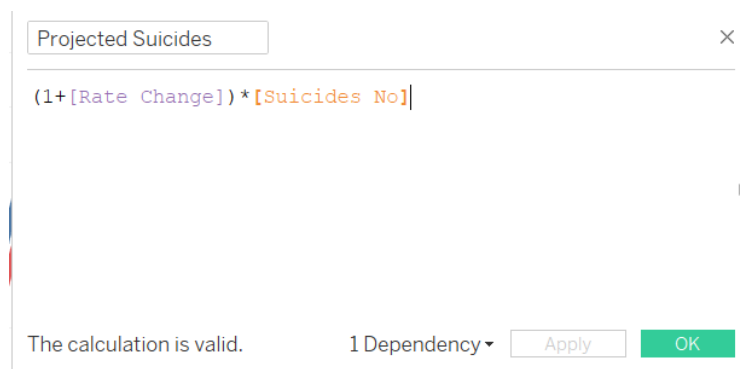


Figure 11. Measures: Projected Suicides

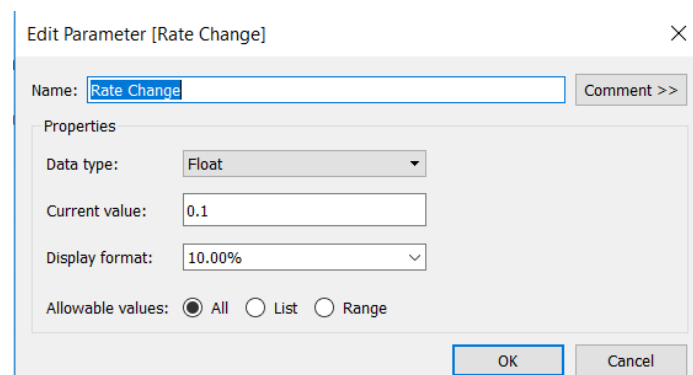


Figure 12. Parameter: Rate Change

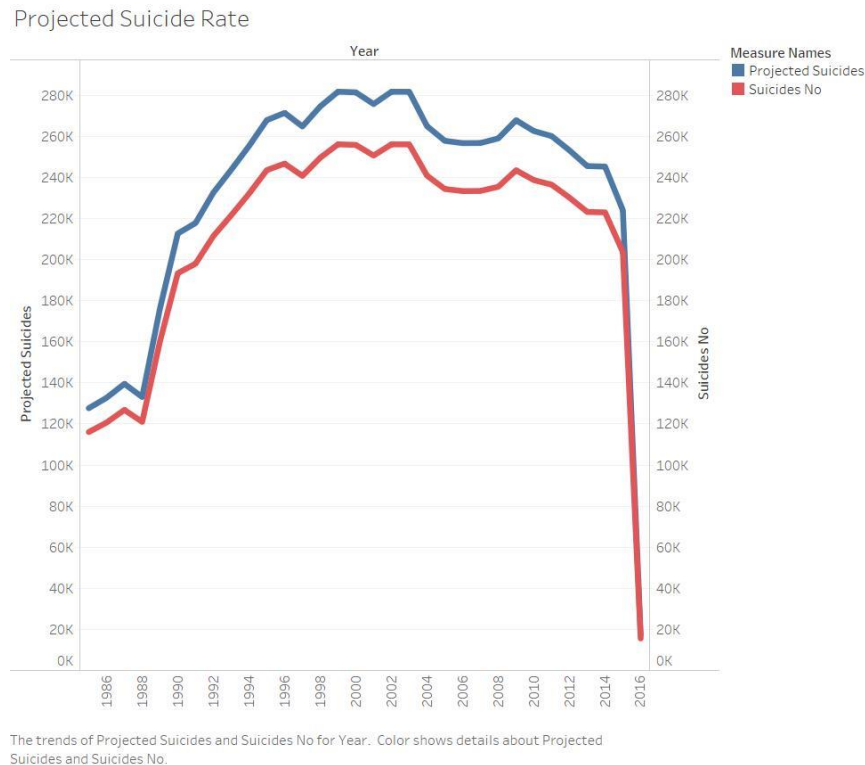


Figure 13. Projected Suicide Rate with -10% rate change

Preventing suicide is not an easy job, but if we come as one to fight this problem, we can save the next generation. The protective factors include support from ongoing medical and mental health care relationships, family and community support (“connectedness”), easy access to clinical interventions and support for help seeking, and effective clinical care for mental, physical, and substance abuse disorders (U.S. Public Health Service, 1999). I also noticed some developing countries does not have national helpline support. There are five powerful ways that we can impact mental health awareness in our community:

1. Host a mental health screening event. Find out more: <https://www.mindwise.org/>
2. Talk about it! Ask questions and never judge. Always be ready to listen and encourage non-judgmental speak. Never use words like “crazy” or “insane” as insults

3. Share your story. Have you personally struggled or currently struggle with mental illness?
4. Share and spread in social media (Don't forget to use hashtags!). September 10th is World Suicide Prevention Day
5. Write to your local government leaders to support mental health legislation. Educate yourself on the issues and get involved.

3W's

What Went Well. Primarily, I watched YouTube Tableau tutorial and had some practices before I started this project. I learnt from my mistake from the data mining project; so, I don't want to mess up with this one. I also read the Tableau book, but there are some parts that makes me confuse specifically the parameter and measurement. I did a lot of trial and error in this project. I believe this is the best way to get familiar with the application and how to utilize the cool features that I could never done in Microsoft Excel. Also, I asked for help I did not like the dataset at first, because I was not sure if I can present a solid presentation with this –but, I was wrong. I am happy with the results. I also asked help from a friend who taught me how to utilized the parameter and measure tool.

What Did NOT go Well. I was not confident with this suicide data and what I wanted to do with it. I had a hard time finding a good thesis, but after playing around on the Tableau app, I started to get a lot of ideas and built my thesis from there. In fact, parameter and measurements are giving me the hardest time –even though I created them successfully at the end. I made more than 5 parameters, but none of them take effect on my graph. So, I wondered around what is

going on. After getting a help from a friend, he explained that I need to include the parameter formula in the measurement formula.

What Would you do Differently Next Time. Even though I had some practices before I start the project, I realize I needed more specially parameter and measure. I just had 2-3 times practice. I guess it was not enough. I would have planned my time better. I should have started this project when we started learning the Tableau in class rather than doing it in the last 4 days. It gave me so much pressure in which I believe that I could have done so much better. Apparently, these past couple days were hectic (exams, presentation, and research paper). If I started doing it at least a week before, I am sure that I can design my dashboard better and learn how to use the “button click”, “navigate”, etc.

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