

# Let's Address These Factors in Our Mental Health Discourse

Using Python to conduct data analysis and investigate adult depression rates in California has led me to find diverse factors that connect back to mental health.



Image by Mary Shin

**H**ip fashion trends, high technology, and innovation. These are some of the distinctive features from the last decade or so that arise when considering Hollywood, Silicon Valley, and the state of CA overall.

However, with continuous modernization and a push for cutting-edge growth, can Californians afford the time to relax? Can we use the state's mental health statistics to examine health and wellness among the population?

## What I learned with Google Trends

I started by looking at the statewide search interest in mental health-related words over time. The easiest way for me to do this was to explore the vast space of Google Trends, where “you can measure interest on a search topic over time or by geography,” as described by Shelby Temple:

*“However, there is a key nuance to this data. It is not measuring the overall query volume. It is measuring the normalized, relative share of Google searches on a topic compared to all other searches for that time and place.”*

The words I looked up within the state of CA included: anxiety, depression, sad, therapy, wellness. Since I wanted to make connections between the historical search interest for each of these five words, I compared each search term to a baseline term, drought.

I found that the interest over time in these five words all steadily increased from the beginning of 2012 to the end of 2018. That is to say, CA residents are engaging in more web searches for these topics in 2018 as compared to six years earlier. The reason why I chose this time frame was so that I could match it with the “Adult Depression” indicator that I use later in my data analysis.

If we dive into the trends data, it turns out that the search interest for “depression” seems *seasonal*—there are spikes in the later months of each year, while search interest decreases during the summer months. In addition, the interest in searching for “wellness” heightened towards the end of 2016 and during the first few months of 2017.

This tells us that people in CA have been searching more and more about mental health-related topics. If we’re curious about depression, or if we want to get more information about therapy, we go on Google!

**Since people are developing more curiosity about mental health and wellness online, is this because mental health issues have been getting more prevalent in our society over time?**

With this in mind, I set out to explore mental health trends in my home state of CA. Using the Let's Get Healthy California (LGHC) indicator, which contains data from the California Behavioral Risk Factor Surveillance Survey (BRFSS), I was able to access information about CA residents regarding their health-related behaviors, chronic conditions, and use of preventive services.

In particular, I was interested in the “Adult Depression” (LGHC Indicator 24) source dataset that includes statistics from 2012 to 2018. This indicator is based on the question: “Has a doctor, nurse or other health professional EVER told you that you have a depressive disorder

(including depression, major depression, dysthymia, or minor depression)?” One important thing to note is that this is a specific operationalization of depression, which differs from surveys that might ask for individuals to self-report or self-diagnose their emotions and conditions.

My main motivation was my desire to understand how mental health trends have changed over time for Californians, and gain any interesting insights about health and wellness overall.

With that, let's turn to the data!

## Insights from CA depression rates

The “Adult Depression” indicator was the focal point of my research data. Using Python to analyze adult depression rates, I was able to gather more context and information about mental health in the Golden State. (If you're interested, you can access my project [here](#))

The data is organized mainly by Year, Category, Category Name, Frequency, and Percent. Each row has:

- Year—from 2012 to 2018,
- Category—divided into the following: Total, Sex, Race-Ethnicity, Education, Income, and Age.
- Category Name—shows specific sub-divisions under each Category (e.g., For Education: ‘No High School Diploma’, ‘High School Graduate or GED Certificate’, ‘Some College or Tech School’, ‘College Graduate or Post Grad’),
- Frequency—represents the amount of people in each Category Name that answered “Yes” to having been told they had a depressive disorder,
- Percent—takes the ‘Frequency’ of each row and divides it by the total amount of survey respondents in that sub-division, ‘Category Name.’

The first and most obvious question I had was, “**How have depression rates changed over the years?**”

I coded a filter for overall 'Total' adult depression percentages and found that people reported increasing depression rates: the numbers went from 11.74% in 2012 up to 17.78% in 2018.

That is, depression went up from around 3 in 25 adults to slightly less than **1 in 5**.

Change in Adult Depression Percentages from 2012 to 2018 in California

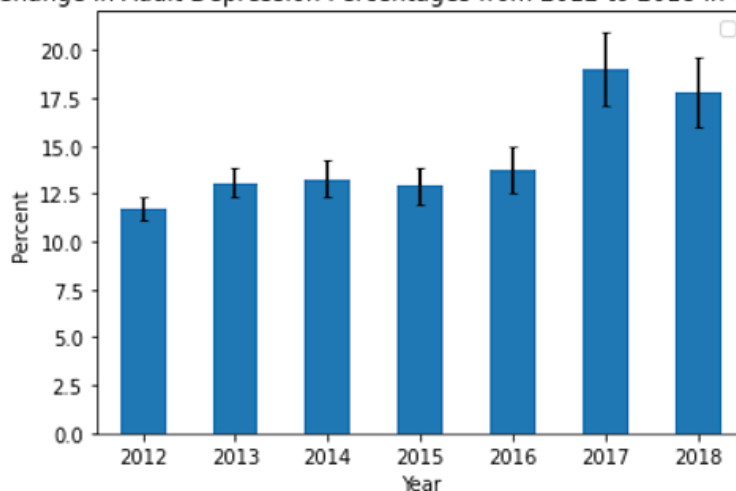


Chart by Mary Shin; Source: California Behavioral Risk Factor Surveillance Survey (BRFSS)

So, depression has increased throughout the years. If we look at the chart above, we can notice a big spike in adult depression percentages from 2016 to 2017, going from about 14% to 19%. This upsurge matches the big increase in search interest for “wellness” on Google, which began during the last two months of 2016 and peaked during the first couple months of 2017. Looking through the most noteworthy events during this time period, and considering how the state of CA leans toward voting democratic, we can infer that there may be a connection between the election of President Donald Trump and these rising statistics.

But what about specific ‘Category Names’? I remember learning in previous psychology courses that women are “nearly twice as likely as men” to be diagnosed with depression. I was limited to a binary category for sex here, but nonetheless, I asked: “**Are there differences in depression rates among males and females?**”

It turns out the answer is: Yes.

Using similar code to filter rows by 'Sex,' I found that for *every single year* from 2012 to 2018, females reported *higher* depression percentages than males. Both sexes saw an overall increase, but with females reporting 15.25% in 2012 and 21.96% in 2018, whereas males indicated 8.12% and 13.44%, respectively.

Given the criteria in the measure, these results might reflect a greater willingness among females to see health professionals. Dr. Paul J. Rosch, current Chairman of the Board of The American Institute of Stress (AIS), explained:

*“Women are more likely than men to consult a physician if they do not feel well or have symptoms of depression, and are therefore more likely to be diagnosed.”*

In addition to the 'Sex' Category, I was also curious about **differences among age groups**. The age groups in this data set are divided into: 18–34, 35–44, 45–54, 55–64, and 65+ years. Out of younger, middle-aged, or older populations, which do you think would have *higher* levels of individuals reporting depression?

Personally, I hypothesized that a higher amount of younger adults than older would report being told they had a depressive disorder.

Once again, I coded a row filter for 'Age' and plotted the data. The results really surprised me:

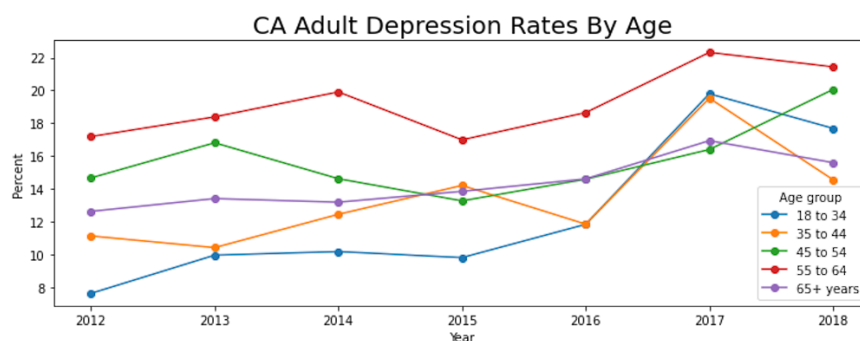


Chart by Mary Shin; Source: California Behavioral Risk Factor Surveillance Survey (BRFSS)

Each color above represents a different age group in the data. We can see that regardless of small fluctuations throughout the years, all of the

age groups saw an overall increase in depression rates by the end of 2018.

Notice that the red line, which represents adults in the 55–64 age category (approximately 7.7% of the CA population), is above all the other lines across the *whole time period*. This means that 55–64 year-olds had the highest percentage of individuals who had been told they had a depressive disorder. The group started at a rate of 17.19% and ended up at 21.44% six years later, or approximately **9 in 50** people in 2012 to **11 in 50** people in 2018.

The blue line, which shows the youngest age range of 18–34 year-olds (approximately 22.4% of the CA population), started at the lowest rate of 7.63%—about 4 in 50 people. However, this group ended up in 2018 at a much higher rate of 17.69%, which is again close to **9 in 50 people** being told they had a depressive disorder according to the survey.

Also, you can see that the 18–34 and 35–44 age groups experienced a very big increase in depression rates from 2016 to 2017, which is consistent with the previous findings on this particular time window.

It was intriguing to learn that 55–64 year-olds make up a smaller percentage of the total population than I thought. If we look at a state like Florida, this age group constitutes 10% of the population whereas 18–34 year-olds, about 18.8%. From this information, it seems like individuals in the 55–64 age range might feel more like a minority in CA.

**So what is it about the 55–64 age range that caused them to report the highest depression rates every year?**

This is a really heavy, complicated question. There's obviously so many factors that can go into depression and mental health overall. However, I still wanted to gain a broad understanding and try to characterize this correlation of 55–64 year-olds reporting the highest rate of depression among different age groups.

Using data from the same large survey (LGHC indicator), we're able to get a better idea of the people in this age range. Although I didn't carry out direct correlation, I looked at numerous other data sets to see if I could find any specific factors that we can discuss and connect back to

mental health. Some factors that you think might draw light on the high levels of depression among 55–64 year-olds, such as losing a job (unemployment figures), divorce, or onset of ill health from lifestyle factors (e.g. from smoking), did not show marked patterns. However, I did find three factors that are interesting to consider.

### Three key factors we can connect to mental health

The LGHC indicator had three specific data sets that I used to understand the age groups:

- Adverse Childhood Experiences (ACEs)
- Prevalence of Diabetes
- Meeting Physical Activity Guidelines

After loading each data set into a Python notebook, cleaning and organizing the data sets, and analyzing them, I found meaningful insights that helped me characterize the depression trends.

### ACEs

This data represents the rate of respondents in each age group that indicated having at least one type of adverse childhood experience. According to the [source data set](#),

*“These include verbal/emotional abuse, physical abuse, sexual abuse, and negative household situations including the incarceration of an adult, alcohol or drug abuse by an adult, violence between adults, mental illness of a household member, and parental divorce or separation.”*

Similar to what I did with the adult depression rates, I created a row filter by ‘Age.’ I would have liked to see more data on the later years (2016–2018), but this survey only collected data up until 2015.

Through my analysis, I found that the reports of ACEs for the 55–64 year age group **increased by the largest amount**, going from 59.8% of respondents in 2011 to 66.2%, or almost **two-thirds** of them, in 2015.

These statistics imply that people in this age range are increasingly reflecting on their lives and childhoods, and processing their experiences in light of how they are feeling now. 55–64 year-olds may

be feeling a delayed mid-life crisis, especially considering 60 might be “the new 40,” as Meryl Hartstein from *HuffPost* wrote:

*“For many, we become empty nesters, divorced, widowed or we just find ourselves alone without any potential of sharing a life [with] someone. This is when we really start to feel 60.”*

## Diabetes

The second data set displays the prevalence of diabetes in CA, containing survey statistics on adults with diabetes per 100 people. With an ‘Age’ filter again, it was evident that the amount of people diagnosed with diabetes **increases a lot with age**.

For 18–34 year-olds, the prevalence of diabetes from 2012 to 2018 (the same time frame as the depression rates) ranged from 1.2% to 4%, whereas for the older age groups, the average prevalence of diabetes across the years were:

- 10.4% for 45–54 years,
- 17.51% for 55–64 years,
- 21.57% for 65+ years

Perhaps the underlying implication here is that 55–64 year-olds might find themselves with more time and can afford to address both their physical and mental health?

Nonetheless, clearly you can see that diabetes particularly affects older populations. Using this data analysis, I was able to conclude that diabetes can be another factor to help us characterize the depression trends. Since it takes a greater toll on older adults, we can address this as a potential stress factor for mental health issues.

## Meeting Physical Activity Guidelines

Lastly, from the same survey, I also discovered my third data set, which represents:

*“California adults who met the aerobic recommendation for physical activity, as defined by the 2008 U.S. Department of Health and Human*



*Services Physical Activity Guidelines for Americans and Objectives 2.1 and 2.2 of Healthy People 2020.*”

What exactly is this recommendation from the 2008 Physical Activity Guidelines?

*“For substantial health benefits, adults should do at least 150 minutes (2 hours and 30 minutes) a week of moderate-intensity, or 75 minutes (1 hour and 15 minutes) a week of vigorous-intensity aerobic physical activity,” which “should be performed in episodes of at least 10 minutes, and preferably, it should be spread throughout the week.”*

My third data set has statistics for only three years: 2013, 2015, and 2017. After my analysis, the good news was that across the age groups, the percentage of adults meeting these physical activity guidelines exceeds 60%. However, looking closely at each age group, the data for 55–64 year-olds revealed that the rate of individuals who met physical activity guidelines saw the largest decrease when compared to all the other groups. That is, this 55–64 year age range is experiencing **less physical activity**.

By the end of 2017, all other age groups reported that at least 70% of individuals met the recommended guidelines. In contrast, for 55–64 year-olds, the results showed that about 70% of them were meeting guidelines for physical activity, but this number decreased to about 67%.

Although these numbers are all at least 2 in 3 people, it's still concerning that this particular age range is seeing the biggest decrease in the results, especially given that most of the age ranges saw increases in physical activity.

## Summary of my findings

The following table shows us a breakdown of the three factors and its trends that I found through my analysis. The rows represent the age groups, and the columns display the three factors I discussed, in addition to the mean depression rates. To characterize the correlation as simply as I can, I assigned each factor and age group one variable out of these: +, o, and -.

- The + sign indicates an increasing trend over the years

- The o sign indicates no change in the trend over the years
- The - sign indicates a decreasing trend over the years

	Depression Mean (%)	Adverse Childhood Experiences	Prevalence of Diabetes	Physical Activity
18-34 years	12.42	o	+	-
35 to 44 years	13.45	+	-	+
45 to 54 years	15.77	+	+	+
55 to 64 years	19.27	+	-	-
65+ years	14.32	+	+	+

Chart by Mary Shin; Source: California Behavioral Risk Factor Surveillance Survey (BRFSS)

As we can see from the table above, the 55–64 year age groups had a +, -, and -, meaning the respondents in these age categories experienced an increasing rate of those with ACEs, overall decreasing prevalence of diabetes (although these percentages are at higher levels than most of the other age groups), and decreased number of people meeting physical activity guidelines.

18–34 year-olds, who started at the lowest depression rate but went through a very large increase from 2012 to 2018, did not see much of a rise in reporting adverse childhood experiences. However, we can see from the table that this group saw a spike in the prevalence of diabetes and was the only other group besides the 55–64 age category that reported a decrease in the percentage of people meeting physical activity guidelines.

These results help us gain a wider perspective on what the older adult populations are going through. Obviously there are many other factors that should be considered, but we get a generally clearer sense of what it means to be an older adult in CA.

My main goal when starting this project was to broaden our understanding of mental health. I hope that through my research and data analysis, I was able to point to additional factors that can help explain what it is about the 55–64 age range that made them report the highest rates of depression in the 2012 to 2018 time period.

Further studies on this subject matter could bring more attention to other diverse determinants of mental health that would qualitatively unpack the existence of 50+ year-olds in CA, including but not limited

to: retirement savings, research on pre-existing health conditions, and access to health insurance.

## Major Takeaways

Based on the Google Trends data, people are more interested in gaining knowledge about mental and emotional health online. Considering our thoughts and actions are closely linked to how our minds and bodies feel, it's worthwhile for us to discuss how these topics affect our society.

When addressing data collection on depression or other health and wellness matters, I hope we can recognize that these issues do not exist in a vacuum. There are sociocultural and behavioral influences that are embedded into this whole conversation.

No matter how quant-heavy our data about individuals gets, we should work to establish a people-focused approach to advance our conversation around our mental health. One of the most crucial ways to understand this type of data in an increasingly online, data-driven world is to start by developing a deep awareness for the demographics involved—whether that's age, sex, race/ethnicity, or gender.