

# The Effect of COVID-19 on Birth Rates

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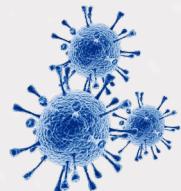
Sources and databases used



A pair of hands, one light blue and one dark brown, are shown from the side, cupping a small pair of red baby feet. The hands form a heart shape around the feet. The background is a light grey with faint wavy lines and small green plus signs.

# 01 Questions/Motive

# Our goal



To analyze existing CDC data in order to understand the effects of COVID-19 on birth rates and answer questions regarding covid vaccines, states, income, ages, immunocompromised and household information.

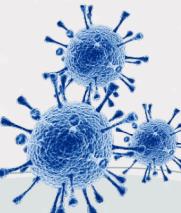
Who were the leading population in terms of infection in the beginning of the pandemic? Can we visualize the spike on infection and deaths in the U.S.?

We want to categorize and understand what implications did the COVID-19 pandemic have on social structural changes, specifically in terms of unemployment, marriage and pregnancy.

Were there any underlying illnesses or conditions that contributed to deaths in the U.S.? If so, which were the top comorbidities?

Once vaccines became available, which vaccines were used the most?

Lastly, we want to zoom into the state of Texas and visualize hospitalization rates.



# Factors used to answer our question:



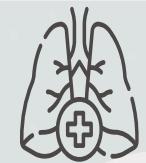
## Type of Vaccines

- Pfizer/Moderna/J&J



## State/Region

- Access to Resources (Rural/Urban)
- Market Impact
- Unemployment



## Epidemiology

### Immunocompromised

- Obesity
- Autoimmune Disorders
- Respiratory issues



## Single/Married Household

- Number of current children



## Age

- 5-14 yo
- 18-29 yo
- 30-39 yo
- 50-64 yo

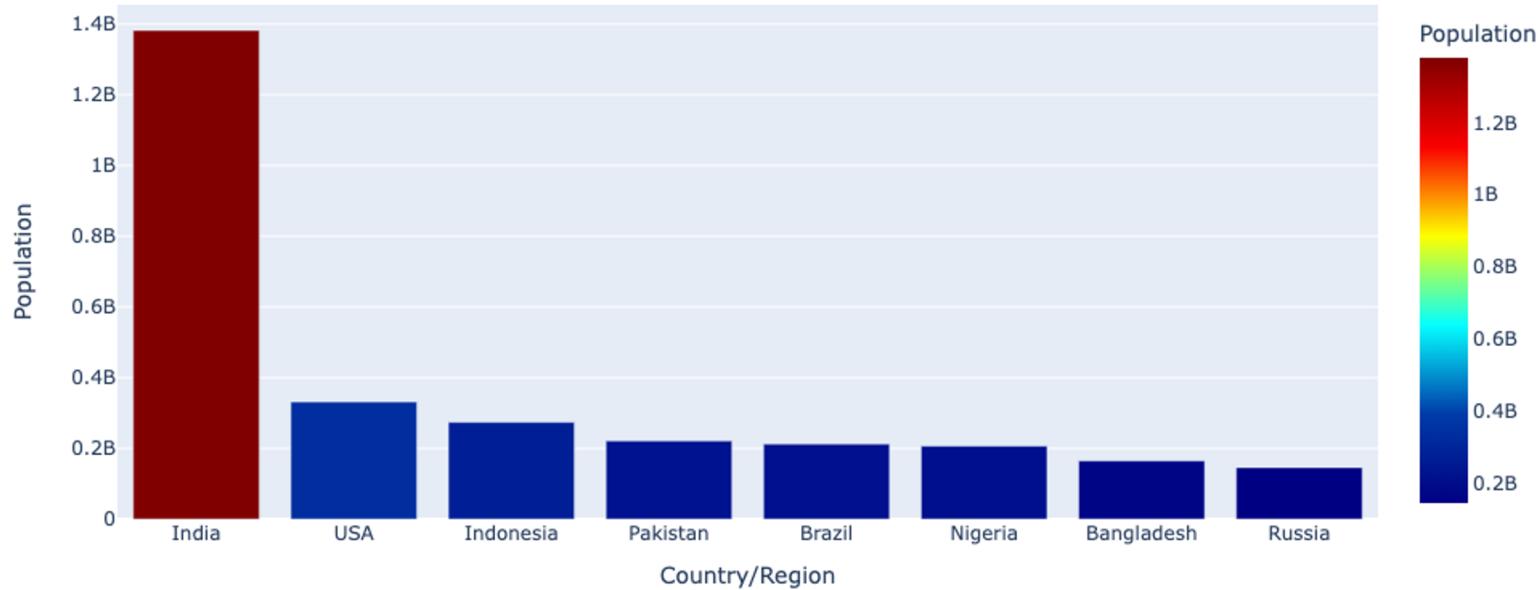


A pair of hands, one light blue and one dark brown, are shown from the side, cupping a small pair of pink baby feet. The hands are positioned in a heart shape, with the feet resting in the center. The background is a light grey with faint, wavy teal lines and small teal plus signs.

## 02 Data Exploration

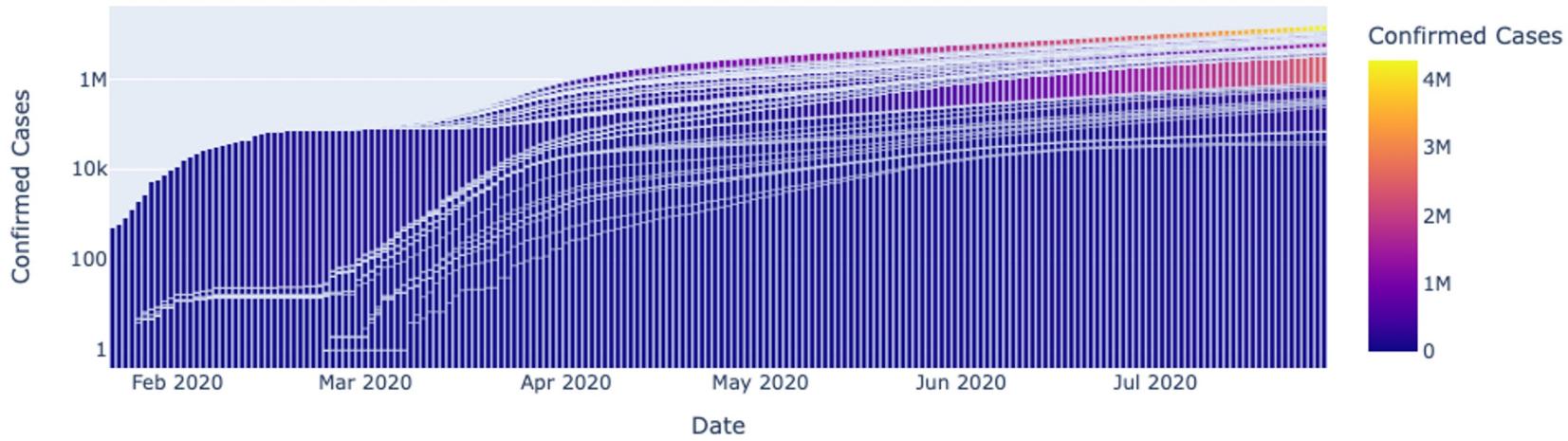
# Global Numbers

Leading Population Numbers Before the COVID-19 Pandemic

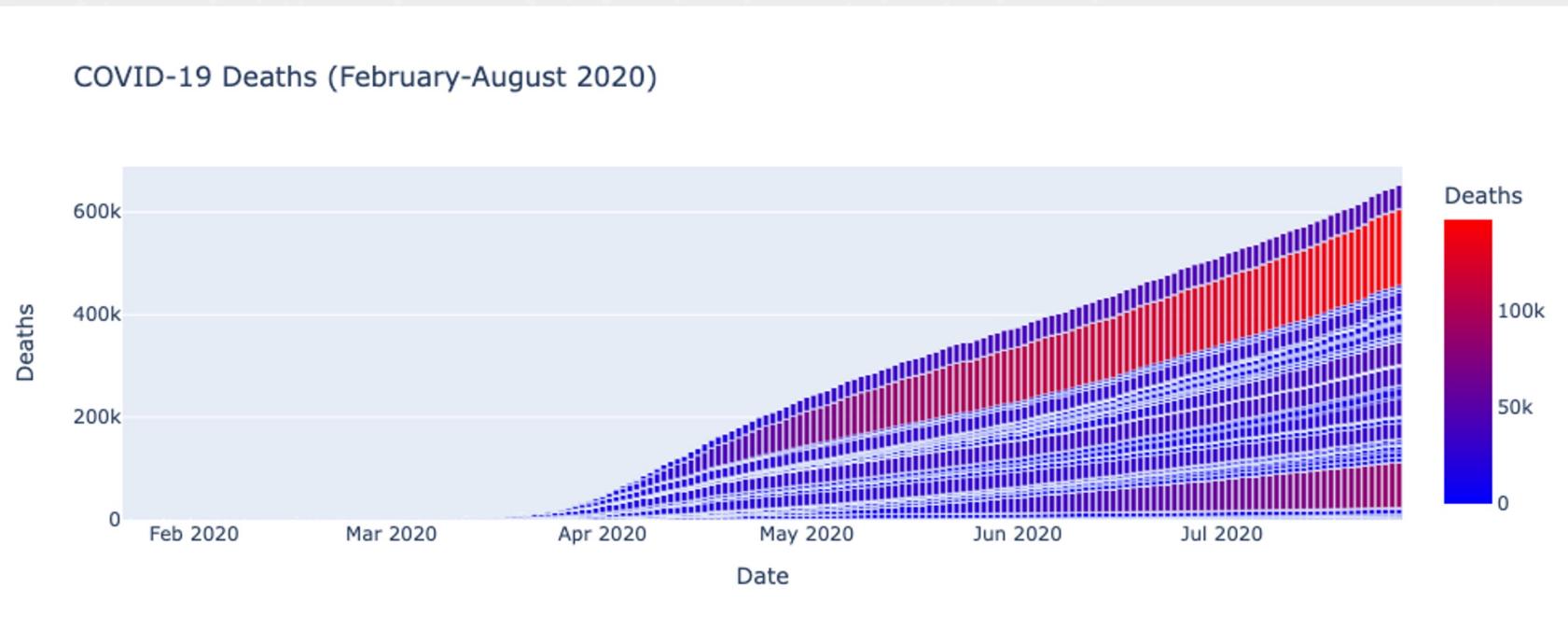


# Global Numbers

Confirmed COVID-19 Cases Globally

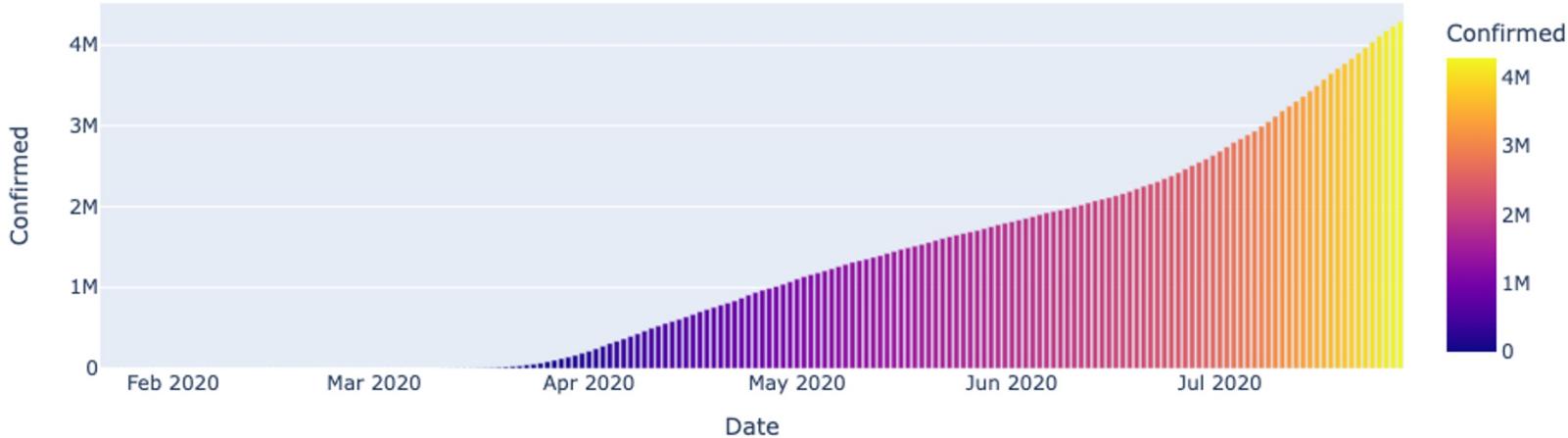


# Global Numbers

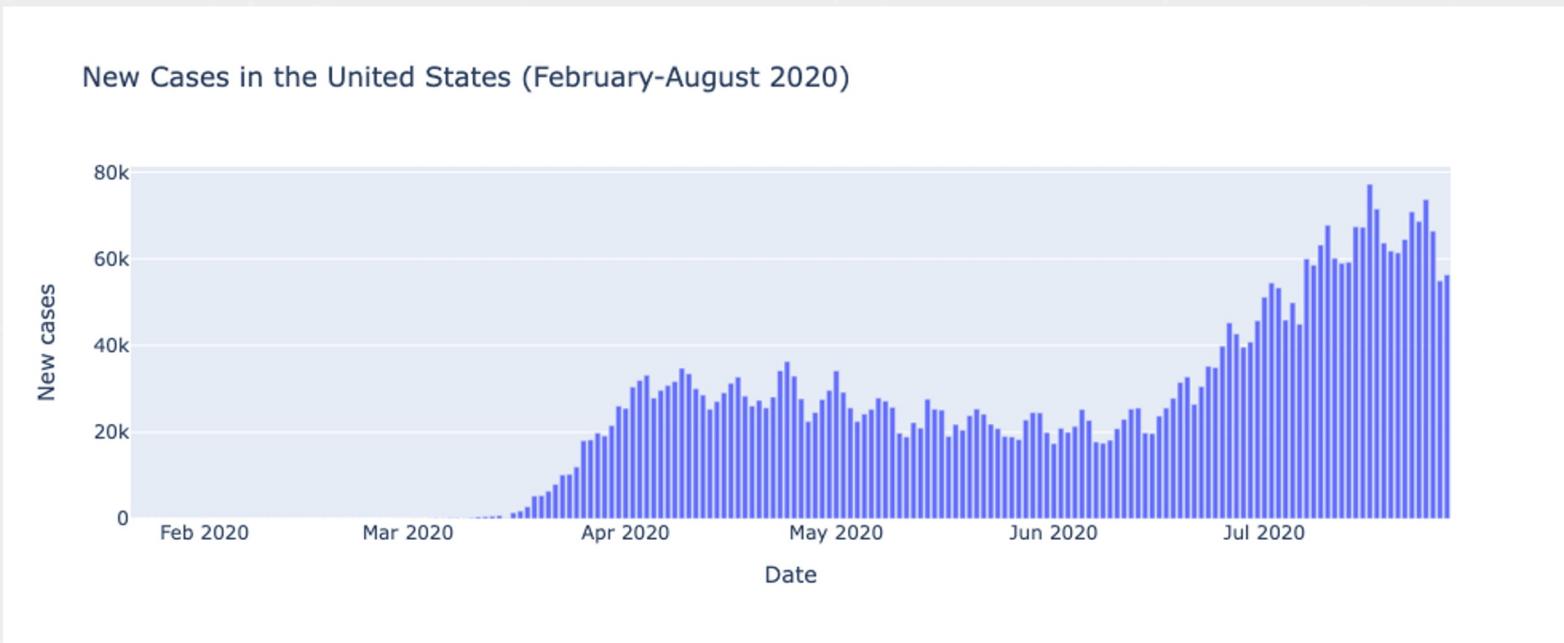


# National Numbers (USA)

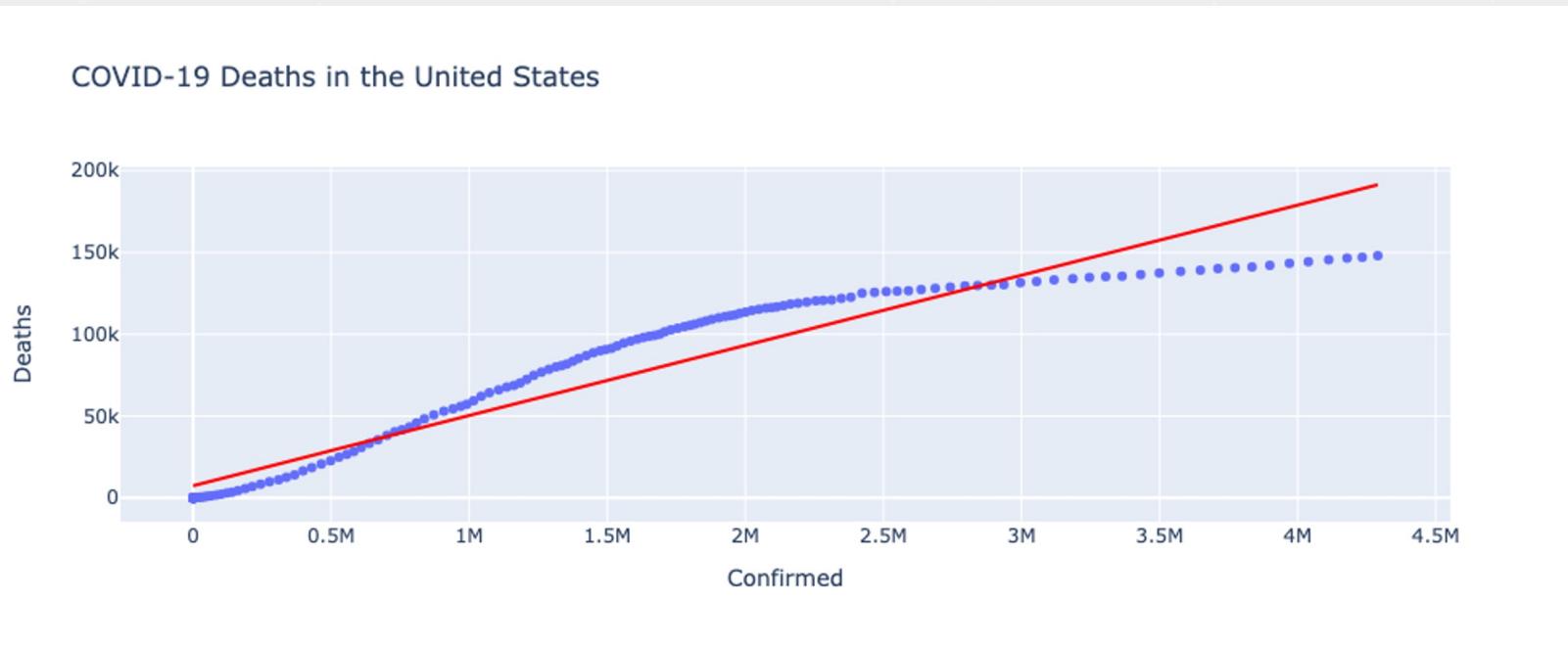
Confirmed Cases in the United States



# National Numbers (USA)

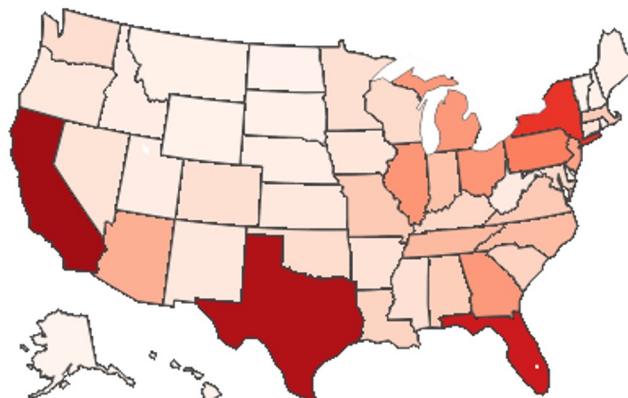


# National Numbers (USA)

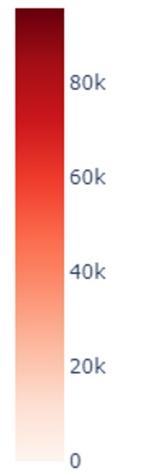


# National Numbers (USA)

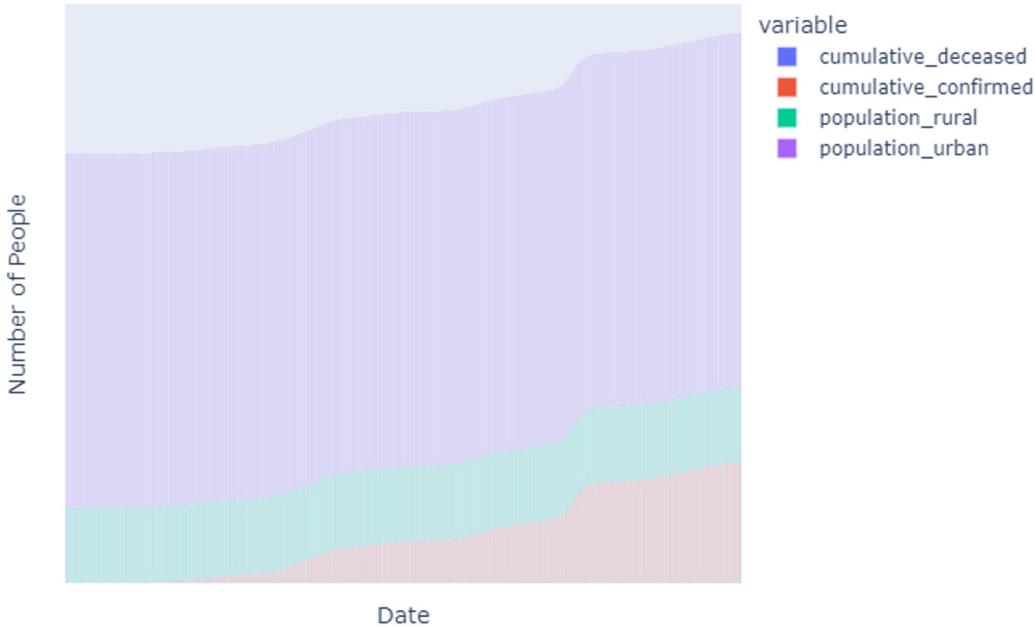
COVID Death Map JAN2020-MAR2022



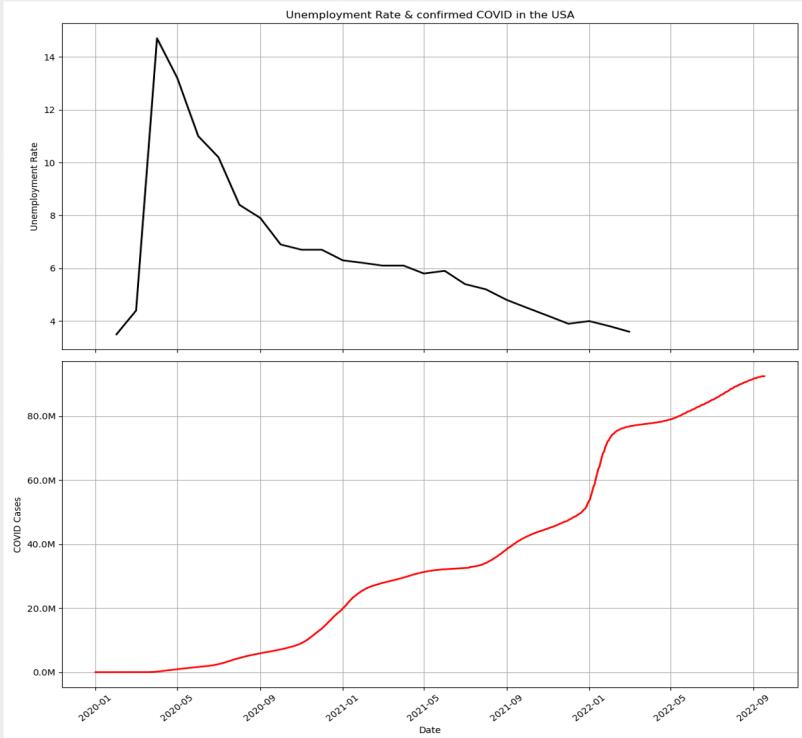
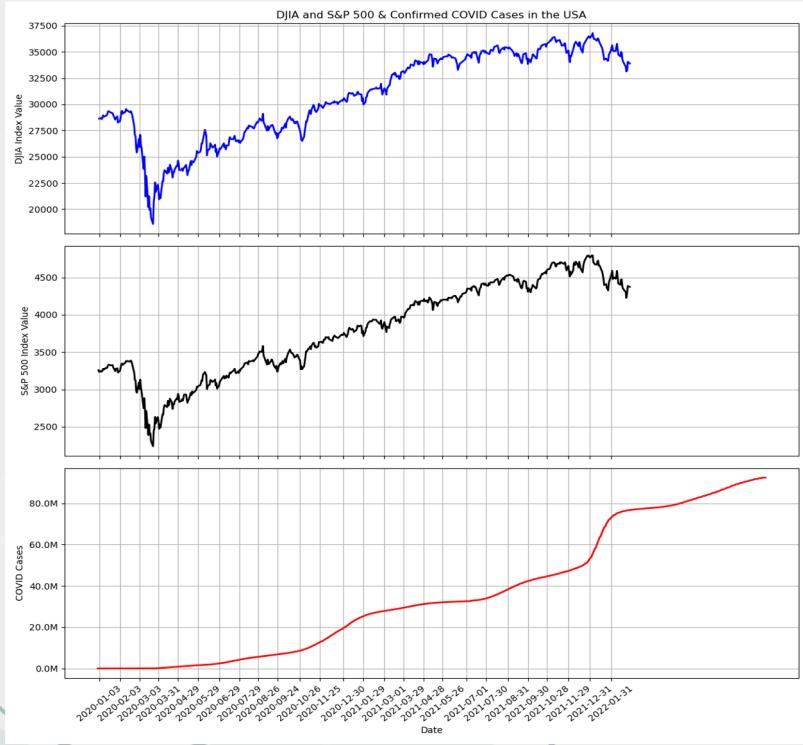
COVID Death



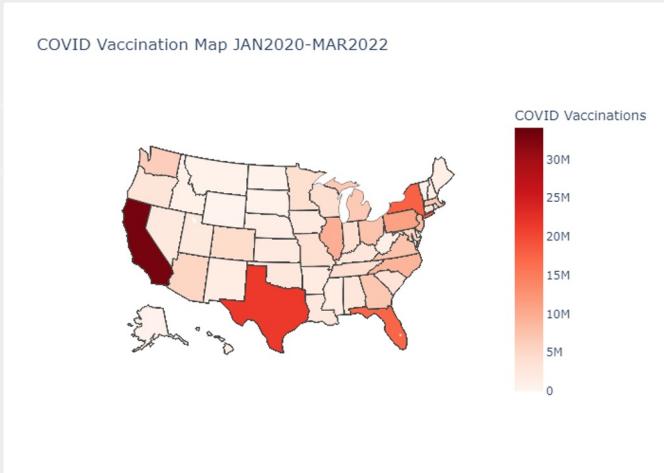
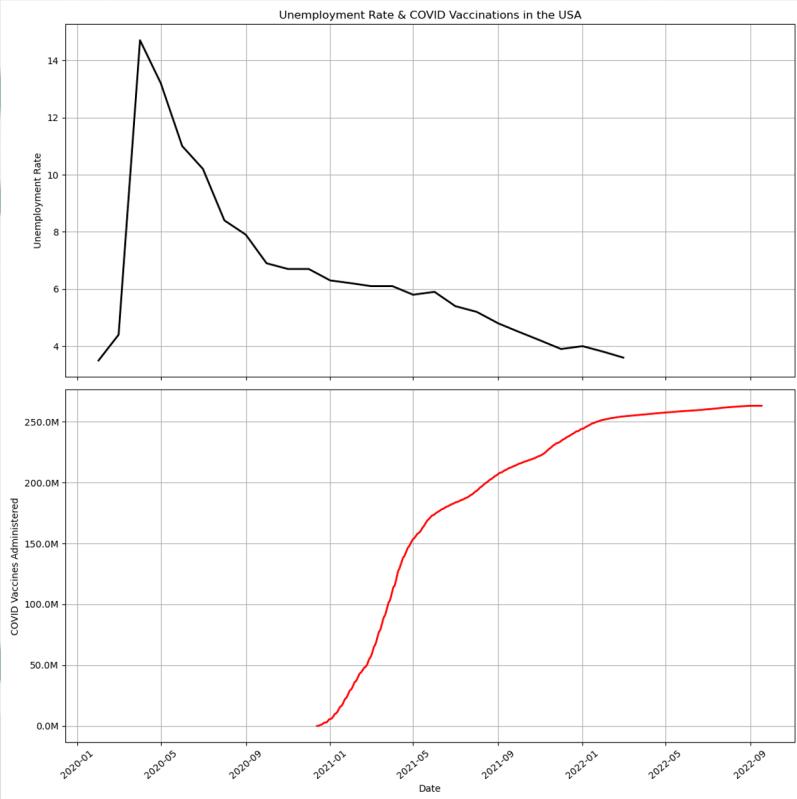
# COVID-19 Rural & Urban



# National Numbers (USA)



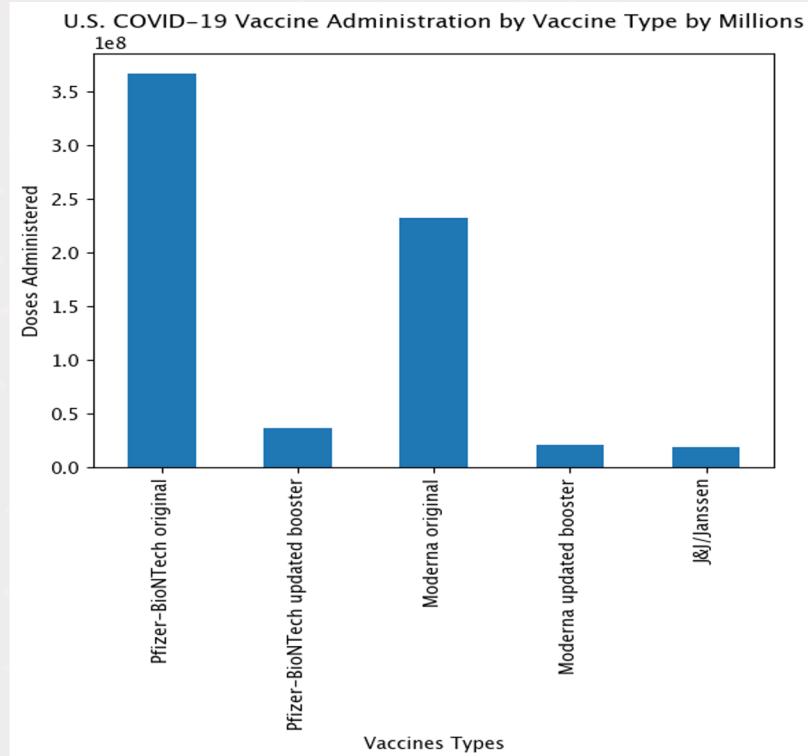
# National Numbers (USA)



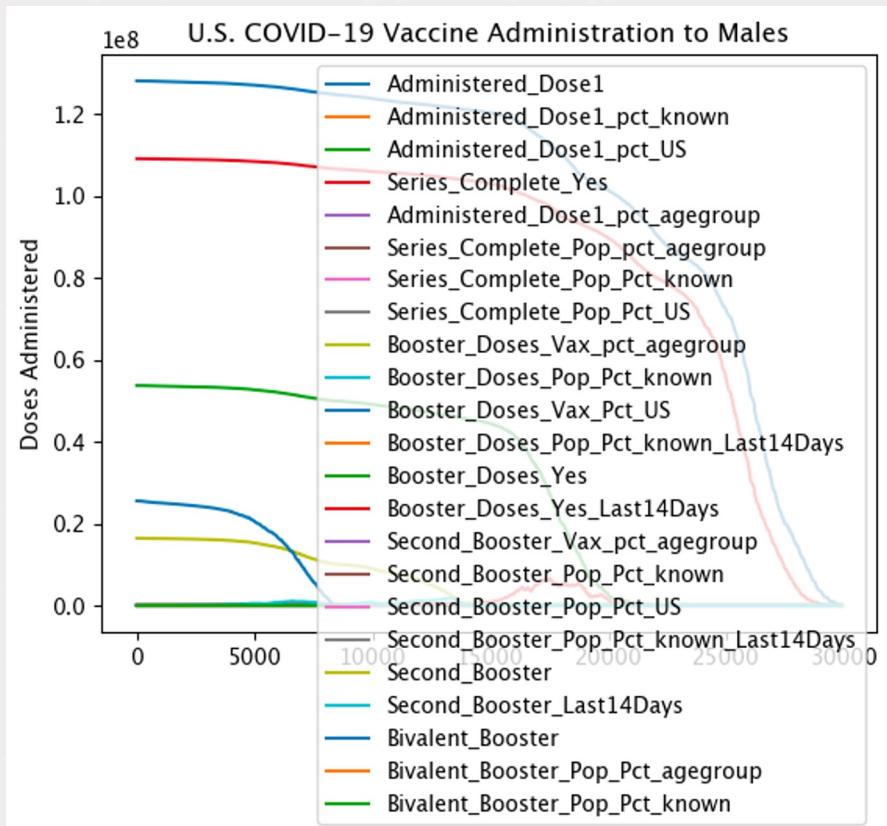
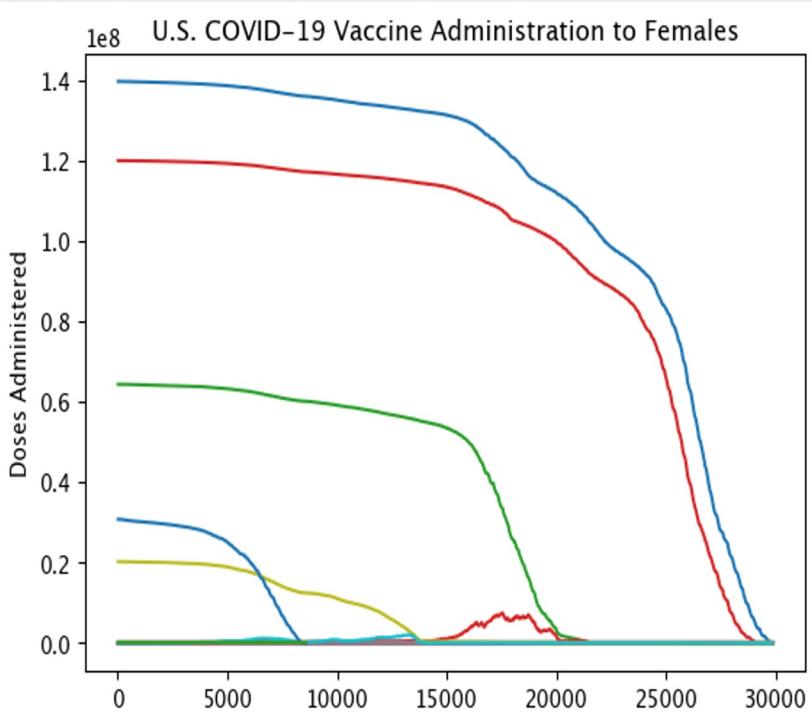
- Unemployment continues to decline as vaccines are administered.

# Type of Vaccines

- Pfizer Original
- Pfizer Booster
- Moderna Original
- Moderna Booster
- J&J



# Vaccines Administered



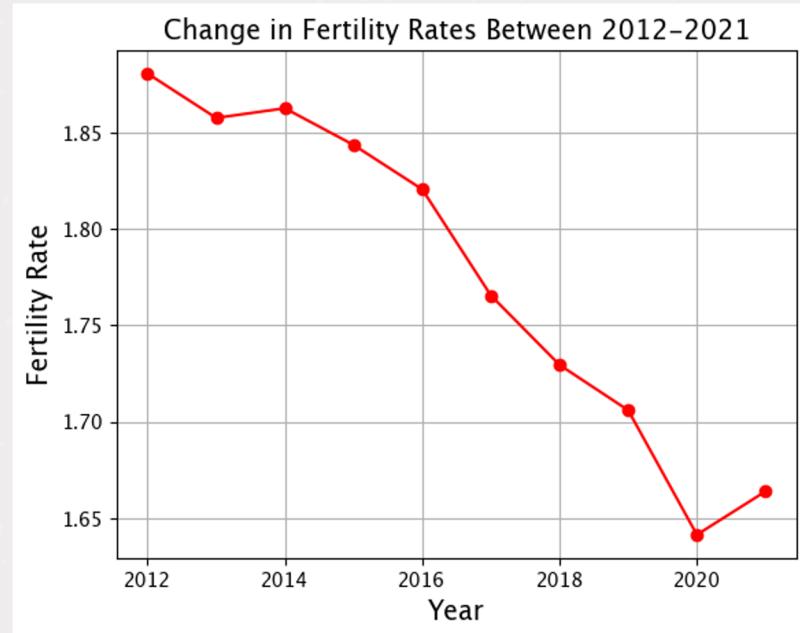
# Presumed or confirmed cases of maternal+ COVID-19 during pregnancy

Table 1. Presumed or confirmed cases of maternal COVID-19 during pregnancy, by selected maternal and infant characteristics and by race and Hispanic origin of the mother: 14 states and the District of Columbia, April 2020–December 2022

		Total	Yes Covid	No Covid						
5		142,561	2,440,305	71,306	1,168,631	20,484	278,321	34,328	655,033	
7	COVID-19 case percent distribution	5	100.0	...	50.0	...	14.4	...	24.1	...
8	Non-COVID-19 case percent distribution	5	...	100.0	...	47.9	...	11.4	...	26.8
12		Total	99.9	100.1	100.0	100.0	99.9	100.0	100.1	100.0
13		Under 20	4.5	4.1	3.5	3.1	6.4	6.3	5.8	5.5
14		20-24	19.9	17.7	18.9	16.5	24.4	22.7	21.5	21.0
15		25-29	29.5	27.4	30.6	28.1	29.6	28.3	29.5	29.0
16		30-34	28.4	30.0	30.1	32.0	24.9	25.2	25.5	26.0
17		35-39	14.4	16.8	14.2	16.8	11.7	13.7	14.1	14.5
18		40 or more	3.2	4.1	2.7	3.5	2.9	3.8	3.7	4.0
20		Total	100.0	99.9	99.9	99.9	100.0	100.0	100.1	100.1
21	Less than High School		11.0	11.3	6.0	6.6	10.2	10.8	23.9	22.4
22	High School graduate or GED		29.3	26.7	25.3	22.8	39.7	36.6	33.4	33.4
23	Some college		20.9	19.4	19.4	18.2	25.5	24.8	21.9	21.1
24	Associate degree		8.9	7.9	10.5	9.0	7.9	7.5	6.5	6.8
25	Bachelor's degree and higher		29.9	34.6	38.7	43.3	16.7	20.3	14.4	16.4
28	Source of payment - Medicaid		42.7	41.1	31.5	29.7	63.5	61.5	56.7	58.3
29	ICU admission		0.5	0.2	0.4	0.1	0.6	0.2	0.6	0.2
31	Total preterm	7	11.21	10.02	10.11	9.39	15.48	14.48	10.88	9.32
32	34-36 weeks		8.35	7.36	7.70	7.09	10.88	9.60	8.16	6.95
33	Less than 34 weeks		2.86	2.66	2.41	2.30	4.61	4.87	2.72	2.37
34	Low birthweight	8	8.60	8.05	7.07	7.02	14.51	14.28	7.71	7.03
35	Very low birthweight	9	1.28	1.30	0.98	1.03	2.43	2.88	1.15	1.12
36	NICU admission		9.7	8.7	9.0	8.6	12.9	12.2	9.0	7.5
37	Infant living	10	99.8	99.8	99.8	99.8	99.7	99.6	99.8	99.8

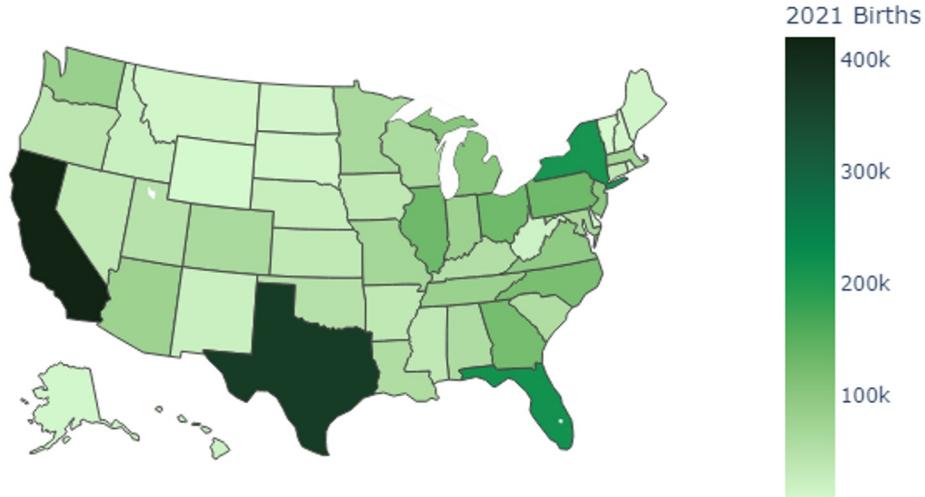
# Fertility Rates

- Total fertility rate represents the number of children that would be born to a woman if she were to live to the end of her childbearing years and bear children in accordance with age-specific fertility rates of the specified year.



# Births during COVID-19

2021 Births by State

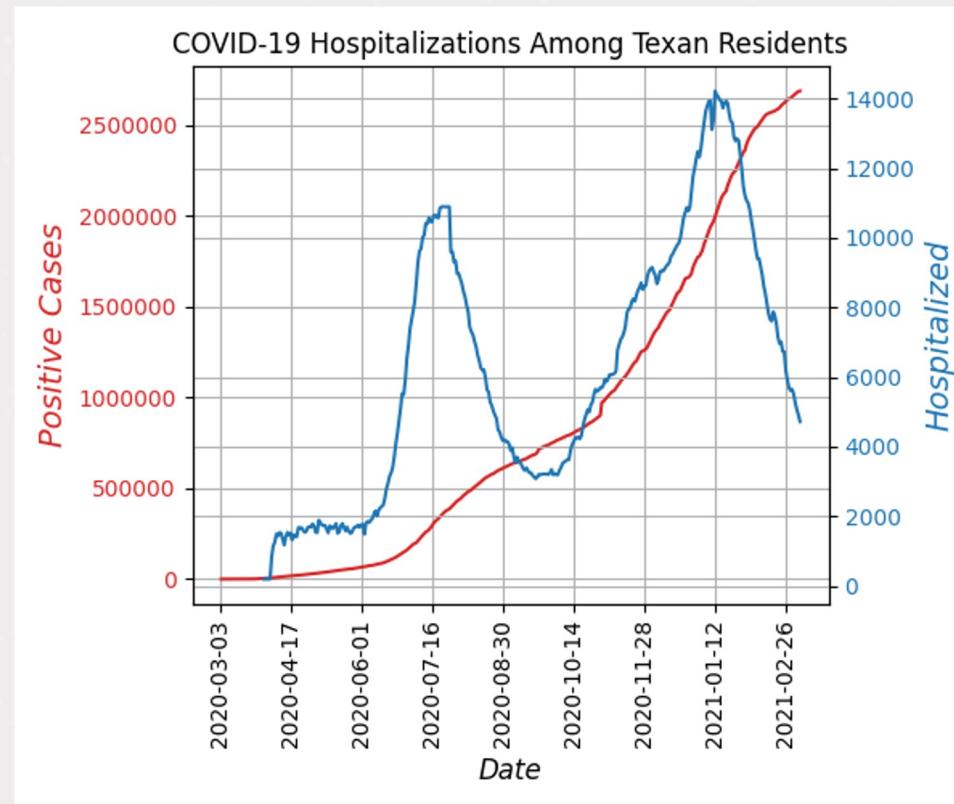


# State/Region - Texas



# State/Region - Texas

- Positive-cases was a *constantly increasing* trend
- Hospitalizations had two major peaks:
  - July-August '20**
    - ~11,000 hospitalized
    - ~500,000 cumulative cases
  - January '21**
    - ~14,000 hospitalized
    - ~2,000,000 cumulative cases



# State/Region - Texas

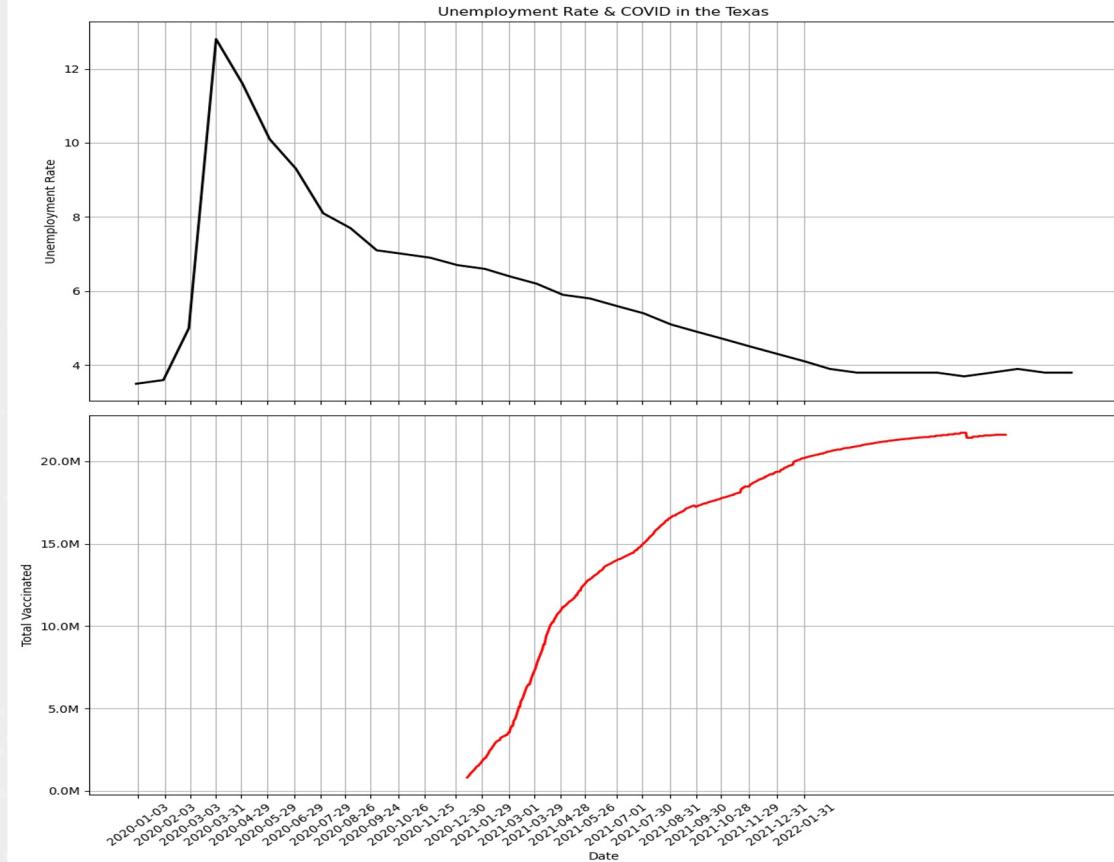
- Texas residents surpassed over 2.5 million **positive test results** in March '21
- Over 20 million COVID **viral tests** were administered
- Nearly 1 million **antibody tests**
- Roughly 3 million **antigen tests**

COVID-19 Testing in Texas (2020-2021)



# State/Region - Texas

- Texas residents experienced a slightly lower Unemployment rate than the national average.
- Similar to the relationship as the national unemployment rate and total vaccinations.



# Epidemiology

Were there any underlying conditions that contributed to COVID-19 deaths? What were those major illnesses?

Here we have a list of the most frequent illnesses that contributed to deaths.

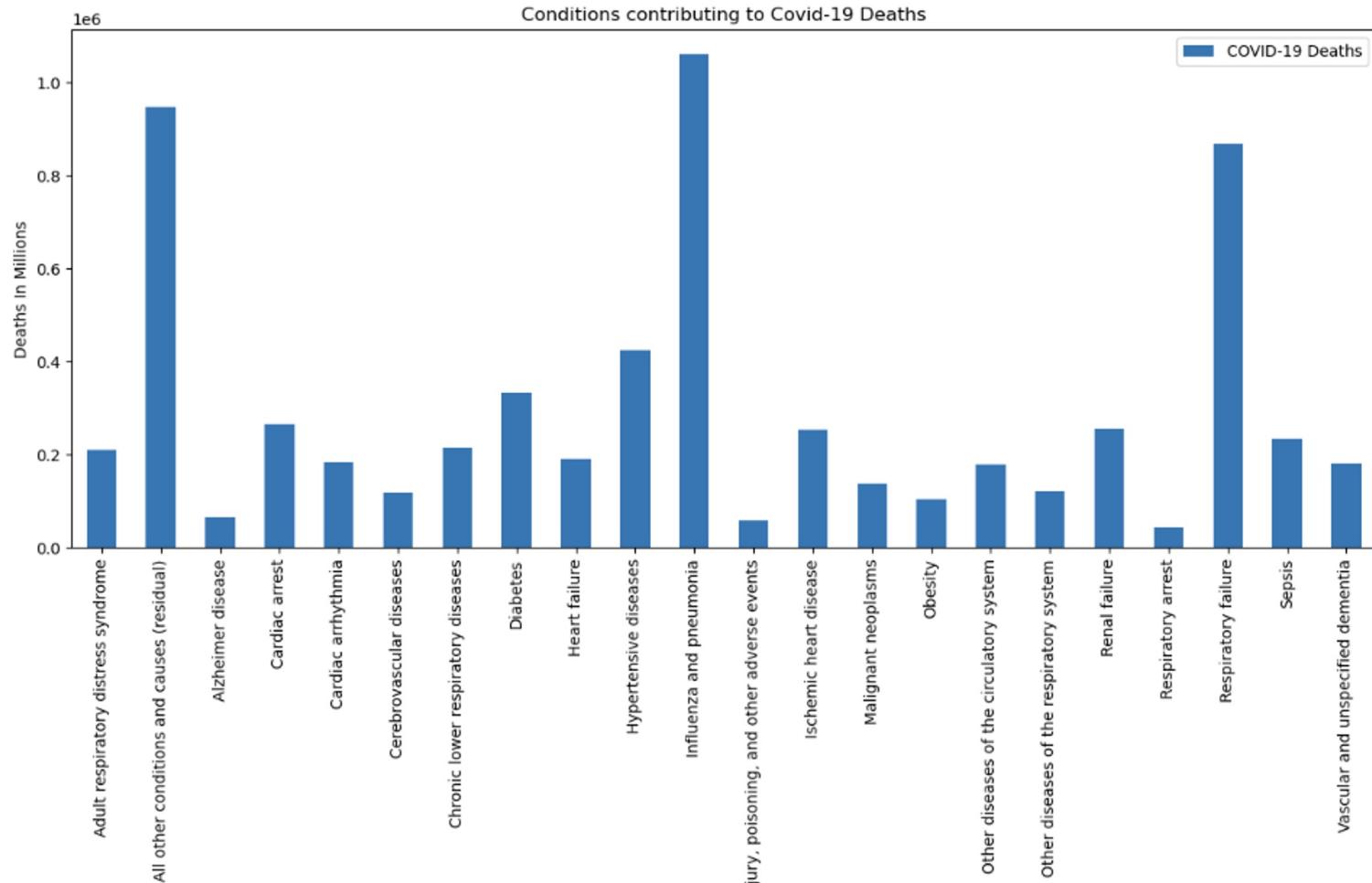
However, in the upcoming slides, we will show more conditions as well as graphs for better visualization.

The following data comes directly from the CDC database. Since our mission is to see the overall illnesses in the country, we will present the total number of deaths from four years; 2020, 2021, 2022 & 2023.

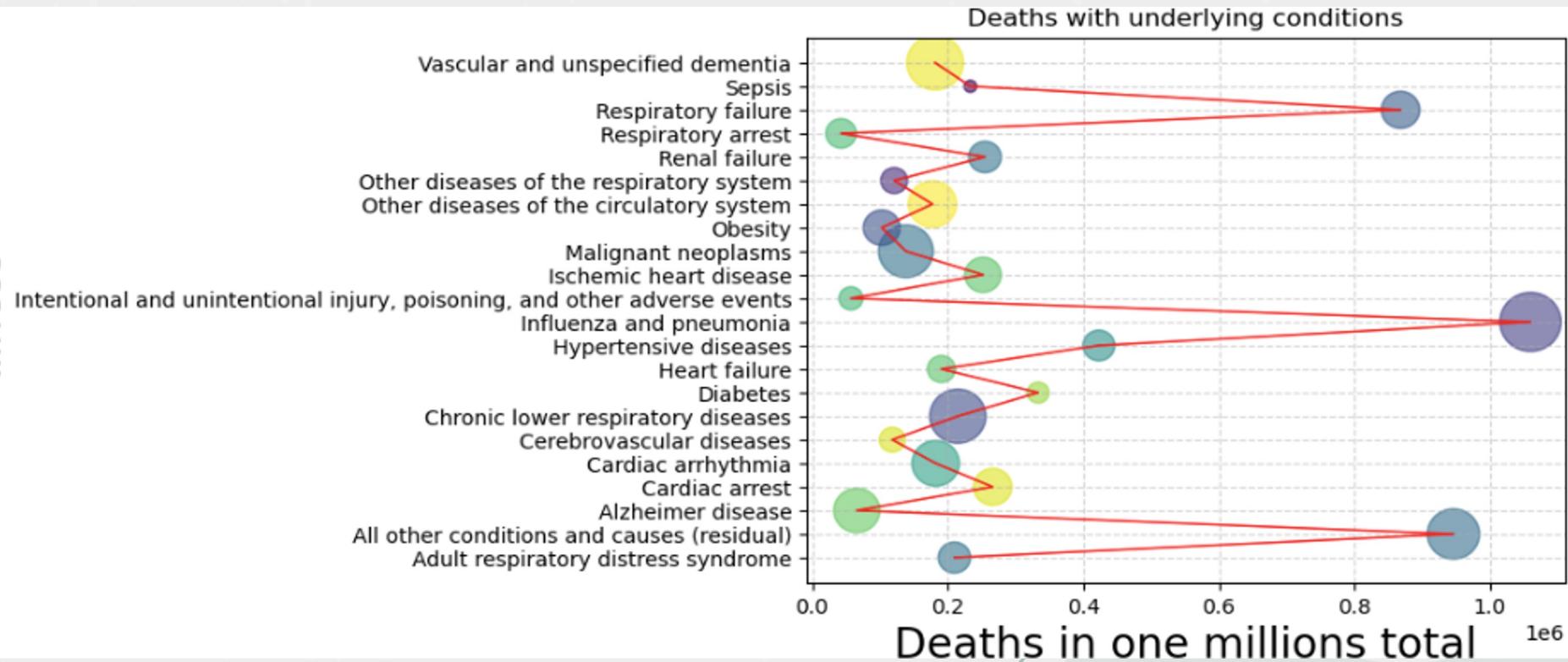
Condition
Influenza and pneumonia
All other conditions and causes (residual)
Respiratory failure
Hypertensive diseases
Diabetes
Cardiac arrest
Renal failure
Ischemic heart disease
Sepsis

# Comorbidities & other conditions

We can measure total deaths in a million.  
2020-2023.

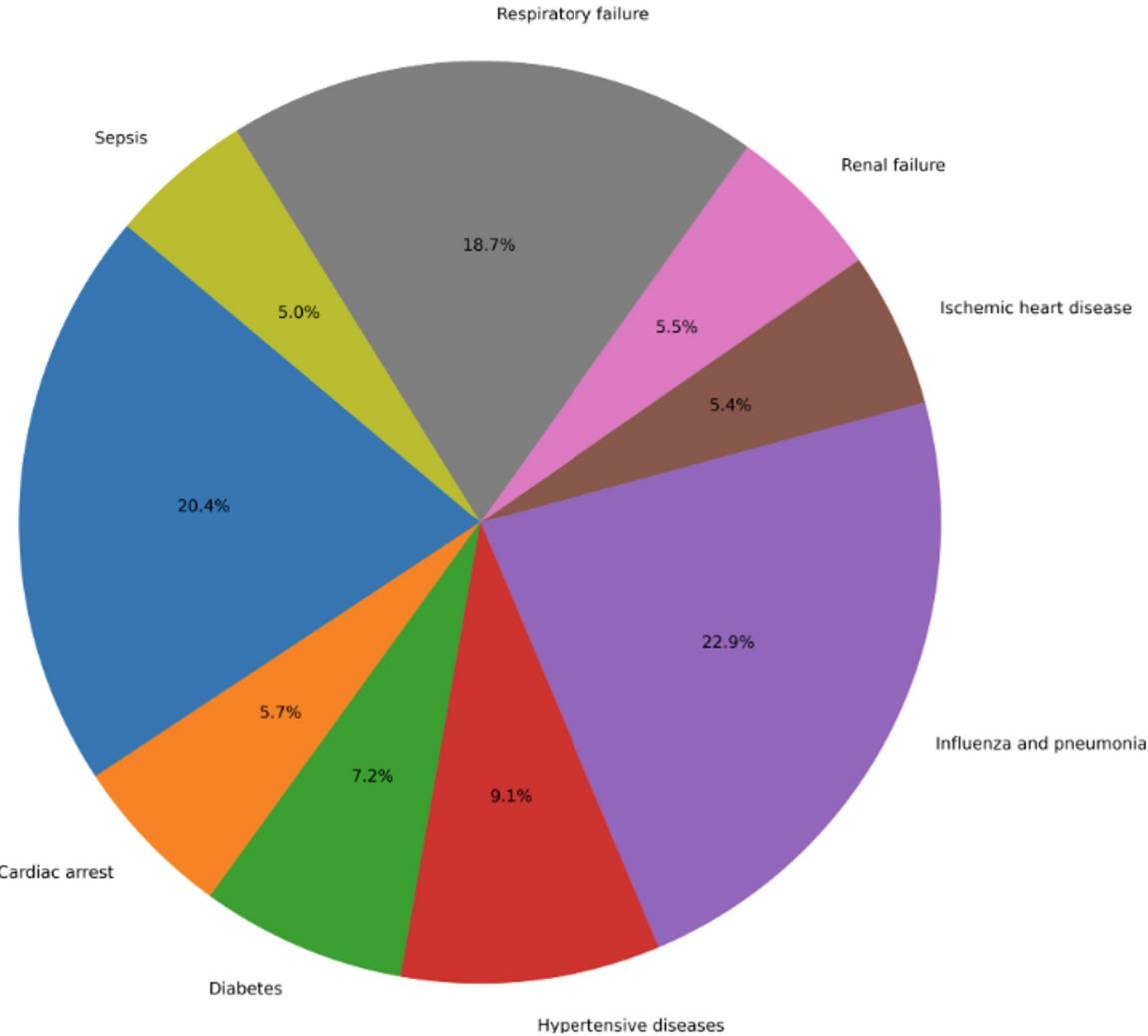


# All categories for deaths with underlying conditions.



## Top 9 & largest categories.

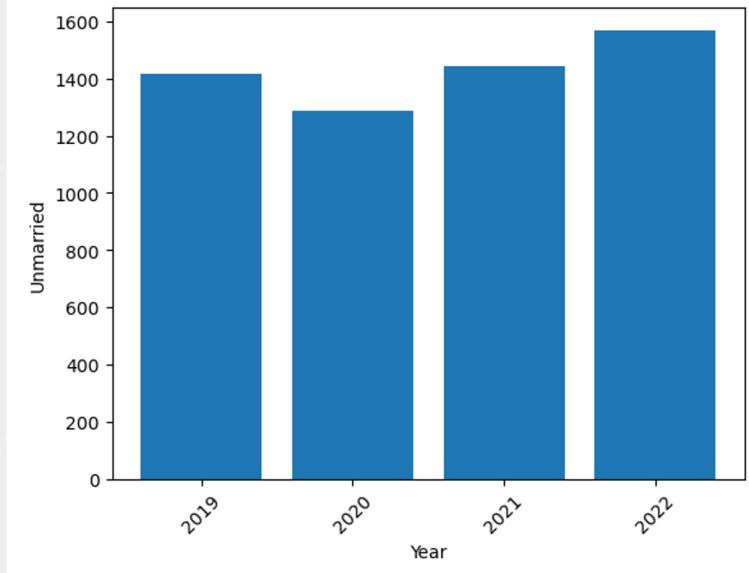
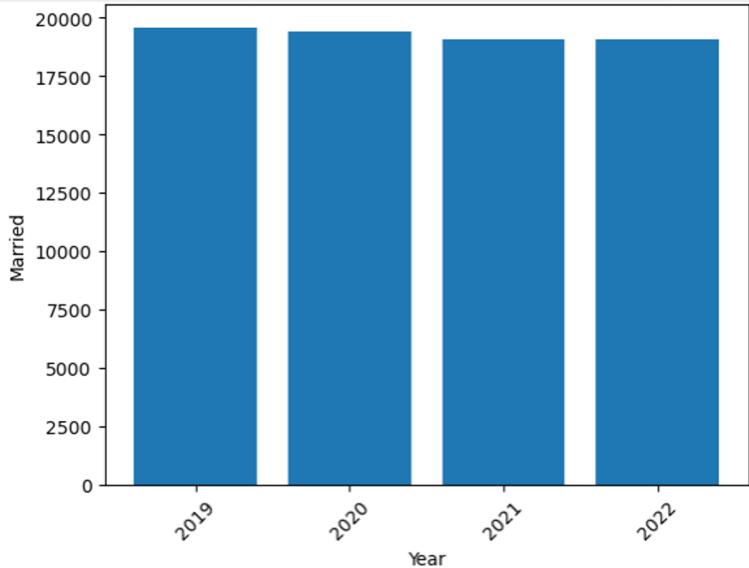
COVID-19 Deaths	
Condition	
Influenza and pneumonia	1059580
All other conditions and causes (residual)	945906
Respiratory failure	867913
Hypertensive diseases	422941 (residual)
Diabetes	333397
Cardiac arrest	266310
Renal failure	254943
Ischemic heart disease	252011
Sepsis	233425



## Most frequent listed Comorbidities with Covid-19 Deaths

Data as of 7/23/2023		Total	2023	2022	2021	2020
Influenza & Pneumonia		Hypertension		Diabetes		
46.4% (528,400 deaths)		18.6% (211,989 deaths)		14.7% (167,828 deaths)		
Alzheimer disease and other Dementias		Sepsis				
11.2% (127,157 deaths)		10.4% (118,041 deaths)				

# Single/Married Households by Race



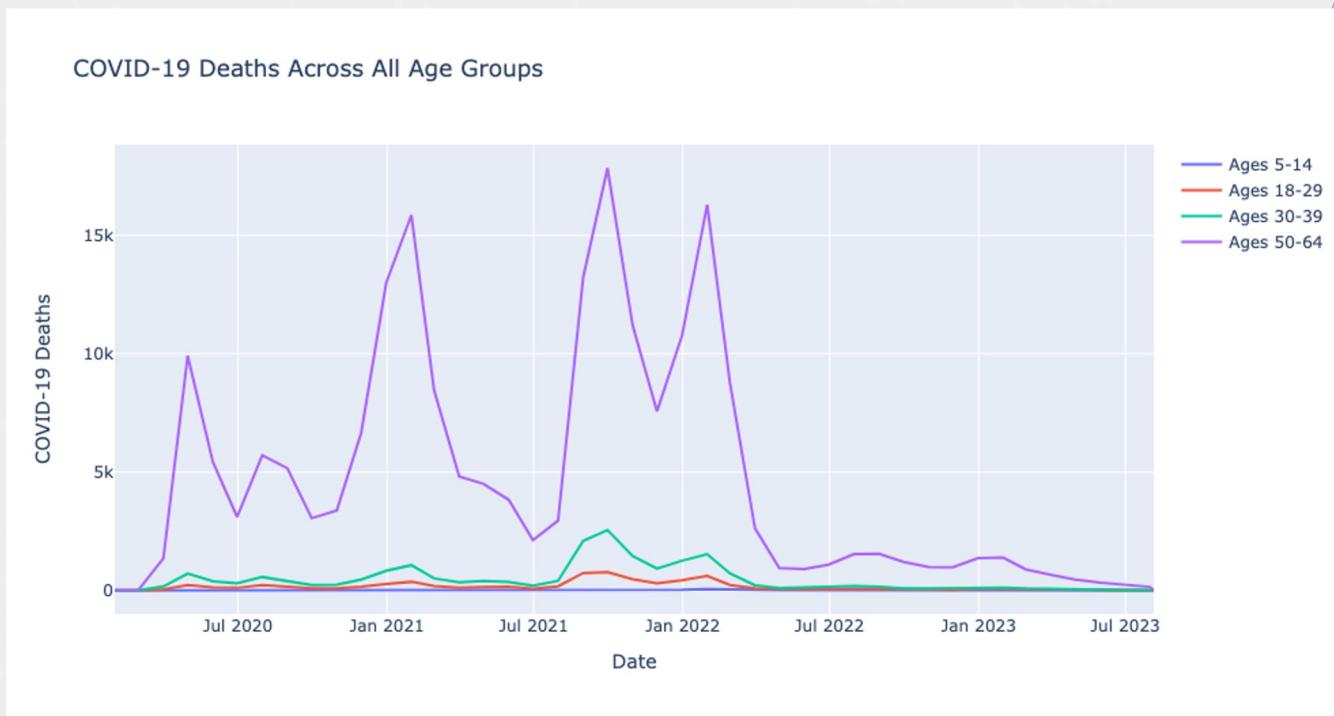
Rates for white married and unmarried families

# Age

Method: Five different age groups were analyzed in terms of COVID Death's from July 2020 - July 2023

## Age Groups

- 5-14 yo
- 18-29 yo
- 30-39 yo
- 50-64 yo



Data: CDC Provisional COVID-19 Data

# Age

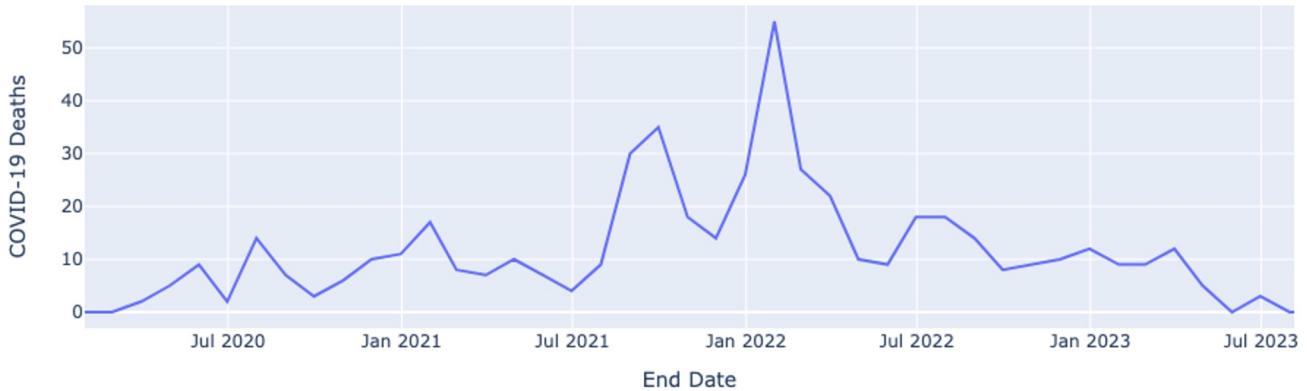
## Age Groups

- **5-14 yo**
- 18-29 yo
- 30-39 yo
- 50-64 yo



Method: Five different age groups were analyzed in terms of COVID Death's from July 2020 - July 2023

COVID-19 Deaths Among 5-14 Year Olds



Data: [CDC Provisional COVID-19 Data](#)

# Age

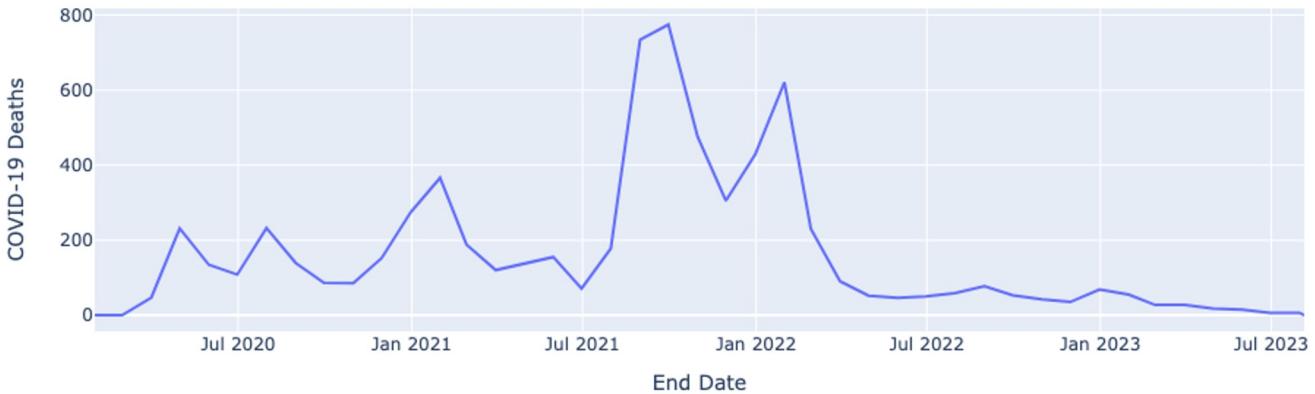
## Age Groups

- 5-14 yo
- **18-29 yo**
- 30-39 yo
- 50-64 yo



Method: Five different age groups were analyzed in terms of COVID Death's from July 2020 - July 2023

COVID-19 Deaths Among 18-29 Year Olds



Data: [CDC Provisional COVID-19 Data](#)

# Age

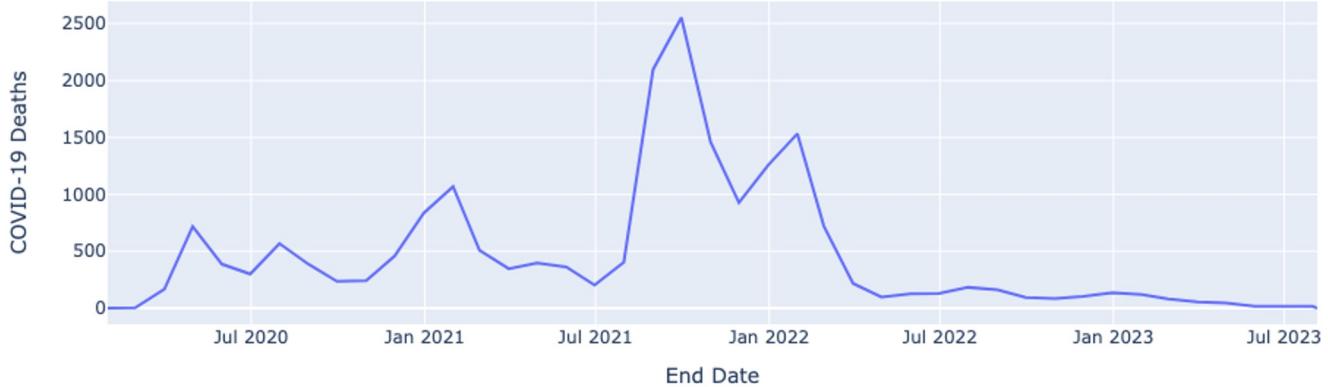
## Age Groups

- 5-14 yo
- 18-29 yo
- **30-39 yo**
- 50-64 yo



Method: Five different age groups were analyzed in terms of COVID Death's from July 2020 - July 2023

COVID-19 Deaths Among 30-39 Year Olds



Data: [CDC Provisional COVID-19 Data](#)

# Age

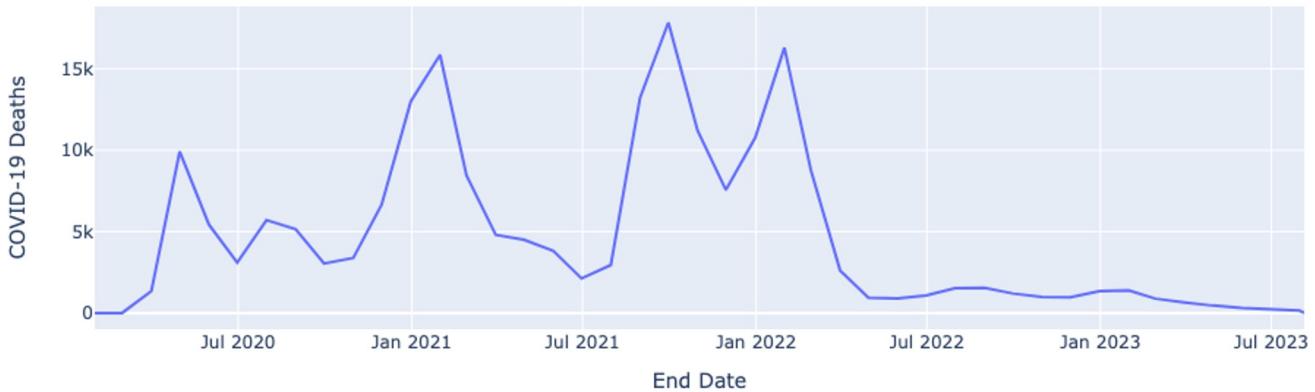
Method: Five different age groups were analyzed in terms of COVID Death's from July 2020 - July 2023

## Age Groups

- 5-14 yo
- 18-29 yo
- 30-39 yo
- **50-64 yo**



COVID-19 Deaths Among 50-64 Year Olds



Data: [CDC Provisional COVID-19 Data](#)



# 03 Conclusions/ Implications

# To Conclude

Throughout this project, our group was able to both visualize and answer the questions we wanted to answer regarding the COVID-19 pandemic.

One factor that helped us achieve this goal was the ease of access to COVID-19 data via the CDC, census data from the U.S. Census Bureau, as well as other datasets.

We were able to answer - in terms of infection - who was the leading population in numbers during the pandemic. The spike on deaths in the U.S. The national death numbers and how this unfolded into social structural changes in society. For example; changes in unemployment, birth rates and marriages.

We were able to see what were the underlying illnesses or conditions that contributed to deaths from COVID-19.

Lastly we zoomed into Texas and analyzed hospitalization rates as well as which vaccines were mostly used.

# Implications



Throughout this project... we were able to research, extract, organize and visualize vast amounts of data in order to answer questions we had. This gave us a better idea on the effects of COVID-19 on the U.S. population. Not only did we answer basic questions, but we also learned more during our research. This also gave us a better understanding on how to manipulate data through python and collaborate as a team.

One factor that helped us... The information found in the CDC website since they are the main source for factual information regarding COVID-19. Collaborating as a team helped us filter out information that we needed in order to have a better understanding.

We had trouble with... In the beginning making sense of the huge amounts of data and filtering into concise, clean and presentable chunks that made sense.



# References

- <https://datascience.nih.gov/covid-19-open-access-resources>
- [https://data.cdc.gov/widgets/9bhg-hcku?mobile\\_redirect=true](https://data.cdc.gov/widgets/9bhg-hcku?mobile_redirect=true)
- [https://covid.cdc.gov/covid-data-tracker/#vaccinations\\_vacc-people-booster-percent-pop5](https://covid.cdc.gov/covid-data-tracker/#vaccinations_vacc-people-booster-percent-pop5)
- <https://covid.cdc.gov/covid-data-tracker/#vaccination-demographics-maps>
- <https://data.cdc.gov/Vaccinations/COVID-19-Vaccination-Age-and-Sex-Trends-in-the-Uni/5i5k-6cmh>
- <https://storage.googleapis.com/covid19-open-data/v3/location/US.json>
- <https://www.census.gov/library/stories/2023/05/family-households-still-the-majority.html>
- [https://www.cdc.gov/nchs/nvss/marriage\\_divorce.htm?CDC\\_AA\\_refVal=https%3A%2F%2Fwww.cdc.gov%2Fnchs%2Fmardiv.htm](https://www.cdc.gov/nchs/nvss/marriage_divorce.htm?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fnchs%2Fmardiv.htm)
- <https://www.census.gov/data/tables/time-series/demo/families/families.html>
- <https://data.cdc.gov/NCHS/Provisional-Death-Counts-for-Influenza-Pneumonia-a/ynw2-4vig>