



The University of Texas at Austin
McCombs School of Business

UT Austin Boot Camps



Pregnancy Related Mortality

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Introduction

Why this topic?

- The United States has the highest pregnancy-related mortality rate among developed countries, making it a critical public health issue.

Where was this data obtained from?

- This project focuses on analyzing and visualizing data obtained from the California Public Health Department regarding pregnancy-related mortality from the years 2019-2021. In addition to the World Health Organization and Center for Disease and Control Prevention
- The pregnancy-related mortality data shown in this data is the number of pregnancy related deaths per 100,000 live births
- What was used for this data analysis?
 - We utilized Python, specifically within Jupyter Notebook environment and Matplotlib for the visualizations.

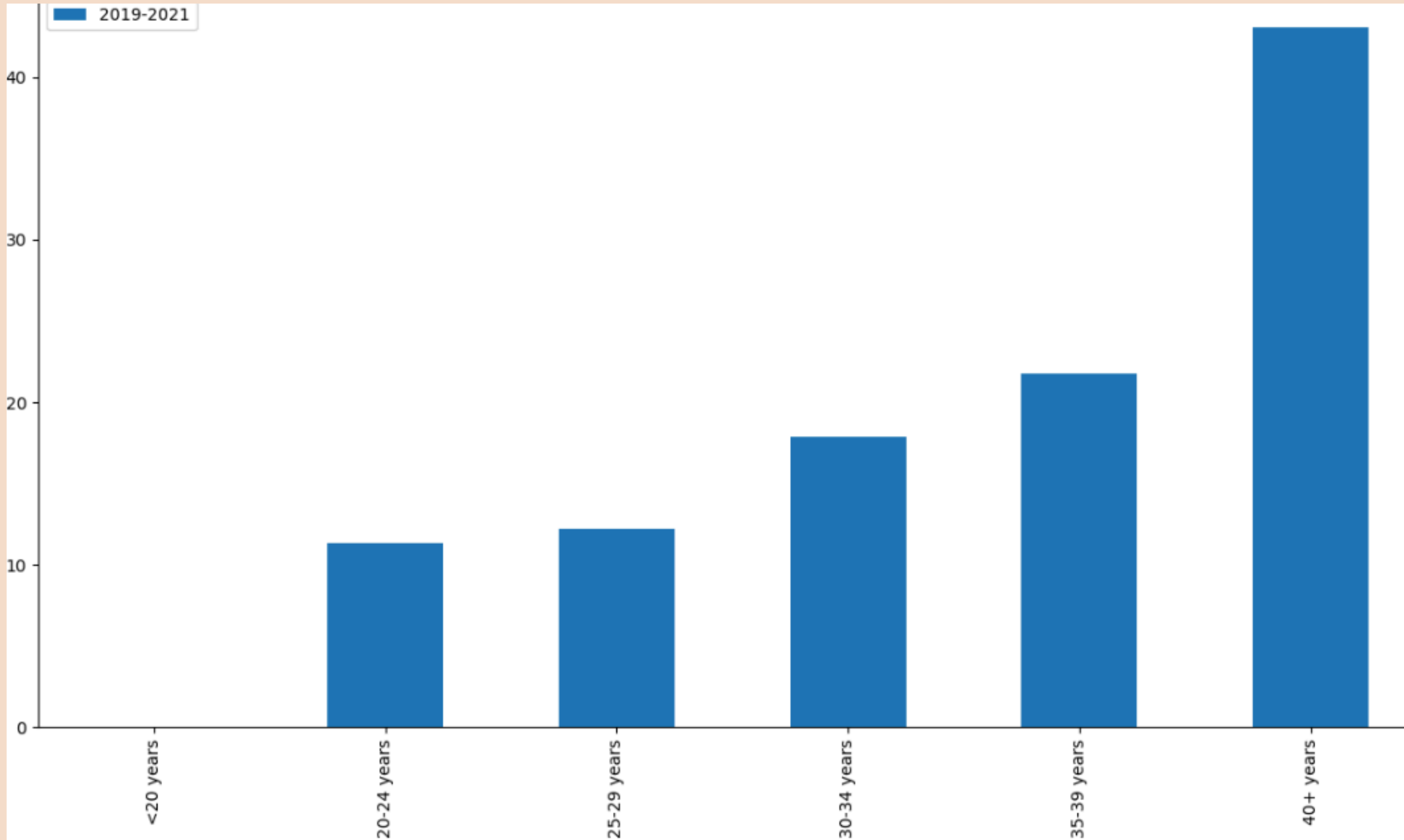
Purpose: Our objective was to identify and visualize key factors contributing to maternal deaths to better understand this issue, inform potential interventions, and bring more awareness .

Key Factors Influencing Pregnancy-Related Mortality

- Age
- Types of Insurance
- Race
- Cause of Death
- Gestational Week
- Body Mass Index



Pregnancy Mortality Rate - Age

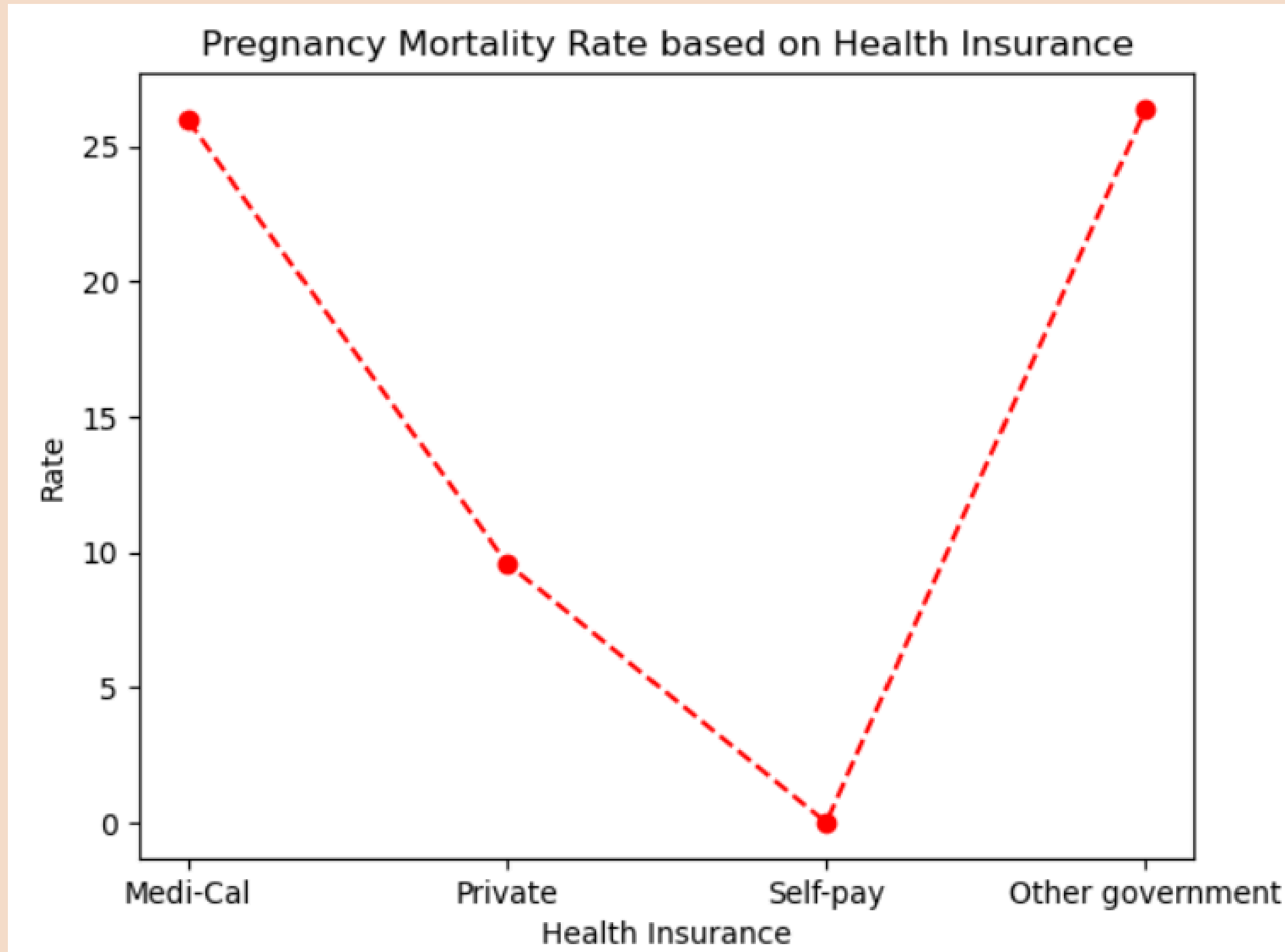


How does the age of pregnant women correlate with pregnancy-related mortality rates?

- Data revealed that women aged 40 and above had significantly higher rates of pregnancy-related mortality.
 - Mortality rate in this age group was substantially higher compared to younger age groups.
- Data indicated a noticeable increase in mortality rates starting at age 30.
 - The trend suggests a progressive rise in risk with advancing maternal age beyond 30.
- Women in the 20-29 age range exhibited average mortality rates.
 - This age group showed the most favorable outcomes in terms of pregnancy-related mortality.



Pregnancy Mortality Rate - Insurance

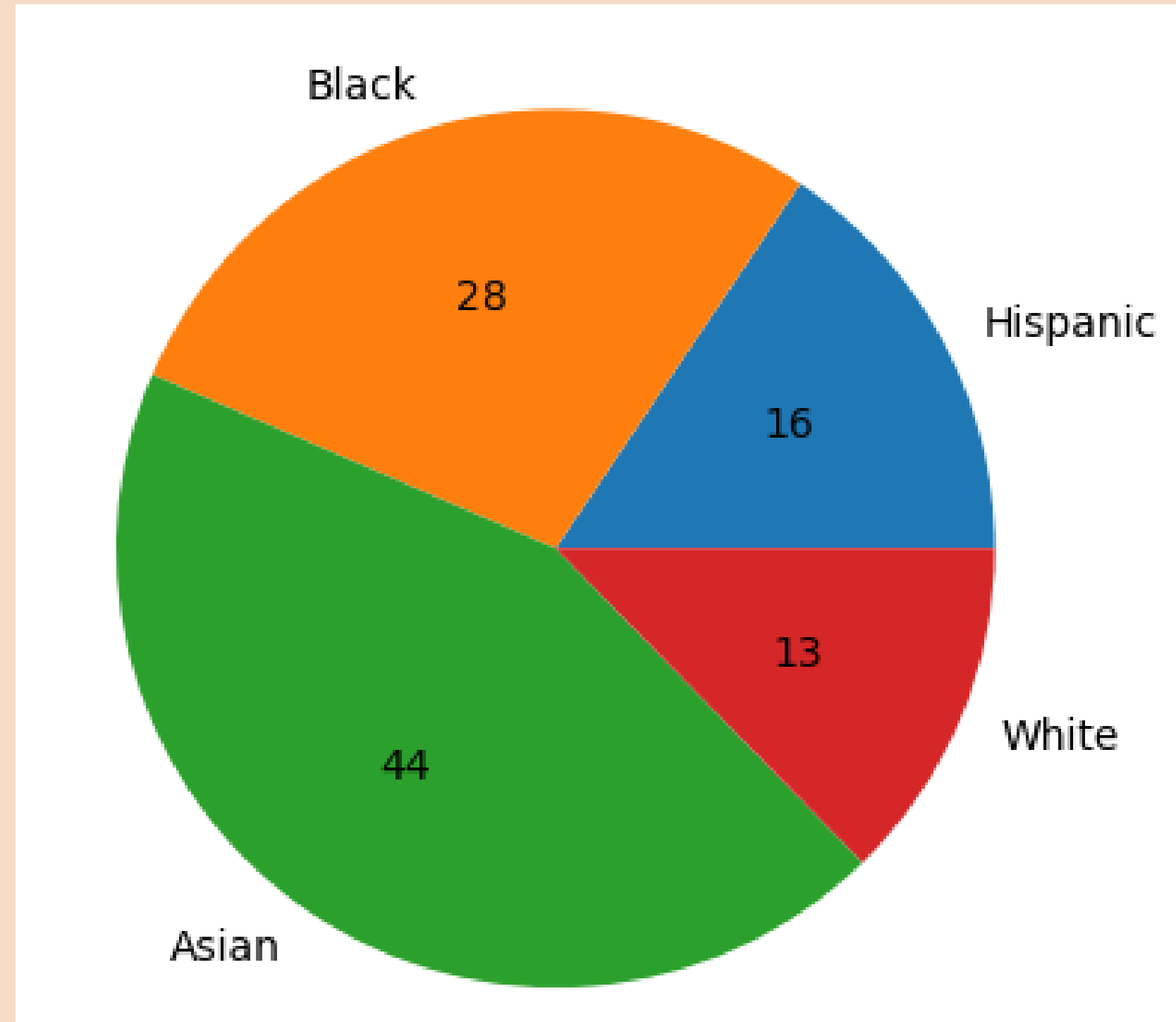


What is the impact of the type of health insurance (public vs. private) on pregnancy-related mortality rates?

- Women covered by Medi-Cal and other government insurance programs exhibited the highest pregnancy-related mortality rates.
 - possible factors could be limited access to high-quality prenatal care, lower socioeconomic status
- Women with private health insurance had significantly lower pregnancy-related mortality rates compared to those with public insurance.
 - may include better access to comprehensive prenatal care, higher socioeconomic status, and more consistent healthcare services.
- Women who self-paid for their healthcare services showed the lowest pregnancy-related mortality rates.



Pregnancy Mortality Rate - Race

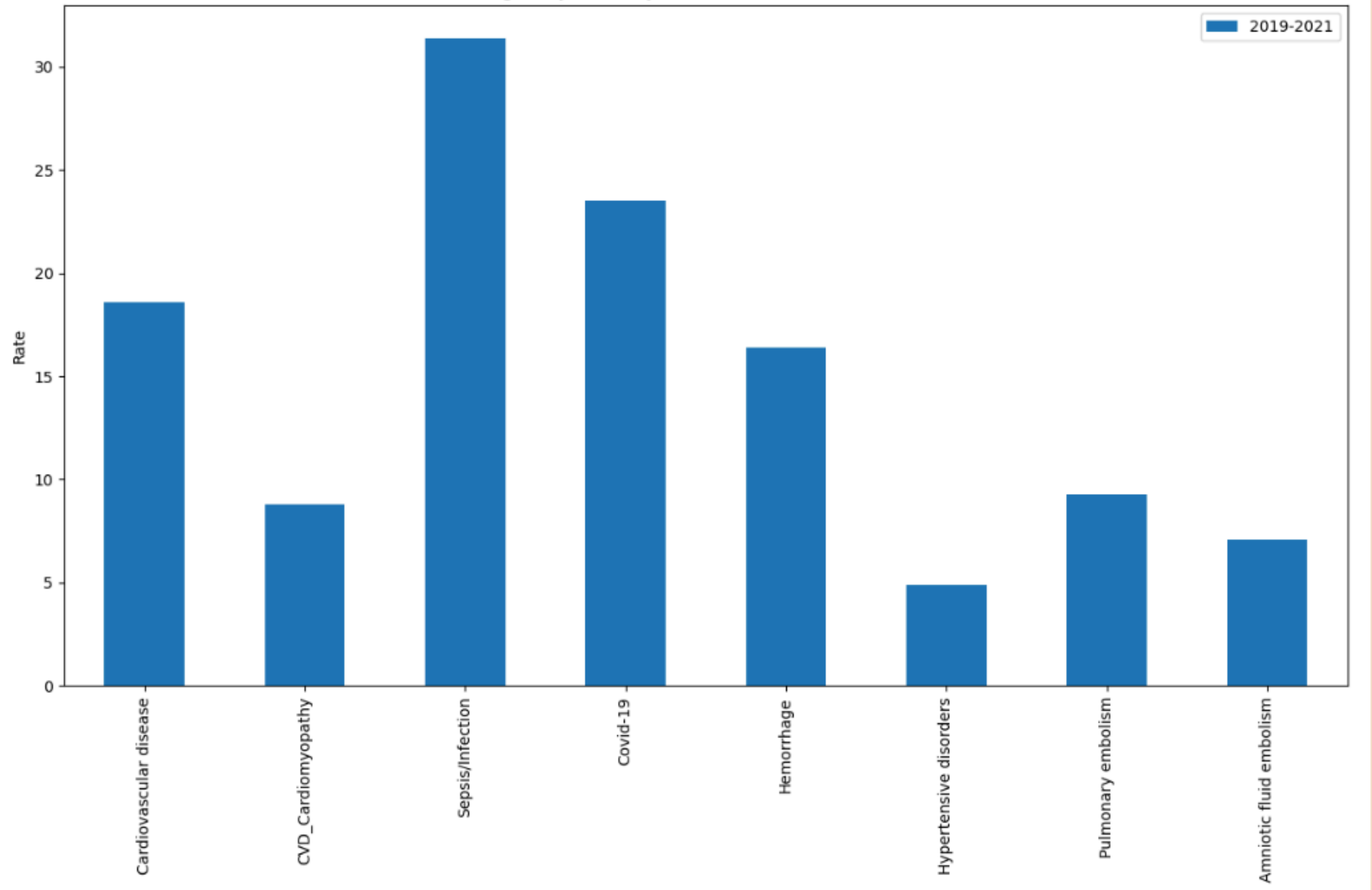


How do pregnancy-related mortality rates vary among different racial groups in California?

- Asian women had the highest pregnancy-related mortality rates from 2019-2021 at 44%
 - Potential underlying causes: cultural and language barriers in accessing healthcare, differences in health-seeking behaviors
- 28% of Black women exhibited the second highest pregnancy-related mortality rates.
- Hispanic women had lower mortality rates than Black women but higher than White women.
- White women had the lowest pregnancy-related mortality rates at 13%.
 - Contributing factors: better access to healthcare resources, higher socioeconomic status, and lower prevalence of certain chronic health condition
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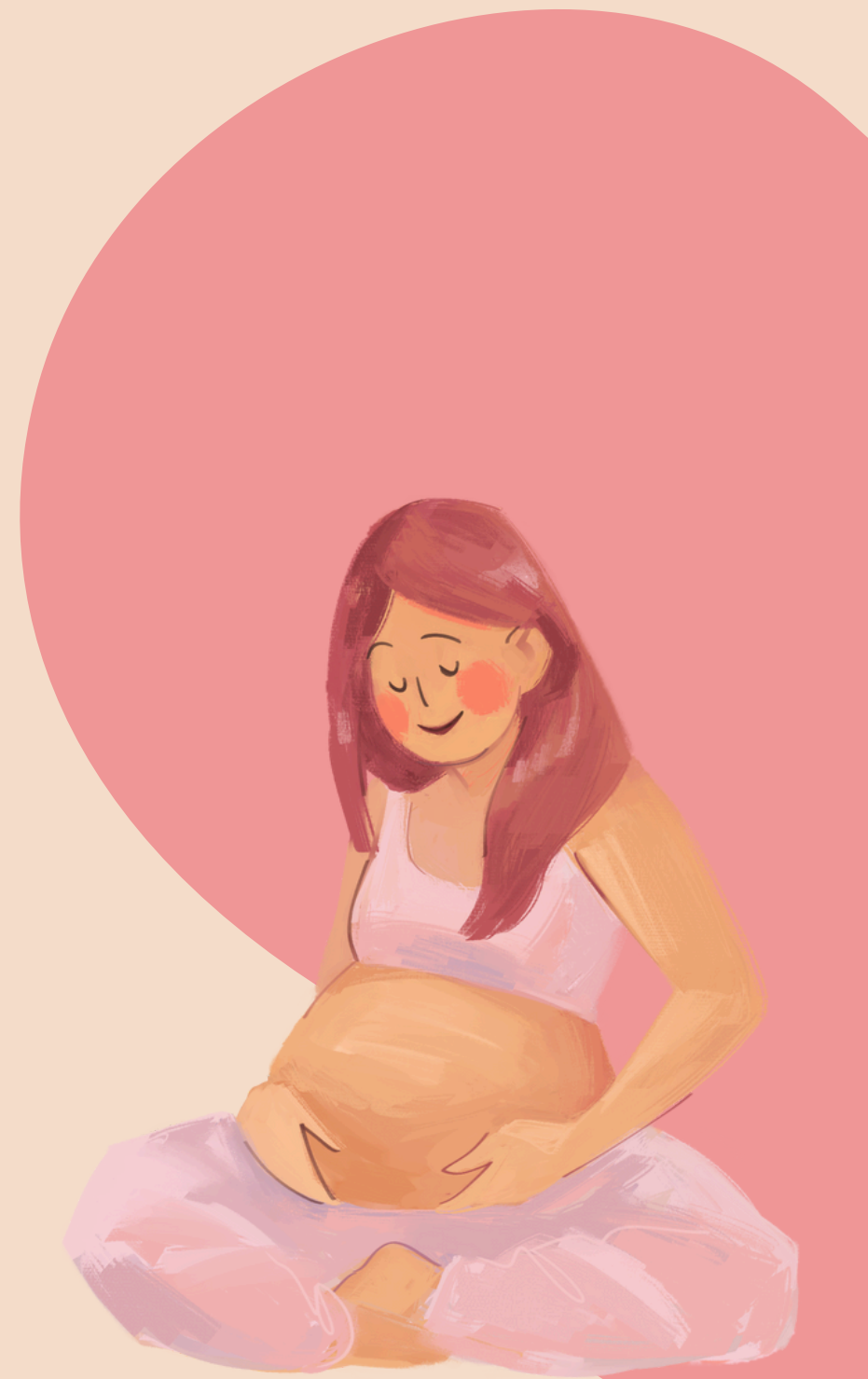


Pregnancy Mortality Rate - Cause of Death

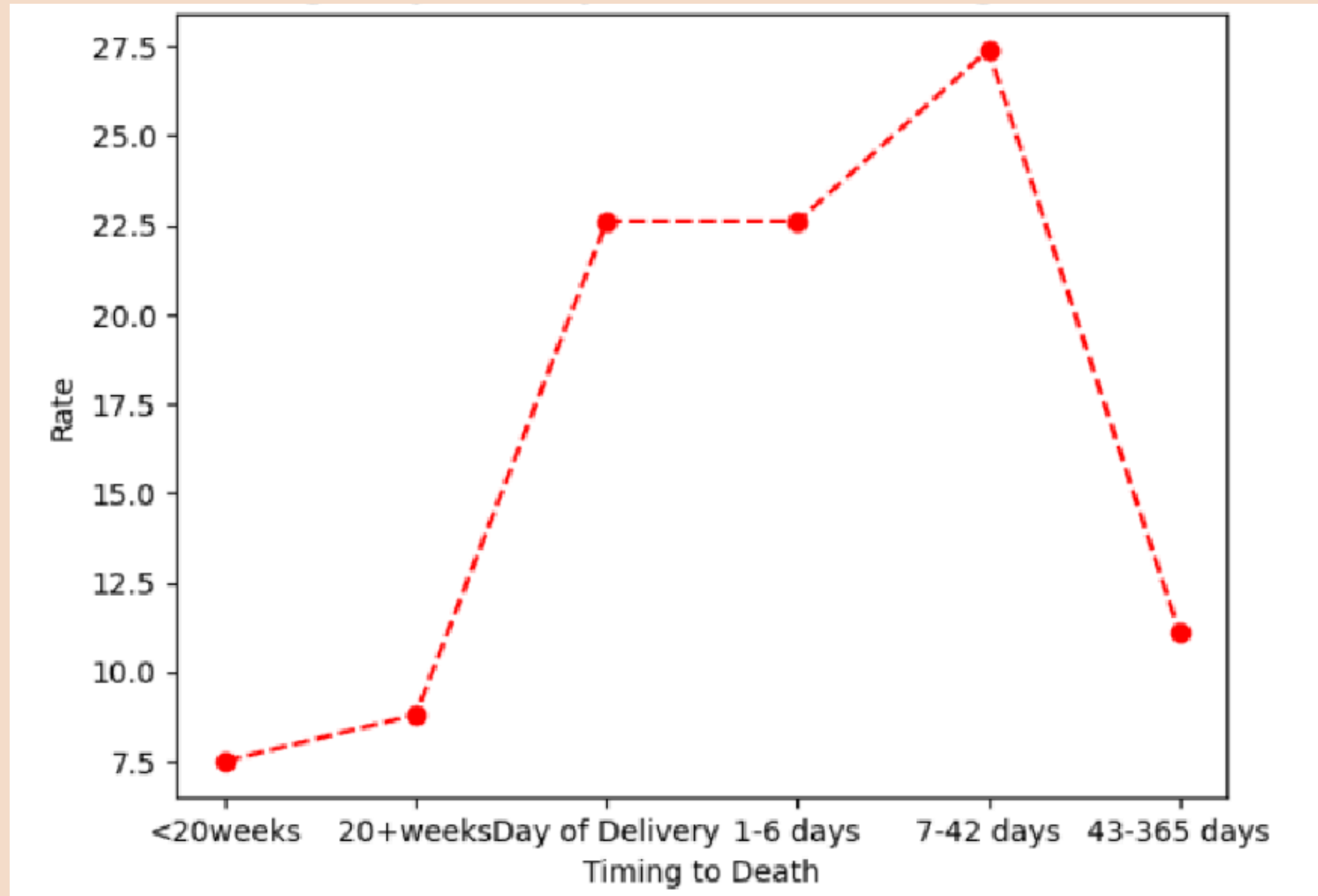


What are the most common causes of pregnancy-related deaths in California from 2019-2021?

- Sepsis and infections were the most common causes of pregnancy-related deaths.
 - Possible contributing factor: undiagnosed COVID-19 cases and its variants during 2019 and subsequent years
- COVID-19 was the second leading cause of pregnancy-related deaths.
 - Limitations: underreporting or misclassification of deaths due to lack of testing or unclear cause of death during the early stages of the pandemic
- Cardiovascular disease and hemorrhage had similar mortality rates with the third and fourth leading cause in deaths.
- Lower Mortality Rates for Other Causes:
 - Hypertension
 - Pulmonary Embolism
 - Amniotic Fluid Embolism
 - Cardiomyopathy



Pregnancy Mortality Rate - Timing

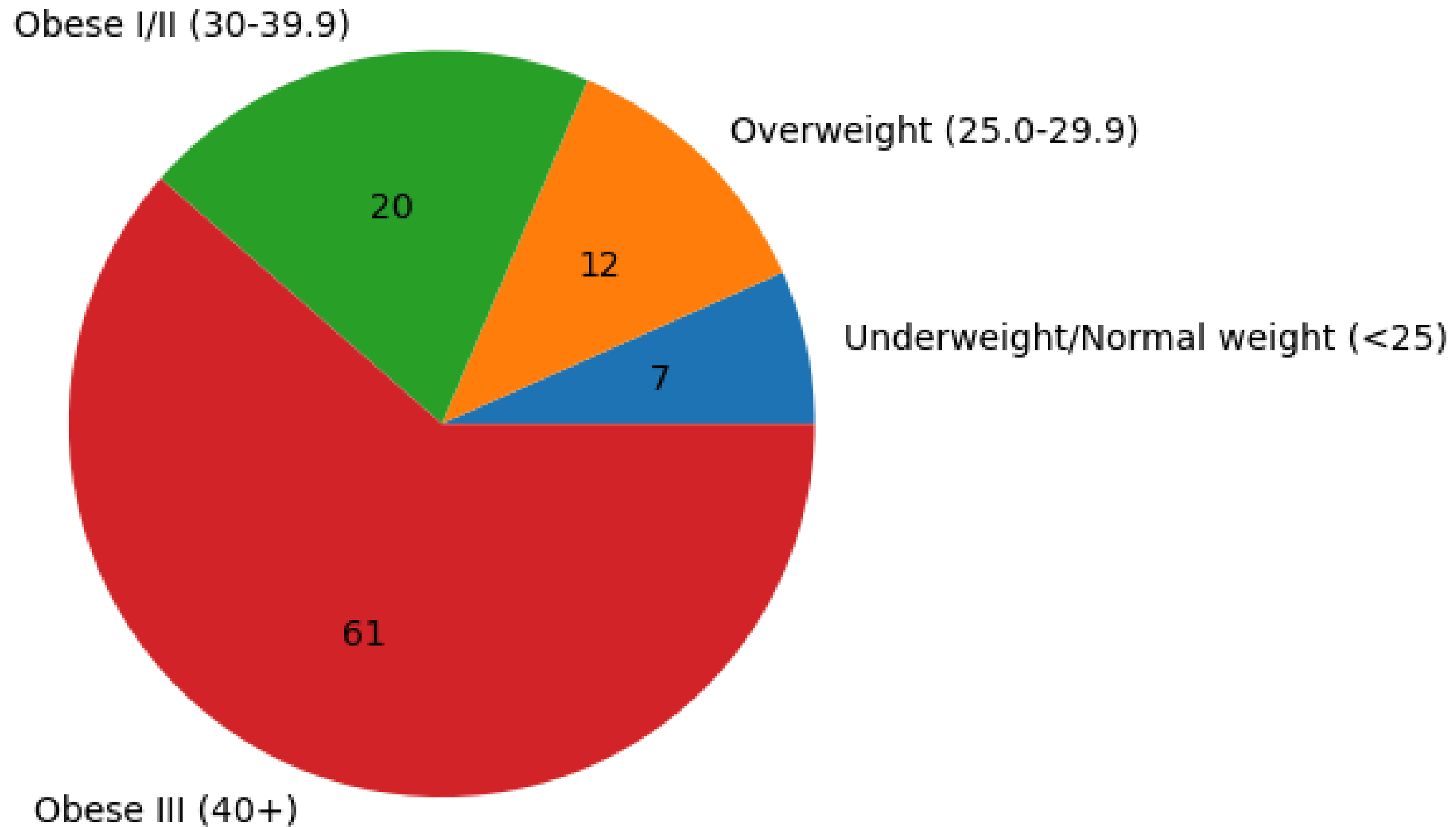


During which gestational weeks do the highest rates of pregnancy-related mortality occur?

- Mortality rates begin to increase significantly after 20 weeks of gestation.
- A significant increase in the trend occurs at the time of delivery
 - Contributing factors: complications during labor and delivery, and emergency cesarean sections
- The most significant spike in mortality rates is observed between 7 and 42 days postpartum
 - Contributing factors: infections, and complications from pre-existing conditions that worsen after delivery.
- Mortality rates decrease again after 43 days postpartum but remain a concern up to 365 days later.
 - late postpartum complications, mental health issues, and delayed recognition of postpartum conditions.



Pregnancy Mortality Rate - BMI



How does the Body Mass Index (BMI) of pregnant women influence pregnancy-related mortality rates?

- Women classified as Obese III (BMI 40 and above) had the highest pregnancy-related mortality rates.
 - potentially due to severe obesity-related complications, such as increased risk of gestational diabetes, hypertension, and cardiovascular issues
- Women with Obese I and II categories (BMI 30.0-39.9) experienced a reduced but still elevated risk compared to normal weight categories
- Women in the overweight category (BMI 25.0-29.9) had lower mortality rates compared to those in the obese categories but still faced increased risks compared to normal weight individuals.
- Women classified as underweight or in the normal weight range (BMI < 25) had the lowest pregnancy-related mortality rates.
 - These groups generally experienced fewer complications related to BMI, though underweight individuals may still face risks.



Hypothesis testing - BMI

- Comparison: Obese III (BMI 40+) vs. Underweight/Normal Weight (BMI < 25)
- Test Type: Independent Samples t-test
- Test Results
 - t-Statistic: 7.8183
 - p-Value: 1.6592e-07
- The pregnancy-related mortality rate for Obese III (40+) is 453.73% higher than that for Underweight/Normal Weight (<25)



The results indicate a statistically significant difference in pregnancy-related mortality rates between Obese III and Underweight/Normal Weight groups.

Limitations to the Data

- **Limited Time Frame (2019-2021)**
 - The dataset covers only three years, which may not fully capture long-term trends or variations in pregnancy-related mortality rates.
- **Geographic Limitation (California Only)**
 - The analysis is specific to California, which may not be representative of pregnancy-related mortality rates in other states or regions.
- Some pregnancy-related deaths may be underreported or misclassified, especially concerning conditions like COVID-19, which could affect mortality rate estimates.
- The dataset does not include detailed information on socioeconomic status, environmental factors, or other potential determinants of health
- The influence of COVID-19 on pregnancy-related mortality may be confounded by the varying stages of the pandemic and differing healthcare responses.

Disclaimer: The information presented in this analysis of maternal mortality rates in California from 2019-2021 is intended solely for educational purposes as part of a class assignment. It should not be construed or used as medical advice, clinical guidance, or as a reference for medical decisions. The analysis and findings are based on publicly available data and are not intended to substitute professional medical judgment or expertise. Individuals seeking medical advice or information related to maternal health should consult qualified healthcare professionals or authoritative sources. This educational exercise aims to enhance understanding of data analysis techniques and maternal health trends within an academic context, and caution should be exercised in applying these findings beyond educational or research purposes.





**Are There Any
Questions ?**





Thank You

See you next time