

Data Brief: 2020/Q1 2021 Increases in Deaths in Santa Cruz County

California Department of Public Health - Fusion Center - Last updated: 10.15.2021

Background

This Data Brief presents an analysis of excess mortality (change in deaths) for Santa Cruz County in 2020 and Quarter 1 of 2021, using California vital statistics death data (death certificates). This Brief includes assessment of differential excess mortality by race/ethnic group and age, and changes in specific causes of deaths.

This Brief is the Santa Cruz-specific version of the full State Brief [here](#). The full State Brief is a follow-up to findings in the [2021 State of Public Health Analysis](#), part of the [State Health Assessment](#).

Detailed methods are included at the end of this document.

About this Santa Cruz County Data Brief

This document is wholly generated using an automated data analysis and report formatting system (R, and R markdown). Therefore, compared to the full State Brief, there is less interpretive text about the specific data in the tables and charts.

The extended text, discussion, and limitations sections included only in the full State Brief will likely be helpful to frame and understand many of the findings in this Santa Cruz County brief, but the specific observations in the State Brief (e.g. that a particular value is higher or lower than another value) may or may not be congruent with observations in the Santa Cruz County Brief.

Because some jurisdictions have small numbers overall or small numbers in some demographic subgroups, some charts in these jurisdiction-specific Briefs may have values that are very high or low, but may be reflective of “unstable random bounce” rather than important differences of concern. Local Health Departments should determine appropriate contextualization when using charts and tables with these “unstable” values.

Summary

- There were 1,878 deaths in Santa Cruz in 2020 (corresponding to an age-adjusted all-cause death rate of 591.3 per 100,000 population), compared to 1,781 deaths in 2019 (rate of 570.4). This is a 3.7% change in the death rate in Santa Cruz.
- The change in death rate differed by race/ethnicity, as shown in Figures 2, 3a and 3b.*
- Changes in deaths from conditions other than COVID-19 were observed, as shown in Table 2 and Figure 4.*
- The change in death rate differed by age differentially among race/ethnic groups as shown in Figure 5.*

*Unless data are suppressed because of small numbers

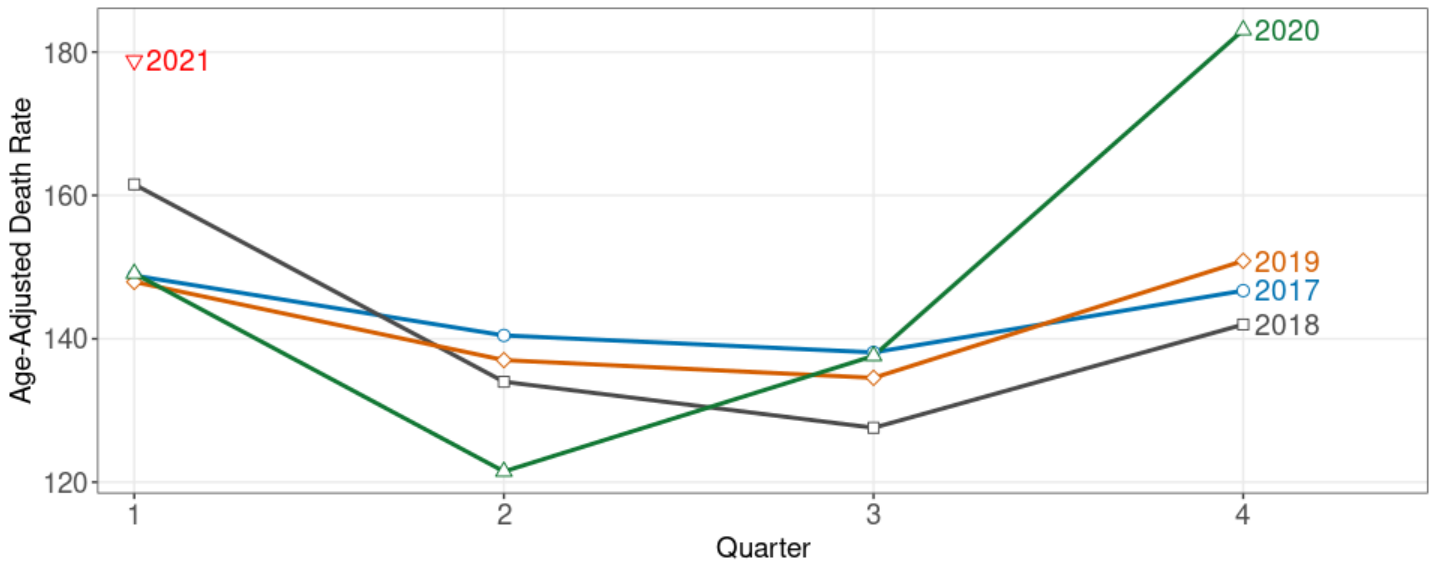
Findings

Table 1 - Number, Age-Adjusted Rate, and Change in Rate from Prior Year, Deaths from All Causes in Santa Cruz, 2017-2020

Year	Number of Deaths	Age-Adjusted Death Rate	% Increase in Rate from Prior Year
2020	1,878	591.3	3.7%
2019	1,781	570.4	0.9%
2018	1,723	565.1	-1.6%
2017	1,739	574.1	-

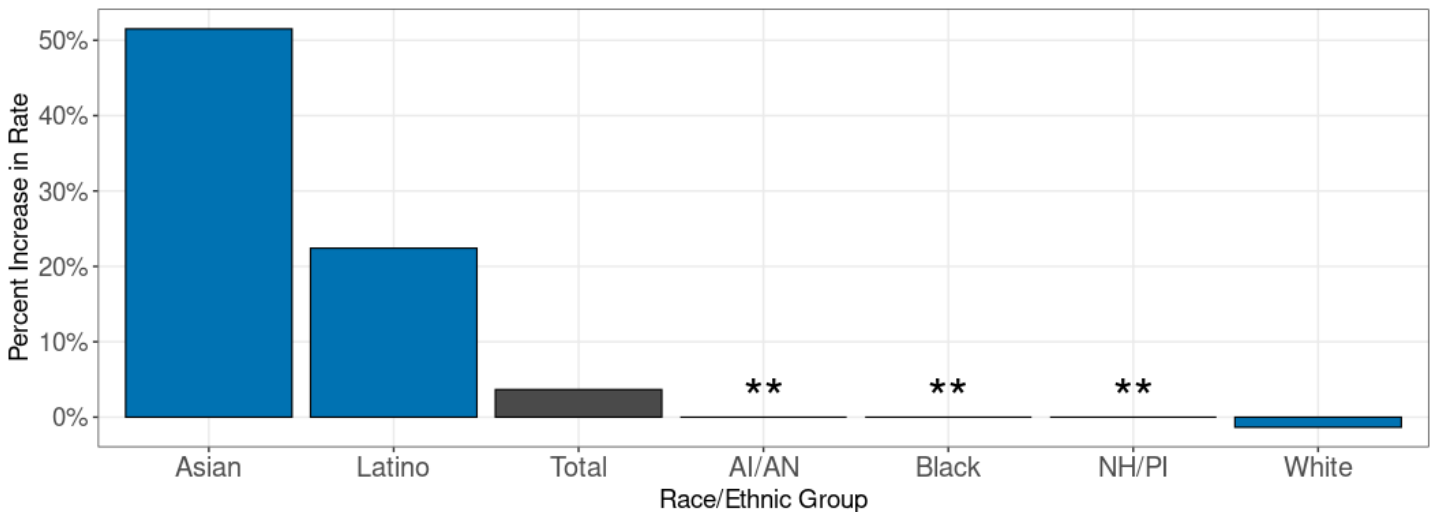
- As the pandemic intensified throughout 2020, the increases in the rates accelerated in most jurisdictions. Comparing death rates in the 3rd quarter of 2020 to the 3rd quarter of 2019, there was a 2.3% change; and when comparing 4th quarters, a 21.3% increase; and when comparing the 1st quarter of 2021 to the 1st quarter of 2019, there was a 20.9% increase.

Figure 1 - All-Cause Death Rate by Quarter and Year in Santa Cruz, 2017-2020 and Q1-2021



Deaths increased more among some race/ethnicity groups than others

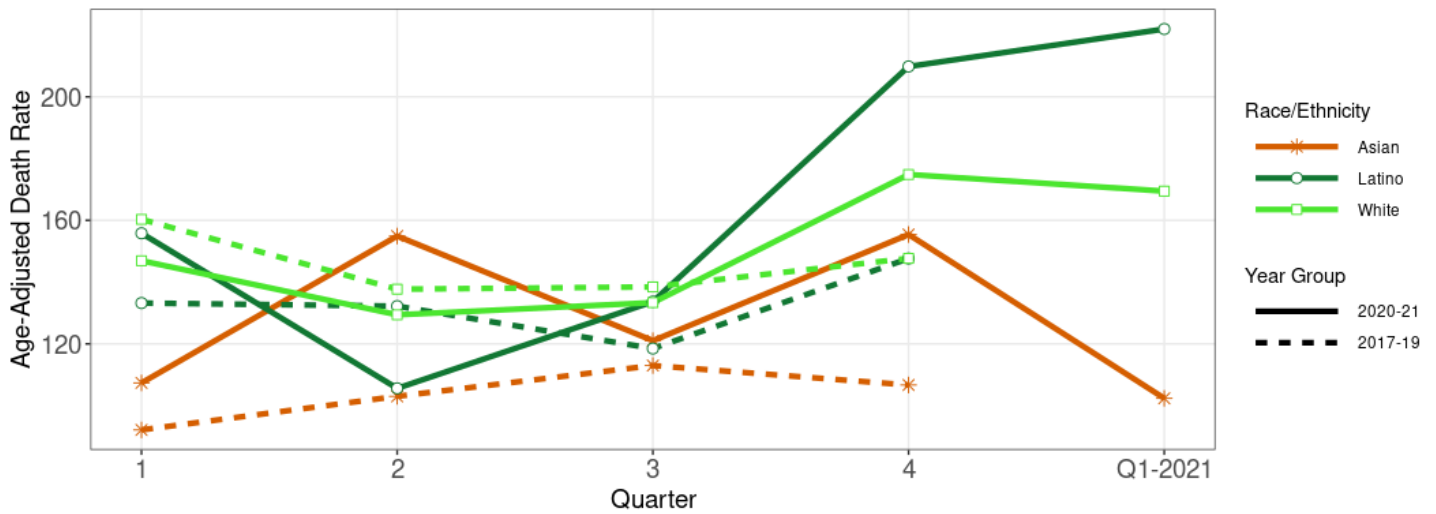
Figure 2 - Percentage Increase in Race-Specific Age-Adjusted Death Rates 2019 to 2020, Santa Cruz



** Note: Any race/ethnic group with < 11 deaths in 2020 or with a decrease in the age-adjusted death rate of > 10% is not shown in Figure 2

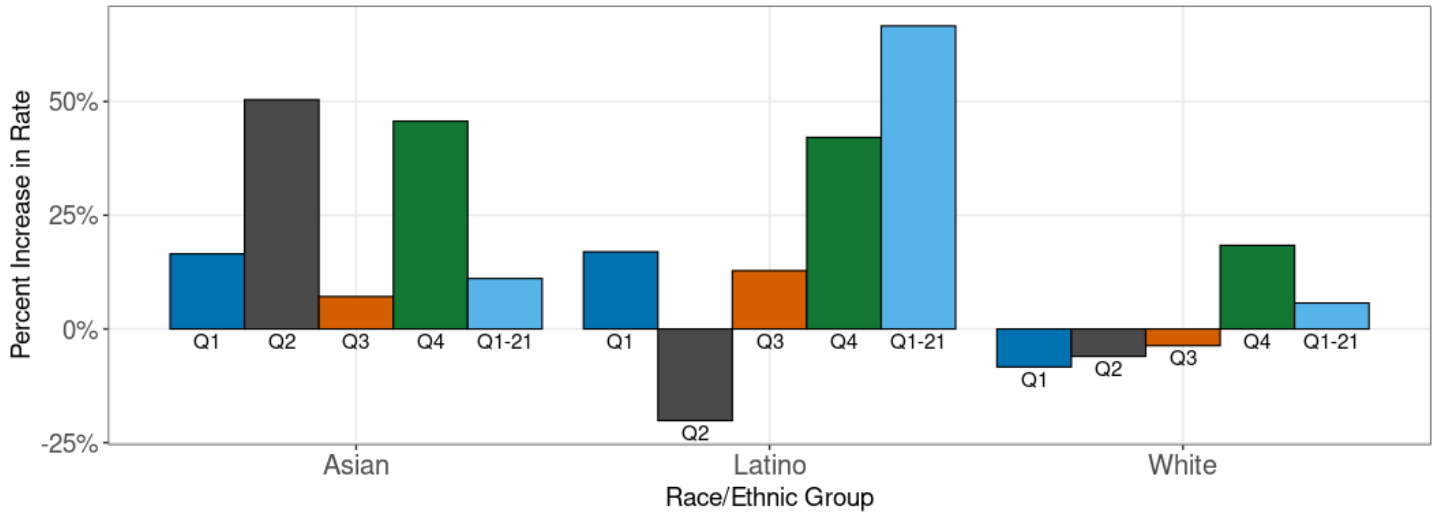
- For the State overall, and for many counties, deaths among most race/ethnic groups were higher in quarters 2, 3, and 4 of 2020, and quarter 1 of 2021 compared to the average rate of the corresponding 2017-2019 quarters.
- These disparities are seen in Figure 3a by observing the increasing gap within any specific race/ethnicity group (dotted line compared to solid line), and by observing the increasingly larger gaps in some groups than others.
- Note: Any race/ethnic group with < 5 deaths in any quarter (or average of 2017-2019 quarters) is not shown in Figure 3a or 3b

Figure 3a - Trends in All Cause Age-Adjusted Mortality Rate by Race/Ethnicity by Quarter, 2020/Q1-2021 and 2017-2019 Average, Santa Cruz



- Figure 3b below shows the same data as in 3a above, with a different perspective. Each bar is the **percent change** in the death rate for each race/ethnicity group comparing quarters of 2017-19 to the corresponding quarters of 2020 and 2021. The height of the bar reflects the size of the increase, or decrease if the value is less than zero.

Figure 3b - Percentage Increase in Age-Adjusted Death Rate by Quarter, 2020/Q1-2021 and 2017-2019 Average, by Race/Ethnicity, Santa Cruz



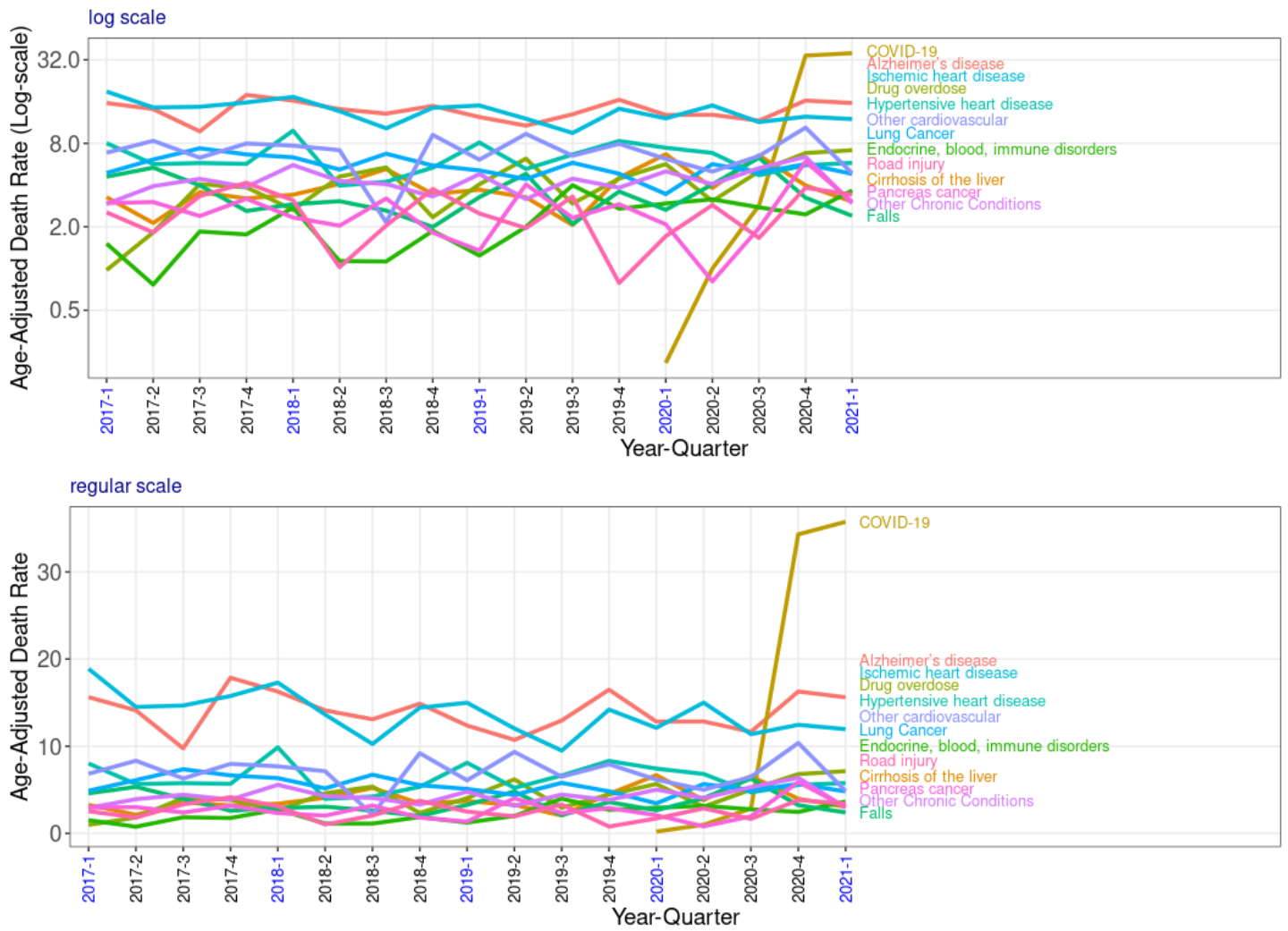
Causes of death other than COVID-19 also increased

Table 2 - 2017 to 2020, Selected Causes of Death, ordered by percent increase 2019 to 2020, Santa Cruz

Cause	N deaths				Age-Adjusted Rate				2019 -> 2020	
	2017	2018	2019	2020	2017	2018	2019	2020	Increase in N deaths	% Increase in Rate
Cirrhosis of the liver	39	49	42	61	12.1	16.1	13.5	20.8	19	54.2%
Kidney diseases	37	29	30	41	12.5	8.8	9.3	12.6	11	36.4%
Lymphomas and multiple myeloma	19	26	22	31	6.0	8.0	6.8	9.3	9	36.1%
Other Chronic Conditions	48	50	55	65	15.1	17.2	16.2	20.6	10	27.2%
Road injury	33	28	27	26	11.8	9.9	8.5	10.0	-1	17.3%
Drug overdose	32	44	46	57	10.7	14.9	17.6	20.4	11	15.9%
Stroke	99	85	98	109	34.5	28.4	32.0	34.4	11	7.6%
Suicide/Self-harm	42	40	43	29	14.3	14.4	14.0	9.3	-14	-33.8%
Other malignant neoplasms	51	51	66	45	15.3	16.8	20.4	13.3	-21	-34.9%
Other Infections/Nutritional	21	28	37	24	7.0	9.2	11.8	7.5	-13	-36.2%
Breast cancer	26	37	34	26	8.3	10.9	11.2	7.1	-8	-36.8%
COVID-19				121				38.2		--

- Figure 4 below shows 2017-2020, and Q1-2021 quarterly trends in conditions that had large percentage or large absolute increases from 2019 to 2020.

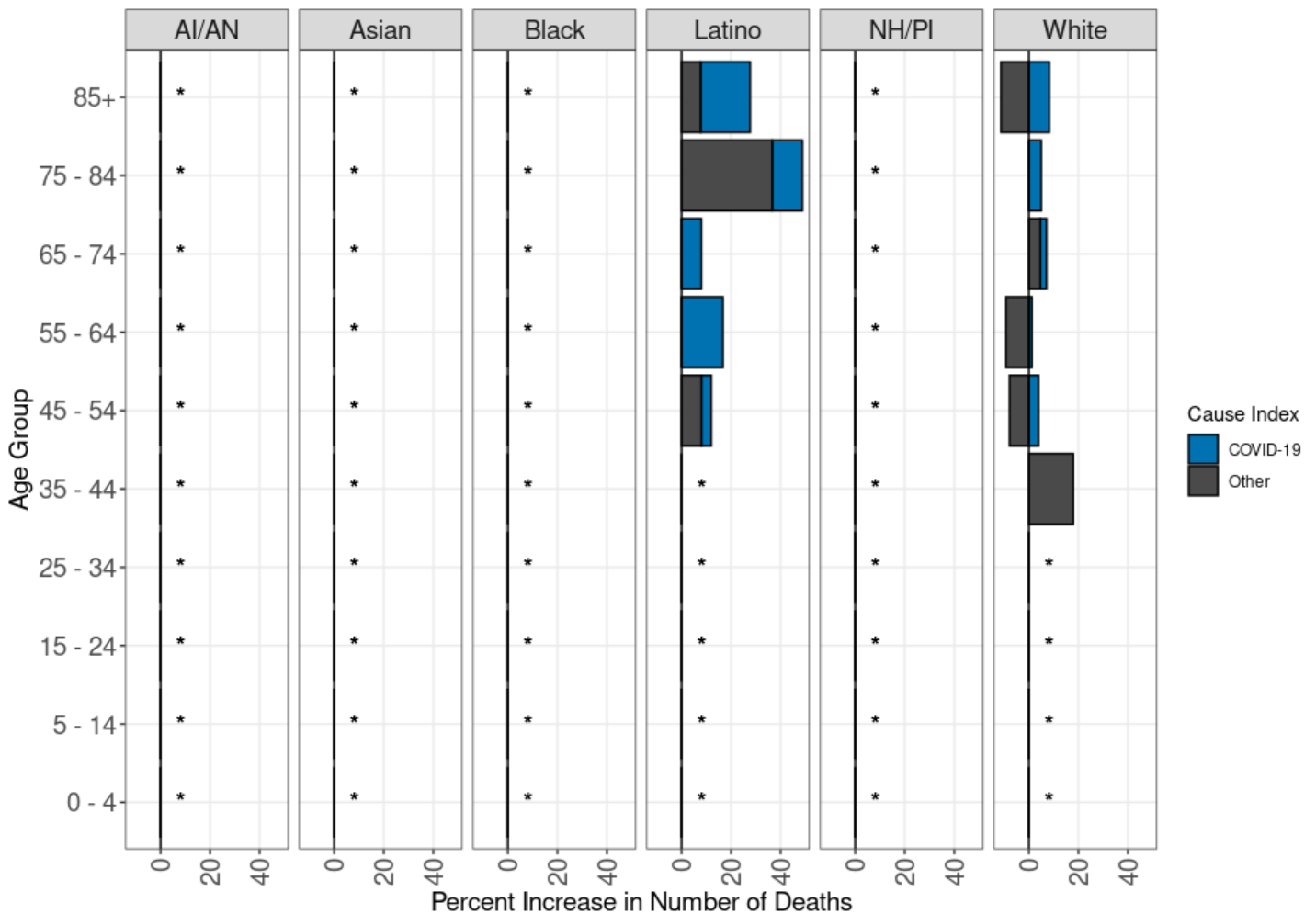
Figure 4 - Quarterly Trend in Selected Causes of Death 2017-2020/Q1-2021, Santa Cruz



The amount of increase in deaths, and conditions associated with the increase, differed substantially by age and race/ethnicity

- In general, a large proportion of the increase in deaths among older persons was due to COVID-19 while a large proportion of the increase in deaths among younger persons was due to other conditions.

Figure 5 - Percent Increase in Number of Deaths 2019 to 2020 by Age Group and Race/Ethnicity and Proportion of Increase due to COVID-19, Santa Cruz



Note: The “cause index” is, rather than a direct proportion, the ratio of the number of COVID-19 deaths in 2020 to the total increase in deaths from 2019 to 2020, and is truncated at 1.0. See the Methods section for details.

* Data not shown due to small numbers or zero deaths

Additional Exploratory Analyses

- Questions from partners and ongoing analyses since the original Brief version have resulted in the addition of the two exploratory sections below:

Social Determinants of Health - Santa Cruz County

- Excess mortality was associated with social determinants of health (SDOH), including poverty, house overcrowding, and limited english proficiency, in preliminary/exploratory analyses
- SDOH are based on the community level (census tract) not individual level, using the [Krieger/Harvard Public Health Disparities Geocoding approach](#)
- Both SDOH and race/ethnicity are independently associated with excess mortality. The patterns of SDOH and excess mortality differ across race/ethnicity groups. These interrelationships are complex, difficult to measure, and important.

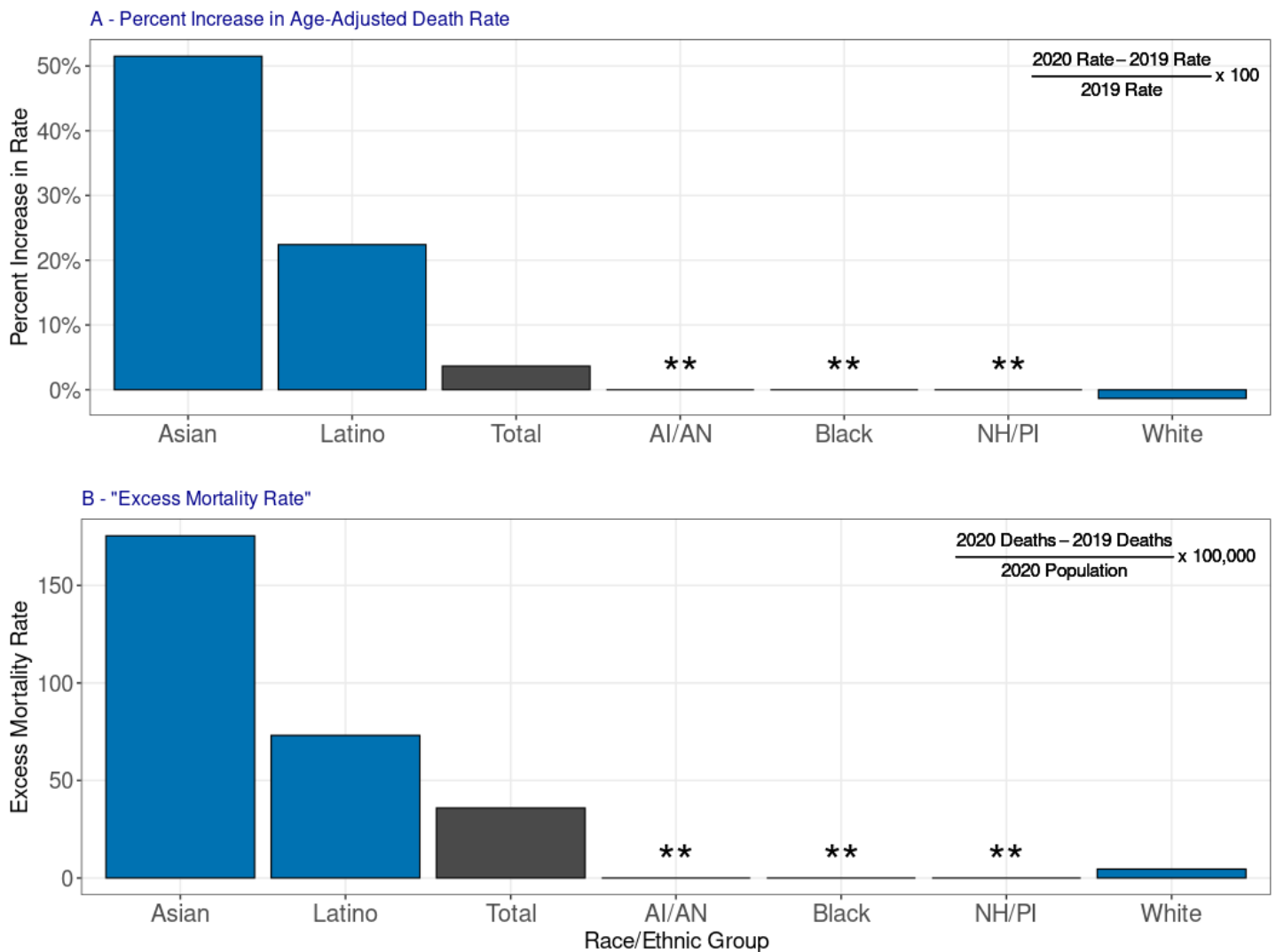
Figure 6 - Increase in Crude Death Rate by Race/Ethnicity, and Social Determinants of Health in 2020



Different calculation methods can yield different insights into the magnitude and disparities of excess mortality

- In the information above, excess mortality is calculated as the **percent increase** in a rate from 2019 to 2020. Other methods can be used, including a method that calculates excess mortality as the increase in the **number** of death divided by the population size – this method has been used in [a published letter](#) assessing excess mortality in California.
- Part A in the chart below replicates Figure 2 above. Part B below uses the other method.
- The “conclusions” from the two methods differ in the State overall and may differ in Santa Cruz County because of the different ways the methods take into account the rate in the baseline period and the population size. Both of these methods are reasonable and provide different insights.

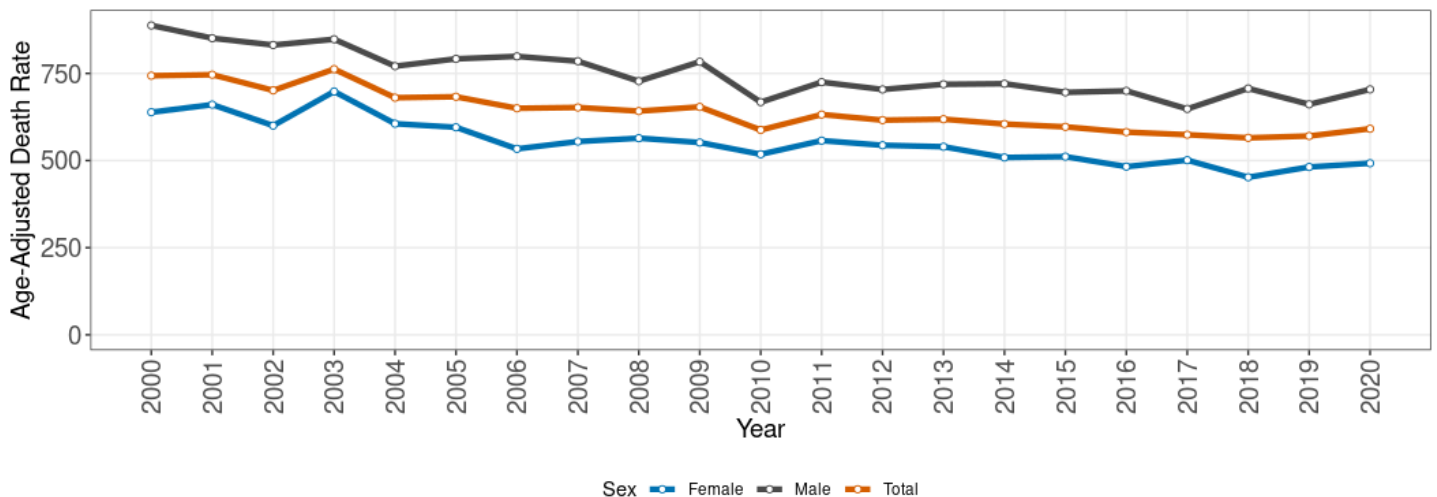
Figure 7 - Excess Mortality Measures Comparison



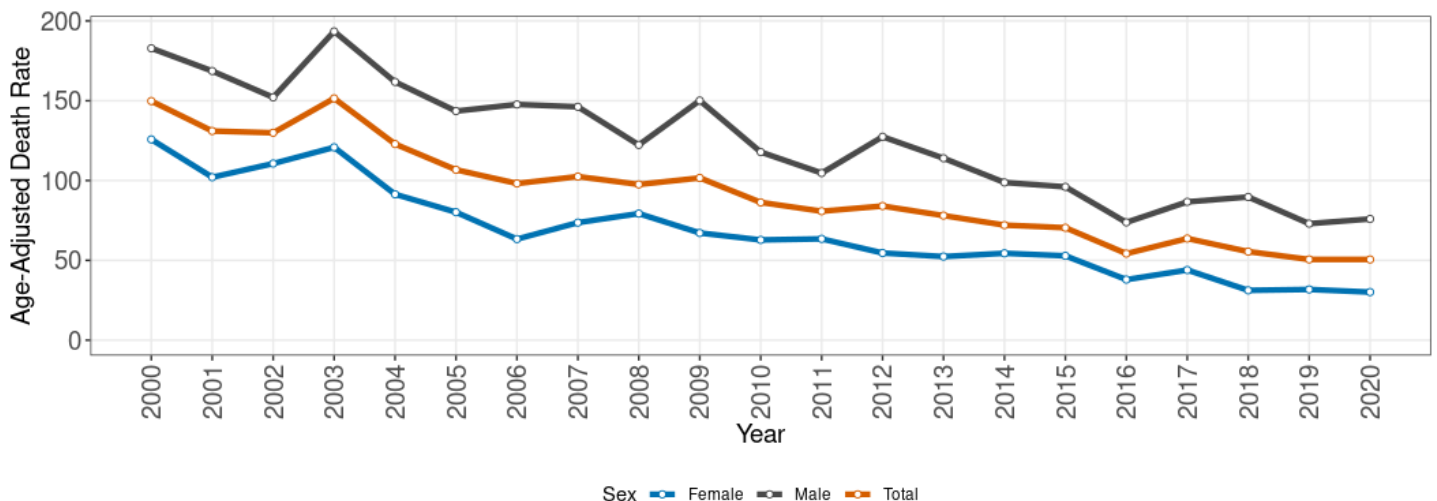
Supplemental Charts

- For the [Statewide Data Brief](#), a number of additional detailed charts and tables are included in the [Appendix](#). The full Appendix data are not included for this Santa Cruz County Brief. However, for reference, Santa Cruz-specific trends in several conditions with large observed statewide increases (ischemic heart disease, Alzheimer’s disease, drug overdose and homicides) and long-term Santa Cruz County all-cause mortality are shown below.
- Additional all-cause and cause-specific mortality data for Santa Cruz County, including trends, maps, rankings, and wide range of other data can be found at the [California Community Burden of Disease Engine](#).
- Note: Data are not shown for death rates based on < 11 deaths.

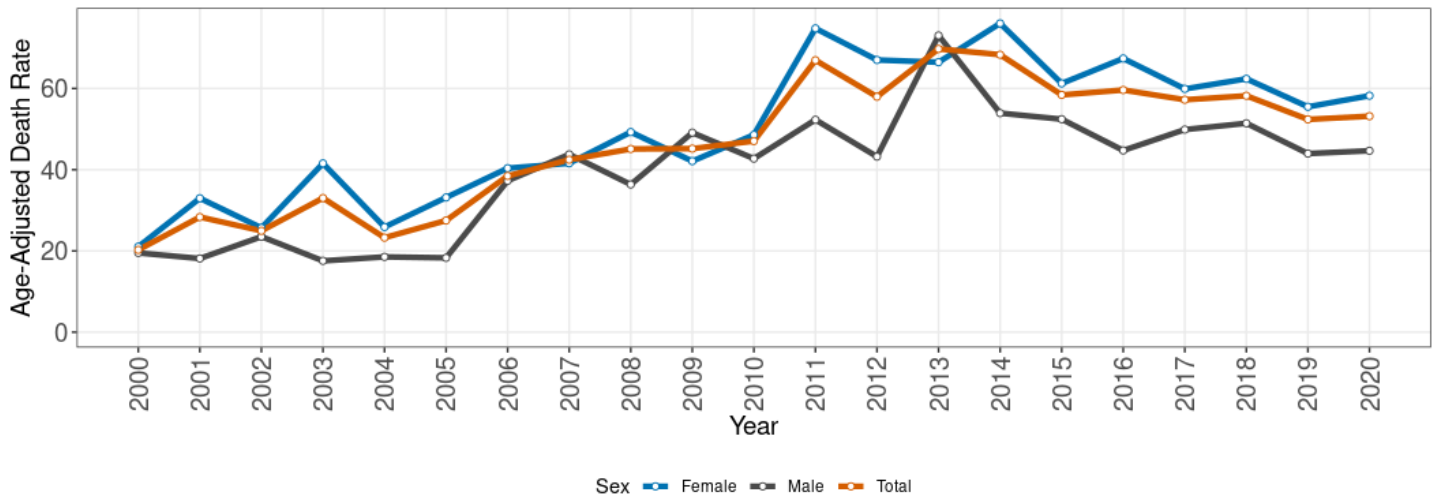
All-Cause, Age-Adjusted Death Rate Trend by Sex in Santa Cruz, 2000-2020



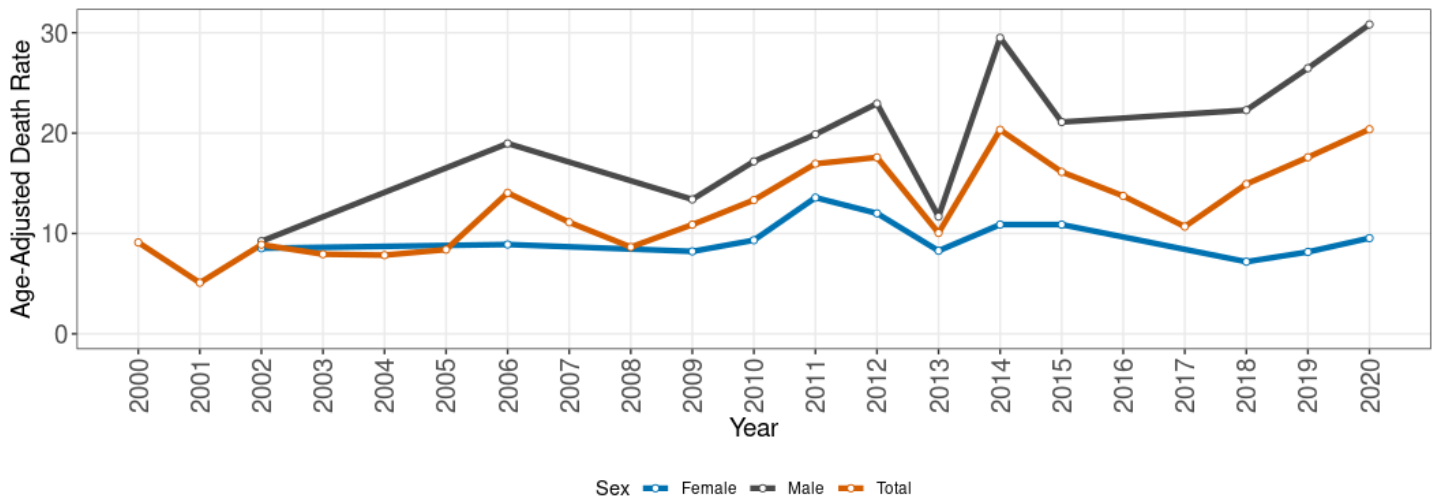
Ischemic Heart Disease, Age-Adjusted Death Rate Trend by Sex in Santa Cruz, 2000-2020



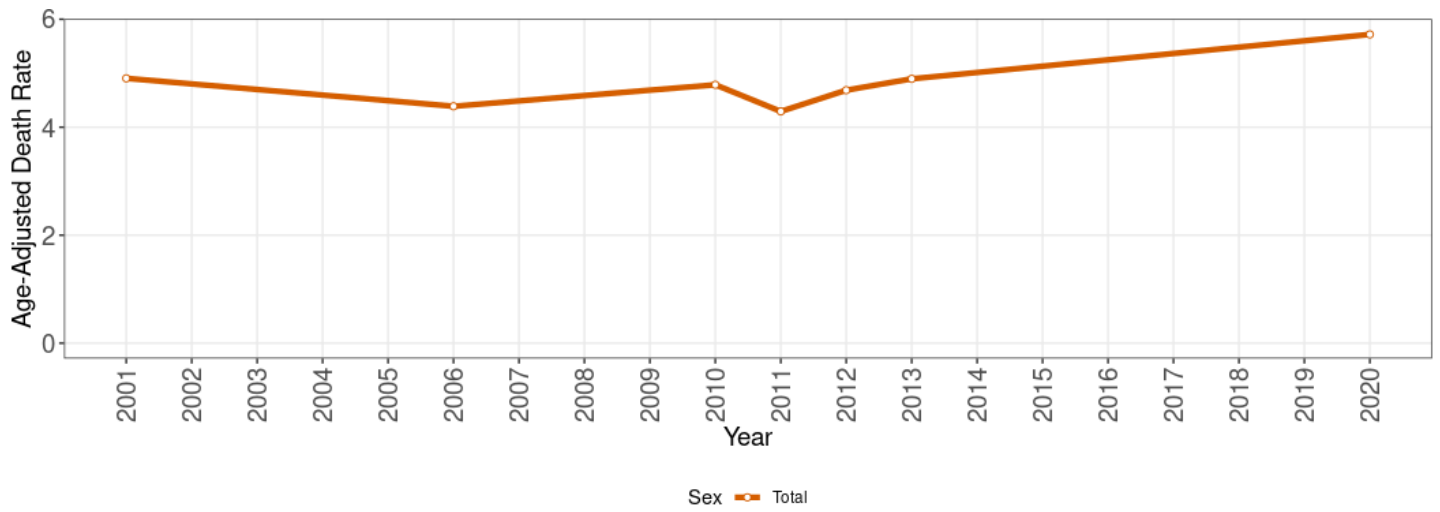
Alzheimer's Disease and other dementias, Age-Adjusted Death Rate Trend by Sex in Santa Cruz, 2000-2020



Drug Overdose, Age-Adjusted Death Rate Trend by Sex in Santa Cruz, 2000-2020



Homicide, Age-Adjusted Death Rate Trend by Sex in Santa Cruz, 2000-2020



Data, Methods, and Technical Notes

- This Data Brief was developed as a part of the broader [State Health Assessment](#), and builds on the [2021 State of Public Health Analysis](#).
- Death data are from the California Integrated Vital Records (CalIVRS) system, based on death certificates/reports transmitted to the California Department of Public Health, Center for Health Statistics and Informatics (CHSI):
 - 2020 and Quarter 1, 2021 deaths are based on data received from CHSI on July 12, 2021. Additional 2020 and Q1-2021 deaths will continue to be reported subsequent to that date, and cause of death information will change for some deaths already reported. However, based on examination of the data and historic precedence, it is highly unlikely that the statewide patterns and trends described in the report will change in any meaningful way once final data are available.
- All death numbers and rates in this analysis are based only on the primary underlying cause of death, not on any secondary contributing factors (i.e. no “multiple cause of death” codes are included).
- Deaths in this Data Brief are based on this vital statistic data, and death numbers may differ from numbers reported based on other systems. In particular, numbers of deaths from COVID-19 may differ from COVID-19 death numbers posted on CDPH, National, or other web sites. Those sites can include reports of deaths from sources other than death certificates and/or on deaths where COVID-19 is not listed as the “primary” cause of death.
- The grouping of ICD-10 cause of death codes into condition categories is based on the California Burden of Disease System, a California-modified version of the Global Burden of Disease system. Details of this system are available on the [California Community Burden of Disease Engine \(CCB\)](#), in the **About -> Technical Documentation** tab. Of specific note for this Data Brief:
 - “COVID-19” is based on ICD-10 codes U07.1.
 - [March 2020 National Center for Health Statistics guidance on new ICD code for COVID-19 deaths](#)
 - [April 2021 CDC report supporting the accuracy of COVID-19 mortality surveillance](#)
 - The “Drug overdose” condition includes “accidental poisonings by drugs” codes (X40-X44) and “substance use disorder codes” (F11-F16, F18, F19), but not “alcohol use disorder” (F10). The drug overdose condition also includes “newborn (suspected to be) affected by maternal use of drugs of addiction” (P044).
- Population denominator data for rate calculations are from the California Department of Finance (DOF) [Population Projections \(Baseline 2019\)](#) Table P-3: Complete State and County Projections Dataset.
- Unless otherwise specified, the term “rate” throughout this Data Brief means age-adjusted death rate per 100,000 population.

- Age-adjusted rates are calculated using the “direct” method, with the CDC [standard 2000 projected U.S. population](#) published by CDC/NCHS in January 2001—specifically, Table 2, Distribution #1 was used, but with age groups <1 and 1-4 combined.
- Excess mortality measures how much higher (or lower) mortality is in one time period or group compared to another. Excess mortality in the context of the COVID-19 pandemic is generally the mortality in a particular COVID-19-impacted time period, like 2020, compared to a prior period not impacted by COVID-19, like 2019. Other periods can be used too, like specific ranges of weeks, months or quarters. Excess mortality in this Brief compares rates in 2020 to ‘baseline’ rates in 2019, or the average of 2017-2019, using full year or quarters .
- Race/ethnicity is grouped and coded using standard CDPH methods and is detailed in the CCB technical documentation. Persons coded as “multi-race” are excluded from race-specific data, because numerator-denominator mis-alignment makes such rates uninterpretable.
 - Issues related to classification of multirace persons are likely to become increasingly important in California; standardized procedures and data collection systems are needed.
- The data in **Table 2** were first restricted to causes of death for which there were ≥ 11 deaths in all years, 2017-2020. Then, among those causes, the data were restricted to causes that had among the top five relative (percent change in age-adjusted death rate) or absolute (change in number of deaths) increases from 2019 to 2020 or among the bottom three relative or absolute decreases.
- The data in **Figure 4** are restricted to causes of death for which there were ≥ 11 deaths in any quarter of any year, 2017-2020, and among those the causes that were among the top three relative or absolute increases from Quarter 2, 3 or 4 in 2019 to the same quarter in 2020.
 - Figure 4 also includes COVID-19 for reference, even though there is no prior year comparison.
- For **Figure 5**, the overall length of each bar is the percent increase in the **number** of deaths from all cases from 2019 to 2020 in the specific age and race/ethnic group. The “Cause Index” was constructed by first calculating the ratio of the number of COVID-19 deaths (in 2020) in each group to the total increase in the number of deaths in that group. If that ratio was greater than 1.0 (i.e. the number of COVID-19 deaths in 2020 was greater than the increase in number of deaths from 2019 to 2020), the ratio was set to one. The COVID-19 proportion of each bar is the product of that ratio and that overall percent increase; the “Other cause” proportion is the remainder of each bar.
- All analysis and data display were conducted using R and this document was generated using R markdown. All data and numbers in this document were generated/extracted directly from the data; no numbers were “hand transcribed”. This approach provides internal documentation and facilitates updating, reproducibility, and reuse.