Data Brief: 2020 and 2021 Increases in Deaths in California

California Department of Public Health - Fusion Center - Last updated: 7.01.2022

This Data Brief (HTML version available here) presents an analysis of excess mortality (increase in deaths) for California in 2020 and 2021, using California vital statistics death data (death certificates), and includes assessment of differential increases by race/ethnic group, age, and increases in deaths due to conditions other than COVID-19. This analysis is a follow-up to findings in the State Health Assessment Core Module 2021 Update, part of the State Health Assessment.

Summary

- These data show that after many years of decreasing death rates in California, the rate increased substantially in 2020 (15.8%) and 2021 (17.5%) **compared to 2019**. This increase in deaths, or "excess mortality", is due to COVID-19 and to other causes of death.
- Excess mortality differed substantially by race/ethnicity
  - There were striking increases in deaths among Latinos. Compared to prior years, deaths among Latinos increased 34.3% in 2020 and 38.3% in 2021. In Quarter 1 of 2021 the increase among Latinos was 86.7%, the largest excess mortality percent increase for any quarter for any group to date.
  - There were striking increases in deaths among American Indian/Alaska Natives (38.0%) and Native Hawaiian and Pacific Islanders (31.6%) in 2021.
  - The increase among Whites was much lower than all other groups in 2020 (7.6%) and 2021 (8.2%)
  - Among other groups, deaths increase about 20%.
  - As 2020 proceeded, excess mortality increased within all racial groups, and disparities between groups increased.
  - As 2021 proceeded, the pattern was variably relative to 2021, but excess mortality continued to increase for all groups except Whites into Quarter 1 of 2021. Excess mortality then decreased for all groups in Quarter 2 2021, increased for all groups in Quarter 3, and decreased for all groups in Quarter 4, except for AI/AN where it increased to the highest level among that group, 44.5%. The variability in these patterns over time are undoubtedly associated with the interplay between differences in infectiousness of different COVID-19 strains, differences in the virulence of different COVID-19 strains, and reductions in susceptibility to severe outcomes due to increased vaccination coverage.
- Substantial increases in death rates were seen in conditions other than COVID-19, including drug overdoses, homicide, diabetes, alcohol-related conditions, in *both* 2020 and 2021, compared to 2019. Increases for all these conditions were greater than 10% in both years and increases in drug overdoses and homicides were greater than 30% for both years.

- Deaths from ischemic heart disease (the leading cause of death in California, except for COVID-19) increased (4.7%) in 2020 for the first time in many years, but decreased again in 2021 (-2.2%).
- Deaths from "Alzheimer's disease and other dementias", the other top leading cause of death in California, also increased in 2020 (10.0%), and just a bit in 2021 (0.5%).
- The increase in death rate differed by age differentially among race/ethnic groups in both 2020 and 2021. Of particular note, the overall death rate increased sharply among young blacks aged 5-14 and American Indian/Alaska Natives (AI/AN) aged 35-44 in both times periods. Large increases (greater than 50%) were also seen in other young Black and AI/AN age groups in 2020 or 2021. Large increases were seen in 2021 among both Latinos and Native Hawaiian/Pacific Islanders among most age groups between 25-34 and 65-74. 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.

**Note: Downloadable data for all charts in this PDF version are available by accessing the HTML version here.*

Findings

Deaths increased in 2020 and 2021 compared to prior years

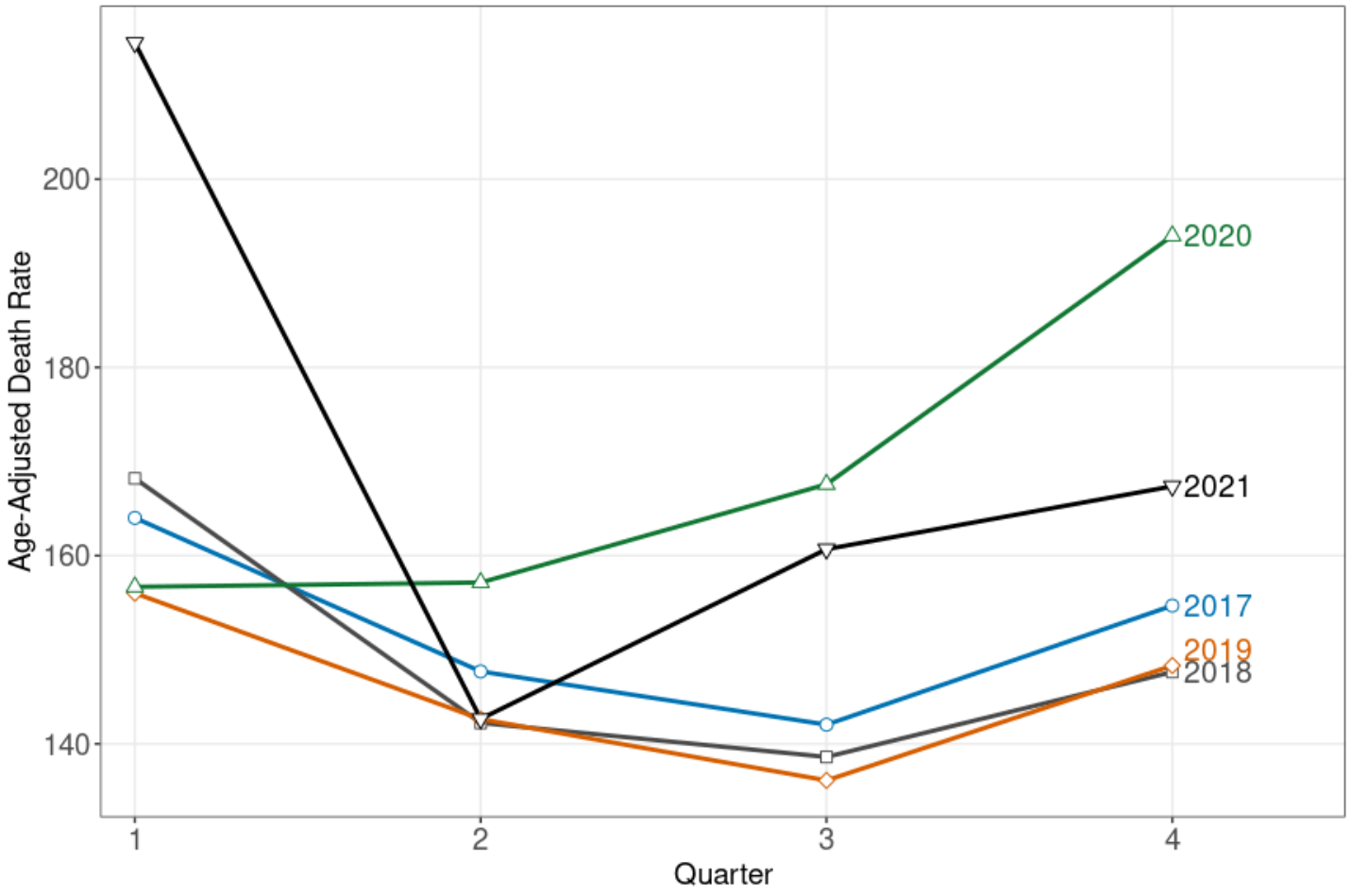
- There were 316,962 deaths in California in 2020 (corresponding to an age-adjusted all-cause death rate of 675.4 per 100,000 population), compared to 267,034 deaths in 2019 (rate of 583.1). This is a 15.8% increase in the death rate in California, and was the **highest statewide death rate in the past 12 years**.
- In 2021 there were 329,312 deaths in California (corresponding to an age-adjusted all-cause death rate of 685.2 per 100,000 population), an additional increase of 1.5% from 2020.

Table 1 - Number, Age-Adjusted Rate, and Increase in Rate from Prior Year, Deaths from All Causes in California, 2017-2021

Year	Number of Deaths	Age-Adjusted Death Rate	% Increase in Rate from Prior Year
2021	329,312	685.2	1.5%
2020	316,962	675.4	15.8%
2019	267,034	583.1	-2.3%
2018	266,161	596.7	-1.9%
2017	265,439	608.4	-

- As the pandemic intensified throughout 2020, the increases in the rates accelerated. Comparing the 1st quarter of 2020 to the 1st quarter of 2019, death rates were similar, with just a 0.4% increase; then, in the 2nd quarter there was a 10.2% increase; a 23.1% increase in the 3rd quarter; and a 30.8% increase in the 4th quarter.
- The rate in the 1st quarter of 2021 was a 37.5% increase from the 1st quarter of 2019, and was higher than all quarterly rates in 2020, and much higher than any other recent prior quarter.

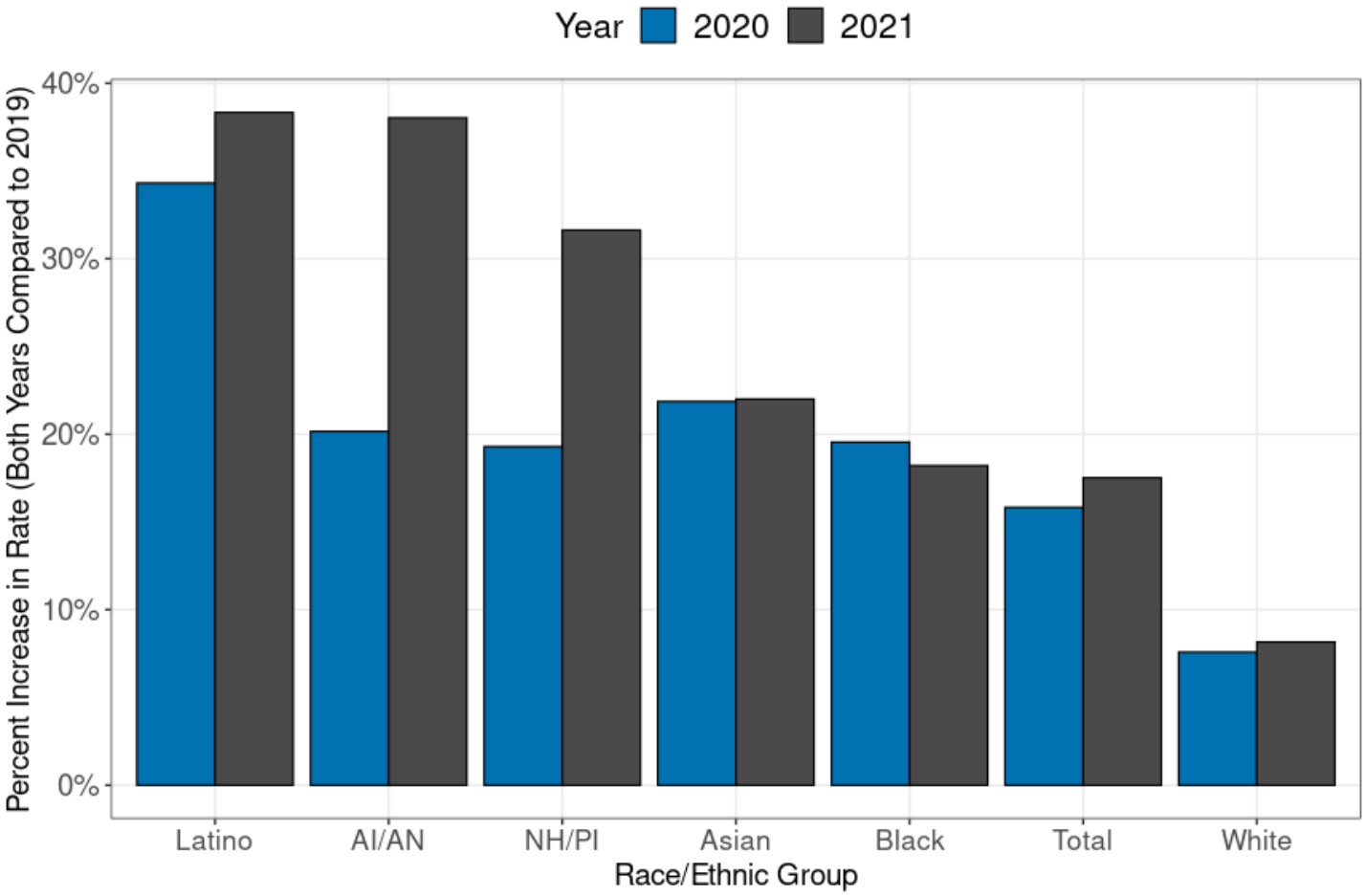
Figure 1 - All-Cause Death Rate by Quarter and Year, California 2017-2021



Deaths increased more among some race/ethnicity groups than others

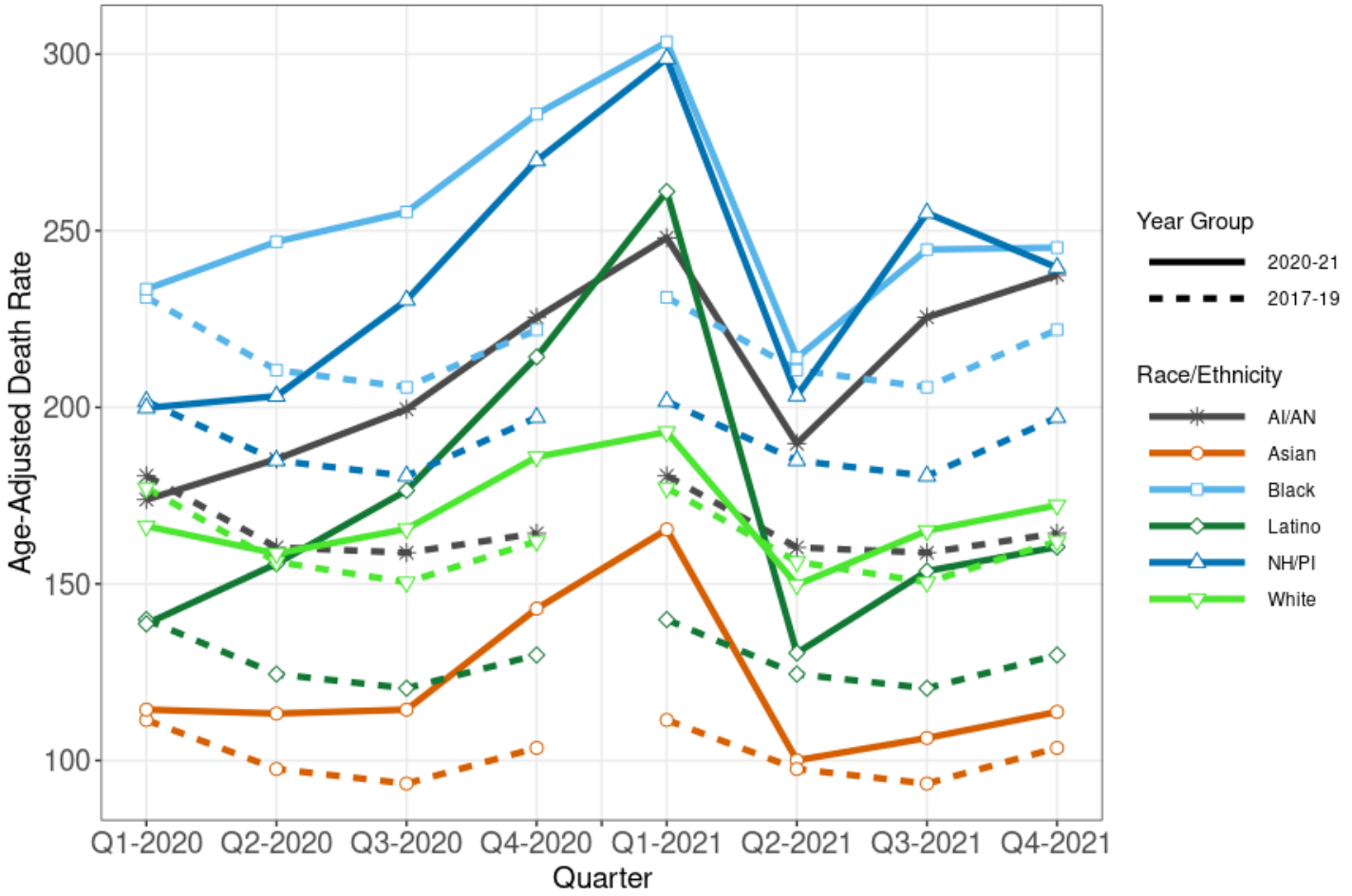
- From 2019 to 2020, the death rate increased 34.3% among Latinos, 7.6% among Whites, and about 20% among other groups.
- From 2019 to 2021, the death rate increased 38.3% among Latinos, 38.0% among American Indian/Alaska Natives, and 31.6% among Native Hawaiian and Pacific Islanders; the increase was again, much lower among Whites (8.2%), and about 20% among Asians and Blacks.

Figure 2 - Percentage Increase in Race-Specific Age-Adjusted Death Rates 2019 to 2020/2021



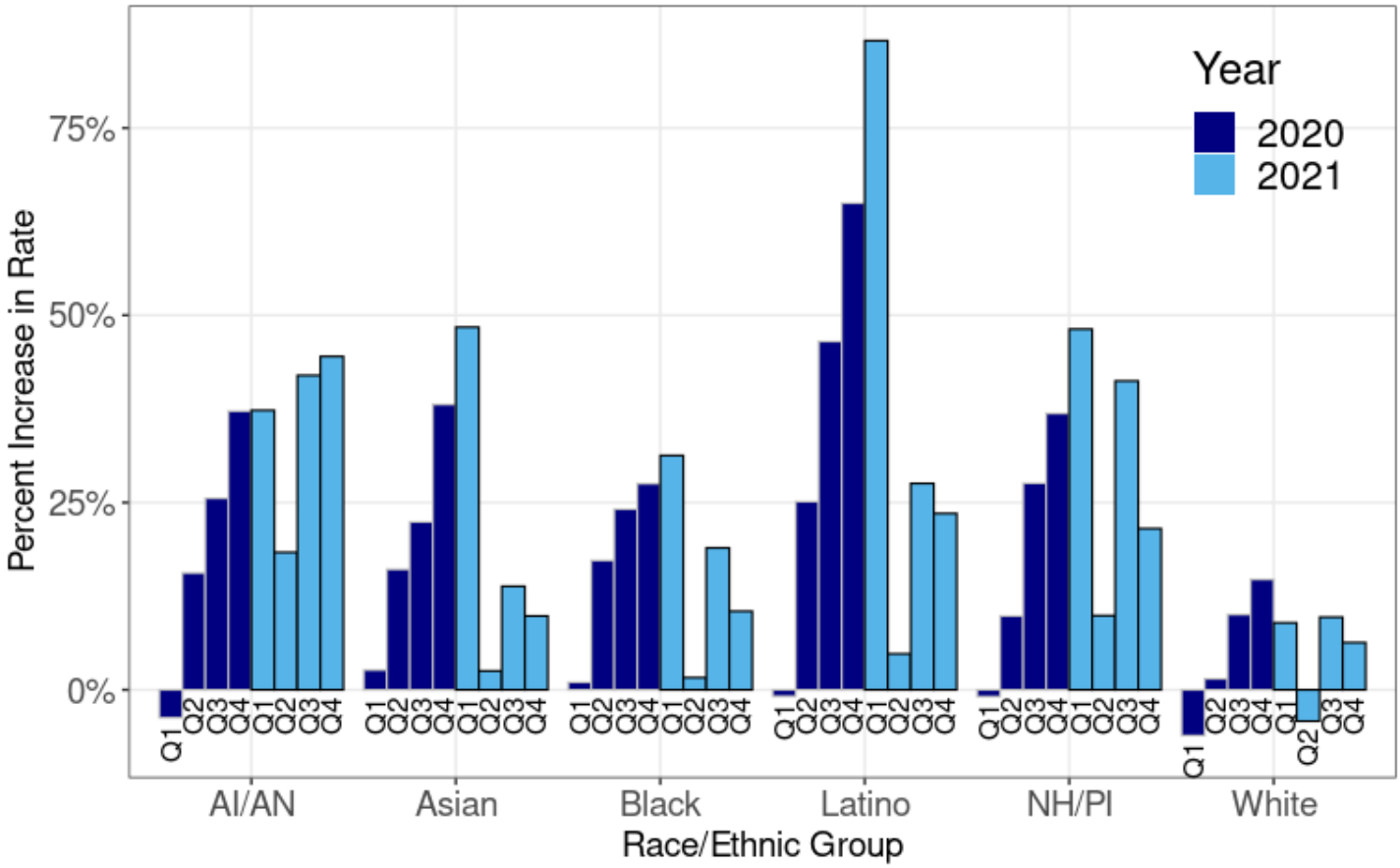
- Deaths among all race/ethnic groups were higher in quarters 2, 3, and 4 of 2020 and in quarters 1, 3 and 4 of 2021 compared to the average rate of the corresponding 2017-2019 quarters.
- From quarter 2 2020 to quarter 1 2021, these differences **within** each race/ethnic group increased for all race/ethnic groups, and disparities in rates **between** groups increased.
- 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.
- These increases were all statistically significant for all groups in 2020. (See Appendix Figure Set 1)

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



- Figure 3b below shows the same data as in 3a above, with a different perspective. Each bar is the **percent increase** 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.
- In the 1st quarter of 2020, prior to the pandemic, there were very small increases for some groups, and small decreases for others.
- In the 2nd quarter of 2020, death rates increased in all race/ethnic groups, with the largest increase among Latinos and the smallest increase among Whites.
- This same exact pattern of increasing excess mortality in all groups, with the largest increases among Latinos and the smallest increase among Whites, continued in the 3rd and 4th quarters of 2020 and into the first quarter of 2021. In the 1st quarter of 2021 the excess mortality for Latinos was 86.7%, the largest excess mortality percent for any quarter for any group to date.
- Excess mortality then decreased sharply for all groups in the 2nd quarter of 2021, and rose again for all in the 3rd quarter of 2021.
- In the 4th quarter of 2021 excess mortality decreased, at least a bit, for all groups except AI/AN. Among AI/AN, the increase was 44.5%, the largest of any group that quarter.

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



Causes of death other than COVID-19 also increased

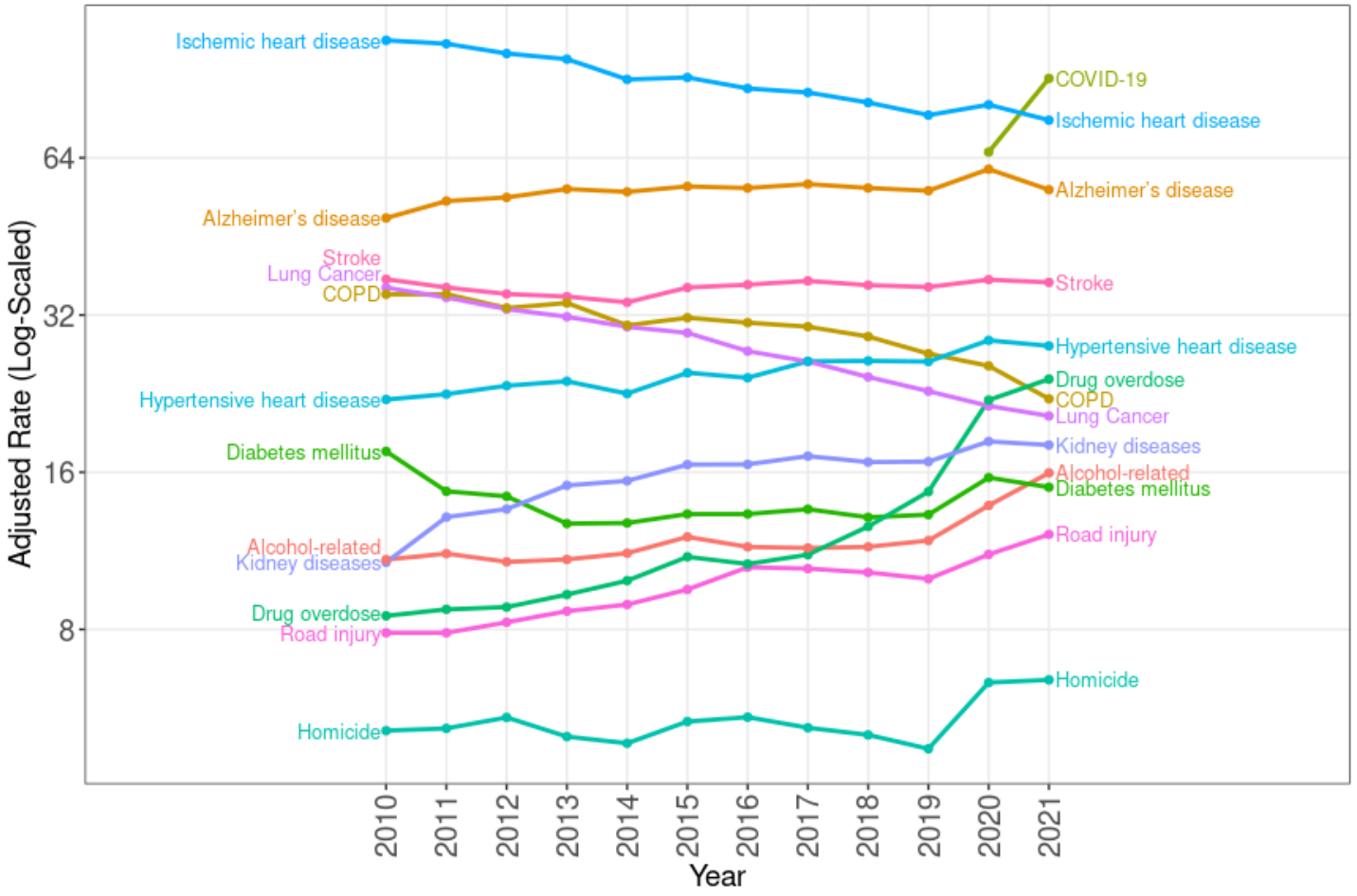
- Aside from COVID-19, four conditions had large percent increases in deaths from 2019 to 2020, and 2019 to 2021: Drug overdoses (49.8%) in 2020 and (64.3%) in 2021, homicide (33.9% and 35.5%), diabetes (17.7% and 12.9%), and alcohol-related deaths (16.7% and 34.7%), Table 2.
- Compared to 2019, the absolute number of deaths increased by over 1,000 for each condition in both 2020 and 2021 for Alzheimer disease, drug overdoses, ischemic heart disease, hypertensive heart disease and diabetes. The largest single increase was for drug overdoses, an increase of 3,763 deaths in 2021.
- For drug overdose deaths, the increases are consistent with recent trends, albeit accelerated.
- For Alzheimer's disease and other dementias, the increases are consistent with long-term increasing trends, but a sharp reversal of decreasing trends the past two years. For ischemic heart disease, the leading cause of death in California, the apparent increase in 2020 was a concerning reversal of a steady downward trend of many prior years. The increase in homicide is also striking and alarming, in contrast to the encouraging decreases the last few years, and the long-term downward trend. For long-term trends in cause-specific deaths in California, see Appendix Figure Set 2 or the California Community Burden of Disease Engine (CCB).
- Regarding **decreases** from 2019 to 2020 and 2021, **suicide/self-harm and lung cancers** both had noteworthy decreases in both years.

Table 2 - 2017 to 2021, Selected Causes of Death, ordered by percent increase 2019 to 2020 [note: table is sortable]

	N deaths					Age-Adjusted Rate					Increase in N		% Increase in Rate	
Cause	**2017**	**2018**	**2019**	**2020**	**2021**	**2017**	**2018**	**2019**	**2020**	**2021**	**2019 -> 2020**	**2019 -> 2021**	**2019 -> 2020**	**2019 -> 2021**
Drug overdose	4,589	5,204	6,039	8,945	9,802	11.1	12.6	14.7	22.0	24.1	2,906	3,763	49.8%	64.3%
Homicide	2,020	1,967	1,849	2,445	2,476	5.2	5.0	4.7	6.3	6.4	596	627	33.9%	35.5%
Diabetes mellitus	5,993	5,936	6,151	7,437	7,305	13.6	13.1	13.3	15.6	15.0	1,286	1,154	17.7%	12.9%
Influenza	642	1,226	553	658	29	1.5	2.8	1.2	1.4	0.1	105	-524	16.9%	-94.9%
Alcohol-related	5,043	5,129	5,295	6,144	7,097	11.5	11.5	11.8	13.8	15.9	849	1,802	16.7%	34.7%
Alzheimer's disease	24,865	25,056	25,616	29,227	27,754	57.0	56.0	55.4	60.9	55.6	3,611	2,138	10.0%	0.5%
Hypertensive heart disease	11,532	11,817	12,156	13,740	13,810	26.1	26.1	26.1	28.6	27.9	1,584	1,654	9.8%	7.1%
Ischemic heart disease	37,799	37,099	36,197	39,006	37,621	85.4	81.7	77.3	80.9	75.6	2,809	1,424	4.7%	-2.2%
COPD	13,265	13,043	12,542	12,277	11,002	30.4	29.1	27.0	25.6	22.1	-265	-1,540	-5.2%	-18.0%
Lung Cancer	11,530	11,073	10,710	10,370	10,191	26.1	24.3	22.9	21.4	20.5	-340	-519	-6.3%	-10.3%
Suicide/Self-harm	4,230	4,423	4,343	4,064	3,948	10.3	10.7	10.5	9.8	9.5	-279	-395	-6.4%	-8.9%
Other respiratory diseases	4,720	4,630	4,715	4,503	4,691	10.8	10.4	10.3	9.5	9.6	-212	-24	-7.5%	-6.7%
COVID-19				31,103	43,838				65.6	90.8			--	--

- Figure 4 below shows the trend from 2010 to 2021 of annual death rates for the causes with large increases noted above, and other selected leading causes of death.
- COVID-19 was the second leading cause of death in 2020 and the leading cause of death in 2021.
- Deaths from drug overdoses increased sharply in 2020 and 2021, continuing an increasing pattern; deaths from alcohol-related conditions also increased sharply in 2020 and 2021.
- Deaths from ischemic heart disease and Alzheimer's disease, the two leading causes of death in all years from 2000 to 2019, both increased in 2020 and decreased in 2021, a pattern that warrants further investigation.
- Road injuries, after decreasing slightly in the prior three years, increased more sharply in 2020 and again in 2021.

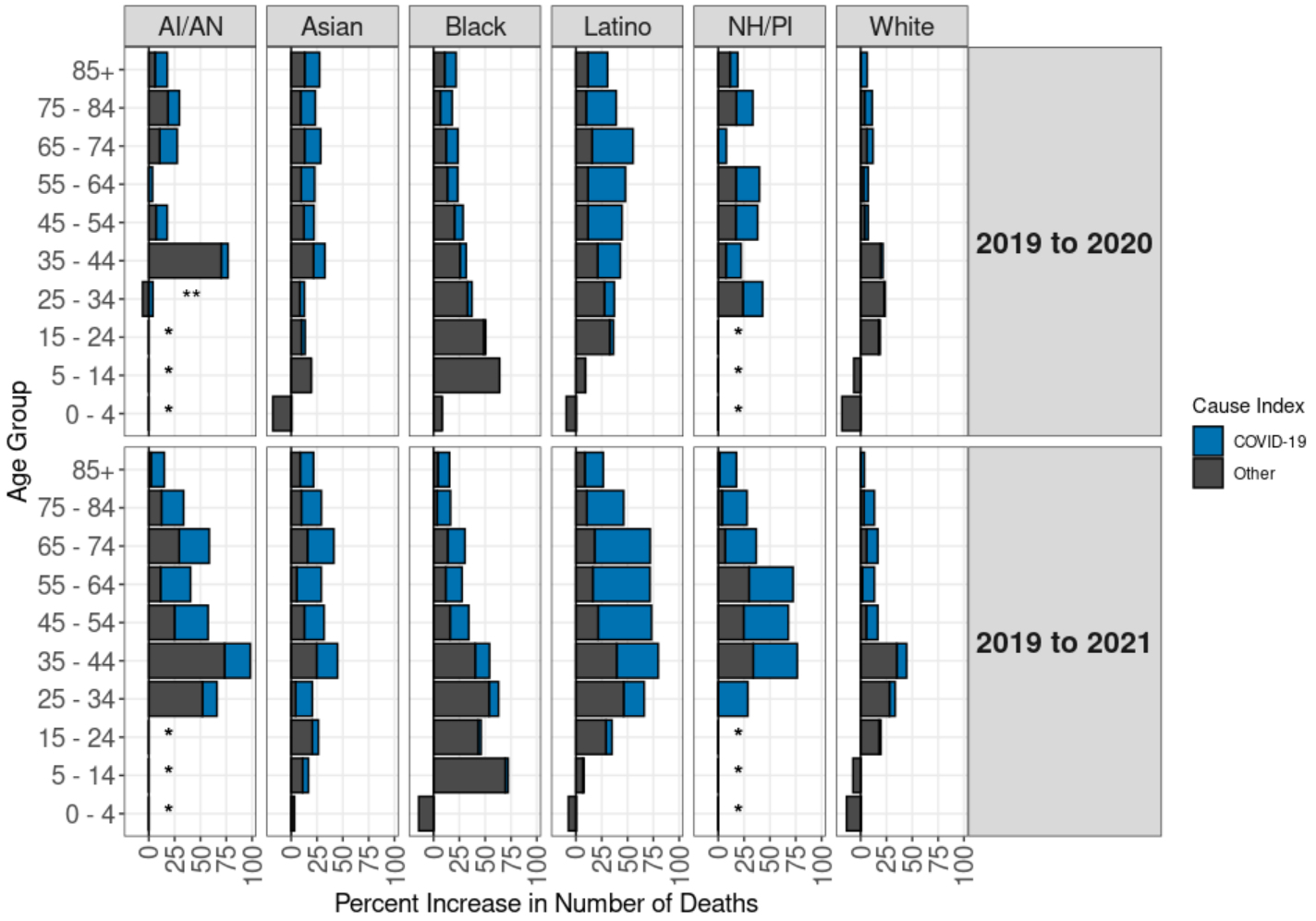
Figure 4 - Trends in Age-Adjusted Rates for Selected Causes of Death (log-y-axis), 2010-2021



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.
- As seen in Figure 5, from 2019 to 2020 large (greater than 50%) increases in the number of deaths were seen among older (65-74) Latinos, younger (5-14 and 15-24) Blacks, and adult (35-44) AI/AN groups (detailed data in Appendix Figure Set 3 and Appendix Table 2).
- From 2019 to 2021, large (greater than 50%) percent increases were generally seen in these same groups and among several Latino, Black, AI/AN, and NH/PI adult age groups.
- The increase in deaths among young persons, particularly the 63.9% (in 2020) and 72.2% (in 2021) increase among 5-14 year-old Blacks, and the 50.5% (in 2020) and 46.0% (in 2021) increase among 15-24 year-old Blacks is highly concerning. While the underlying absolute numbers are small, the increases are nevertheless concerning on their own, and for their implications of differential health status, social pressures and access to care during the pandemic crisis. Additional investigation of these data will continue, and updates will be provided as they become available.
- Among 15-24 year old Blacks and Latinos, the greatest contributing causes of death were homicide, road injury, and drug overdose.
  - Among Black 15-24, there were 916 deaths in 2020 and 2021 (465 in 2020 and 451 in 2021), including homicide (295), road injury (160), and drug overdoses (142).
  - Among Latinos 15-24, there were 3912 deaths in 2020 and 2021 (1967 in 2020 and 1945 in 2021), including homicide (639), road injury (894), and drug overdoses (891).
- Of the 225 deaths among 35-44 year old AI/AN groups in 2020 and 2021 (106 in 2020 and 119 in 2021), the greatest contributing causes were drug overdoses (45), and road injury (17).
- Cause-specific data by race/ethnicity and age are available in Appendix Table 3.

Figure 5 - Percent Increase in Number of Deaths 2019 to 2020/2021 by Age Group and Race/Ethnicity and Proportion of Increase due to COVID-19



Note: The "cause index" is, rather than a direct proportion, the ratio of the number of COVID-19 deaths in 2020 and 2021 to the total increase in deaths from 2019 to 2020 and 2021, and is truncated at 1.0. See the Methods section for details.

*For younger NH/PI and AI/AN age groups, the underlying number of deaths for 2019 and 2020 or 2021 is <25 so data are not shown

**25-34 year old AI/AN experienced an overall decrease in deaths, and had a small number of deaths from COVID-19

Data, Methods, and Technical Notes

- This Data Brief was developed as a part of the broader State Health Assessment, and builds on the State Health Assessment Core Module 2021 Update.
- 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):
  - Deaths are based on data received from CHSI on April 18, 2022. Additional 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 2000 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 and 2021 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 > 500 deaths in any year, 2017-2021. 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.
- 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 or 2021 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 or 2021) 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 or 2021), 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.
- All data and visualizations in the Data Brief are available at the county level, at the request of the respective county health department.

Discussion

- Deaths overall increased 15.8% in 2020 and 17.5% in 2021, compared to 2019, with most of this increase due to COVID-19. The highest overall death rate was seen in the 1st quarter of 2021. Deaths among Latinos increased 34.3% in 2020 and 38.3% in 2021, including a staggering 86.7% increase in the 1st quarter of 2021 compared to the 1st quarter of 2019.

- Deaths from a number of other conditions also increased, including drug overdoses, Alzheimer's disease and other dementias, homicide, ischemic heart disease, and others. The 2020 increase in ischemic heart disease, the leading cause of death in California, is a reversal of a 20 year downward trend; this rate then decreased in 2021 slightly below the 2019 rate, continuing the downward trajectory. The sharp increase in homicides reverses three prior years of decreases, and results in rates not seen since 2007. Charts showing these trends are available in the Appendix and are available for all California counties.

- Overall suicide rates decreased from 2019, in both 2020 and 2021. This observation is being investigated and it is clear that this trend differs by multiple factors including age, race/ethnicity, and place. In concerning contrast, there appears to be a noteworthy increase in suicides among the 5-14 year-old age group (see Appendix Table 3), mostly among Latinos and Blacks. Further analysis of violence impacting specific populations and regions is urgently needed.

- As has been well described, older persons are at elevated risk for severe outcomes of COVID-19 infection including death. Among all groups, COVID-19 cases-fatality rates increase sharply with increasing age. However, because of a combination of 1) the differences in age-specific incidence of COVID-19 across race/ethnic groups, 2) the differences in the population age distribution of different race/ethnic groups in California, and 3) differences in case fatality rates, there are substantial differences in the age distributions of COVID-19 deaths by race/ethnicity, as seen in Appendix Figure 4. Of note, the largest proportion of COVID-19 deaths among Whites and Asians is among the 85+ year old age group, whereas the largest proportion of COVID-19 deaths among Latinos, Blacks, NH/PI, and AI/AN is among the 65-74 year-old age group. And, the latter four groups have substantial numbers of COVID-19 deaths among persons less than 55 years of age, whereas Whites and Asians do not.

- These data do not provide insight into what role COVID-19 has had in these observed increases, or on decreases in other conditions. It is logical to think that COVID-19 caused changes and delays in access to care, changes in social support, and changes in eating, drinking, exercising and other behaviors, all of which could have had important impacts on health.

- The increase in deaths among young persons is highly concerning, particularly among 5-14 year-old Blacks (63.9% in 2020 and 72.2% in 2021) and among 15-24 year-old Blacks (50.5% in 2020 and 46.0% in 2021). While the underlying absolute numbers are small, the increases are nevertheless concerning on their own, and for their implications of differential health status, social pressures and access to care during the pandemic crisis. Additional investigation of these data will continue, and updates will be provided as they become available.

- There are important limitations to this analysis:

  - The 2021 death data are not fully complete, and some small changes are likely to occur, but they are unlikely to alter any of these observations of state level trends.

  - The data in this report focus exclusively on the "underlying" or "primary" cause of death, and do not reflect the "contributory" or "multiple cause of death" causes. For example, the 31,103 COVID-19 deaths in 2020 shown in Table 2 all have COVID-19 listed as the underlying cause of death, but there are an additional 2,172 deaths in 2020 with some other condition listed as the primary cause of death and COVID-19 as a contributing cause. Of these 2,172 the top five primary causes were: Ischemic heart disease (411), Alzheimer's disease and other dementias (409), Stroke (162), Hypertensive heart disease (114), and Diabetes mellitus (97). Another important example is that there were 1,790 deaths in 2020 with "alcohol disorders" listed as the underlying cause of death, but many more (4,746) with another condition listed as the underlying cause and alcohol disorders listed as a contributory cause. Additional investigation of both contributory and underlying cause of death data is underway.

- Reporting on changes in deaths is the "tip of the iceberg" and changes seen in deaths may not fully reflect changes in morbidity. Investigations into changes in rates of hospitalizations, emergency department visits, reportable diseases, and other measures of morbidity are underway. The relationship of these changes in mortality, and morbidity, to the underlying social determinants of health, such as poverty, education, racism, language, and a host of others, are also underway. This ongoing comprehensive assessment and analysis across multiple programs is critical to long-term prevention and equitable improvements in population health.

- While this rapid analysis of these readily available vital statistics death data provides clear evidence of important trends, deeper insights and understanding are urgently required. It may be possible to gain insights from additional rapid analysis of other available data including surveillance data, administrative data sets, and other sources. Other critical insights will require longer-term complex research and study designs.

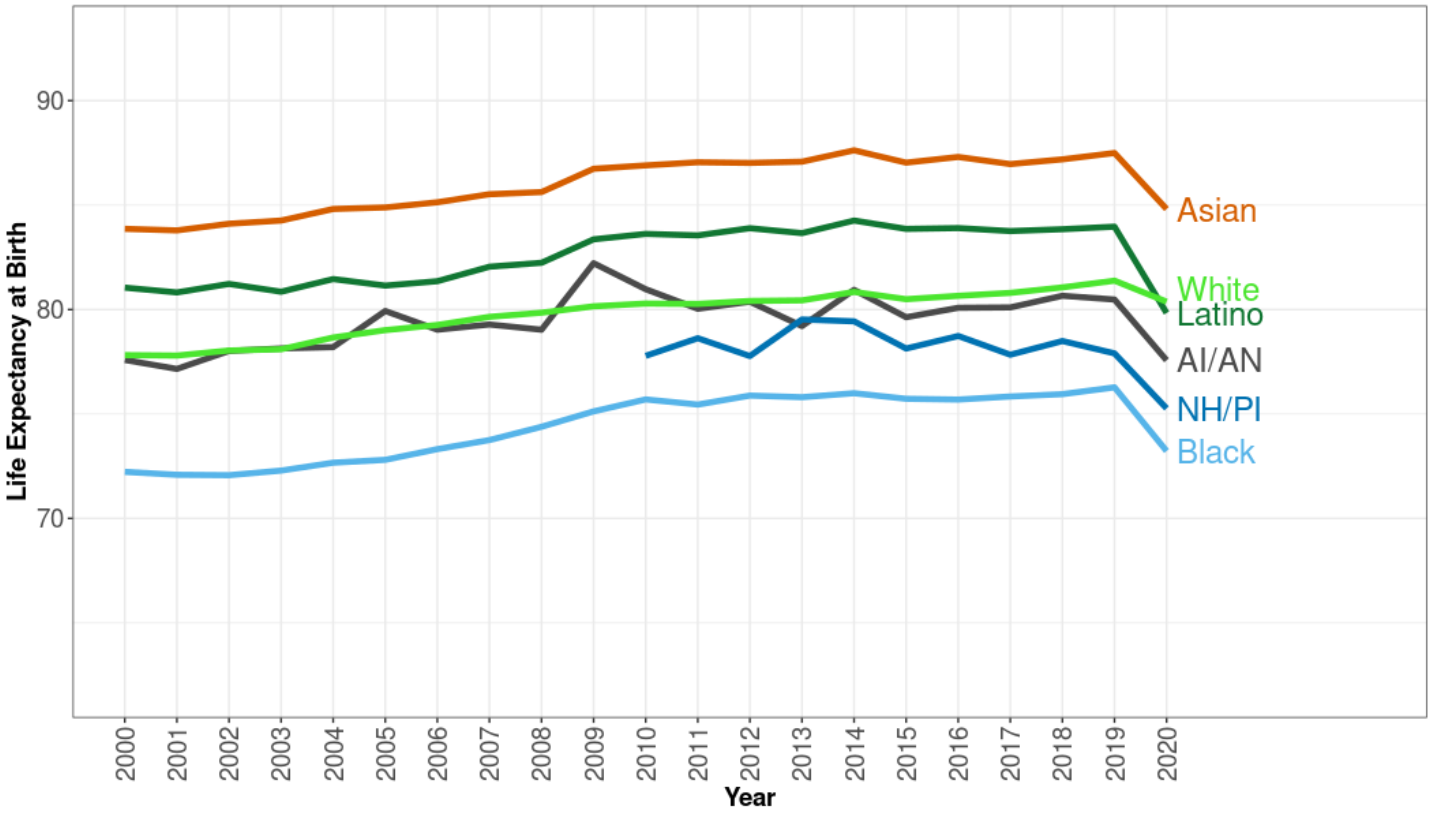
Additional Exploratory Analyses (Note: the section does not include any data or updates from 2021)

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

All-cause age-adjusted mortality rate is extremely closely related, in inverse, to life expectancy at birth. Life Expectancy is more commonly used and a more intuitive measure.

- Life expectancy at birth (LE) decreased among all groups in California in 2020
- Latino LE decreased 3.6 years from 2019 to 2020
- Black LE, as key overall measure of disparity, was 73.2 in 2020, 11.6 year less than Asians LE estimates available for all counties on CCB
- Life expectancy calculations are all per the California Community Burden of Disease, and are document therein.

Figure 6 - Life Expectancy Trend by Race/Ethnicity, 2000-2020



Social Determinants of Health

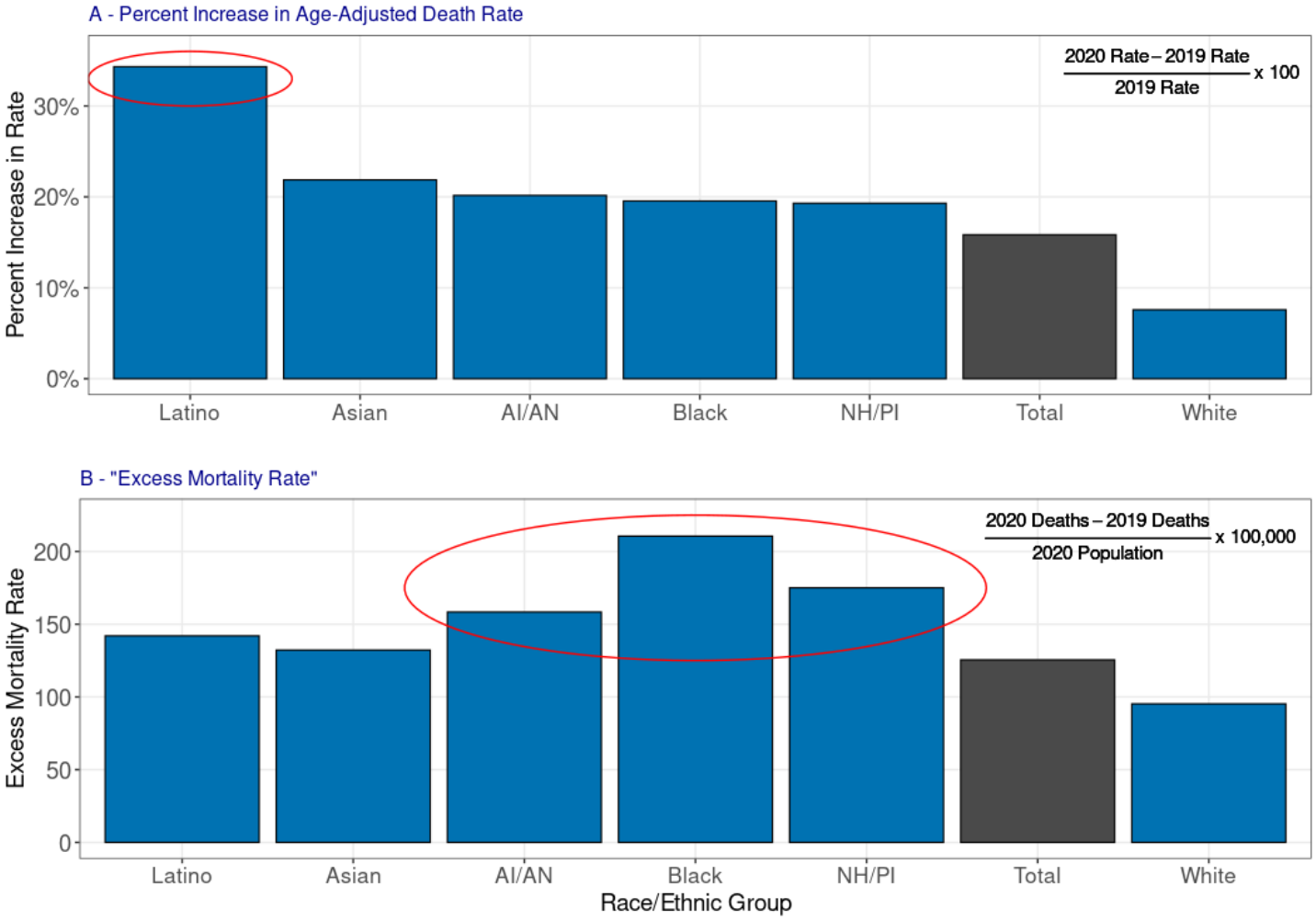
- Excess mortality was associated with Social Determinants of Health, including Poverty, House Overcrowding, and Limited English Proficiency, in preliminary/exploratory analyses
- SDOH are based on the community level (census tract) not individual level, using the Krieger/Harvard Public Health Disparities Geocoding approach
- Both SDOH and race/ethnicity are independently associated with excess mortality. The patterns of SDOH and excess mortality different across r/e groups. These interrelationships are complex, difficulty to measure, and important.

Figure 7 - Increase in 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, and indicates that Latinos have the highest excess mortality based on percent increase. Part B below uses the other method and indicates that Blacks have the highest excess mortality based on the "excess mortality rate"; and indicates that both American Indian/Alaska Natives and Native Hawaiian/Pacific Islanders have a higher excess mortality rate than Latinos.
- The "conclusions" from the two methods differ 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 8 - Excess Mortality Measures Comparison



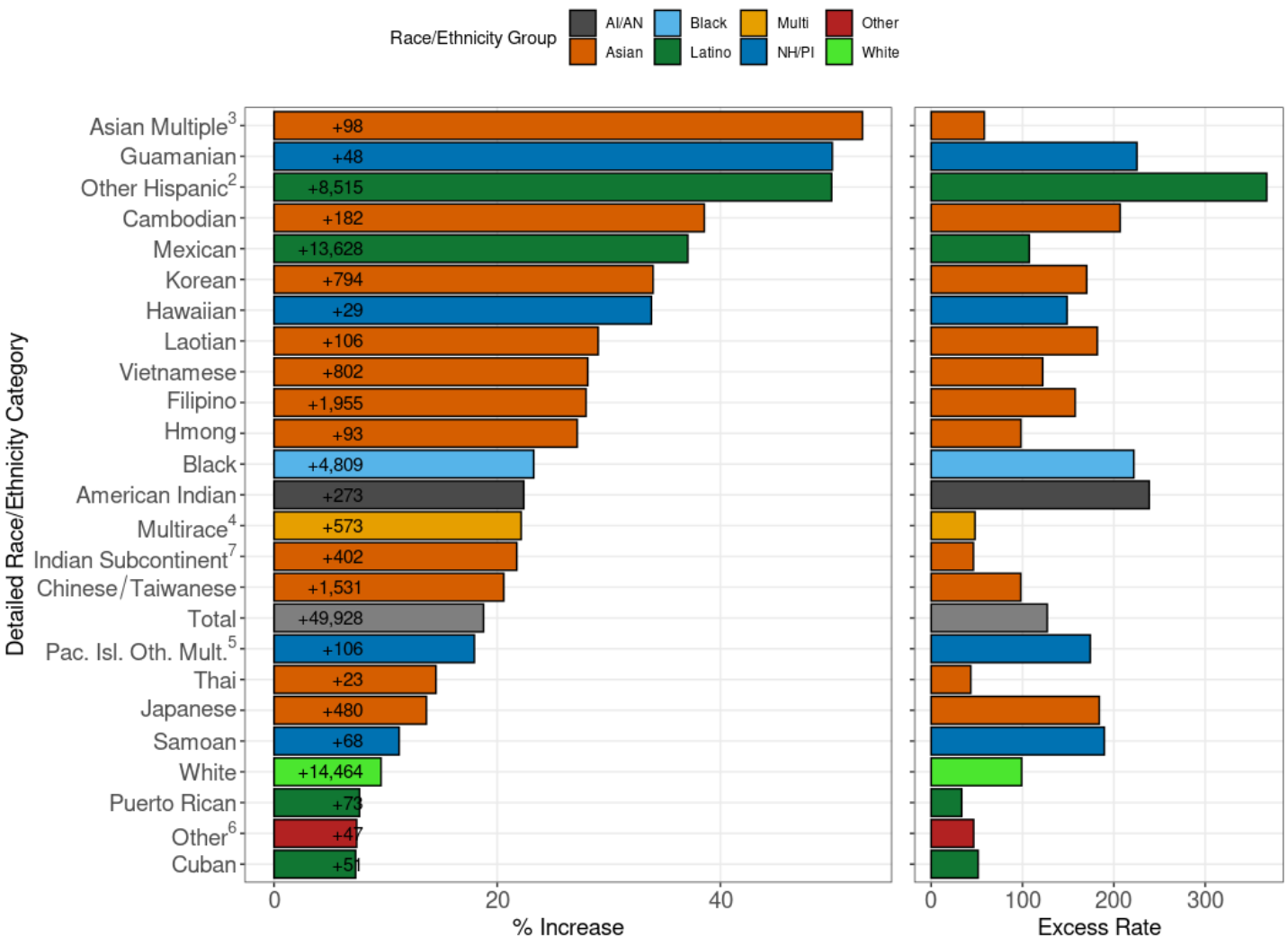
Disaggregation of race and ethnicity into more detailed groups provides further insight

- This preliminary analysis looks at excess mortality using disaggregation of broad race and ethnicity into detailed groups. This type of work is important since detailed race and ethnicity "sub-groups" are likely to be heterogeneous with respect to many characteristics, including health outcomes, health care access and health-related behaviors, and upstream social determinants of health. Analysis based on these more specific "sub-groups" can inform different strategies in terms of public health programs and interventions.

- Key observations in this chart:
  - There is substantial heterogeneity in excess mortality within in the broad Latino, Asian, and Pacific Islander groups. For example,
    - Among Latinos the "Other Hispanic" group appears to have the highest excess mortality, whereas Puerto Ricans and Cubans appear to have the lowest excess mortality.
      - Note that for deaths the "Other Hispanic" group cannot be disaggregated. But among the population data, 62% of this group is Central American—this strongly suggests that a majority of deaths in this group are also Central Americans, and that Central Americans have very high excess mortality.
    - Among Asians, Cambodians appear to have high excess mortality whereas Thais appear to have low excess mortality.
  - There appears to be notably high excess mortality among the "Other Hispanics" and Guamanian sub-groups.
    - The excess mortality being high in these two groups based on both the "Percent Increase" and "Excess Mortality Rate" approaches strengthens the evidence for this observation.

- This "first look" at these detailed data has a number of limitations:
  - There are differences in collection of race/ethnicity information for deaths (family or MD informant) versus population data (self-report via survey), which likely contribute to some numerator/denominator misalignment.
  - There are some differences in race/ethnicity groupings and codes between death and population data. Some minor assumptions were required about mapping to a common list for purposes of this analysis.
  - The population data (2015-2019, American Community Survey) are not quite as current as the death data (2019 and 2020).
  - Some of the subgroup numbers are small and may be unstable. Please note that the increase in the number of deaths from 2019 to 2020 for each group is shown inside the bars below.

Figure 9 - Excess Mortality Based on Detailed Race and Ethnicity Groupings (using both "Percent Increase" and "Excess Mortality Rate" Approaches)[1]

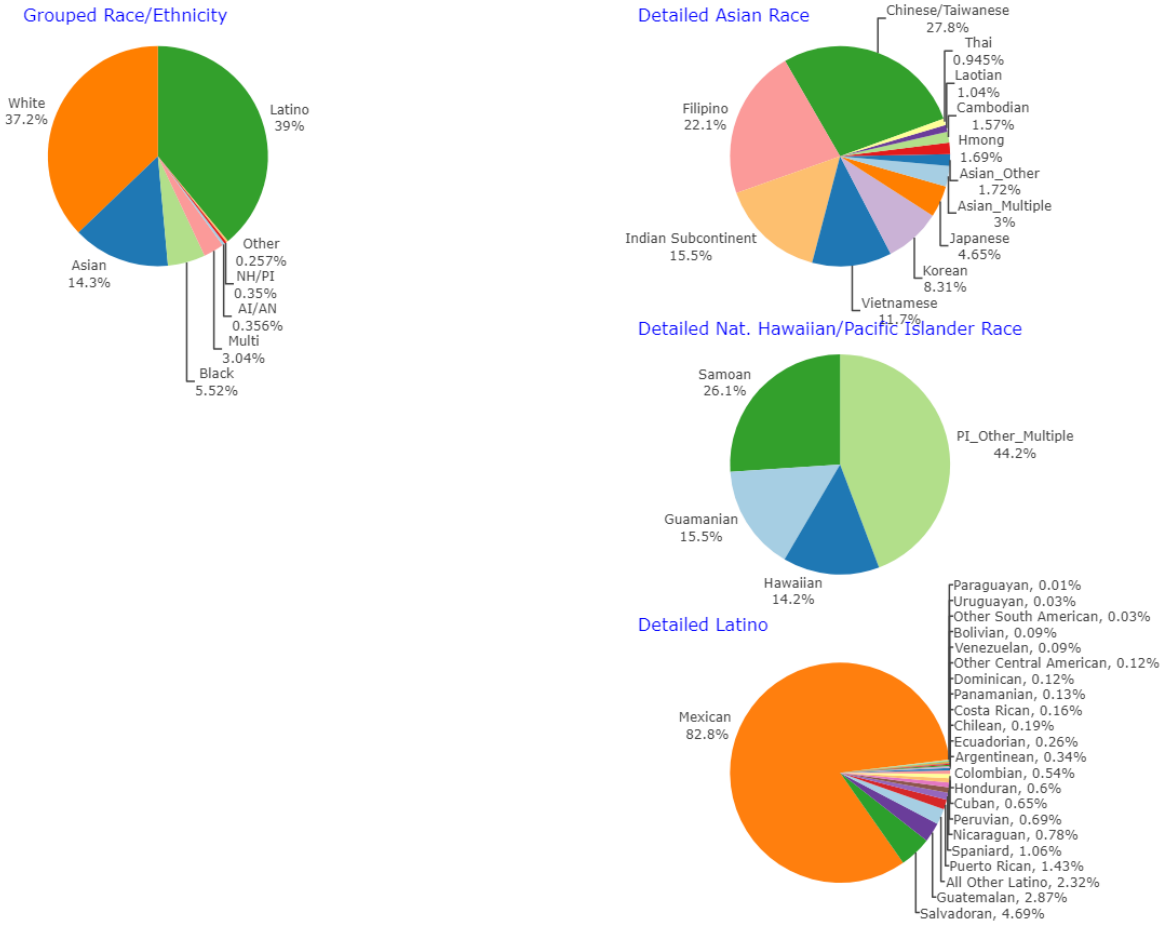


NOTES:

1. The population denominator data source for these detailed race and ethnicity groupings is the American Community Survey Public Use Microdata Sample (ACS PUMS), 2015-2019 release. Population denominator data used elsewhere in this Brief are from the California Department of Finance (DOF)–the DOF source does not provide detailed race/ethnicity disaggregation.
2. Based on the population data source the "Other Hispanics" category is 62% Central American. Current California death data includes codes for "Mexican", "Cuban", "Puerto Rican", and "Other Hispanic". Modifications are underway to the death data system, and more detailed data are expected in 2022.
3. "Asian Multiple" includes persons of more than one "detailed" Asian race, but not "Asian Unknown", and no other races, and not Hispanic.
4. "Multirace" includes persons of more than one race group, but not "Other", and not Hispanic.
5. "Pac. Isl. Oth./Mult." includes persons of another "detailed" Pacific Islander race or of more than one "detailed" Pacific Islander race, and no other races, and not Hispanic.

6. "Other" person indicating another race without specifying what race.
7. "Indian Subcontinent" consists of Asian Indians, Pakistanis, Bangladeshis, and Sri Lankans.
8. "Asian Other" (which includes persons of an unspecified detailed Asian race, and no other races, and not Hispanic) is not included in the chart above due to concerns of numerator/denominator misalignment.

Figure 10 - Distribution of California *Population* by *Grouped* Race/Ethnicity and by *Detailed* Race/Ethnicity



Conclusion

- Deaths increased substantially in California in 2020 in large part because of COVID-19 and, importantly, other causes of death also increased. These increases differed by race/ethnicity and age. Further investigation of these changes is crucial to address the immediate situation and to prepare for the future.

Links to related information

National excess mortality

- COVID-19 is the Number One Cause of Death in the U.S. in Early 2021 (Kaiser Family Foundation Data - 2.22.2021)
- Leading Causes of Death in the US for 2020 (National Center for Health Statistics - JAMA - 3.31.2021)
- Excess Deaths From COVID-19 and Other Causes in the US (JAMA - 4.2.2021)
- Learning From Excess Pandemic Deaths - Editorial related to article above (JAMA 4.2.2021)
- Excess Deaths Associated with COVID-19 (CDC Dashboard)

California excess mortality

- Excess Mortality in California During the Coronavirus Disease 2019 Pandemic, March to August 2020 (UCSF team - JAMA Internal Medicine research letter 5.2021)
- COVID-19 mortality in California based on death certificates: disproportionate impacts across racial/ethnic groups and nativity (USC Team - Annals of Epidemiology June 2021)
- 40,000+ excess deaths in 2020, and other things we learned from California death data (The Mercury News 1.27.2021)

California excess mortality - occupational sector

- Excess mortality associated with the COVID-19 pandemic among Californians 18–65 years of age, by occupational sector and occupation - UCSF team (PLOS ONE 6.4.2021)
- Pandemic's Toll on California Workers in High Risk Industries (UC Merced Fact Sheet 4.2021) and related newsletter