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# **UNEQUAL OPPORTUNITIES, UNEQUAL OUTCOMES: THE COVID-19 RECESSION IN COLORADO**

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# INTRODUCTION

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By mid-March 2020, it was apparent that a major pandemic was in process. Estimates were that millions upon millions of Americans would die from COVID-19 and that there would be insufficient hospital resources to treat all the expected chronic cases. As a result, almost all states instituted shelter-in-place emergency orders. Given the available information, the idea was that we should lock down for two weeks to “flatten the curve”—that is, to spread out the timing of infections so as to preserve hospital capacity.

Colorado joined in the effort, shuttering all businesses but those deemed essential by the governor. While this might have been a reasonable response at the time based on humanitarian concerns to preserve life, Colorado repeatedly extended its emergency orders in spite of mounting evidence of severe unintended consequences. This study examines those consequences for the economy, for mental health, and for education. We find that the most severe negative consequences were borne disproportionately by Colorado’s low-income earners and minorities.

## Key Findings

- **Government lockdown policy in Colorado exacerbated the economic impact of COVID-19, compared with less-restrictive states.**
- **Leisure and hospitality—the lowest paying industry by category in Colorado—has been hit harder than any other segment of the Colorado economy.** Hispanics—the largest minority group in Colorado—comprise the highest percentage of workers in this industry compared with other industries surveyed.

- **The number of small businesses in Colorado declined by over 40% from pre-pandemic levels by June 2021.** Both nationally and in Colorado, large businesses enjoyed rapid increases in earnings and share price as small businesses were shuttered.
- **In Colorado, the percentage of lower income adults who postponed a medical procedure was almost twice the percentage of higher-income adults who postponed a medical procedure.** The long-term economic impact on the poor of reduced health outcomes, while difficult to measure presently, is certain to increase inequality in the future.
- **Nationally, students of color and students from low-income backgrounds faced greater academic struggles with government-mandated school closures during the pandemic.** Since education is highly correlated with earnings, this is certain to increase inequality of income and wealth in the future.
- **The COVID-19 pandemic accelerated the rise of overdose rates in Colorado, with an outsized effect on minority groups.** In Colorado, drug overdoses increased markedly in 2020 across racial and ethnic groups, with the sharpest increases occurring among Coloradans who are Hispanic and black or African American.
- **When responding to COVID-19 and similar public health crises in the future, policymakers should consider all the negative effects policies will have** on the well-being of the populations they are intended to protect, not just those related to the spread of a virus.

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The most severe negative consequences [from the government response to COVID-19] were borne disproportionately by Colorado’s low-income earners and minorities.

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# BACKGROUND

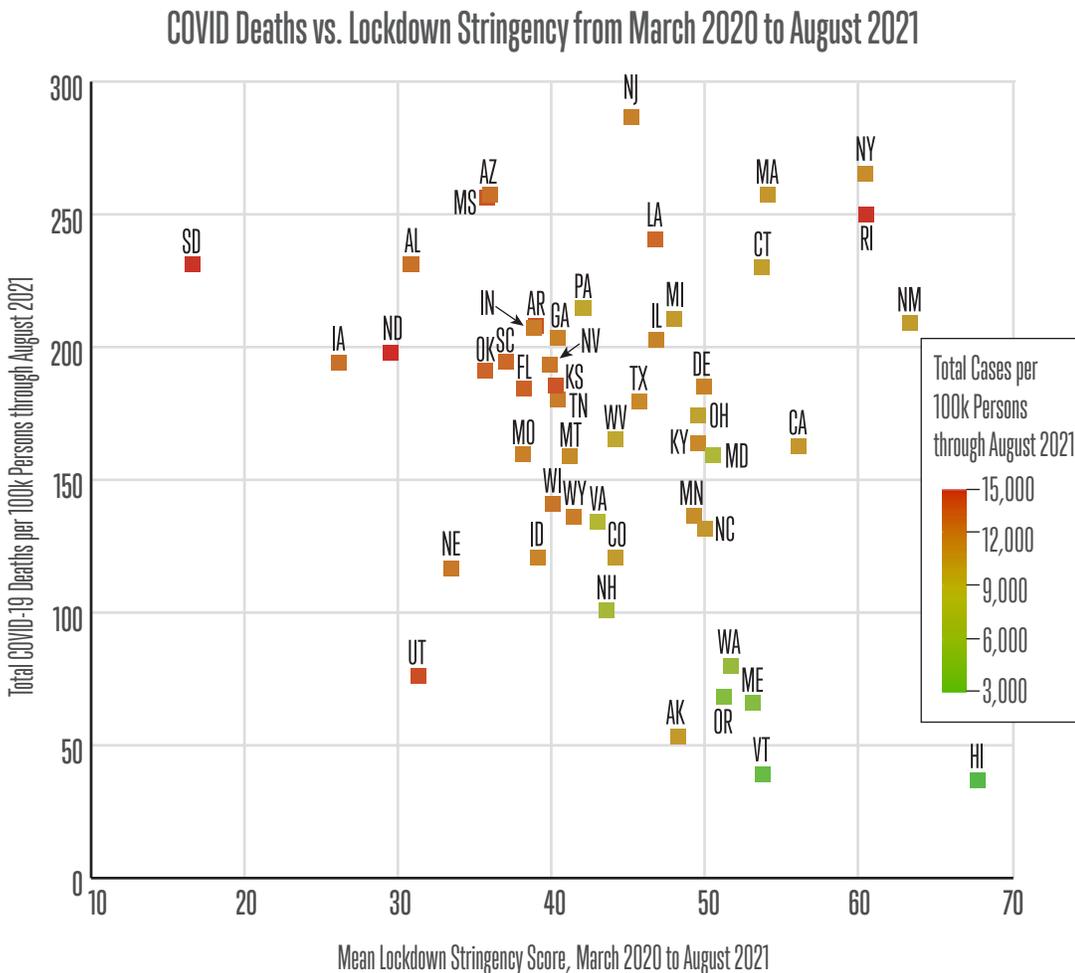
## State Policies and COVID-19 Mortality

The onset of the coronavirus pandemic prompted a wide variety of responses by U.S. state governments to protect public health, with some states imposing little to no economic restrictions to contain the spread of the virus and others implementing lockdown measures such as stay-at-home orders and business closures. Our research examines the secondary economic, health, and social effects of these policy reactions rather than evaluating how well they served their

primary purpose of reducing COVID-19 cases and fatalities. However, a brief discussion of the relationship between social distancing measures and COVID-19 mortality in each state provides useful context for the analysis to follow.

We found that economic restrictions have not been effective in limiting coronavirus deaths. There is no statistically significant relationship between degree of lockdown and COVID-19 death rates. Figure 1 displays each state's cumulative mortality rate from COVID-19, or the total number

**Figure 1: Variation in COVID-19 mortality rates versus variation in states' average level of lockdown stringency during the pandemic.**



There is no statistically significant relationship between degree of lockdown and COVID-19 death rates.

NOTE: For information on data sources and computation of metrics, see Appendix A.

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An aim to limit the spread of the virus almost exclusively drove the COVID-19 public policy responses, with little consideration given to other factors examined later in this report.

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of deaths caused by the virus per 100,000 people living in the state. That rate is plotted against an index constructed by Oxford University researchers which measures how strict each state's lockdown has been in response to COVID-19.<sup>1</sup>

Across all 50 states, the correlation coefficient between these two variables is a modest -0.19. And variation in lockdown stringency, irrespective of complicating factors, explains only 3.8% of the variation in mortality rates from COVID-19 among U.S. states.

The data show no statistically significant relationship between degree of lockdown and COVID-19 death rates. A strong relationship between lockdown stringency and COVID-19 death rates would have produced a more linear plotting of states from the top left (low stringency and high death rates) to the bottom right (high stringency and low death rates) of Figure 1.

The data presented in Figure 1 align with a body of literature indicating that a stricter lockdown is not always beneficial to public health. At the international level, Bendavid et al. find that more restrictive interventions like stay-at-home orders and business closures have little effect on COVID-19 case rates, while less restrictive interventions like social distancing and bans on large gathering sizes do mitigate the spread of COVID-19.<sup>2</sup> Spiegel and Tookes conducted a study at the U.S. state level and reported similar findings: mortality decreases when states implement measures such as mask mandates and restaurant closures, but the closure of other, lower-risk businesses is ineffective in preventing COVID-19 fatalities.<sup>3</sup>

An aim to limit the spread of the virus almost exclusively drove the COVID-19 public policy responses, with little consideration given to other factors examined later in this report. In

hindsight, we can see that the data show different types of non-pharmaceutical interventions (NPIs) have mixed public health benefits, with no strong relationship between these measures and COVID-19 deaths. Conversely, as the remainder of this report demonstrates, the data show a strong relationship between NPIs and adverse economic, educational, and other public health outcomes. In light of these findings, when responding to this and similar public health crises, policymakers should consider all the negative effects policies will have on the well-being of the populations they are intended to protect, not just those related to the spread of a virus.

Next, we document the unintended effects of NPIs in the state of Colorado since the start of the COVID-19 pandemic, with a particular emphasis on disparities in outcomes between demographic and income groups.

## **COVID-19 Relief Funds in Colorado**

All the economic and social trends discussed in this report have occurred amid unprecedented levels of federal spending to assist states, local governments, and individuals in withstanding the financial damage caused by COVID-19 and accompanying economic restrictions. This fiscal response was enacted through numerous pieces of federal legislation, the largest of which were the Coronavirus Aid, Relief, and Economic Security Act (CARES Act, effective March 2020), Paycheck Protection Program and Health Care Enhancement Act (effective April 2020), the Coronavirus Response and Relief Supplemental Appropriations Act (CRRSA, effective December 2020), and the American Rescue Plan Act (ARPA, effective March 2021).

Over the course of the pandemic, the federal government has appropriated \$5.9 trillion in coronavirus relief funds, of which \$4.49 trillion has been spent nationwide.<sup>4</sup> Colorado has received \$64.2 billion in appropriated funds, of which \$52.3 billion has been distributed to the state as of August 2021. \$12 billion of the appropriated funds is directed to state and local governments in Colorado, while the rest bolsters preexisting government programs and provides direct support to the state's residents and businesses. The largest appropriations include \$15.6 billion in business aid through the Paycheck Protection Program, \$13.9 billion in stimulus checks issued to individuals, and \$9.02 billion in unemployment benefits.

During a special session in the Fall of 2020, the Colorado legislature passed ten bills consisting of a total of \$300 million in state pandemic aid, in addition to the federal aid listed above.<sup>5</sup> The funding aimed to address various public health, economic, and social consequences of the pandemic and subsequent government lockdowns and mandates. Much of the funding was allocated specifically to address the negative impact of state lockdown policies on small businesses, low-income students and families, and

minorities. For example, House Bill 1001 provided grants to expand internet access for P-12 education as sustained school shutdowns disproportionately affected low-income and rural students, who struggled to access the internet for remote learning. Senate Bill 1 allocated \$37 million to relief payments for small businesses subject to government-mandated capacity limits, including restaurants and bars.

Putting aside the question of whether the state acted prudently in their policy response to COVID-19, these bills serve as implicit acknowledgement by legislators and the governor that their policies wreaked havoc on certain populations in the state, namely small businesses, low-income families, and minorities. These "relief" bills represent policymakers' attempt to repair the lopsided damage they caused to those particular populations. The following data collected in this report suggest that these efforts were less-than-successful in preventing or repairing the wreckage lawmakers and the state's governor inflicted on small businesses and vulnerable populations.

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## ECONOMIC OUTCOMES

### Macroeconomic Trends

The economic toll of the COVID-19 recession in Colorado has been enormous. The state weathered a peak-to-trough decline in real GDP (as measured in 2012 dollars) from \$361.4 billion in the fourth quarter of 2019 to \$331.7 billion in the second quarter of 2020, a loss of \$29.7 billion in total economic activity; a loss of 8.2%. The peak-to-trough decline in real wage and salary income was smaller

but still noteworthy, a drop from \$169.9 billion in the first quarter of 2020 to \$160.2 billion in the second quarter of 2020—a loss of \$9.7 billion (or 5.7%) in wages and salary income.

Largest of all, however, was the decline in the number of employed persons in the state. Employment fell from a peak of 3,072,012 people in December 2019 to a trough of 2,621,363 people in April 2020, a loss of 450,649 jobs, or 14.7% of all jobs.

Since wages and salaries dropped 5.7% but employment dropped 14.7%, the vast majority of lost income must have been concentrated in lower-paying jobs.<sup>6</sup>

While these are gross statistics, behind each one is a real person who lost a real job or his/her small business. Moreover, the ability for thousands of people to independently take care of their families was destroyed, as were the dreams that go with small business entrepreneurship. The Colorado lockdown policy resulted in billions of dollars in lost income, hundreds of thousands of unemployed low-income workers, and tens of thousands of destroyed small businesses.

Take the case of Juan and Kate (fictitious names but actual events), interviewed by the author. They are a married couple with two children. Juan is half-Hispanic and half-Korean, and one of their children has special needs. Their dream was to build a family business that would provide financial independence and a good income. They started a small business in 2013 and invested, in their words, “eight years of blood, sweat, and tears” in addition to financial resources. Their children worked in the business with them. As with most small business start-ups, they struggled at first, then finally turned a corner to profitability in 2018. They had sold their house and moved into an apartment so they could invest more into the business. They were able to expand to a second location in 2019, ultimately creating jobs for 35 low-income earners, the majority of whom were minorities. They had just set a record for sales revenue when the government-mandated lockdown forced them to close. They tried to stay open but faced fines of \$15,000 per day. They eventually had to file for bankruptcy and lost everything. According to them, “Our American dream was dead, because of government policies.”

The human toll in Colorado has been enormous. In addition to the economic hardship endured by families like Juan and Kate, we will show how the psychological damage resulted in a large increase in social pathologies such as depression and drug abuse.

Further, the opportunity cost of the Colorado lockdown must be taken into consideration. A recent study by the World Bank estimated that global extreme poverty increased by up to 124 million people from what it would otherwise have been without the global recession.<sup>7,8</sup> This methodology of comparing “with and without,” rather than just “before and after,” can be applied to Colorado. If we assume a continued trend in economic growth from 2019, then the Colorado losses become even larger.

In 2019, real GDP in Colorado increased 4.3%, real wage and salary income increased by 4.5%, and employment increased 2.2%. Assuming these trends would have continued without the interruption of a pandemic, the economic cost of the COVID-19 lockdowns is 12.5% in real GDP, 10.2% in wages and salary income, and 16.9% in employment.

The state’s economy has been in recovery since the third quarter of 2020, and Colorado has now surpassed pre-COVID levels of real GDP and real wage and salary income. However, the state has yet to fully recover in terms of employment. Examining the latest available data from the Bureau of Economic Analysis and the Bureau of Labor Statistics (BLS), Colorado’s real GDP and real wage and salary income were \$365.0 billion and \$172.5 billion, respectively, in the first quarter of 2021, while employment was 2,999,829 in June 2021.

To place the trajectory of Colorado’s economy in context, we track the state’s

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The vast majority of lost income must have been concentrated in lower-paying jobs.

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performance on several macroeconomic indicators relative to two comparison groups. The first group comprises the five states scoring highest on the lockdown stringency index used in the preceding section: Hawaii (most restrictive), New Mexico, Rhode Island, New York, and California. The second group comprises the five states scoring lowest on that index: Utah, Alabama, North Dakota, Iowa, and South Dakota (least restrictive). Colorado ranked near the middle, 24 out of 50 states, in lockdown stringency.

that states taking more drastic actions in response to the pandemic endured the most severe recessions. Compared to the least restrictive states, Colorado's trend in real GDP is similar, although Colorado suffered steeper declines in employment and real wages and salaries. These trends indicate that Colorado sacrificed more jobs and labor income than the least restrictive states in its effort to combat COVID-19, although the state still fared better than the states with the tightest public health rules.

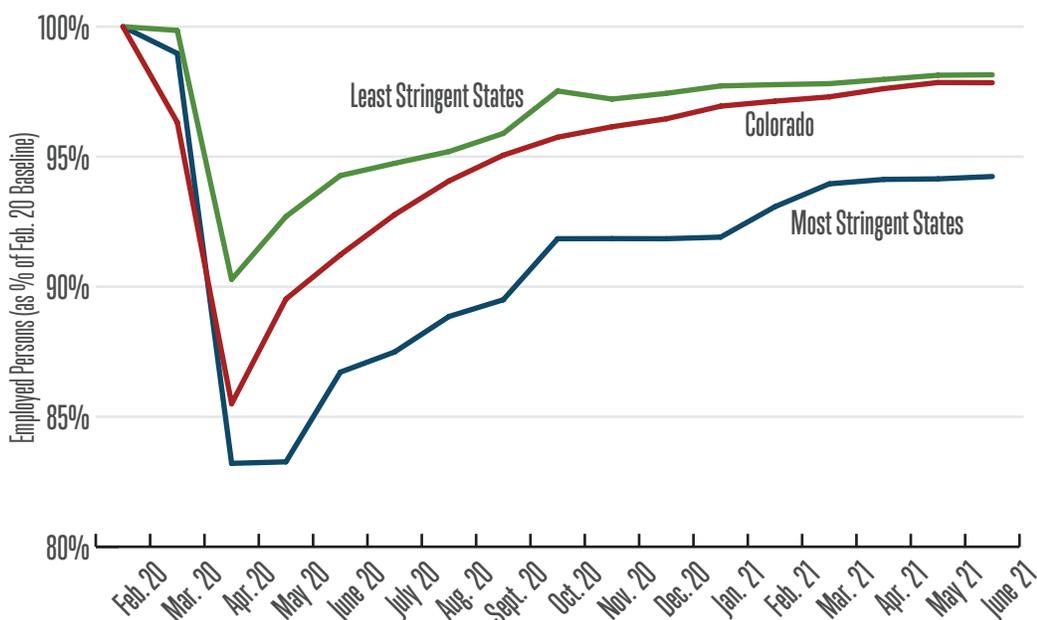
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The most restrictive states suffered the sharpest drop on all three metrics relative to their pre-COVID levels, indicating that states taking more drastic actions in response to the pandemic endured the most severe recessions.

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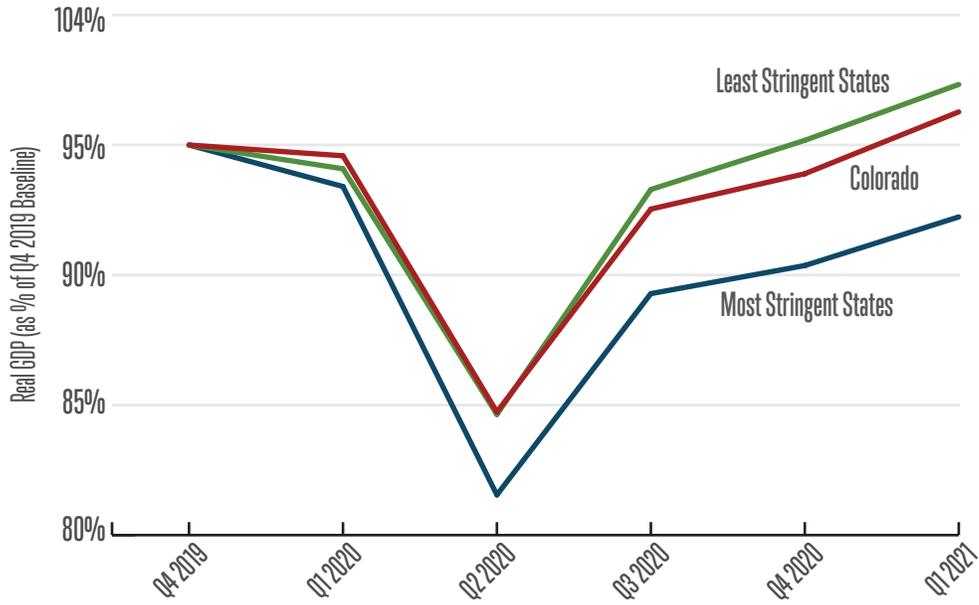
Figures 2 to 4 plot trends in real GDP, real wage and salary income, and employment in Colorado, along with the average trends in the comparison groups. (For information on data sources and methodology, consult Appendix B.) The most restrictive states suffered the sharpest drop on all three metrics relative to their pre-COVID levels, indicating

**Figure 2: Employment Relative to Pre-COVID Baseline**



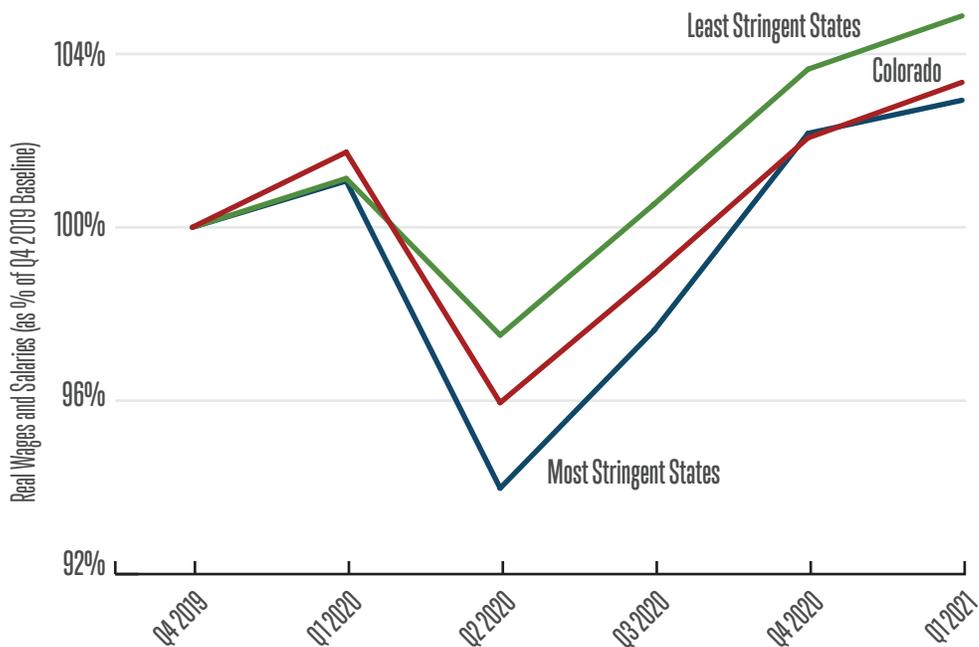
NOTES: Monthly variation in the number of employed persons relative to a February 2020 baseline.

**Figure 3: Real GDP Relative to Pre-COVID Baseline**



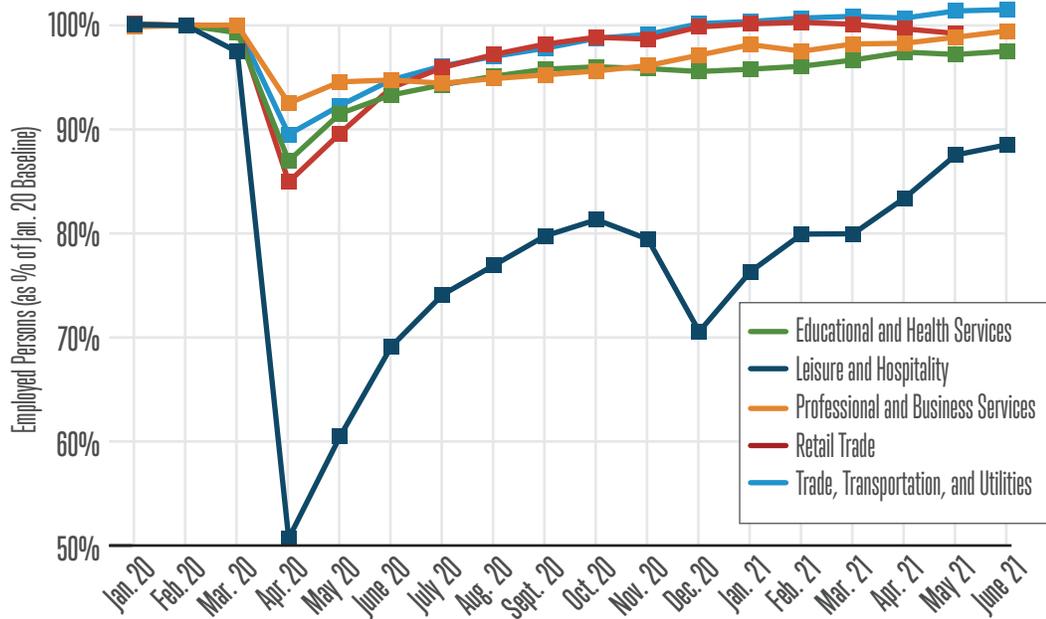
NOTES: Quarterly variation in real GDP relative to a Q4 2019 baseline.

**Figure 4: Real Wages and Salaries Relative to Pre-COVID Baseline**



NOTES: Quarterly variation in real wage and salary income, which is a component of personal income, relative to a Q4 2019 baseline

**Figure 5: Employment in Colorado**



NOTES: This chart measures the number of employed people in each of the four industries employing the most people in Colorado. Employment numbers are plotted relative to a February 2020 baseline. The retail trade sector is a component of trade, transportation, and utilities, but we plot its individual trend in addition to the industrywide trend.

## Breaking Down Colorado’s Job Losses - Industry Level

For any given distribution of income based on employment, an equal impact would show the same percentage decline in income as in employment. The fact that employment dropped more precipitously than real wage and salary income in Colorado suggests that job losses during the state’s recession have been concentrated among workers with below-average incomes, while wealthier workers have been less affected. Performing an industry-level analysis, we provide further evidence for that phenomenon below.

Using data from the Colorado Department of Labor and Employment, we plot the trends in the number of employed people in each of the four largest industries in Colorado in Figure 5. To determine how retailers have fared during the recession, we also plot employment in retail trade, which is a

component of the trade, transportation, and utilities industry. Clearly, the leisure and hospitality industry has been hit harder than any other segment of the economy, with employment dropping to nearly half of pre-COVID levels by April 2020.

According to the Census Bureau’s Quarterly Census of Employment and Wages, leisure and hospitality is the lowest paying of the industries plotted in Figure 5. Prior to the pandemic, workers in this industry in Colorado earned an average weekly wage—including tip income—of just \$530 throughout the fourth quarter of 2019. For comparison, the highest paying of the four industries, professional and business services, boasted an average weekly wage of \$1750 over the same period. Thus, the economic damage caused by Colorado’s response to the coronavirus has put the greatest burden on the industry with the least well-off workers.

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Furthermore, a higher percentage of workers in leisure and hospitality are Hispanic—the largest minority group in Colorado—than in the three other industries shown in Figure 5, according to data from the Census Bureau’s Quarterly Workforce Indicators. In the fourth quarter of 2019, 21.8% of leisure and hospitality workers were Hispanic or Latino, compared to 19.7% of workers in trade, transportation, and utilities; 16.7% of workers in educational and health services; and 15.7% of workers in professional and business services. The fact that the industry most reliant on Hispanic labor lost the most workers in the COVID-19 recession suggests that minorities may have fared worse than non-Hispanic whites. We will present additional evidence on this subject in the following section.

It is also worth noting that while Figure 5 shows employment in industries other than leisure and hospitality has nearly recovered to pre-pandemic levels, the recovery has been driven by larger employers as small businesses continue to struggle. According to data compiled by the Opportunity Insights Economic Tracker, the number of small businesses open in Colorado in June 2021 was an astounding 43.2% lower than the pre-pandemic level in January 2020. Of all small businesses, those in the professional and business services industry have fared the best during the pandemic, but even the number of small businesses open in that sector was also down 24.0% relative to January 2020.

These statistics from Opportunity Insights do not provide a clear view of whether the small business closures are permanent or temporary. Economic reporting from the Colorado Secretary of State’s office indicates that the number of permanent exits increased during the pandemic. Over the 12-month period from Q2 2020 to Q1

2021, 37,820 businesses in Colorado filed for dissolution, a 6.2% increase relative to the preceding period of Q2 2019 to Q1 2020.<sup>9</sup> That figure almost certainly understates the true number of business failures since the arrival of COVID-19, as dissolution filings in Colorado following the Great Recession did not peak until Q2 2011, several years after the onset of the financial crisis. Given that a May 2020 study found that 29% of business owners surveyed saw COVID-19 as a major problem for their ability to avoid permanent closure,<sup>10</sup> dissolution filings resulting from the pandemic might continue increasing even after it ends.

## Breaking Down Colorado’s Job Losses - Individual Level

The findings in the preceding section strongly suggest that most employees who were laid off in Colorado were below-average earners and that many of them were minorities. However, industry-level data cannot reveal which employees within an industry lost work. To confirm that low-income and minority workers bore the brunt of layoffs in Colorado, we conducted an individual-level analysis of Census survey data currently available.

To provide high-frequency data on the coronavirus pandemic, the Census Bureau developed the Household Pulse Survey (HPS), a weekly survey of households in all 50 states. Since its sample sizes are relatively small, we aggregate data from successive weeks into four-week periods and present 90% confidence intervals for all HPS data plotted in this report. Our methodology for constructing estimates and confidence intervals from HPS data is described in Appendix D.

The HPS asks respondents whether they have done any work for pay in the preceding seven days. Grouping respondents by whether they live in a

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household with an income above or below \$75,000 per year (close to the median income of \$72,000 in Colorado), we plot the percentage who say they have done work for pay in each four-week period in Figure 6. This metric is *not* defined in the same way that the BLS defines its employment rate. Here, the “employment percentage” is essentially an employment-population ratio, since all respondents contribute to the denominator rather than just those in the labor force.

Evidently, Coloradans from households below the median income have been employed less often throughout the entire pandemic. But because the HPS started in mid-April 2020, we cannot observe trends occurring prior to the outbreak of coronavirus in Figure 6. To gauge how the HPS numbers compare to pre-pandemic levels, we use BLS data to compute a similar percentage of Coloradans who did work for pay in January and February 2020. Our method for computing that statistic is described in Appendix E.

On average in January and February of 2020, 58% of Coloradans living in households with a household income under \$75,000 were employed, compared to 70% of Coloradans with a household income over \$75,000. Thus, the percentage of Coloradans with a household income over \$75,000 who were working remained steady between the months prior to and immediately following the recession, as the employment percentage in the first period of HPS data for this group is also roughly 70%. Meanwhile, Figure 6 shows that the percentage of Coloradans with a household income under \$75,000 who were working dropped sharply to less than 50% in the spring of 2020.

## Income Inequality

Research on COVID-19 and prior pandemics indicates that the current pandemic has likely exacerbated global

inequality.<sup>11,12</sup> U.S. government data on income inequality is released with a considerable time lag, but other empirical evidence suggests that inequality has increased in Colorado during the pandemic. Future research should confirm this finding when data from the Internal Revenue Service and other federal agencies become available.

As noted earlier, real wage and salary income declined by a far smaller percentage (5.7%) than total employment (14.7%) in Colorado, indicating that low-wage workers were disproportionately affected by the recession. Estimates from Urban Institute researchers support this conclusion, as they report that 171,574 jobs with salaries below \$40,000 were lost in Colorado from February 2020 to April 2020.<sup>13</sup> BLS reports that a total of 444,550 jobs were lost in Colorado over this time frame, so workers making less than \$40,000 a year account for 38.6% of the layoffs. Many workers who remained employed experienced pay cuts during the pandemic.<sup>14</sup>

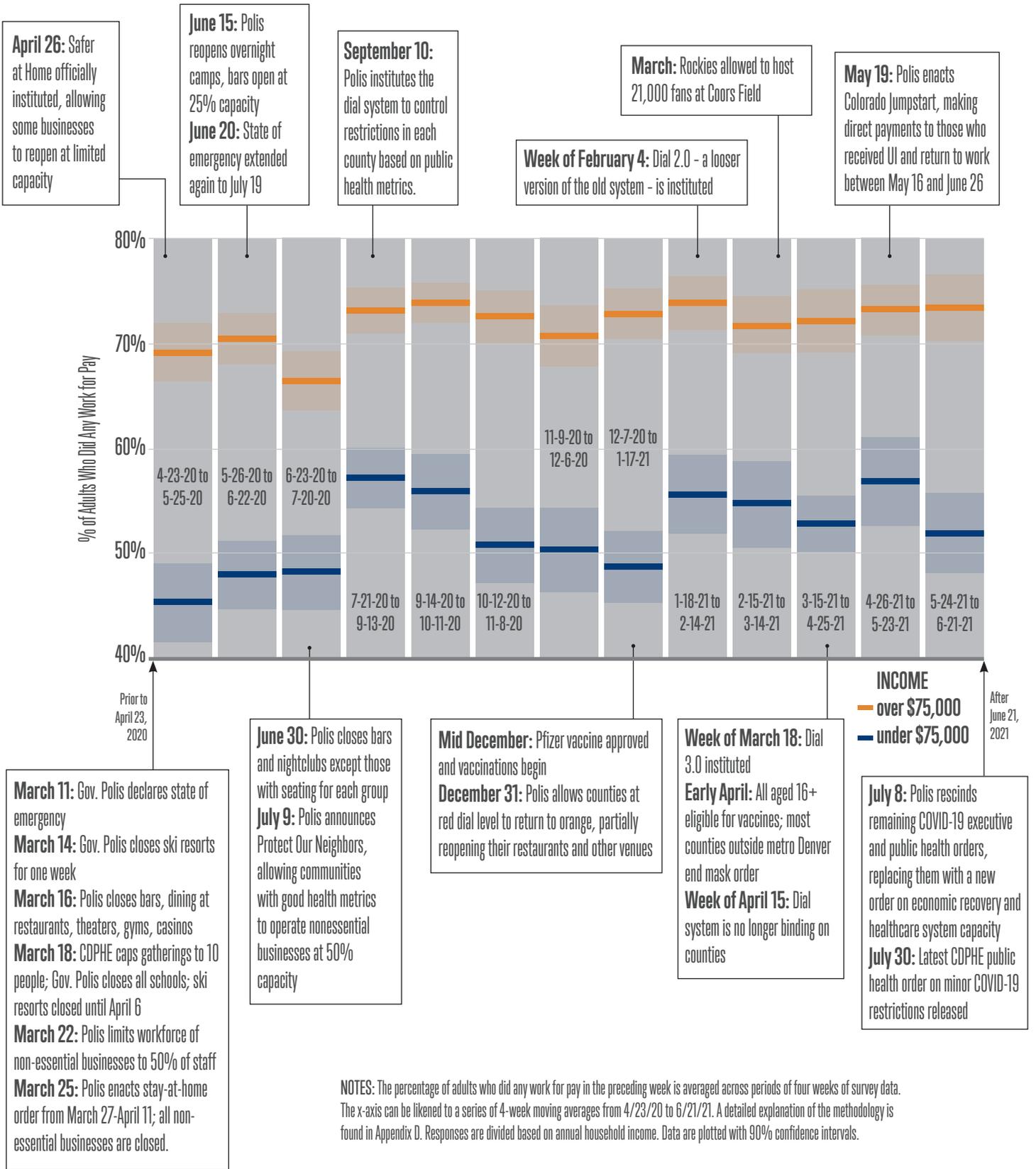
A similar narrative emerges when examining how businesses have weathered the recession. Data from Opportunity Insights cited above indicates that by June 2021, the number of open small businesses in Colorado declined by over 40% from pre-pandemic levels. Meanwhile, publicly traded companies have fared exceedingly well during the pandemic: according to Google Finance, the S&P 500 and Dow Jones Industrial Average rose 41% and 34%, respectively, from the first week of March 2020 to the first week of June 2021. During the same period, stock prices increased by an average of 61.4% among the Fortune 500 companies headquartered in Colorado.<sup>15</sup> Both nationally and in Colorado, larger businesses are enjoying rapid increases in profits and share price as small businesses are shuttered.

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The percentage of Coloradans with a household income over \$75,000 who were working remained steady... Meanwhile, the percentage of Coloradans with a household income under \$75,000 who were working dropped sharply.

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**Figure 6: Percentage of Adults Who Did Any Work for Pay During COVID**



# HEALTH OUTCOMES

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## Mental Health

We also use HPS data to examine the mental health of Coloradans during the pandemic, as COVID-19 has caused a combination of social isolation and fear for one's health and economic well-being. In Figures 7 and 8, we plot the percentage of respondents in Colorado (again divided by income) who report feeling anxious or depressed on more than half or all of the previous seven days.

Clearly, lower-income Coloradans have experienced symptoms of anxiety and depression at higher rates than their wealthier counterparts, although we cannot observe how those rates were altered by COVID-19 because the HPS data only extend back to April 2020.

## Deaths of Despair

Given the high rates of anxiety and depression observed in the previous section, we anticipate that “deaths of despair,” such as suicides and overdoses, have increased during the pandemic. Using data provided by the Colorado Department of Public Health and Environment, we plot trends in all-cause, suicide, and overdose death counts in the state in Figure 9. Additional background on the computation of these statistics is provided in Appendix F.

Mirroring preliminary academic findings,<sup>16</sup> Figure 9 reveals that overdoses have increased markedly since the onset of the pandemic, although they make up a relatively small share of the total increase in deaths in Colorado. Suicides, meanwhile, occurred roughly as often prior to and during the pandemic. This latter finding is curious, as a recent national CDC study concluded that visits to the emergency room for

suspected suicide attempts had increased dramatically among adolescents during the pandemic, particularly among girls aged 12-17.<sup>17</sup> Unfortunately, it may be the case that suicidal ideation has increased in Colorado during the COVID-19 pandemic even though we do not observe an increase in suicide deaths in the data.

The Colorado Department of Public Health and Environment also reports mortality data at the state level based on racial and ethnic group, allowing us to investigate which groups have been most affected by the increase in overdoses visible in Figure 9. In Table 1, we report age-adjusted death rates for three demographic groups over the last several years, along with year-over-year changes in those rates.

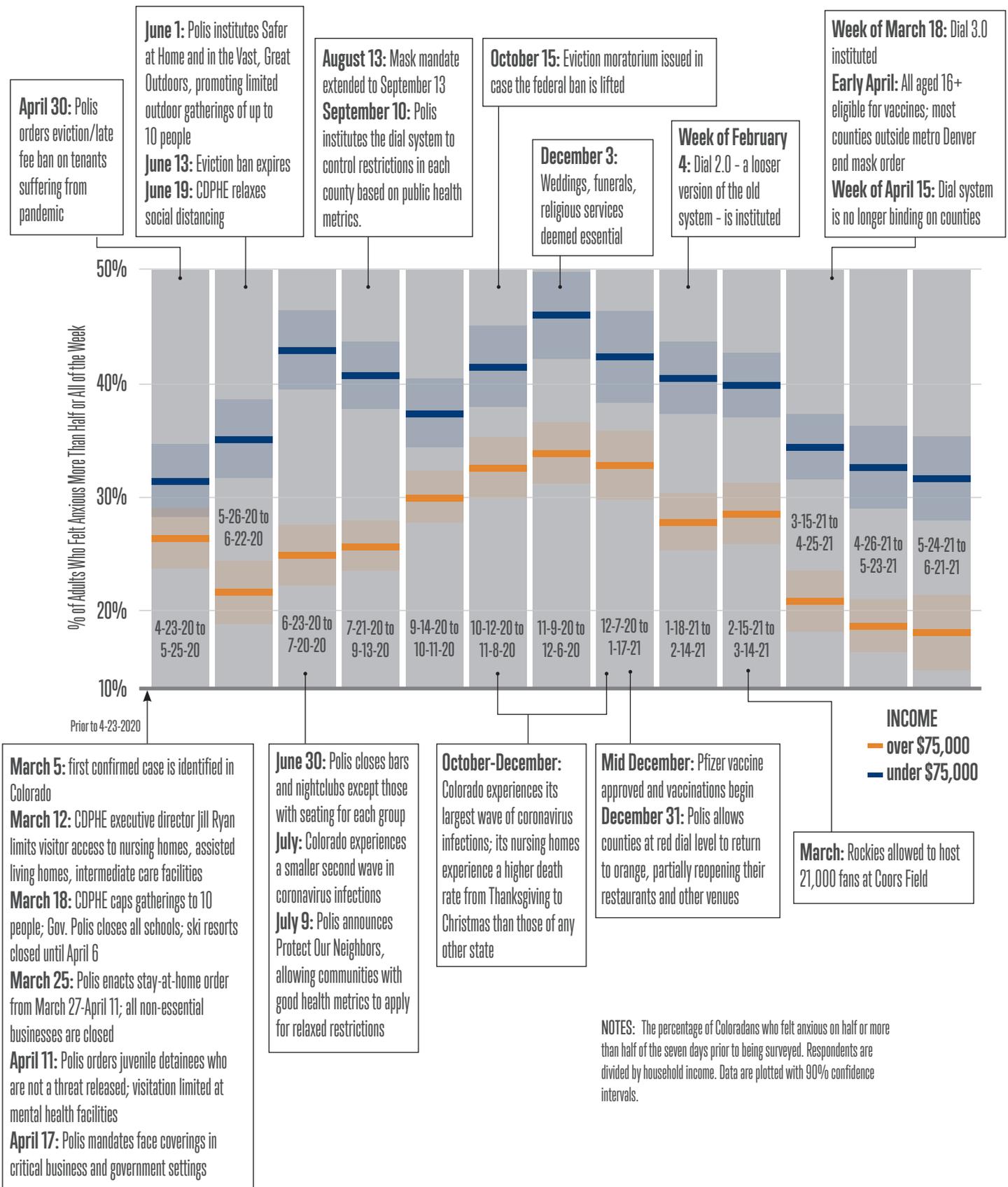
Table 1 clearly indicates that overdoses increased markedly in 2020 across all three racial and ethnic groups shown, but the sharpest increases occurred among Coloradans who are Hispanic and black or African American. Overdoses were already rising rapidly prior to 2020 within these populations, unlike non-Hispanic white Coloradans, but the rate of increase from 2019 to 2020 is much higher for both Hispanics and black or African Americans than the rate of increase from 2018 to 2019. This suggests that the COVID-19 pandemic accelerated the rise of overdose rates in Colorado, with an outsized effect on minority groups.

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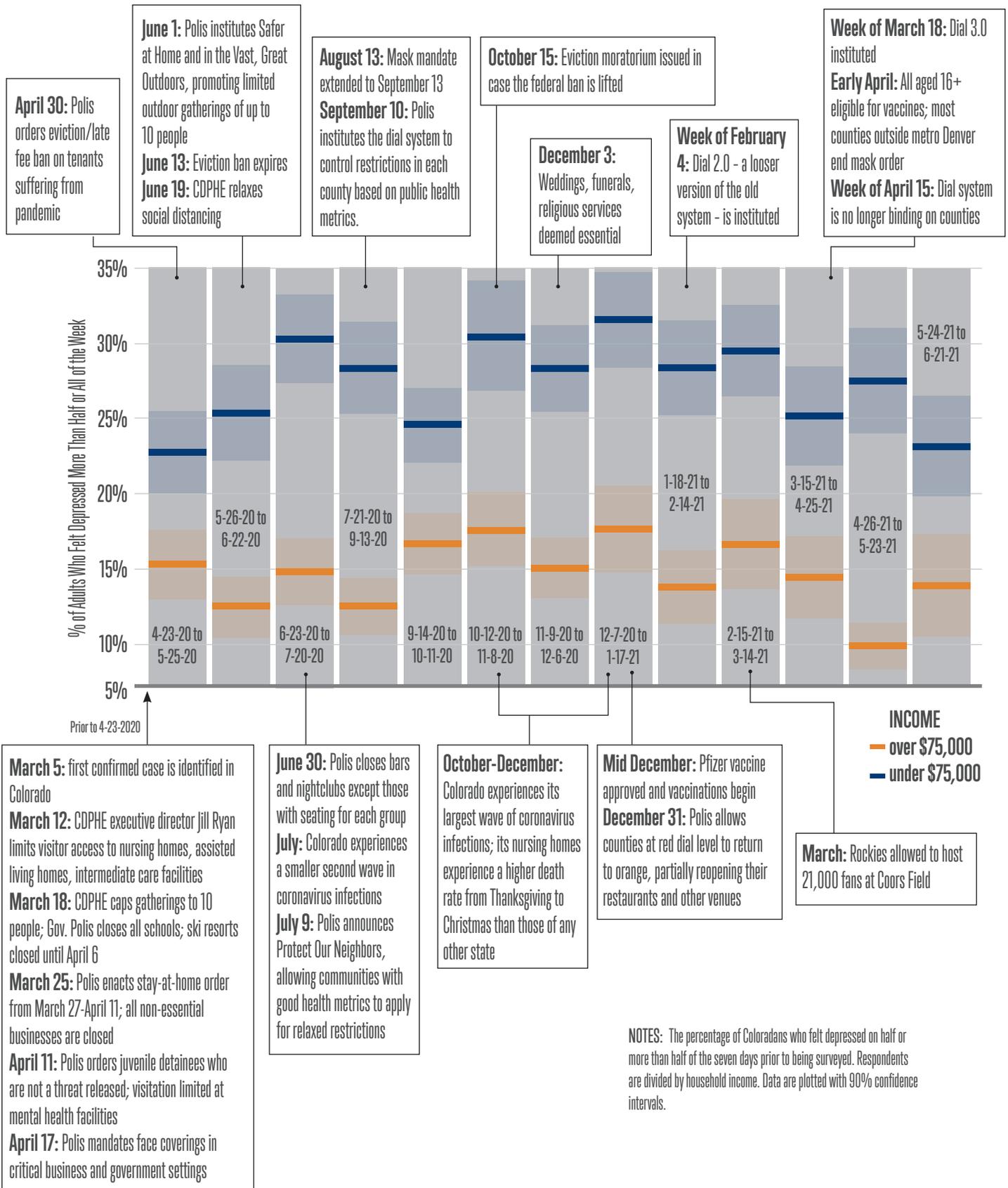
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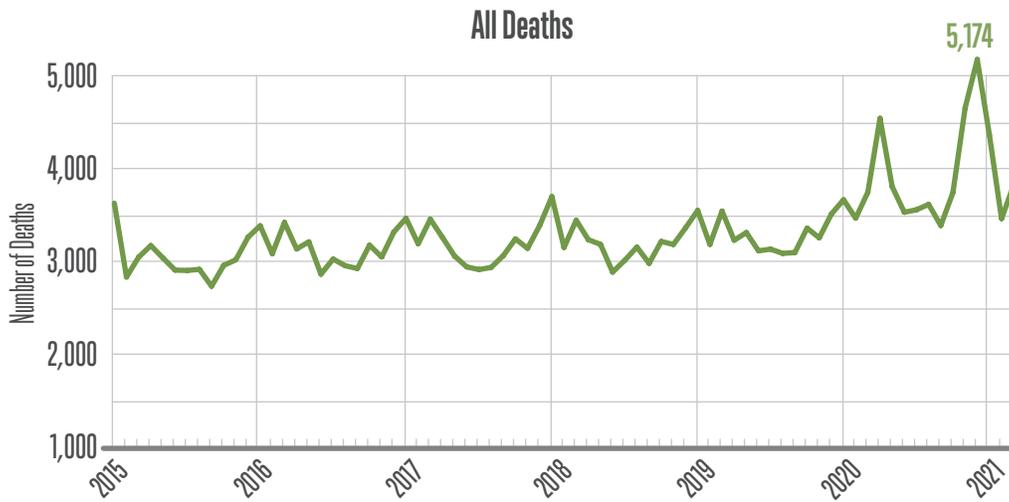
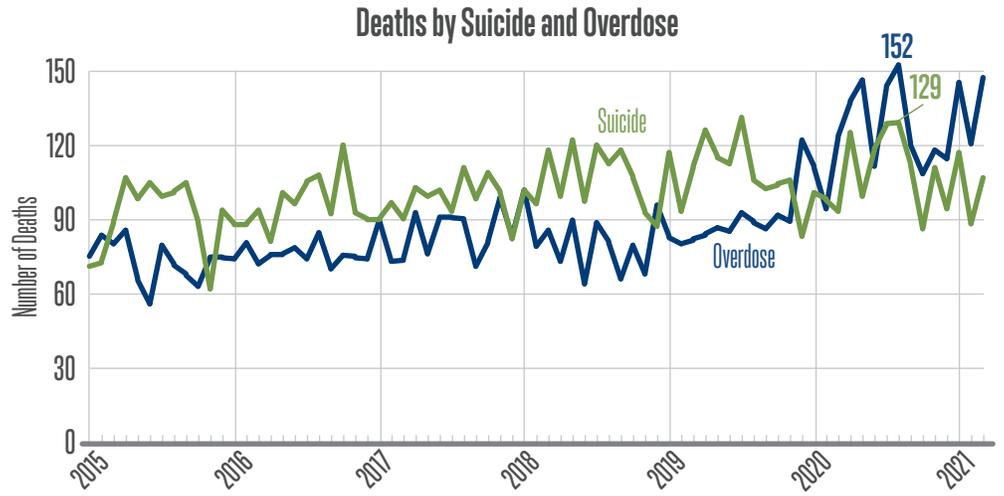
### Figure 7: Anxiety in Colorado During the Pandemic



### Figure 8: Depression in Colorado During the Pandemic



**Figure 9: Monthly Death Counts in Colorado**



## Medical Procedure Delays

In the early months of the pandemic, Coloradans across income and demographic groups delayed medical procedures at an alarmingly high rate, with potential impacts on their prognoses and mental health.<sup>18</sup> Figures 10 and 11 display the percentage of Coloradans who reported delaying a medical procedure in the last four weeks, according to HPS data.

By income group, the gap in delays for medical procedures began to widen early in the lockdown, and with rare exceptions continued to be wider through mid-2021. The lower income group exhibited

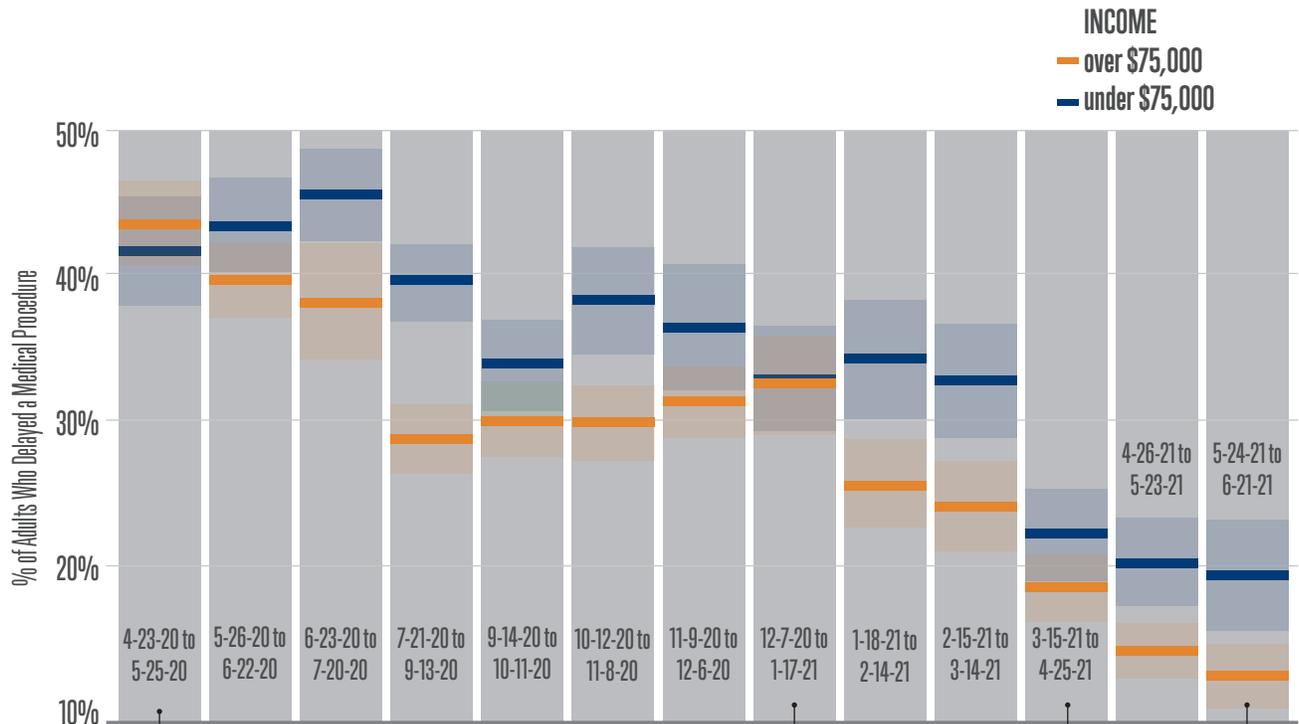
significantly more delays in medical procedures compared with the higher income group. By race, the gap in delays for medical procedures did not begin to widen until later. By mid-2021 minorities exhibited twice the rate of delays in medical procedures as did the white/non-Hispanic population.

The disparate impact on health due to government policy in Colorado is certain to be long-lasting. As with other figures produced using these data, survey weeks are aggregated into four-week periods, and the methodology for that process is described in Appendix D.

**Table 1: Age-adjusted Death Rates from Overdoses in Colorado by Racial and Ethnic Group, 2015-2020**

Year	White, non-Hispanic		White, Hispanic		Black or African American	
	Age-adjusted overdose death rate	Change from previous year	Age-adjusted overdose death rate	Change from previous year	Age-adjusted overdose death rate	Change from previous year
2020	21.7	27.74%	29.02	57.82%	36.26	54.67%
2019	16.7	2.90%	19.09	16.54%	25.86	41.54%
2018	16.23	-10.97%	16.38	-2.67%	18.27	17.87%
2017	18.23	6.80%	16.83	1.88%	15.5	29.82%
2016	17.07	4.21%	16.52	8.40%	11.94	-4.17%
2015	16.38	--	15.24	--	12.46	--

**Figure 10: Delays in Medical Procedures in Colorado During the Pandemic, by Income**



Prior to 4-23-2020

**March 5:** first confirmed case is identified  
**March 11:** Gov. Polis declares state of emergency  
**March 12:** CDPHE executive director Jill Ryan limits visitor access to nursing homes, assisted living homes, intermediate care facilities  
**March 19:** Polis orders delay of elective surgeries to save PPE

**April 26:** Polis issues executive order for certain elective surgeries

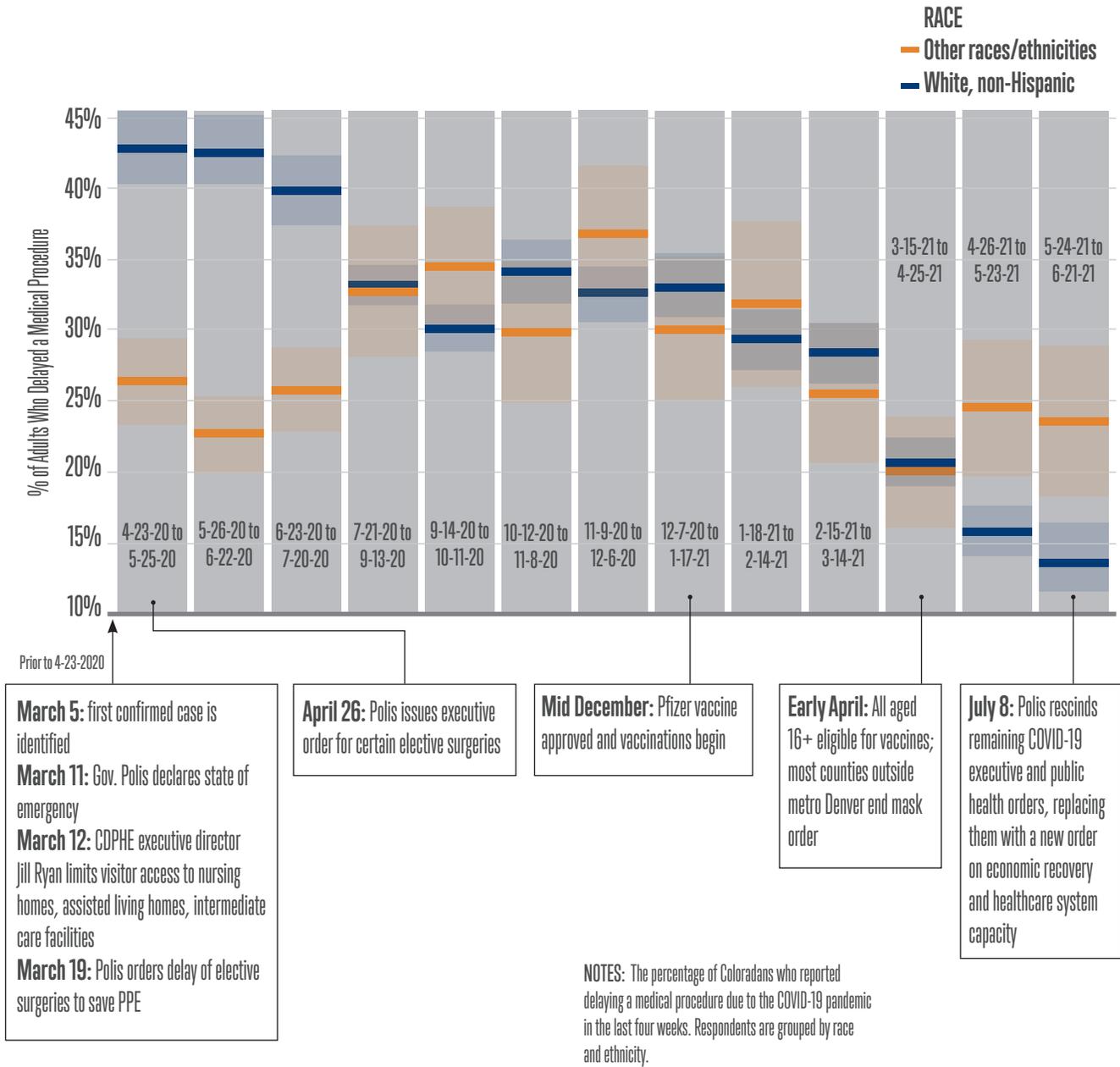
**Mid December:** Pfizer vaccine approved and vaccinations begin

**Early April:** All aged 16+ eligible for vaccines; most counties outside metro Denver end mask order

**July 8:** Polis rescinds remaining COVID-19 executive and public health orders, replacing them with a new order on economic recovery and healthcare system capacity

**NOTES:** The percentage of Coloradans who reported delaying a medical procedure due to the COVID-19 pandemic in the last four weeks. Respondents are grouped by household income.

### Figure 11: Delays in Medical Procedures in Colorado During the Pandemic, by Race



# EDUCATION OUTCOMES

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## Remote Learning

Gauging the extent of learning losses in Colorado due to coronavirus-induced school closures is challenging, as the state cancelled the Colorado Measures of Academic Success (CMAS) assessment for students in spring 2020 and only administered it to select grades in spring 2021.<sup>19</sup> While a thorough analysis of state-wide academic achievement is beyond the scope of this inquiry, newly released data from the Colorado Department of Education show an increasing gap of academic performance between rich and poor from before lockdown in 2019 to after lockdown in 2021.<sup>20</sup> Since future earnings are tied closely to past academic performance, the earnings gap between rich and poor is certain to increase in the future.

In the Pikes Peak region, School District 38 (Lewis-Palmer 38) is among the wealthiest and School District 2 (Harrison 2) is among the poorest, based on the percent of students eligible for free-and-reduced lunch. From 2019 to 2021, math proficiency in wealthier D38 fell by 2.9%, but in poorer D2, it fell by 15.9%. English proficiency in wealthier D38 fell by 0.8%, while poorer D2 experienced a 9.8% drop.

In the Denver Metropolitan region, School District 5 (Cherry Creek 5) is among the wealthiest and School District 14 (Adams D14) is among the poorest, based on the percent of students eligible for free-and-reduced lunch. From 2019 to 2021, math proficiency in wealthier D5 fell by 1.4% while D14 fell by 27.2%. English proficiency in wealthier D5 fell by 2.6%, with a 26.7% decline in D14.

We can also draw inferences from national studies which indicate that

students of color and students from low-income backgrounds faced greater academic struggles during the pandemic. A McKinsey report estimated that learning losses for students of color ranged from 6-12 months nationwide,<sup>21</sup> compared to 4-8 months for white students. Similarly, educational assessment firm Curriculum Associates has determined that students from lower-income schools are more likely to be two or more grades behind in both reading and math than students from higher-income schools.<sup>22</sup>

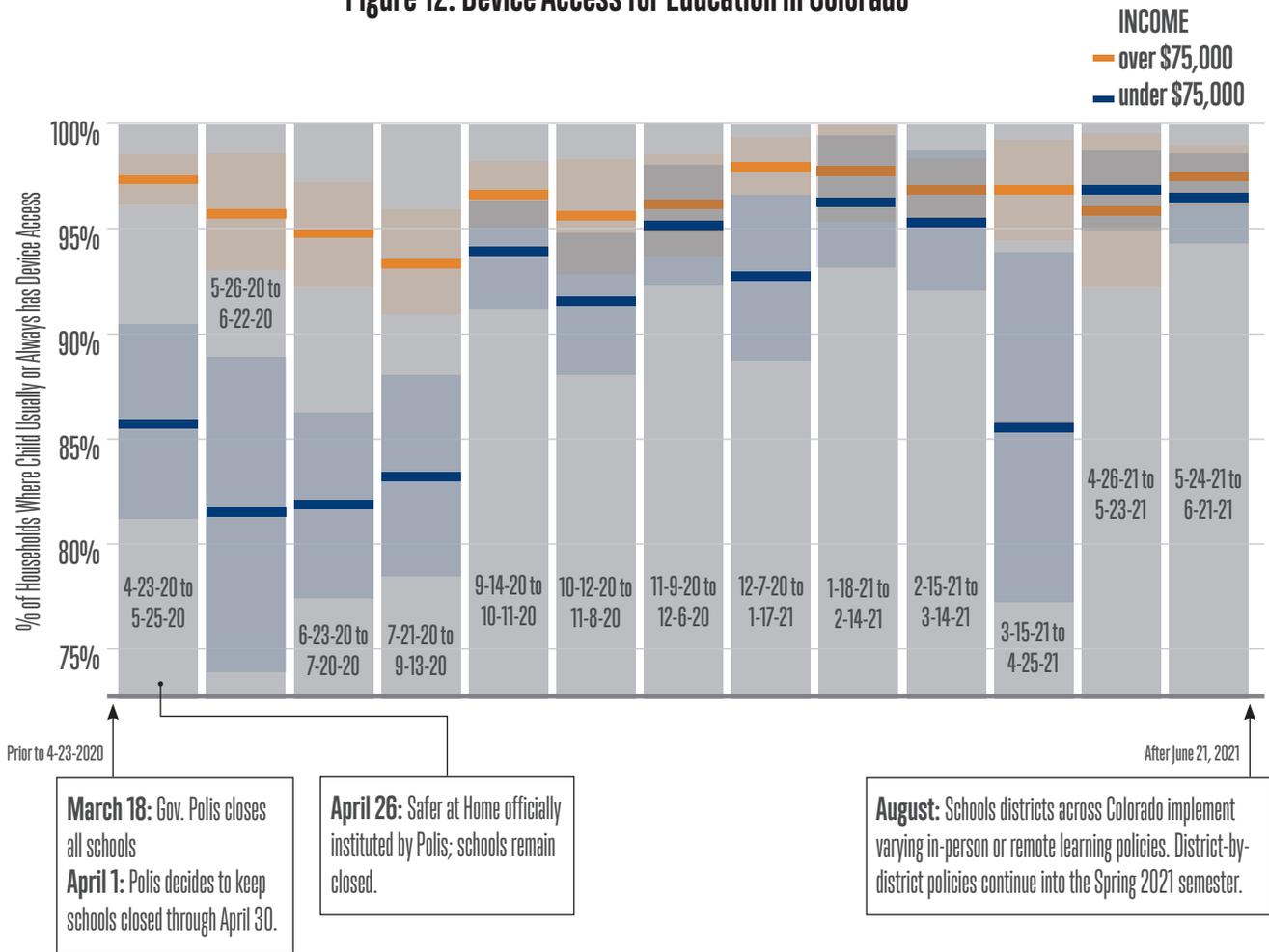
Our analysis of access to technology for remote learning in Colorado suggests that a similar gap between advantaged and disadvantaged students has likely emerged in this state. Figures 12 and 13 plot the percentage of households in Colorado where students have access to the Internet or to devices such as a laptop or tablet for educational purposes, based on HPS data. Access, for our purposes, is defined as technology either “usually” or “always” being available to students for educational use. These figures reveal a disparity in technology access between lower- and upper-income households in the early periods of HPS data, which span the spring and early summer of 2020. During the first several months of remote learning, then, it is probable that lower-income students received a lower-quality education than their higher-income counterparts. Additional research should be conducted to confirm this phenomenon once more data on academic outcomes in the state become available.

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During the first several months of remote learning, then, it is probable that lower-income students received a lower-quality education than their higher-income counterparts.

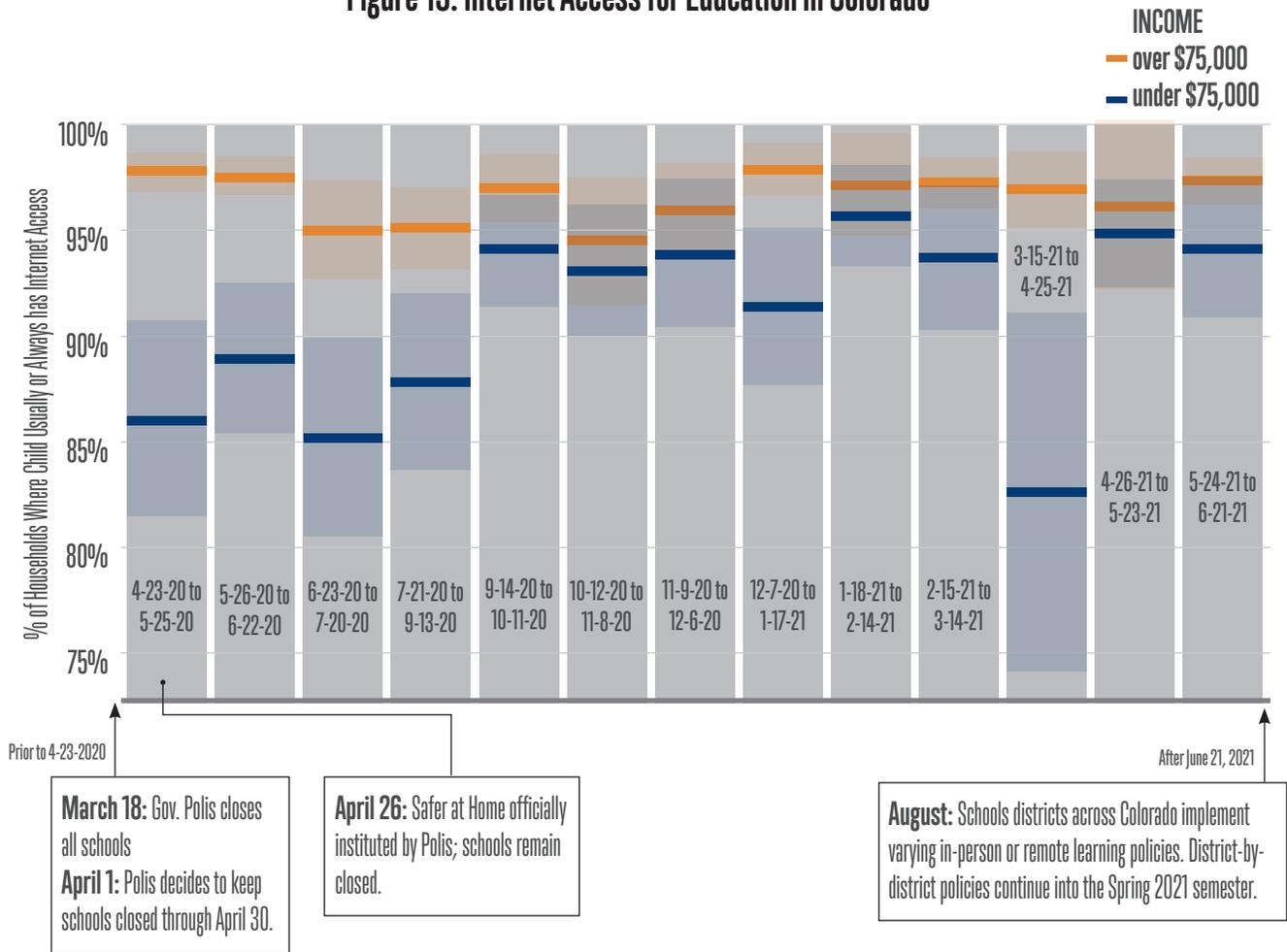
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### Figure 12: Device Access for Education in Colorado



NOTES: The percentage of households where students “usually” or “always” have access to a device for education in Colorado. Responses are divided based on income. Data are plotted with 90% confidence intervals.

### Figure 13: Internet Access for Education in Colorado



NOTES: The percentage of households where students “usually” or “always” have access to the Internet for education in Colorado. Responses are divided based on income. Data are plotted with 90% confidence intervals.

# CONCLUSION

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The economic damage to Colorado from COVID-19 and lockdown policies is massive. Our estimates of the loss in real GDP range from 8.2% “before and after” to 12.5% “with and without.” Our estimates of the loss in real wages and salaries range from 5.7% “before and after” to 10.2% “with and without.” Our estimates of the loss in employment range from 14.7% “before and after” to 16.9% “with and without.” These economic losses are concentrated among lower-income Coloradans and minorities.

The human damage is incalculable. We found a large increase in “deaths of despair,” particularly deaths from drug overdoses among minorities. An already increasing trend in overdoses among Blacks and Hispanics accelerated during the pandemic. Data from 2020 show a greater than 50% increase in overdose rates from 2019.

These near-term consequences are dire, but the effects of the lockdown will linger well beyond the economic rebound. Coloradans have lost opportunities for advancement on the job, lost educational opportunities, and will experience poorer medical outcomes due to foregone

procedures such as heart and cancer screenings. The ultimate damage will likely last for decades, and the brunt of it will be borne by low-income and minority Coloradans.

Colorado’s leaders must proceed with extreme caution as they craft policy to respond to the highly infectious Delta variant of COVID-19. Preventing Delta from overwhelming Colorado’s hospital capacity is important, but any steps taken to achieve that goal should be justified with thorough cost-benefit analysis. Our research demonstrates that Colorado’s most vulnerable poor and minorities have endured more than enough harm to their health and well-being as it is. Policymakers should think twice before inflicting more suffering on them to protect other citizens from COVID-19.

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Colorado’s leaders must proceed with extreme caution as they craft policy to respond to the highly infectious Delta variant of COVID-19.

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# APPENDICES

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## Appendix A: COVID-19 Deaths and Lockdown Stringency

We do not test for a causal relationship between deaths due to COVID-19 and the implementation of non-pharmaceutical interventions (NPIs) in the 50 U.S. states. However, we do investigate whether a correlation exists between these phenomena, irrespective of complicating factors. Below, we define the variables used to measure deaths and the severity of a state's NPIs.

### COVID-19 Deaths

We obtain the total number of COVID-19 deaths in each state through August 6 from the Centers for Disease Control and Prevention's COVID Data Tracker. The CDC reports deaths from New York and New York City separately; we combine these figures into one total for the state. Since death data is not separated into probable and confirmed deaths for every state, we use the combined count of probable and confirmed deaths in our analysis.

We report cumulative deaths due to COVID-19 as a rate per 100,000 persons in each state to avoid conflating a higher population with a more severe outbreak of coronavirus. We use the resident population counts from the 2020 Census in each state to produce these rates.

### Mean Lockdown Stringency

Oxford University's COVID-19 Government Response Tracker provides daily measurements of the severity of coronavirus-related restrictions in every U.S. state; we use measurements from March 1, 2020 through August 9, 2021. Of the indicators computed by the Oxford team, we utilize the stringency index, which scores U.S. states based on the degree to which they have implemented the following policies: school closures, workplace closures, cancellations of public events, restrictions on gathering sizes, public transit closures, stay-at-home orders, restrictions on internal movement, restrictions on international travel, and a public information campaign. This index does not factor in actions taken by the federal government, but it incorporates decisions made by both state and local policymakers. When there

is variation between local governments' implementation of one of these policies within a state, the Government Response Tracker factors the strictest locality's policy into the state's overall score on the stringency index.

In our exploratory analysis, we compare each state's cumulative COVID-19 death rate from March 2020 to August 6, 2021 with its mean daily stringency index score from March 2020 to August 9, 2021. A causal analysis would examine the timing of variations in lockdown measures relative to the timing of variations in COVID-19 deaths, but causal inference is not a focus of our study. Rather, we are merely interested in each state's average response to COVID-19 over the course of the pandemic in relation to the deaths it suffered over the course of the pandemic.

## Appendix B: GDP, Wages and Salaries, and Employment

We compare Colorado's trends in employment, GDP, and wages and salaries to the five U.S. states whose response to COVID-19 has been the most restrictive and the five states whose response has been the least restrictive. These states are selected using their mean stringency index scores, which we compute in the manner described in the preceding appendix. The five most restrictive states are Hawaii (most restrictive), New Mexico, Rhode Island, New York, and California. The five least restrictive states are Utah, Alabama, North Dakota, Iowa, and South Dakota (least restrictive). We detail our data sources and method of computing the trend in each macroeconomic indicator below.

### Data Sources

We track employment in each state using seasonally adjusted monthly data from the Bureau of Labor Statistics' Local Area Unemployment Statistics program. We are able to observe absolute job losses and gains from these data because we use the number of employed persons in each state rather than an employment rate, which also fluctuates based on changes in the size of the labor force.

Data on state GDP is accessed from the Bureau of Economic Analysis (BEA), which releases the data

quarterly in real terms with a base year of 2012 dollars. The BEA also releases quarterly personal income estimates for each state by major component, from which we obtain quarterly figures for each state's total wage and salary income. Those figures are adjusted for seasonality but not inflation, so we convert them to real dollars using a quarterly personal consumption deflator with 2012 as the base year. We obtain that deflator from the St. Louis Federal Reserve. Importantly, although the BEA incorporates regional price differences into its inflation adjustment for GDP, it releases regional price deflators on an annual rather than quarterly basis. Consequently, our inflation adjustment to quarterly wages and salaries in each state only reflects changes in price levels nationwide.

### **Computing Trends Relative to Baseline**

We observe employment, real GDP, and real wages and salaries in Colorado as a percentage of their values in the state in the fourth quarter of 2019, which serves as a baseline period. Before converting values for the most and least restrictive states to a percentage of baseline, we compute quarterly averages of employment, real GDP, and real wages among the five most restrictive states and among the five least restrictive states. We then represent the quarterly average in each group for each indicator as a percentage of the average value of that indicator within the group in the fourth quarter of 2019.

## **Appendix C: Industry-Level Analysis**

Our data on monthly employment levels in each industry are drawn from the Current Employment Statistics (CES), accessed through the Colorado Department of Labor and Employment's Labor Market Information (LMI) gateway. These data are seasonally adjusted. Excluding government, the four largest industries by number of employees in Colorado in February 2020 were trade, transportation, and utilities (482,700 workers), professional and business services (447,500), educational and health services (353,900), and leisure and hospitality (346,900). We analyze monthly trends in the employment levels in each of these industries during the pandemic relative to a February 2020 baseline.

To infer how trends in each industry have affected different demographic and income groups in Colorado, we draw on the Census Bureau's Quarterly Workforce

Indicators (QWI) and the Bureau of Labor Statistics' Quarterly Census of Employment and Wages (QCEW). The QCEW provides an average weekly wage for each of the subindustries that comprise the four industries we analyze using the CES. To obtain overall average weekly wages for each of the four industries, we use QCEW data on the average number of people employed in each subindustry during the quarter to compute a weighted average of the subindustry wages. We determine these weighted averages in Q4 2019 because it is the last full quarter before the pandemic began. Similarly, we examine Q4 2019 data from the QWI to analyze the demographic makeup of each industry prior to the pandemic. Specifically, we use the counts of the number of employees in each subindustry by race and ethnicity at the beginning of Q4 2019 rather than the end (the QWI provides both counts). Since these data are not seasonally adjusted, employment numbers at the end of Q4 would be influenced by the holiday season.

Naming conventions for subindustries in the CES, the QWI, and the QCEW vary slightly. Table 2 presents the names for these subindustries in the CES and their corresponding names in the QWI and QCEW.

Our data on the number of small businesses open in each industry in Colorado are taken from the Opportunity Insights Economic Tracker, which itself draws these data from Womply. Womply is a firm, which offers digital services to small businesses based on its analysis of credit card transactions and has over 10,000 clients in Colorado.

## **Appendix D: Analysis of the Household Pulse Survey**

In April 2020, the Census Bureau launched the Household Pulse Survey (HPS), a high-frequency survey of households in all 50 states intended to assess the effects of the coronavirus pandemic. We use data from the HPS to investigate trends in employment, access to medical care, mental health, and education in Colorado. This section details the procedure we employ to obtain accurate estimates of these trends, disaggregated by racial and income groups, from the raw data provided in the Census Bureau's Public Use Files for the HPS.

### **Time Frame**

To increase our sample size, we combine waves of HPS data collection to produce estimates over four-week

**Table 2: The names of the industries analyzed in this report and the names of the subindustries within them.**

<b>Trade, Transportation, and Utilities</b>	
<b>CES Name</b>	<b>QWI/QCEW Name</b>
Retail Trade	Retail Trade
Wholesale Trade	Wholesale Trade
Transportation, Warehousing, and Utilities	Transportation and Warehousing
<b>Professional and Business Services</b>	
<b>CES Name</b>	<b>QWI/QCEW Name</b>
Professional, Scientific, and Technical	Professional and Technical Services
Management of Companies and Enterprises	Management of Companies and Enterprises
Administrative and Support and Waste Management	Administrative and Waste Services
<b>Educational and Health Services</b>	
<b>CES Name</b>	<b>QWI/QCEW Name</b>
Educational Services	Educational Services
Health Care and Social Assistance	Health Care and Social Assistance
<b>Leisure and Hospitality</b>	
<b>CES Name</b>	<b>QWI/QCEW Name</b>
Accommodation and Food Services	Accommodation and Food Services
Arts, Entertainment, and Recreation	Arts, Entertainment, and Recreation

periods instead of individual weeks. We take this step to address two concerns regarding the quality of HPS data. First, because the Census Bureau releases results from the HPS far more rapidly than for more established surveys like the American Community Survey (ACS), it cautions that HPS data may be less reliable than data from said other surveys. Additionally, since we are interested in separating trends based on socioeconomic status, we have to divide an already modest weekly sample size for the state of Colorado into subgroups, which increases the variability of our estimates. Aggregating data across weeks counteracts this effect by enlarging our sample for each socioeconomic group.

In all, the Census Bureau has released 33 weeks of data from the HPS across four phases of collection: Phase 1 (April 23, 2020 – July 21, 2020), Phase 2 (August 19, 2020 – October 26, 2020), Phase 3 (October 28, 2020 – March

29, 2021), and Phase 3.1 (April 14, 2021 – July 5, 2021). In Phase 1, each survey week spanned exactly one week; starting in Phase 2, the Bureau switched to collecting data across biweekly periods but continued to label these periods as survey weeks for continuity. We obtain 13 periods, each spanning four weeks of real time, by combining groups of four successive survey weeks in Phase 1 and by combining pairs of successive survey weeks in Phases 2 through 3.1. With the exception of periods 8 (survey weeks 21 and 22) and 11 (survey weeks 27 and 28), all periods are created by combining survey weeks which occurred consecutively in real time. Survey weeks 21 and 22 took place from December 9 to December 21, 2020 and January 6 to January 18, 2021, respectively. Survey weeks 27 and 28 took place from March 17 to March 29, 2021 and April 14 to April 26, 2021, respectively.

## Derived Metrics

Before computing the metrics that we construct from the HPS data, we divide the HPS Colorado sample into two comparison groups using two different procedures. First, we divide the sample based on whether the respondent lives in a household with a combined income of more or less than \$75,000 per year. This threshold is close to the median household income in Colorado from 2015 to 2019, which the Census Bureau reports was \$72,331 in 2019 dollars. Second, we divide the sample based on whether the respondent is white and non-Hispanic or of any other race and ethnicity. Limiting our analysis to just two income groups and two racial and ethnic groups enables us to investigate whether COVID-19 has had disparate impacts on different socioeconomic groups in Colorado without substantially increasing the variances of our estimates.

The metrics we estimate are listed in the table below, along with the variables and questions from which they are derived. Note that the Census Bureau does not impute data when a respondent leaves a question blank in the HPS, so researchers computing percentages are instructed to exclude individuals who fail to answer a question from the denominator of a proportion derived from that question. We follow this guidance and compute all percentages using only individuals who responded to the relevant questions.

### 1. Anxiety percentage

- *Metric description:* The percentage of respondents within a racial/income group who report feeling anxious during more than half or all of the last seven days
- *HPS variable name:* ANXIOUS
- *Question text:* Over the last 7 days, how often have you been bothered by the following problems... Feeling nervous, anxious, or on edge? Would you say not at all, several days, more than half the days, or nearly every day? Select only one answer.
- *Responses included in metric numerator:* More than half the days, nearly every day

### 2. Depression percentage

- *Metric description:* The percentage of respondents within a racial/income group who report feeling depressed during more than half or all of the last seven days
- *HPS variable name:* DOWN

- *Question text:* Over the last 7 days, how often have you been bothered by...feeling down, depressed, or hopeless? Would you say not at all, several days, more than half the days, or nearly every day? Select only one answer.
- *Responses included in metric numerator:* More than half the days, nearly every day

### 3. Employment percentage

- *Metric description:* The percentage of respondents within a racial/income group who report doing any work for pay within the last seven days
- *HPS variable name:* ANYWORK
- *Question text:* In the last 7 days, did you do ANY work for either pay or profit? Select only one answer.

### 4. Device access percentage

- *Metric description:* The percentage of respondents within a racial/income group who report that children in their household always or usually have access to a computer for educational purposes
- *HPS variable name:* COMPAVAIL
- *Question text:* How often is a computer or other digital device available to children for educational purposes? Select only one answer.
- *Responses included in metric numerator:* Always available, usually available

### 5. Internet access percentage

- *Metric description:* The percentage of respondents within a racial/income group who report that children in their household always or usually have access to the internet for educational purposes
- *HPS variable name:* INTRNTAVAIL
- *Question text:* How often is the internet available to children for educational purposes? Select only one answer.
- *Responses included in metric numerator:* Always available, usually available

### 6. Delayed medical procedure percentage

- *Metric description:* The percentage of respondents within a racial/income group who report that they delayed a medical procedure within the last four weeks due to the coronavirus
- *HPS variable name:* DELAY
- *Question text:* At any time in the last 4 weeks, did you DELAY getting medical care because of the coronavirus pandemic? Select only one answer.
- *Responses included in metric numerator:* Yes

### Estimating Variance using Replicate Weights

We report all estimates along with 90% confidence intervals, following the standards the Census Bureau lays out in its Source and Accuracy Statement for the HPS. Our confidence intervals are based on approximations of the variance of each estimate using replicate weights provided by the Census Bureau. A set of replicate weights is a replacement for the official HPS sample weights, which indicate how many people in the population are represented by an individual in the HPS sample. The variance of a metric  $x$  is computed as:

$$\text{var}(x) = \frac{4}{80} \sum_{i=1}^{80} (x_i - x_0)^2$$

Where  $x_i$  is an estimate of the metric using the  $i$ th set of replicate weights provided by the Census Bureau and  $x_0$  is the estimate of the metric using the official sample weights for each observation in the dataset. Our methodology relies on pooling samples from multiple survey weeks, in which case the Census Bureau directs researchers to divide each observation's sample weight by the number of samples being combined. However, because all of our metrics are percentages rather than counts, scaling weights in this manner does not affect our estimates.

Note also that the Census Bureau provides two types of weights for each observation in the HPS: a person-level weight for use when measuring characteristics which apply to individual respondents, and a household-level weight for use when measuring characteristics that apply to the entire household. We use the person-level weights for all metrics listed above except the device and internet access percentages, since those questions inquire about all children in the household rather than just the respondent.

## Appendix E: Computing a Baseline “Employment Rate” Using CPS Data

Since the Household Pulse Survey lacks pre-COVID data, it provides no baseline level of employment prior to the pandemic. To address this, we construct a metric similar to the employment percentage described in the appendix above using Current Population Survey (CPS) data, which are available for January and February 2020. We retrieve these data from IPUMS, a tool developed by the University of Minnesota for quickly extracting multiple samples of data from the CPS and other government surveys.

We divide the CPS sample based on household income and based on race and ethnicity. Respondents are split into racial and ethnic groups based on whether they are non-Hispanic whites or of minority status, matching our methodology from the HPS analysis in Appendix D. Respondents are split into income groups based on whether the family income of the householder is above or below \$75,000 per year. This is a slightly different definition of income than that used in the HPS, but total household income—the measure used in the HPS—is only observed in the Annual Social and Economic Supplement (ASEC) to the CPS.

Next, we determine whether each respondent is employed. Since the HPS only asks respondents whether they have worked in the last seven days, we only count CPS respondents as employed if they have done actual work in the past week. This definition excludes individuals who have a job but were not working at it during the previous week, who are typically classified as employed in the CPS.

To compute an employment percentage like the one in Appendix D, we also define which respondents contribute to the denominator. A typical employment rate would exclude individuals in the armed forces and individuals under 15 years of age, and we make these exclusions as well. However, a typical employment rate would also exclude individuals who are not in the labor force, but we include respondents both in and out of the labor force. This step is necessary because CPS data provide information on who is in the labor force, but HPS data do not. By incorporating people who are not in the labor force into the denominator, we stay as consistent as possible with the HPS methodology. After classifying all respondents based on whether they contribute to the numerator and denominator of our employment percentage, we compute the percentage using person-level weights assigned to each respondent in the CPS. Formally, the percentage is the sum of all the person-level weights of individuals who are employed (as we define employed) divided by the sum of all the person-level weights of individuals who are included in our denominator. To increase our sample size, we pool responses from January and February 2020, yielding an average “employment percentage” across the two months. We compute these percentages for each of the two income groups and each of the two racial and ethnic groups defined above.

## Appendix F: Deaths of Despair

The Colorado Department of Public Health and Environment (CDPHE) tracks overdoses and suicides through the State Unintentional Overdose Reporting System (SUDORS) and Colorado Violent Death Reporting System (CoVDRS), respectively. However, SUDORS and CoVDRS data for 2020 are unavailable at this time, so we rely on vital statistics data based on death certificates, which have already been finalized for 2020. These data were provided by the CDPHE upon written request.

The data we received from CDPHE included age-adjusted death rates by cause, race, and ethnicity. Following standard epidemiological practice, the age-adjustments to the crude death rates in the dataset standardized said rates to the age distribution of the 2000 U.S. population. Age adjustment is necessary to make comparisons across demographic groups because age is associated with mortality, meaning that variations in the age distributions of different racial and ethnic subpopulations can affect the crude mortality rates of each subpopulation and obscure underlying trends.

## Appendix G: Data Sources and Documentation

- **Data: State population counts from the 2020 Census.**
  - URL: <https://www.census.gov/data/tables/2020/dec/2020-apportionment-data.html>
  - Notes: Data retrieved from Table 2 (the resident population of each state).
- **Data: Median household income in Colorado.**
  - URL: <https://www.census.gov/quickfacts/fact/table/CO/INC110219>
  - Notes: Income is measured in 2019 dollars.
- **Data: Household Pulse Survey Public Use Files.**
  - URL: <https://www.census.gov/programs-surveys/household-pulse-survey/datasets.html>
  - Documentation:
    - Technical documentation page: <https://www.census.gov/programs-surveys/household-pulse-survey/technical-documentation.html>
    - Guidance on using replicate weights: [https://www.census.gov/content/dam/Census/library/publications/2010/acs/acs\\_design\\_methodology\\_ch12.pdf](https://www.census.gov/content/dam/Census/library/publications/2010/acs/acs_design_methodology_ch12.pdf)
- **Data: CDC data on COVID-19 deaths and cases by state and over time.**
  - Source and accuracy statement: <https://www2.census.gov/programs-surveys/demo/technical-documentation/hhp/Source-and-Accuracy-Statement-April-23-May-5-and-May-7-May12.pdf>
- **Data: CDC data on COVID-19 deaths and cases by state and over time.**
  - URL: <https://data.cdc.gov/Case-Surveillance/United-States-COVID-19-Cases-and-Deaths-by-State-o/9mfq-cb36>
- **Data: Oxford COVID-19 Government Response Tracker (OxCGRT) stringency index.**
  - URL: <https://github.com/OxCGRT/USA-covid-policy>
  - Documentation:
    - Methodology: [https://www.bsg.ox.ac.uk/sites/default/files/2020-12/BSG-WP-2020-034-v2\\_0.pdf](https://www.bsg.ox.ac.uk/sites/default/files/2020-12/BSG-WP-2020-034-v2_0.pdf)
    - Codebook: <https://github.com/OxCGRT/covid-policy-tracker/blob/master/documentation/codebook.md#containment-and-closure-policies>
- **Data: Bureau of Labor Statistics estimates of employment by state over time.**
  - URL: <https://www.bls.gov/web/laus.supp.toc.htm>
  - Notes: We used the downloadable series file entitled “States and selected areas: Employment status of the civilian noninstitutional population, January 1976 to date, seasonally adjusted (ZIP).”
- **Data: Quarterly personal consumption expenditures price deflator.**
  - URL: <https://fred.stlouisfed.org/series/DPCERD3Q086SBEA>
  - Notes: Seasonally adjusted. Index year is 2012.
- **Data: Nominal wage and salary income by state and quarter.**
  - URL: <https://apps.bea.gov/iTable/iTable.cfm?reqid=70&step=1&acrdrn=2>
  - Notes: Selected from the series “Quarterly Personal Income by Major Component” (SQINC4). Seasonally adjusted.
- **Data: Real GDP by state and quarter.**
  - URL: <https://apps.bea.gov/iTable/iTable>

[cfm?reqid=70&step=1&acrnd=2](#)

- Notes: Selected from the series “Real GDP in chained dollars” (SQGDP9). Base year is 2012.

- **Data: Quarterly Workforce Indicators (QWI) data on racial/ethnic makeup of each industry’s workforce in Colorado.**

- URL: <https://ledextract.ces.census.gov/static/data.html>

- Documentation: [https://lehd.ces.census.gov/doc/QWI\\_101.pdf](https://lehd.ces.census.gov/doc/QWI_101.pdf)

- Notes: We use the “Emp” indicator series, which represents beginning of quarter employment counts. Not seasonally adjusted.

- **Data: Quarterly Census of Employment and Wages (QCEW) data on the average weekly wage in each industry in Colorado.**

- URL: <https://www.colmigateway.com/vosnet/lmi/default.aspx>

- Documentation: <https://www.bls.gov/opub/hom/cew/>

- Notes: We gather averages across firms of all types of ownership. Not seasonally adjusted.

- **Data: Percentage decrease in the number of small businesses open by industry.**

- URL: <https://www.tracktherecovery.org/>

- Documentation: [https://opportunityinsights.org/wp-content/uploads/2020/05/tracker\\_paper.pdf](https://opportunityinsights.org/wp-content/uploads/2020/05/tracker_paper.pdf)

- **Data: Monthly employment by industry in Colorado from the Current Employment Statistics.**

- URL: <https://www.colmigateway.com/vosnet/lmi/default.aspx>

- Notes: Seasonally adjusted.

- **Data: All-cause, overdose, and suicide death data in Colorado.**

- Source: Provided upon request by the Colorado Department of Public Health and Environment.

- **Data: Employment status microdata from the Current Population Survey, accessed through IPUMS.**

- URL: <https://cps.ipums.org/cps/>

## Appendix H: Timeline of COVID-19 Policies in Colorado

### General Sources

Colorado Health Institute: <https://www.coloradohealthinstitute.org/research/covid19>

Colorado Springs Gazette: [https://gazette.com/news/a-timeline-of-covid-19-in-colorado/article\\_b3467cd4-f9e2-11ea-98fa-cbe60dbab59d.html](https://gazette.com/news/a-timeline-of-covid-19-in-colorado/article_b3467cd4-f9e2-11ea-98fa-cbe60dbab59d.html)

CDPHE: <https://covid19.colorado.gov/public-health-executive-orders>

### 2020

**Early February:** first confirmed cases occur in Colorado, although not identified until March

**March 5:** first confirmed case is identified

**March 11:** Gov. Polis declares state of emergency

**March 12:** CDPHE executive director Jill Ryan limits visitor access to nursing homes, assisted living homes, intermediate care facilities

**March 14:** Gov. Polis closes ski resorts for one week

**March 16:** Polis closes bars, dining at restaurants, theaters, gyms, casinos

**March 18:** CDPHE caps gatherings to 10 people; Gov.

Polis closes all schools; ski resorts closed until April 6

**March 19:** Polis orders delay of elective surgeries to save PPE

**March 20:** Polis extends income tax payment deadline to July 15, 2020

**March 22:** Polis limits workforce of non-essential businesses to 50% of staff

**March 25:** Polis enacts stay-at-home order from March 27-April 11 (some cities/counties have already enacted an order by this time); all non-essential businesses are closed (overriding the 50% capacity cap)

**March 28:** Trump declares Colorado a major disaster area at Polis’ request, opening up federal avenues for assistance

**April 1:** Polis relaxes restrictions on telehealth and keeps schools closed through April 30

**April 3:** Polis recommends mask-wearing

**April 6:** Stay at home extended to April 26; ski resorts closed until April 30

**April 8:** State of emergency extended to May 15

**April 11:** Polis orders juvenile detainees who are not a threat released; visitation limited at mental health facilities

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**April 17:** Polis mandates face coverings in critical business and government settings

**April 20:** Polis announces stay-at-home will expire on

**April 26:** marking the start of Safer at Home

**April 26:** Safer at home officially enacted:  
Gatherings of over 10 people still banned, Coloradans asked to avoid traveling outside their county and no more than 10 miles from home. Mask-wearing encouraged but not mandated. Elective procedures are allowed to resume.

OPENING: Retailers with curbside service, offices with 50% of the workforce on site, childcare, home showings, haircuts

CLOSED: schools, restaurants

**April 30:** Polis enacts eviction/late fee ban on tenants suffering from pandemic; ski resorts closed until May 23

**May 12:** State parks accessible for camping

**May 25:** Polis extends Safer at Home to June 1, day camps will open on June 1, restaurants can open at half capacity

**June 1:** Polis institutes Safer at Home and in the Vast, Great Outdoors, promoting limited outdoor gatherings of up to 10 people; overnight camps still closed, but day/sports camps open

**June 4:** Polis gives businesses the right to refuse unmasked customers

**June 13:** Eviction ban expires, Polis requires 30-day warning before evicting tenants; Polis also continues state aid for rent/mortgage payments

**June 15:** Polis reopens overnight camps, bars open at 25% capacity

**June 19:** CDPHE relaxes social distancing – bars at 25% capacity, overnight camps up to 25 people (outdoors), indoor gatherings of up to 100, and outdoor gatherings of up to 175

**June 20:** State of emergency extended again to July 19

**June 30:** Polis closes bars and nightclubs except those with seating for each group

**July:** Colorado experiences a smaller [second wave](#) in coronavirus infections

**July 9:** Polis announces Protect Our Neighbors, allowing communities with good health metrics to apply for relaxed restrictions (e.g., nonessential businesses can operate at 50% capacity)

**July 16:** Polis imposes statewide mask order for indoor spaces and residents over 10 ( follows a number of county-wide mandates in June and early July)

**July 21:** Curfew on alcohol service at 10 pm

**August 13:** Mask mandate extended to September 13

**August 20:** Last call pushed to 11 pm for bars

**September 10:** Polis institutes the dial system to control restrictions in each county based on public health metrics. The system will be revised numerous times across subsequent executive orders, but the order establishing it is viewable [here](#).

**October-December:** Colorado experiences its [largest wave](#) of coronavirus infections; its nursing homes experience a [higher death rate](#) from Thanksgiving to Christmas than those of any other state

**October 11:** Polis extends mask mandate through November

**October 15:** Eviction moratorium issued in case the federal ban is lifted

**December 3:** Weddings, funerals, religious services deemed essential

**Mid December:** Pfizer vaccine approved and vaccinations begin

**December 31:** Polis allows counties at red dial level to return to orange, partially reopening their restaurants and other venues

## 2021

**Week of February 4:** Dial 2.0 – a looser version of the old system – is enacted

March: Rockies allowed to host 21,000 fans at Coors Field

**Week of March 18:** Dial 3.0 enacted

**Early April:** All aged 16+ eligible for vaccines; most counties outside metro Denver end mask order

**Week of April 15:** Dial system is no longer binding on counties

**May 14:** Polis lifts mask mandate for fully vaccinated individuals in response to updated CDC guidance; also lifts it for unvaccinated individuals in select settings

**May 19:** Polis enacts Colorado Jumpstart, making direct payments to those who received UI and return to work between May 16 and June 26

**July 8:** Polis [rescinds](#) remaining COVID-19 executive and public health orders, replacing them with a [new order](#) on economic recovery and healthcare system capacity

**July 30:** Latest CDPHE public health [order](#) on minor COVID-19 restrictions released

# ENDNOTES

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