Excess Death Rates by State During the COVID-19 Pandemic: United States, 2020–2023

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See also Chowell and Islam, p. 879.

Objectives. To estimate state-level excess death rates during 2020 to 2023 and examine differences by region and partisan orientation.

Methods. We modeled death and population counts from the Centers for Disease Control and Prevention to estimate excess death rates for the United States, 9 census divisions, and 50 states. We compared excess death rates for states with different partisan orientations, measured by the party of the seated governor and the level of partisan representation in state legislatures.

Results. The United States experienced 1 277 697 excess deaths between March 2020 and July 2023. Almost 90% of these deaths were attributed to COVID-19, and 51.5% occurred after vaccines were available. The highest excess death rates first occurred in the Northeast and then shifted to the South and Mountain states. Between weeks ending June 20, 2020, through March 19, 2022, excess death rates were higher in states with Republican governors and greater Republican representation in state legislatures.

Conclusions. Excess death rates during the COVID-19 pandemic varied considerably across the US states and were associated with partisan representation in state government, although the influence of confounding variables cannot be excluded. (*Am J Public Health*. 2024;114(9):882–891. https://doi.org/10.2105/AJPH.2024.307731)

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The United States experienced a dramatic increase in excess deaths during the COVID-19 pandemic, as many studies have documented.[1–9] "Excess deaths" refers to the difference between observed deaths from all causes and the number that would be expected under normal circumstances. During the COVID-19 pandemic, this difference was largely explained by COVID-19 deaths, but some of the increase reflected deaths attributed to non–COVID-19 causes, such as uncounted or miscoded COVID-19 deaths and deaths among people without COVID-19 who died from other causes induced by the pandemic (e.g., acute emergencies, chronic diseases, behavioral health crises).

The United States experienced more deaths from COVID-19, a higher rate of excess deaths, and larger losses in life expectancy than other high-income countries.[10–13] The US mortality experience was the product of differential mortality trends in the 50 states, but few studies have compared excess death rates at the state level. Previous studies that did report excess death rates by state did so only for 2020 through mid-2021.

Existing state-level data suggest that excess death rates at the onset of the pandemic in spring 2020 were highest in states where the outbreak first occurred (e.g., New York, New Jersey), but patterns shifted over time. As the pandemic spread to other regions, such as the South, states adopted different response plans and experienced disparate mortality outcomes. For example, 1 study found that states that ended lockdowns earlier in May and June of 2020 experienced longer surges in excess deaths during summer 2020 than those that reopened later.[4]

The politicization of public health created a sharp partisan divide in how states responded to the pandemic.[14] In general, states with Republican governors and conservative political

orientations were more resistant to enforcement of pandemic control measures (e.g., masking, social distancing, COVID-19 vaccination) than those with Democratic leadership, potentially increasing excess deaths.[15–17] One analysis suggested that more conservative states, notably those in the South, experienced more excess deaths during the Delta-variant surge in fall 2021.[18] Another study reported that excess death rates during June 2020 to April 2022 were higher in states with Republican governors and those with larger Republican representation in the state legislature than states with Democratic governors or a larger Democratic presence in the legislature.[19] A multivariate analysis found that COVID-19 outcomes were not associated with the governor's party but were associated with votes for the 2020 Republican presidential candidate.[20]

In this study, we aimed to estimate state-level excess death rates from 2020 to 2023 and to examine differences by region and partisan orientation. This article contributes to the literature in 4 ways. First, by extending the analysis to 2023, it provides the most current estimates of state-level excess death rates during the COVID-19 pandemic. Second, it compares outcomes across 5 distinct phases of the pandemic, including the initial outbreak, the prevaccine period, and the vaccine period during which vaccination coverage expanded and then stabilized, and a quiescent period during which no major surges in mortality occurred. Third, it compares excess death rates across US Census divisions and states with partisan orientations, measured by both a binary variable (party of the seated governor) and ordinal variable (degree of partisan representation in state legislature). Finally, it employs a sophisticated modeling method to estimate excess deaths and examines the proportion of excess deaths attributed to COVID-19.

METHODS

We obtained weekly death data for the 50 US states and the District of Columbia from the National Center for Health Statistics for the weeks ending March 7, 2020, through the week ending July 1, 2023,[21] and for the same weeks during the preceding 6 years (2014–2019).[22] The analysis included total deaths and deaths from COVID-19. COVID-19 deaths included those in which COVID-19 was cited on death certificates as an underlying or contributing cause. Population counts for 2020 to 2023 were obtained from the projected population counts provided by Centers for Disease Control and Prevention Wide-ranging ONline Data for Epidemiologic Research (CDC WONDER).[23] The partisan orientation of governors and state legislators by year was obtained from the National Conference of State Legislatures.[24] Data on the partisan composition of state legislatures excluded Nebraska, which has a unicameral and nonpartisan legislature.

Estimation of Excess Death Rates

We employed a hierarchical generalized linear mixed model to predict expected deaths based on historical patterns. We estimated expected deaths and their corresponding 95% confidence intervals (CIs) by fitting the model to weekly death counts, assuming a negative binomial distribution to account for potential overdispersion. The analysis covered the period from December 29, 2013, to February 29, 2020, with data drawn from the September 20, 2023, data set.

The selected model, chosen for its optimal fit as detailed in the "Model comparisons" section of the Appendix (available as a supplement to the online version of this article at https://ajph.org), utilized a combination of harmonic functions to account for seasonality and adjusted for annual trends through a continuous year effect. Notably, the model allowed for variations in seasonal and temporal trends at the state level.

We defined excess deaths as the difference between observed and expected deaths predicted by the model. We computed excess death rates by dividing the number of excess deaths by the respective state's population count for the corresponding year.

Phases of Analysis

We calculated the results for the total period (weeks ending March 7, 2020, through July 2, 2023) and for 5 distinct phases of the pandemic:

- Phase 1 (weeks ending March 7, 2020, through June 13, 2020): Phase 1 represents the initial outbreak of the COVID-19 pandemic and the first surge in mortality, which reached its nadir by the week ending June 13, 2020. This phase was marked by lockdowns and increasingly partisan debates over when to reopen and how strongly to trust public health guidance.
- Phase 2 (weeks ending June 20, 2020, through March 13, 2021): Phase 2 represents the prevaccine era, during which state policies on masking, social distancing, and congregate events became more politically polarized. The week ending March 13, 2021, marks the nadir in deaths following the winter 2020–2021 surge.

- Phase 3 (weeks ending March 20, 2021, through March 19, 2022): Phase 3 represents the early vaccine period, during which population uptake of COVID-19 vaccines was increasing and the fall 2021 Delta and Omicron variant surge and the winter 2021–2022 surges occurred. Although COVID-19 vaccines were first available to the public in December 2020, only 24.1% of the US population had received 1 dose as of March 15, 2021, when this phase began.[25] Bollyky et al.[20] marked March 15, 2021, as the start of the vaccine era. This phase ended on March 19, 2022, after completion of the winter 2021–2022 surge and after February 2022, when uptake of COVID-19 vaccines began to plateau, with 76.9% of the population having received 1 dose.[26]
- Phase 4 (weeks ending March 26, 2022, through February 4, 2023): Phase 4 captures the period of stabilizing vaccine coverage and includes the winter 2022–2023 surge, the nation's last major surge in COVID-19 deaths.
- Phase 5 (weeks ending February 11, 2023, through July 2, 2023): Phase 5 captures a relatively quiescent period marked by no major surges.

Analysis by Census Division

In addition to calculating rates at the state level, we also calculated rates for 9 US Census Bureau divisions: Division 1 (New England), Division 2 (Middle Atlantic), Division 3 (East North Central), Division 4 (West North Central), Division 5 (South Atlantic), Division 6 (East South Central), Division 7 (West South Central), Division 8 (Mountain), and Division 9 (Pacific).

Analysis by Partisan Orientation

We stratified excess death rates for each phase based on partisan affiliation, using 3 measures. First, we calculated rates by phase for states with Democratic or Republican governors, based on the party affiliation of the seated governor in the designated year. Second, we calculated rates for states with 4 different levels of Republican representation in the state legislature: less than 33% (group 1), 33% to 49% (group 2), 50% to 66% (group 3), and 67% or more (group 4). Representation of greater than 50% is necessary for party control, and the majority party can exert greater influence if it holds enough seats (usually 67% or greater) to override a governor's veto. Accordingly, the groups were defined to capture Democratic control with (group 1) or without (group 2) veto-override power and Republican control with (group 4) or without (group 3) veto-override power. Third, we calculated rates for states with 4 different levels of control over the branches of government, including 2 "trifecta" scenarios in which either Democrats or Republicans held the governor's seat and controlled both chambers, and 2 scenarios of divided government in which the governor's party controlled only 1 chamber.

Partisan affiliation for each phase was based on data from the National Conference of State Legislatures for the election that immediately preceded the start of each phase. As shown in the Appendix, Tables A through C (available as a supplement to the online version of this article at https://ajph.org), the number of states varied by year for each of the 3 measures (number of governors, by party; level of Republican representation; and control over branches of government). We determined the statistical significance of differences in mortality rates among states grouped by partisan affiliation with the χ^2 test, pairwise comparison of proportions test (with *P* value adjustment utilizing the Benjamini–Hochberg procedure), and the Wilcoxon rank sum test. We conducted data cleaning and preparation in SAS version 9.4 (SAS Institute Inc, Cary, NC), and we conducted statistical analyses in RStudio version 1.3.1093 (RStudio, PBC, Boston, MA).

RESULTS

Over the entire study period (phases 1–5, March 2020 through June 2023), an estimated 1 277 697 excess deaths occurred in the United States, including 1 130 696 (88.5%) deaths attributed to COVID-19. Table 1 provides excess deaths and death rates for the 9 census divisions, the 50 states, and the District of Columbia. Appendix Figures A through E (available as a supplement to the online version of this article at https://ajph.org) map the geographic distribution. Over the course of the entire period, excess death rates were highest in East South Central, Mountain, and West South Central census divisions. The 10 states with the highest excess death rates were West Virginia, New Mexico, Mississippi, South Carolina, Wyoming, Louisiana, Arizona, Kentucky, Arkansas, and Alabama.

Excess Death Rates by Phase

Excess death rates in the United States increased from phase 1 (44.6 per 100 000) to phase 2 (140.7 per 100 000) and phase 3 (150.1 per 100 000) and then fell dramatically during phase 4 (44.6 per 100 000) and phase 5

TABLE 1— Excess Death Rates, by Phase, US Census Divisions, and States: 2020–2023

	Excess Death Rates (per 100 000 Population)					
	Phase 1: Outbreak[a]	Phase 2: Prevaccine[b]	Phase 3: Early Vaccine[c]	Phase 4: Stable Vaccine[d]	Phase 5: Quiescent[e]	Overall[f]
United States	44.6	140.7	150.1	44.6	0.1	94.0
Region 1: Northeast						
Division 1: New England	86.6	46.4	50.1	19.3	−16.3	46.4
Connecticut	119.9	75.5	64.8	26.2	−20.0	66.5
Maine	−1.8	50.6	146.2	80.7	6.8	70.6
Massachusetts	109.6	23.8	17.8	−0.2	−25.0	31.4
New Hampshire	25.1	49.9	72.9	59.7	7.0	53.5
Rhode Island	73.4	86.4	28.5	−31.9	−22.0	33.5
Vermont	17.6	32.6	81.9	47.1	0.8	44.9
Division 2: Mid-Atlantic	149.8	87.7	79.4	4.6	−21.4	74.9
New Jersey	179.5	65.0	46.1	−22.1	−32.6	58.5
New York	200.2	75.0	77.1	25.7	−11.9	91.6
Pennsylvania	50.6	123.9	107.6	−7.9	−27.6	61.6
Region 2: Midwest						
Division 3: East North Central	48.6	130.8	152.8	33.0	−5.3	89.9
Illinois	66.3	115.4	114.4	36.9	−2.3	82.5
Indiana	43.9	152.9	171.7	38.7	−9.6	99.1
Michigan	68.8	97.6	168.1	33.7	−5.8	90.6
Ohio	28.5	171.6	190.6	22.7	−8.6	101.2
Wisconsin	18.2	120.8	115.9	36.5	0.1	72.7
Division 4: West North Central	18.4	137.7	130.5	35.6	−1.4	80.0
Iowa	17.2	137.4	103.7	25.3	−5.7	69.6
Kansas	8.9	164.7	157.6	47.2	8.9	96.7
Minnesota	26.6	76.4	95.8	38.1	4.2	60.0
Missouri	21.5	173.8	180.5	51.9	−1.9	106.1
Nebraska	5.1	111.8	86.8	(2.0)	−3.5	49.5
North Dakota	20.2	200.5	121.6	0.1	−28.7	78.7
South Dakota	0.4	220.7	108.3	(0.9)	−35.2	73.3
Region 3: South						
Division 5: South Atlantic	27.8	144.5	181.8	53.4	0.8	101.0
Delaware	67.1	130.3	168.7	77.7	18.0	115.0
District of Columbia	156.5	151.5	233.2	94.8	17.2	164.7
Florida	13.7	134.7	190.2	37.5	−6.7	90.8
Georgia	31.0	173.5	193.7	56.3	0.7	112.8
Maryland	69.9	100.4	82.6	13.4	−12.8	62.8
North Carolina	17.6	141.0	176.1	63.3	5.8	100.0
South Carolina	28.4	229.4	243.6	80.9	12.8	148.0
Virginia	31.6	116.3	154.9	71.2	12.7	96.1
West Virginia	25.0	195.4	353.2	149.1	17.9	185.5
Division 6: East South Central	25.5	216.5	246.6	59.6	0.9	136.7
Alabama	31.7	243.6	220.1	29.7	−4.0	129.9
Kentucky	18.5	170.5	258.3	86.4	11.6	136.1
Mississippi	50.5	266.9	263.4	78.1	2.7	165.2

Continued

TABLE 1— Continued

	Excess Death Rates (per 100 000 Population)					
	Phase 1: Outbreak[a]	Phase 2: Prevaccine[b]	Phase 3: Early Vaccine[c]	Phase 4: Stable Vaccine[d]	Phase 5: Quiescent[e]	Overall[f]
Tennessee	14.6	204.9	249.8	54.7	−3.3	129.3
Division 7: West South Central	19.1	196.3	185.7	44.5	2.9	111.0
Arkansas	6.0	214.5	228.7	76.4	5.6	132.2
Louisiana	82.6	188.5	225.6	69.5	7.7	143.2
Oklahoma	6.7	207.8	224.3	52.8	−7.2	120.6
Texas	11.6	194.1	169.7	36.1	3.2	102.3
Region 4: West						
Division 8: Mountain	21.7	157.0	193.7	67.9	13.5	112.2
Arizona	26.6	219.3	219.4	87.0	21.8	141.1
Colorado	36.8	98.2	165.4	67.6	16.2	95.5
Idaho	−3.5	97.3	169.7	22.0	−8.9	68.5
Montana	−7.4	138.6	204.2	10.4	−15.1	82.4
Nevada	11.7	160.0	192.1	63.6	12.1	108.1
New Mexico	40.0	220.9	300.1	118.8	31.8	177.7
Utah	5.3	75.8	96.6	25.4	−6.6	48.5
Wyoming	17.4	169.5	262.9	94.0	31.1	143.7
Division 9: Pacific	15.5	135.0	114.2	66.1	16.0	86.1
Alaska	2.2	84.3	225.4	117.4	38.2	116.5
California	18.8	164.3	105.7	61.2	16.1	90.9
Hawaii	−3.2	29.0	95.7	68.1	12.8	50.6
Oregon	4.0	52.2	167.9	94.2	21.2	84.6
Washington	8.2	41.0	123.1	72.4	10.5	63.5

[a]Mar 7, 2020–Jun 13, 2020.
[b]Jun 20, 2020–Mar 13, 2021.
[c]Mar 20, 2021–Mar 19, 2022.
[d]Mar 26, 2022–Feb 4, 2023.
[e]Feb 11, 2023–Jul 2, 2023.
[f]Mar 7, 2020–Jul 2, 2023.

(0.1 per 100 000). Fully 657 945 (51.5%) of the excess deaths (and 580 961 [51.4%] of the deaths attributed to COVID-19) occurred in phases 3 through 5, after COVID-19 vaccines were available. The census divisions and states with the highest excess death rates varied as the pandemic unfolded, with the highest rates first occurring in the Northeast and then shifting to the South and Mountain states.

In phase 1 (March–June 2020), reflecting the outbreak of the pandemic, the Middle Atlantic division experienced the highest excess death rates (149.8 per 100 000), driven by deaths in New York and New Jersey. The 10 states with the nation's highest excess death rates during phase 1 were 2 Middle Atlantic states (New York [200.2 per 100 000], New Jersey [179.5 per 100 000]), 3 New England states (Connecticut [119.9 per 100 000], Massachusetts [109.6 per 100 000], Rhode Island [73.4 per 100 000]), 2 South Atlantic states (Maryland [69.9 per 100 000], Delaware [67.1 per 100 000]), 2 East North Central states (Michigan [68.8 per 100 000], Illinois [66.3 per 100 000]), and 1 West South Central state (Louisiana [82.6 per 100 000]).

In phase 2 (June 2020–March 2021), reflecting the prevaccine era during which excess death rates climbed and pandemic control relied on masking and social distancing, the highest excess death rates occurred in the East South Central, West South Central, and Mountain divisions (216.5 per 100 000, 196.3 per 100 000, and 157.0 per 100 000, respectively). The 10 states with the nation's highest excess death rates during phase 2 were 3 East South

Central states (Mississippi [266.9 per 100 000], Alabama [243.6 per 100 000], Tennessee [204.9 per 100 000]), 2 West South Central states (Arkansas [214.5 per 100 000], Oklahoma [207.8 per 100 000]), 2 Mountain states (New Mexico [220.9 per 100 000], Arizona [219.3 per 100 000]), 2 West North Central states (South Dakota [220.7 per 100 000], North Dakota [200.5 per 100 000]), and 1 South Atlantic state (South Carolina [229.4 per 100 000]).

Phase 3 (March 2021–March 2022) marked the period when COVID-19 vaccines became available—with uptake varying across the country—and when the Delta and Omicron variants caused large surges, producing the nation's highest excess death rates. During this period, the highest excess death rates again occurred in the East South Central, Mountain, and West South Central divisions (246.6 per 100 000, 193.7 per 100 000, and 185.7 per 100 000, respectively). The 10 states with the nation's highest excess death rates were 3 East South Central states (Mississippi [263.4 per 100 000], Kentucky [258.3 per 100 000], Tennessee [249.8 per 100 000]), 2 Mountain states (New Mexico [300.1 per 100 000], Wyoming [262.9 per 100 000]), 2 South Atlantic states (West Virginia [353.2 per 100 000], South Carolina [243.6 per 100 000]), 2 West South Central states (Arkansas [228.7 per 100 000], Louisiana [225.6 per 100 000]), and 1 Pacific state (Alaska [225.4 per 100 000]).

In phase 4 (March 2022–February 2023), during which vaccination uptake stabilized across much of the country and excess death rates declined, the highest excess death rate (67.9 per 100 000) occurred in the Mountain division. The highest excess death rates occurred in 3 Mountain states (New Mexico [118.8 per 100 000], Wyoming [94.0 per 100 000], Arizona [87.0 per 100 000]), 2 South Atlantic states (West Virginia [149.1 per 100 000], South Carolina [80.9 per 100 000]), 2 Pacific states (Alaska [117.4 per 100 000], Oregon [94.2 per 100 000]), 2 East South Central states (Kentucky [86.4 per 100 000], Mississippi [78.1 per 100 000]), and 1 New England state (Maine [80.7 per 100 000]).

In phase 5 (February 2023–July 2023), a period marked by no large surges and negative excess death rates, the Pacific division again experienced the highest rates (16.0 per 100 000). The highest excess death rates occurred in 4 Mountain states (Wyoming [31.1 per 100 000], New Mexico [31.8 per 100 000], Arizona [21.8 per 100 000], Colorado [16.2 per 100 000]), 3 Pacific states (Alaska [38.2 per 100 000], Oregon [21.2 per 100 000], California [16.1 per 100 000]), and 2 South Atlantic states (Delaware [18.0 per 100 000], West Virginia [17.9 per 100 000]).

The lowest excess death rates also varied by phase. By division, the lowest rates occurred in the Pacific and West (North and South) Central divisions in phase 1; New England, Middle Atlantic, and East North Central divisions in phase 2; New England, Middle Atlantic, and Pacific divisions in phase 3; and Middle Atlantic, New England, and East North Central divisions in phase 4. In phase 5, Middle Atlantic, New England, and East and West North Central divisions experienced negative excess death rates.

Excess Death Rates by Partisan Affiliation

States with Republican governors experienced lower excess death rates in phase 1 but significantly higher death rates in phases 2 and 3 than did states with Democratic governors ($P < .001$; Figure 1 and Appendix Table D). In phase 4, excess death rates were slightly higher in states with Democratic governors ($P < .001$). Rates did not differ during phase 5 ($P \geq .99$), the period marked by no COVID-19 surges.

In phases 1 through 3, excess death rates generally exhibited a gradient based on the degree of Republican representation in the state legislature (Figure 2). Increasing Republican representation was associated with lower excess death rates during phase 1 but higher excess death rates during phases 2 and 3 ($P < .001$). States with 33% to 49% of seats occupied by Republicans experienced the lowest death rates in phase 2 and the highest death rates in phase 4 ($P < .001$). No significant differences were observed in phase 5 ($P \geq .99$).

States with unified Republican government (Republican governor and Republican control over both chambers of the legislature) experienced the lowest excess death rates in phase 1 but the highest excess death rates in phases 2 and 3 ($P < .001$; Figure 3). In phase 4, states with unified Democratic government experienced the highest excess death rates ($P < .001$). During phases 2 through 4, states with a Republican governor and a divided legislature had the lowest rates ($P < .001$). No differences were observed in phase 5 ($P \geq .99$).

DISCUSSION

This study estimated that the United States experienced 1 277 697 excess deaths between March 2020 and July 2023, 88.5% of them (1 130 696) involving deaths attributed to COVID-19. More than half (51.4%) of US deaths

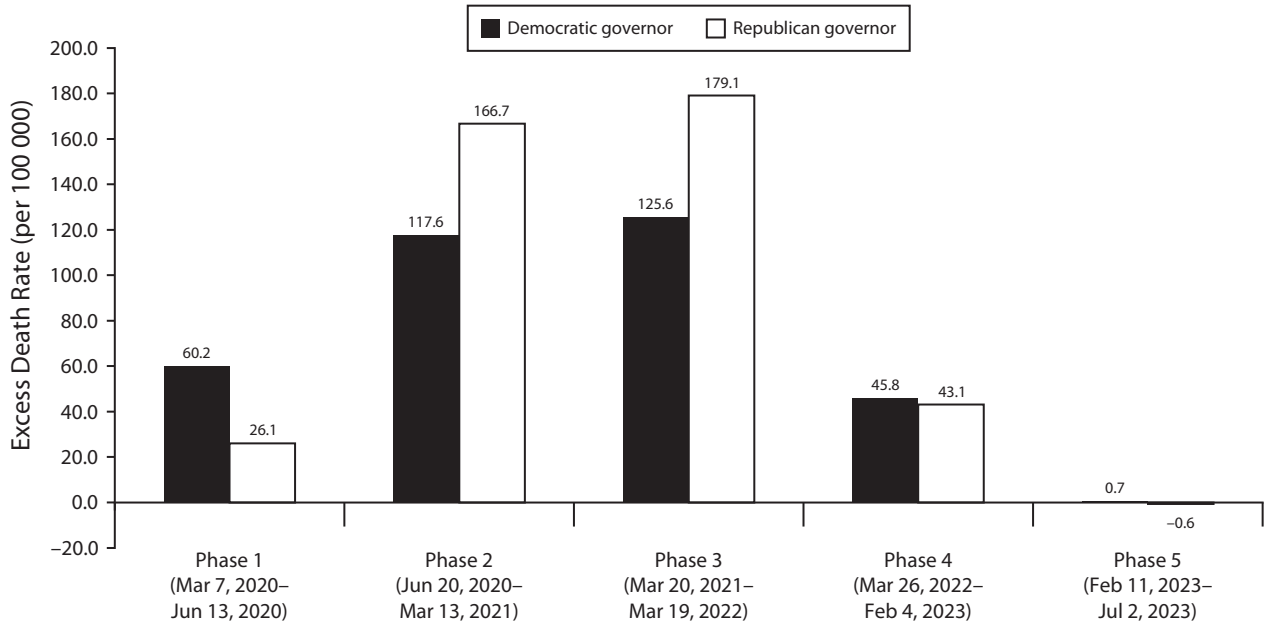

FIGURE 1— Excess Death Rates by Phase and States With Democratic or Republican Governors: United States, 2020–2023

Note. The list of states in each category is provided in Appendix Table A (available as a supplement to the online version of this article at https://doi.org). See Appendix Table D for source data.

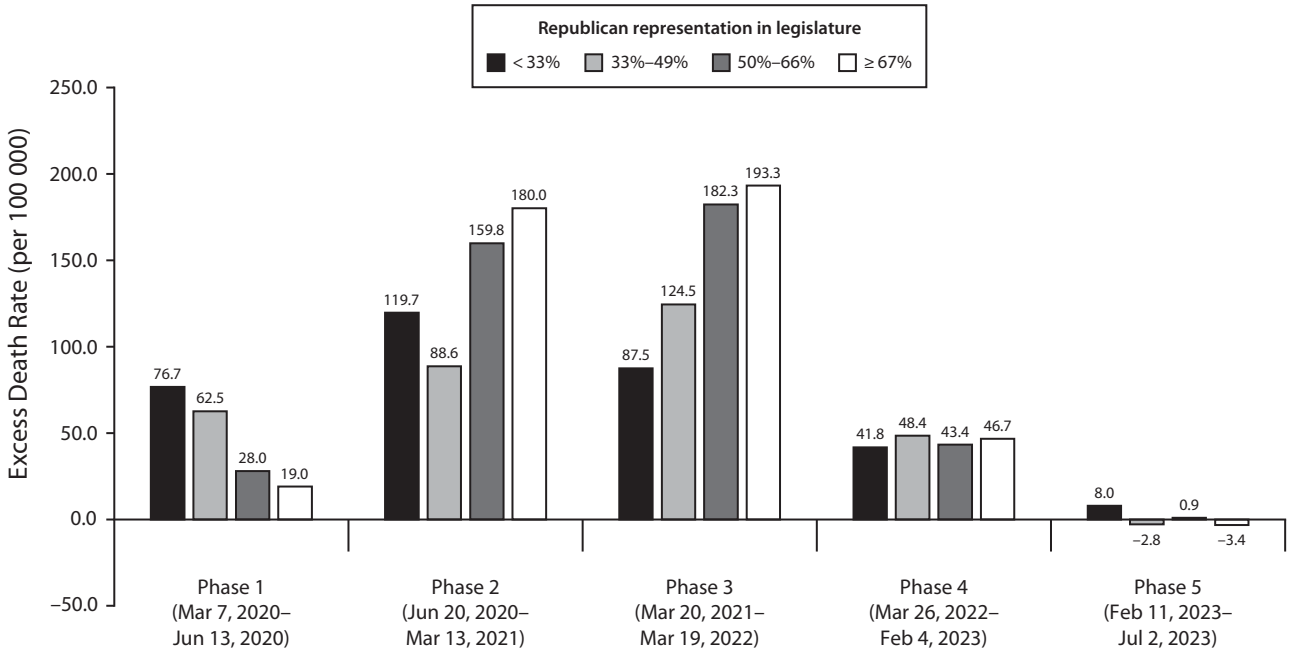

FIGURE 2— Excess Death Rates by Phase and Republican Representation in State Legislature: United States, 2020–2023

Note. The list of states in each category is provided in Appendix Table B (available as a supplement to the online version of this article at https://doi.org). See Appendix Table D for source data.

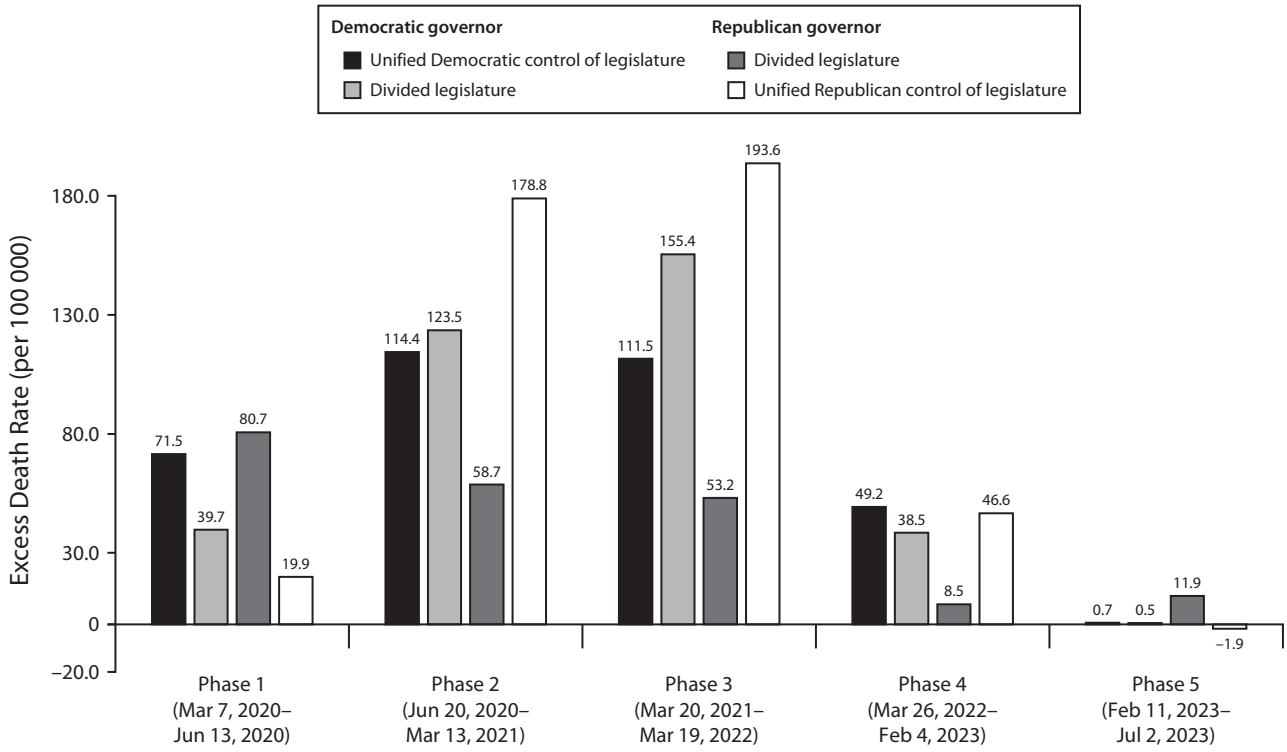

FIGURE 3— Excess Death Rates by Phase and Partisan Control Over State Government: United States, 2020–2023

Note. The list of states in each category is provided in Appendix Table C (available as a supplement to the online version of this article at https://ajph.org). See Appendix Table D for source data.

attributed to COVID-19 occurred after COVID-19 vaccines were available (during phases 3 through 5). Observational studies suggest that COVID-19 vaccination could have prevented the majority of these deaths.[26,27] Lower vaccination coverage was predictive of infection and higher mortality rates.[28,29] In addition, many deaths during the prevaccine periods might also have been prevented by greater adherence to masking, social distancing, and other measures to curb viral transmission.

The states with the highest excess death rates varied as the pandemic unfolded. States in the Middle Atlantic census division (e.g., New York, New Jersey) experienced the highest rates at the outbreak of COVID-19, but the high-impact areas then shifted to the South and later to the Mountain states. Understanding the reasons for these geographic patterns will require further research. Some explanations are intuitive: the early concentration in the Middle Atlantic states likely represented the outbreak of the pandemic in large population centers like New York City when this region, like most of the country, did not understand the disease and was unprepared to implement pandemic control measures to prevent rapid transmission of the highly lethal virus.

This study found that states with Republican governors or a larger representation of Republican lawmakers in the legislature generally experienced lower excess death rates in phase 1 (the initial outbreak of COVID-19) and higher rates in phase 2 (the prevaccine period during which pandemic response plans became highly politicized) and phase 3 (the period when the COVID-19 vaccine became available and levels of uptake varied by state). During phases 2 and 3, states with unified Republican control of state government experienced the highest excess death rates, whereas a handful of states with Republican governors and divided legislatures (Maryland, Massachusetts, New Hampshire, and Vermont) experienced the lowest rates. During phase 4—by slight but statistically significant margins—states with Democratic governors and those with unified Democratic control experienced the highest excess death rates.

The association between partisan orientation and excess deaths should be interpreted with caution because the study did not adjust for other potential confounding variables or demonstrate a causal pathway to account for observed outcomes. Potential confounding variables include baseline predisposing

characteristics that might have contributed to state variation in excess death rates, such as differences in age distribution, racial/ethnic composition, socioeconomic status, rurality, and the prevalence of comorbid health conditions.[30] For example, calculating age-specific or age-adjusted excess death rates, as others have done, might clarify differences across states for more comparable groups.[1,8] Before the pandemic, counties that voted for Republican presidential candidates experienced higher mortality rates.[31] The populations residing in conservative states often have lower educational attainment, high poverty rates, and diminished access to health care. These and other factors—including a higher prevalence of chronic diseases and other comorbid conditions that increased susceptibility—may have contributed to higher case–fatality rates.

Other sources of confounding include dynamic, time-variant circumstances during the phases of the pandemic, such as viral surges and changes in COVID-19 infection rates, access to health care or personal protective equipment (e.g., masks), and vaccination coverage.[32] Moreover, the populations that predominate in states with certain partisan orientations (and whose voting preferences determine the partisan composition of state government) inhabit different information environments and may have exhibited different attitudes and behaviors that influenced outcomes (e.g., resistance to pandemic control measures, vaccine hesitancy).[33]

Finally, the hypothesis that partisan orientation was associated with excess deaths because of harmful policy choices is compelling but was not formally tested. Doing so would require a complex computing task involving the collection and modeling of thousands of data points to reflect the variety of executive actions, legislation, and court rulings that states enacted, modified, rescinded, and reenacted over time. Examples include stay-in-place orders (lockdowns), masking, restrictions on social distancing and large gatherings, and the implementation and mandating of vaccination.[34] A multivariate analysis that comprehensively accounts for the dynamic change in these policies and adjusts for baseline and dynamic, time-variant confounding variables was beyond the scope of this article but is encouraged for future research. One such analysis suggested that the association between partisan orientation and mortality was attenuated by other covariates.[20]

This study has other limitations that should also be considered. The calculation of excess death rates relied on modeling assumptions and did not account for infection and vaccination rates. Variations in rates across different phases of the pandemic were dependent on the dates chosen for those phases, which likely differed across states and regions. Partisan affiliation was determined based on the most recent election but may have changed during the phase.

Accordingly, the association between partisan orientation and excess death rates is intriguing but must be interpreted with caution, given the potential for interaction effects. The degree to which excess deaths during the COVID-19 pandemic reflect policy choices by elected officials warrants further research using study designs that can isolate the independent effects of policy contexts. AJPH

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S. H. Woolf was responsible for conceptualizing the study, interpreting the data, and writing the article. J. H. Lee and D. A. Chapman were responsible for data modeling and calculation of excess death rates, with biostatistical guidance provided by R. T. Sabo. J. H. Lee, D. A. Chapman, R. T. Sabo, and E. Zimmerman provided input on study design and helped edit the article. J. H. Lee produced the maps.

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CONFLICTS OF INTEREST

The authors have no conflicts of interest to report.

HUMAN PARTICIPANT PROTECTION

Informed consent for the study was not required because human participants were not involved.

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