The Politics of COVID-19: Differences Between Blue, Purple, and Red States in COVID-19 Cases, Deaths, and Regulations

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Abstract

Confining and controlling infectious diseases, currently COVID-19, is a challenging task for politicians around the world. Since not much has been known about the virus initially, political decisions had to be made under uncertainty. Thus, worldviews and beliefs of politicians heavily influenced political decisions. The current study investigated political decisions in 2020 and 2021 and their influence on COVID-19 deaths in the 50 states of the United States, with a particular focus on comparing red (Republican) and blue (Democrat) states. Results showed overall more regulations in blue states and fewer COVID-19 related deaths in blue states compared to red states.

One-sentence Summary

Republican states in the USA implement fewer measures to control COVID-19 spreading and have a higher number of COVID-19 related deaths.

Full Text

As the United States currently leads the world in terms of both cumulative COVID-19 cases and deaths, its use of mass-behavioral measures to contain the virus is of particular interest. While many nations focus on a federal-mandate approach to manage their response to the pandemic (7), the United States' state-based jurisdiction has provided a unique petri-dish to investigate a number of strategies for disease containment. Viral variants, such as Delta and most recently at time of writing Omicron, have further prolonged the pandemic period and necessitated the reintroduction of mass-behavioral measures to limit new exposure. Analyzing states' various policies can provide insight for how to further mitigate the current pandemic as variants arise and provide key early intervention for future viral outbreaks.

In the United States, COVID-19, and the mitigation of its spread is largely political. Legislative efforts across party lines demonstrate this (e.g., proposed bill against requiring the wearing of masks (2) as well as media coverage (3)). Is the divide between state political affiliations (blue, purple, and red states) real, in terms of COVID-19 cases and deaths? If so, why? The current study will investigate whether the states' political affiliation, as democrat-affiliation (blue), republican-affiliation (red), and mixed-affiliation (purple), is associated with COVID-19 cases and deaths, and patterns of political mitigation measures; and whether these patterns of political mitigation are associated with COVID-19 cases and deaths.

The research community has mostly focused on a quick response to the pandemic; however, this has left some notable deficits in the literature (4). Previous work tends to focus on opinions, beliefs, promotive well-being factors, and health practices primarily at an individual level or with groups of particular interest (5). However, health is public and collective (6); for all the efforts an individual can excerpt, these will be limited or mitigated by the overall community's health practices. Indeed, there are some studies that investigated states' behavioral health practices, for example focusing on only one state and the consequences of one behavioral measure such as vaccination (7), or on only one behavioral measure such as mask adherence across all states (8). The current study accounts for all states and investigates several behavioral political mitigation measures to yield a more encompassing look at the association to COVID-19 cases and deaths.

A defining aspect of assessing the effects of COVID-19 in America is recognizing the political differences between areas affected. At time of writing, the United States has not initiated a federal mask, lockdown, nor vaccine mandate for citizens. Federal actions related to behavioral change during the pandemic have been largely suggestive such as through recommendations and guidelines (9), brief travel restrictions, or exclusive to federal employees (10). Federal actions have focused more on resource production and economic stimulus than behavior efforts (11). Thus, the focus on states' decisions is justified.

A state's legislative efforts are influenced by the overall political affiliation of a state, and its sitting governance. As such the dominant political affiliation for each state can be derived from its gubernatorial party affiliation, state senate affiliation, and state house of representative affiliation. Whether a state is blue, purple, or red may influence the types of legislatures instated, which in turn may affect the overall spread of COVID-19. In essence, the states' legislative measures on COVID-19 and consequential changes in viral patterns, provide a natural experiment to evaluate these strategies' efficacy.

The need for daily-habit change is justified based on historical precedent and modern research related to epidemiology (12), and research on transmission rates (13), but the efficacy of particular mass-behavioral change is a question among scientists and the public (14). While skepticism, especially among the general public, can be conspiratorial or bizarre in nature (15), there is a genuine and appropriate concern as to the efficacy of mass-behavioral measures.

The current study has therefore three objectives: 1) to investigate whether the states' political affiliation, as blue, purple, or red is associated with COVID-19 cases and deaths in 2020 and 2021; 2) to investigate whether the states' political affiliation as blue, purple, or red is associated with the patterns of behavioral/political mitigation measures the states took in 2020 and 2021, and 3) to investigate whether these patterns of behavioral/political mitigation are associated with COVID-19 cases and deaths in 2020 and 2021. We focused on COVID-19 cases and deaths of 2020 and of 2021 separately, considering the Delta variant and the availability of vaccines.

Data was gathered from all fifty states within the United States, including data for socio-political and behavioral variables to measure the effects of COVID-19 deaths and COVID-19 hospitalizations rates, from previously documented data (see online materials).

Results

First, we compared blue, purple, and red states and investigated their differences according to COVID-19 cases per 100k in 2020 and 2021 and COVID-19 deaths per 100k in 2020 and 2021. As can be seen in Table 1, results and group comparisons show that COVID-19 cases were always significantly higher in red states compared to blue states for 2020, for 2021, and overall. They were also always higher in red states compared to purple states. COVID-19 related deaths did not differ significantly among blue, purple, and red states in 2020 and overall (i.e., 2020 and 2021). For 2021, however, there were fewer COVID-19 related deaths in blue compared to red states. Effect sizes for the significant differences in COVID-19 cases and deaths were large (26).

Table 1
ANOVA Results for COVID-19 Cases and COVID-19 Deaths: Differences Among Blue, Purple, and Red States.

	Blue (N = 16)		Purple (N = 10)		Red (N = 22)		<i>F</i>	<i>df</i>	<i>p</i>	η^2	Pairwise Comparisons
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>					
COVID-19 cases/ 100k 2020	5452.13	1991.31	5717.04	2063.96	7558.89	1839.19	6.44	(2, 45)	.003	.22	B < R, P < R
COVID-19 cases/ 100k 2021	6454.36	1356.91	7129.75	1889.19	8406.42	1693.08	6.93	(2, 45)	.002	.24	B < R, P < R
COVID-19 cases total/ 100k	11906.49	2894.65	12846.79	3318.45	15965.31	2051.49	12.09	(2, 45)	.000	.35	B < R, P < R
COVID-19 deaths/ 100k 2020	102.44	61.75	110.00	45.26	108.77	40.06	0.10	(2, 45)	.904	.004	–
COVID-19 deaths/ 100k 2021	87.31	28.64	96.30	32.88	116.82	41.67	3.30	(2, 45)	.046	.13	B < R
COVID-19 deaths total/ 100k	189.75	76.66	206.30	71.10	225.59	65.90	1.21	(2, 45)	.309	.05	–

In a second step, we compared blue, purple, and red states regarding the political measures taken to combat COVID-19 spread in both 2020 and 2021. As shown in Table 2, for all six regulation measures, blue states had significantly higher scores than red states and purple states had significantly higher scores than red states. All the differences regarding the six mitigation measures (lockdown days in 2020, mask mandate days 2020, mask mandate days 2021, mask mandate days 2020 + 2021, vaccination rate for population older than 12, vaccination mandates) showed very large effect sizes.

Table 2
ANOVA Results for Political Measures to Combat COVID-19: Differences Across Blue, Purple, and Red States.

	Blue (N = 16)		Purple (N = 10)		Red (N = 22)		<i>F</i>	<i>df</i>	<i>p</i>	η^2	Pairwise Comparisons
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>					
Lockdown days 2020	80.88	54.33	57.00	16.37	24.55	21.08	12.05	2, 45	.000	.35	B > R, P > R
Mask Man days 2020	208.13	56.040	152.80	76.025	55.27	73.360	23.88	2, 45	.000	.52	B > R, P > R
Mask Man days 2021	175.88	51.324	146.80	36.138	39.00	49.274	42.57	2, 45	.000	.65	B > R, P > R
Mask Man days total	384.62	51.41	300.50	77.73	96.36	116.41	48.97	2, 45	.000	.69	B > R, B > P, P > R
Fully vacc > 12)	72.95	5.58	67.96	8.39	60.04	5.48	20.13	2, 44	.000	.48	B > R, P > R
Vacc Mand	3.31	.70	1.70	1.06	.14	.35	104.91	2, 45	.000	.82	B > R, B > P, P > R

Third, we compared COVID-19 cases and deaths in relation to political measures across states. We expected COVID-19 cases to be less in states that have more mitigation measures in 2020 (lockdown days, mask mandate days) and in 2021 (mask mandate days, vaccination rates, vaccination mandates). In addition, we expected COVID-19 deaths to be less in states that have more mitigation measures in 2020 (lockdown days, mask mandate days) and in 2021 (mask mandate days, vaccination rates, vaccination mandates). We ran Pearson correlations to test the associations between COVID-19 cases and deaths with behavioral/political mitigation efforts across all states. Table 3 reports the correlations for COVID-19 cases, COVID-19 deaths, and mitigation efforts.

Table 3

Correlations Between COVID-19 Cases (Cumulative, 2020, 2021), COVID-19 Deaths (Cumulative, 2020, 2021), Percentage of Fully Vaccinated 12 Years and Older, Vaccine Mandates, Lockdown Duration, and Mask Mandate Duration (Cumulative, 2020, 2021).

	Cumulative COVID-19 cases	2020 COVID- 19 cases	2021 COVID- 19 cases	Cumulative COVID-19 deaths	2020 COVID- 19 deaths	2021 COVID- 19 deaths	Fully vaccinated	Vaccine mandates	2020 Lock- down	Cumulative Mask mandate	2020 Mask mandate
2020 COVID-19 cases	.83***										
2021 COVID-19 cases	.76***	.26									
Cumulative COVID-19 deaths	.59***	.45***	.49***								
2020 COVID-19 deaths	.43**	.48***	.19	.86***							
2021 COVID-19 deaths	.54***	.22	.66***	.76***	.31*						
Fully vaccinated	-.66***	-.48***	-.58***	-.35*	-.07	-.57***					
Vaccine mandates	-.66***	-.48***	-.59***	-.28	-.06	-.43*	.74***				
Lockdown	-.42**	-.38**	-.28	-.05	-.05	-.03	.47***	.61***			
Cumulative Mask mandate	-.55***	-.45***	-.43**	-.07	.08	-.23	.55***	.77***	.55***		
2020 Mask mandate	-.38**	-.29*	-.32*	.08	.23	-.15	.55***	.63***	.46***	.92***	
2021 Mask mandate	-.63***	-.55***	-.45***	-.24	-.13	-.26	.42**	.77***	.56***	.88***	.63***
* $p < .05$, ** $p < .01$, *** $p < .001$											

For COVID-19 cases in 2020, results show significant correlations with mitigation efforts. More lockdown days and more mask mandate days are significantly associated with fewer COVID-19 cases. For COVID-19 cases in 2021, results show significant correlations with mitigation efforts, such that higher vaccination rates and more vaccine mandates were significantly associated with fewer COVID-19 cases. For total combined COVID-19 cases in 2020 and 2021, fewer cases were also significantly associated with more lockdown days, more mask mandate days, higher percentage of vaccinated people, and more vaccine mandate days.

For COVID-19 deaths in 2020, results showed no significant correlations with mitigation efforts. Lockdown and mask mandate days did not correlate with deaths in 2020. For COVID-19 deaths in 2021, however, results showed significant correlations with mitigation efforts. Higher vaccination rates and more vaccine mandates were significantly associated with fewer COVID-19 deaths. For total combined COVID-19 deaths in 2020 and 2021, fewer deaths were significantly associated with higher vaccination rates.

Discussion

The main objective of the current study is to investigate whether the dominant political affiliation and governance of a state determines the behavioral and political mitigation efforts to fight COVID-19 in 2020 and 2021, and whether these political regulations are associated with COVID-19 cases and COVID-19 deaths. We investigated three research questions.

First, do COVID-19 cases and deaths differ across blue, purple, and red states? Results showed that blue, purple, and red states differ in the number of COVID-19 cases, where cases are much higher in red states compared to blue states and purple states for 2020, for 2021, and overall. In terms of COVID-19 related deaths, however, blue, purple, and red states in 2020 and overall, did not differ significantly. COVID-19 deaths in 2021, however, are significantly less in blue compared to red states.

Second, do behavioral/political mitigation efforts differ across blue, purple, and red states? Blue states had significantly higher scores in all behavioral/mitigation efforts, such as duration of lockdowns in 2020 and mask mandates in 2020 and 2021, vaccination rates, and vaccination

mandates than red states. Purple states too had significantly higher scores in political mitigation measures than red states. A similar, but very different, study explored the differences among various mitigation efforts (government interventions of physical distancing and restrictions) in states in the West and Northeast of the United States. Results showed to what degree they slowed down the outbreak of COVID-19 (27).

Third, do COVID-19 cases relate to use of behavioral/political mitigation measures? For COVID-19 cases in 2020, more lockdown days and more mask mandate days were significantly associated with fewer COVID-19 cases. These findings are supported by studies that observed the decreased trend in COVID-19 infections occurred after mitigation measures are implemented, such as social distancing and restricting large gatherings (28) and such as face mask mandates (29). Specifically, for mask mandates in the year 2020, similar results were found - that for states that had high adherence to mask wearing, COVID-19 rates were low⁸. For COVID-19 cases in 2021, more vaccinated people, more vaccine mandates, and more mask mandate days were significantly associated with fewer cases. For all COVID-19 cases in both years, fewer cases were significantly associated with more lockdown days, more mask mandate days, higher vaccination rates, and more vaccine mandates. Our results are also in line with the protection and the decreased risk for reinfection that is offered by COVID-19 vaccinations (30).

Do COVID-19 deaths relate to behavioral/political mitigation measures? COVID-19 deaths in 2020 did not significantly correlate with mitigation efforts. In 2021, however, in the prevalence of the delta variant, fewer COVID-19 deaths were significantly associated with higher vaccination rates and more vaccine mandates.

Limitations of the study are related to the methodology. First, the study gathered secondary data primarily formally reported to governing bodies (16). In 2021 with the expansion of several at-home testing kits and diagnostics, it is without doubt a number of COVID-19 cases were not reported to a federal entity. Aside from non-reporting, potential fraudulent or otherwise misreporting of COVID-19 cases poses an equal threat to the actual mass-scale effects of the pandemic (31).

For the current study, we did not study adherence to the behavioral and political measures, but just the presence of the mitigating measures given by the state officials. Existing literature on actual adherence to mitigation strategies has observed substantial variability (8, 32).

While the duration of the pandemic and its outcomes remain uncertain, this study shows an apparent association between mitigation efforts and lesser negative outcomes due to COVID-19 (cases and deaths). A key conclusion of this work is, despite hesitancy by many, that mass-behavioral changes and legislation do provide mass-scale dividends in areas which promote these strategies. The individual role of citizens isn't without consequence, but to ultimately lessen the aversive effects of COVID-19 in the United States, it is necessary to behave collectively. The question of efficacy, with such strong evidence, should move to a base-assumptive role for further legislative efforts. Instead, new focus on how to best communicate and implement these strategies across political landscapes should take the forefront of conversation. In highlighting the political divide between COVID-19 legislative and mitigation efforts, researchers do not intend to proselytize one ideology to another but rather to expand on the notion that differences between dominant political affiliations are equally relevant to consider. Disease itself is not bipartisan, but response efforts to the COVID-19 pandemic currently are. Focusing on how to best accommodate the effective mitigation strategies identified in this study to multiple belief systems should be paramount if communities are to address the pandemic with minimal loss and aversive outcomes.

Methods And Protocols

Data was gathered from all fifty states within the United States, including data for socio-political and behavioral variables to measure the effects of COVID-19 deaths and COVID-19 hospitalizations rates, from previously documented data (see below).

COVID-19 Cases and Deaths per 100,000 for 2020 and for 2021

The number of COVID-19 cases and the number of COVID-19 deaths per 100,000 of the population for each state were categorized for 2020 and 2021 from the "CDC Data Tracker" (16). The CDC Data Tracker collects surveillance measurements on confirmed COVID-19 deaths from hospitals, healthcare systems, laboratory data from various community, state, and territorial public health departments. The COVID-19 cases and deaths per 100,000 in 2020 and 2021 data for New York state excluding NYC and New York City are combined for New York State data taking into consideration their overall populations (see "Calculations for New York overall numbers"). The COVID-19 cases and deaths count for this study were assessed from January 21, 2020 to December 31, 2020 for the year 2020 and from January 1, 2020 to October 25, 2021 for the year 2021. The years 2020 and 2021 are segregated because of the impact and presence of vaccine in 2021.

Political State Party Affiliation

The political affiliation for each state was derived from collecting the Gubernatorial Party Affiliation, State Senate Affiliation, and State House of Representatives within the year 2021 (17). Political affiliation was measured as Democrat/blue, mixed/purple, or Republican/red. This study defined the state's political affiliation by the governor's political affiliation, and if either state senate or state house had the same political affiliation as the governor. If the governor's party affiliation was different from both state senate and state house (18), then we coded this state as purple. There were 16 blue, 10 purple, and 22 red states. The two states, Montana and West Virginia, where state governors changed in 2020 were excluded from state comparisons.

Often times in research, the presidential election results are used to determine blue, purple, or red states in research studies. Since COVID-19 related measures in states are primarily initiated by the state's executive branch, i.e., the governor, we primarily relied on the governor's political affiliation.

Behavioral / Political Regulations

State Lockdown Days for Year 2020. The behavioral variables measured for the year 2020 for this study included the number of lockdowns by state. The number of lockdowns per state was defined by the state lockdown order issued from state government officials (19), where each state is listed with the dates of the lockdown order, state lockdown report, and title of the order. The numerical count for the amount of lockdown duration reported in days was calculated from taking the difference between the start date of a lockdown order and end date of a lockdown order by the state documented on state orders.

Mask Mandate Days for Years 2020 and 2021. Mask mandate by state along with the number of days the mask mandate was issued until lifted by state officials was reported for 2020 and 2021. The mask mandates were identified as those reported on U.S. News and World Report (20). The number of mask mandate days for each state was calculated by counting the number of days from when the mask mandates were initiated and lifted. Mask mandates were categorized for the year 2020 and year 2021 as active mask mandate or no mask mandate.

COVID-19 Vaccination Rate 2021. The COVID-19 vaccination rate was gathered from the CDC datasheet from October 25, 2021 for each state and was defined as the total number of individuals 12 years of age and older who were fully vaccinated with the second dose of a two-dose vaccine or one dose of a single-dose vaccine (21). For the state of Idaho, no vaccination information was reported.

COVID-19 Vaccination Mandates 2021. COVID-19 vaccination mandates were recorded for four settings: public schools, universities, hospitals, and place of employment for all 50 states. This study categorized the COVID-19 vaccination mandate active for each state on a scale from 0-4 (0 = no vaccination mandate in all 4 settings to 4 = vaccination mandates in all four settings).

We used public school COVID-19 vaccination mandates for each state (22) that reported secondary COVID-19 vaccination data, derived from the CDC with a virtual map display. This study defined public school COVID-19 vaccinations per state with two measures (0 = no, and 1 = yes).

University COVID-19 vaccination was reported by states that required the vaccination for on-campus or residential students for 2021-2022 academic year but does not identify individual requirements issued by particular academic institutions (23). Many institutions had separate vaccination guidelines for students and employees. Vaccination requirements issued by universities in this study only applied to student populations (0 = no, and 1 = yes).

Hospital COVID-19 vaccination mandates were collected (24), which reported state mandates that required hospital workers and health care employees to receive the COVID-19 vaccine. For the purposes of this study, Hospital COVID-19 vaccination mandates were coded as zero and one (0 = no, 1 = yes).

Employee COVID-19 vaccination mandates were gathered from a listing of reported mandates by each state of vaccination requirements for employees (25). This study categorized the employee COVID-19 vaccination mandate as zero and one (0 = no, 1 = yes, state employees).

Statistical Analysis

All analyses were conducted in the IBM SPSS version (26). Analyses of variance were conducted to compare COVID-19 cases and deaths per 100k and mitigation efforts across states. Pearson correlations were conducted to test the relationships between COVID-19 cases and deaths and mitigation efforts. A priori .05 level of significance, 2-sided, was used for hypothesis testing.

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Project administration: CDG, MTT

Supervision: CDG, MTT

Writing – original draft: MTT, LB, KP, CDG

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References

1. I. Bar-Siman-Tov. Covid-19 meets politics: The novel coronavirus as a novel challenge for legislatures. *Theor Pract Legisl.* **8**, 11–48 (2020).
2. 117th Congress, “H.R.450 - To prohibit the use of Federal funds to propose, establish, implement, or enforce any requirement that an individual wear a mask or other face covering, or be vaccinated, to prevent the spread of COVID-19, and for other purposes.” (117th Congress 2021-2022; <https://www.congress.gov/bill/117th-congress/house-bill/450>).
3. C. Cillizza (September 28, 2021). We’ve reached the ‘Red Covid’ phase of the pandemic. Retrieved from <https://www.cnn.com/2021/09/28/politics/red-covid-republican-states/index.html>
4. C. Palmer, *Researchers Mobilize to Study Impact of COVID-19*. COVID 19 Special Report No. 6; Monitor on Psychology (American Psychological Association. 2020) <https://www.apa.org/monitor/2020/06/covid-researchers>
5. M. T. Tuason, C. D. Güss, L. Boyd, Thriving during COVID-19: Predictors of psychological well-being and ways of coping. *PLoS ONE* **16**, e0248591 (2021). <https://doi.org/10.1371/journal.pone.0248591>
6. Centers for Disease Control, (CDC), “Health equity considerations and racial and ethnic minority groups” (2021; www.cdc.gov/coronavirus/2019-ncov/community/health-equity/race-ethnicity.html).
7. A. M. Cavanaugh, K. B. Spicer, D. Thoroughman, C. Glick, K. Winter, Reduced risk of reinfection with SARS-CoV-2 after COVID-19 vaccination — Kentucky, May-June 2021. *Morb and Mortal Weekly Rep* **70**, 1081-1083 (2021).
8. C. B. Fischer, N. Adrien, J. J. Silguero, J. J. Hopper, A. I. Chowdhury, M. M. Werler, Mask adherence and rate of COVID-19 across the United States. *PLoS ONE* 2021 **16**, e0249891 (2021). <https://doi.org/10.1371/journal.pone.0249891>
9. U.S. Department of Labor, Occupational Safety and Health Administration, (OSHA), “Guidance on returning to work. U.S. Department of Labor” (2020; www.osha.gov/sites/default/files/publications/OSHA4045.pdf).
10. Executive Office of the President, “Protecting the federal workforce and requiring mask-wearing” (Exec. Order No. 13991, 2021; www.federalregister.gov/documents/2021/01/25/2021-01766/protecting-the-federal-workforce-and-requiring-mask-wearing).
11. 116th Congress, “Coronavirus Aid, Relief, and Economic Security (CARES) Act” (H.R.748. Signed into Law, 2020; www.congress.gov/116/bills/hr748/BILLS-116hr748enr.pdf).
12. J. M. Cavaillon, M. F. Osuchowski, COVID-19 and earlier pandemics, sepsis, and vaccines: A historical perspective. *J Intens Med* **1**, 4–13 (2021). <https://doi.org/10.1016/j.jointm.2021.04.003>
13. M. A. Johansson, T. M. Quandelacy, S. Kada, P. V. Prasad 1, M. Steele, J. T. Brooks, R. B. Slayton, M. Biggerstaff, J. C. Butler, SARS-CoV-2 Transmission from people without COVID-19 symptoms. *JAMA Netw Open* **4**, e2035057 (2021). doi:10.1001/jamanetworkopen.2020.35057
14. G. Kolifarhood, M. Aghaali, H. M. Saadati, N. Taherpour, S. Rahimi, N. Izadi, S. S. H. Nazari, Epidemiological and clinical aspects of COVID-19; a narrative review. *Arch Acad Emerg Med.* **8**, e41 (2020).
15. M. S. Hakim, SARS-CoV-2, Covid-19, and the debunking of conspiracy theories. *Rev in Med Vir.* e2222 (2021). <https://doi.org/10.1002/rmv.2222>
16. Centers for Disease Control and Prevention, (CDC), “CDC COVID data tracker” (2021; https://covid.cdc.gov/covid-data-tracker/#trends_totaldeaths_totalcasesper100k).
17. Ballotpedia, “List of governors of the American states” (2021, https://ballotpedia.org/List_of_governors_of_the_American_states).
18. Ballotpedia, “State executive official elections” (2021, https://ballotpedia.org/State_executive_official_elections_2021).
19. Ballotpedia, “Status of lockdown and stay-at-home orders in response to the coronavirus (COVID-19) pandemic, 2020” (202, [https://ballotpedia.org/Status_of_lockdown_and_stay-at-home_orders_in_response_to_the_coronavirus_\(COVID-19\)_pandemic_2020](https://ballotpedia.org/Status_of_lockdown_and_stay-at-home_orders_in_response_to_the_coronavirus_(COVID-19)_pandemic_2020)).
20. K. Hubbard, These states have COVID-19 mask mandates. *U.S. News and World Report.* (2021). <https://www.usnews.com/news/best-states/articles/these-are-the-states-with-mask-mandates>.
21. Centers for Disease Control and Prevention, (CDC), “Covid-19 vaccinations in the United States, jurisdiction” [Data set]. (2021, <https://data.cdc.gov/Vaccinations/COVID-19-Vaccinations-in-the-United-States-Jurisdi/uns-k-b7fc/data>).
22. A. Wong, R. Marx, C., Amico, School mask mandates: Which states ban them? What about vaccines? *USA Today* (2021). <https://www.usatoday.com/storytelling/school-mask-mandate-covid-vaccine-map/>.
23. Best Colleges, “What colleges require the COVID-19 vaccine?” (2021, <https://www.bestcolleges.com/blog/list-of-colleges-that-require-covid-19-vaccine/>).
24. National Academy for State Health Policy, “State efforts to ban or enforce COVID-19 vaccine mandates and passports” (2021, <https://www.nashp.org/state-lawmakers-submit-bills-to-ban-employer-vaccine-mandates/>).
25. L. Mendelson, *Mandatory employee vaccines – coming to a state near you?* Littler. (2021). <https://www.littler.com/publication-press/publication/mandatory-employee-vaccines-coming-state-near-you>.

26. J. Cohen, *Statistical Power Analysis for the Behavioural Sciences* (Academic Press. 1969).
27. E. R. White, L. Hébert-Dufresne, State-level variation of initial COVID-19 dynamics in the United States. *PLOS ONE* **15**, e0240648 (2020). <https://doi.org/10.1371/journal.pone.0240648>
28. M. S. Gallaway, J. Rigler, S. Robinson, K. Herrick, E. Livar, K. K. Komatsu, S. Brady, J. Cunico, C. M. Christ, Trends in COVID-19 incidence after implementation of mitigation measures— Arizona, January 22–August 7, 2020. *Morb and Mortal Weekly Rep.* **69**, 1460–1463 (2020). U.S. Department of Health and Human Services, Centers for Disease Control and Prevention.
29. W. Lyu, G. L. Wehby, Community use of face masks and COVID-19: Evidence from a natural experiment of state mandates in the US. *Health Affairs.* **39**, 1419–1425 (2020).
30. C. B. Creech, S. C. Walker, R. J. Samuels, SARS-CoV-2 Vaccines. *JAMA.* **325**, 1318–1320. (2021). doi:10.1001/jama.2021.3199
31. New York State Office of the Attorney General Letitia James, “Nursing Home Response to COVID-19 Pandemic” (2021, <https://ag.ny.gov/sites/default/files/2021-nursinghomesreport.pdf>).
32. J. Abaluck, L. H. Kwong, A. Styczynski, A. Haque, M. A. Kabir, E. Bates-Jefferys, E. Crawford, J. Benjamin-Chung, S. Raihan, S. Rahman, S. Benhachmi, N. Z. Bintee, P. J. Winch, M. Hossain, H. M. Reza, A. A. Jaber, S. G. Momen, A. Rahman, F. L. Banti, T. S. Huq, S. P. Luby, A. M. Mobarak, Impact of community masking on COVID-19: A cluster-randomized trial in Bangladesh. *Science*, **14**, eabi9069 (2022). doi:10.1126/science.abi9069.

Supplementary Files

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