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William Olsen April 10, 2023

How Partisanship and Polarization Affected State COVID-19 Policy and Outcomes in the United States

by

William Olsen

Michael J. Rich
Adviser

Political Science

Michael J. Rich

Adviser

Alexander Bolton

Committee Member

Richard F. Doner

Committee Member

Holly Patrick

Committee Member

2023

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William Olsen

Michael J. Rich

Adviser

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Abstract

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The COVID-19 pandemic's severe case rates and death toll made the disease one of the worst public health outbreaks in both the United States and world history. Along with infecting and killing millions worldwide, COVID-19 has significantly changed the landscape of social and political relationships, negatively affecting the trust people have in the government and other people. From the pandemic's start, it was clear that elected officials and the public would not unify towards the guidance of health experts and public health officials to clamp down on COVID-19 immediately. The federal government's lack of consistent communication and policy-making sparked the politicization of the disease, with partisan state governments being responsible for adopting COVID-mitigating policies. This response would only divide the public even more. My work for this study builds on three aspects of scholarly literature on public health and politics: political polarization, public health partisanship, and public health policy. I build on the connection between polarization and partisanship's relationship with public health policy and how public health policy connects with public health outcomes. To expand the literature, my theory focuses on partisanship and polarization's effects on COVID-19 policy within state governments and how state COVID-19 policy affected state COVID-19 outcomes. I use existing data that involves ideology scores, state partisan control, dates of COVID-19 policy, and government data on COVID-19 cases and deaths. With this data, I examine the difference between state Democrats' and Republicans' policy responses to COVID-19 based on their political contexts and the connection between their policies with their respective state's COVID-19 outcomes. Descriptive results and a multivariate fixed effects regression analysis indicate that state Republicans were more likely to adopt short-term and loose COVID-19 policies compared to Democrats' strict and long-term policies. The analyses also indicate those strict COVID-19 policies were more successful in dealing with COVID-19 outcomes. The theory of polarization could not be confirmed when measured by itself, but has a significant effect when interacted with the Republican party. Future work is needed to explain political polarization's effect on COVID-19 policies and outcomes and the role that demographic groups in states play in influencing public health policy.

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Introduction

In January 2020, the SARS-CoV-2 virus, or COVID-19, first entered the United States and began to rapidly infect the entire country in a matter of a few months. With a pandemic that the U.S. has not experienced in over a century, Americans and their local, state, and federal governments were unprepared to face such an unprecedented public health outbreak. An uncrystallized strategy, subpar communication, and a lack of coordination between the federal government and state governments prevented the U.S. from clamping down on the virus in its initial stages (Hatcher 2020, 614-620) (Martin & Matthews 2022, 324-326). Soon after, businesses, both large and small, closed and faltered significantly, the stock market plunged to new record lows, schools closed, hospitals were overwhelmed, and the resulting recession put millions of Americans out of work and into critical financial struggles (Taylor, 2020). People struggled to pay for rent, mortgages, bills, daycare, etc. Most importantly, the more people became infected with COVID-19, the more people began to die from it. As of March 2023, in the U.S. there have been over 100 million cases of COVID-19, and 1.1 million people have died from it in a period of a little over three years (Centers for Disease Control and Prevention, 2023).

Several other countries that have quite similar political and governmental systems fared much better than the U.S. when mitigating the spread of COVID-19, proportionally speaking (Kneuer and Wallaschek 2022, 12-18) (World Health Organization, 2023). One resounding factor that sets the U.S. apart from those countries is the significant politicization of COVID-19. From the start of the pandemic, Americans were divided on how severe the disease was, and if it was worth it to take such precautionary and mitigating measures. The Trump Administration was not consistent with their guidance, noting that initially there was nothing to be afraid of, which conflicted with the guidance of public health officials and their top infectious disease experts

(Hatcher 2020, 614-620). In March 2020, President Trump consistently asserted that COVID-19 will "disappear" easily and that the virus is very mild. He claimed, "Now, and this is just my hunch, and — but based on a lot of conversations with a lot of people that do this. Because a lot of people will have this and it's very mild." (Doggett 2020). Trump recognized the transmission's significance but still downplayed many COVID-19 measures that states began to pass in March and April of 2020, such as shelter-in-place orders, mask mandates, and social distancing guidelines (Ibid., 614). State governments began to reflect this inconsistency ideologically, with more liberal states passing stricter and longer COVID-19 policies, while more conservative states advocated for looser and shorter policies. This difference indicated that ideology and partisanship were closely intertwined during the pandemic. Survey data showed ideological splits among the public as well, with liberals recognizing the severity and complying with mitigation policies, while conservatives shot down the severity, protesting unnecessary and government-overreaching policies (Deane et al. 2022). The split continued even when vaccines became available in 2021, as liberal states tended to have higher vaccination rates than conservative states (CDC, 2023).

With increasing divisiveness comes increasing political polarization. If people and elected officials cannot unify on a certain subject, they will polarize by shifting their ideological attitudes toward further extremes (Abramowitz et al. 2008, 547). Political polarization in the U.S. has been rapidly increasing, especially after the 2016 presidential election, which is why studying polarization's influence is important (Ibid., 547). Gridlocked legislatures are never useful, and in times of emergency, such as the COVID-19 pandemic, they can be dangerous, as governments must take immediate and concise action to mitigate a public health outbreak. The federal government may be the most visible and consequential level of government, but as we

saw the federal government devolve COVID-19 policies and guidelines to state governments, the actions state governments take should be analyzed as well. Governors and state legislatures are just as influential in their policy-making and party politics as the federal government, and since state characteristics, partisanship, and institutions are all unique, examining variation in a state's political context can be insightful in analyzing state policy-making in response to the COVID-19 pandemic. It is important to analyze how state partisanship fuels polarization, and how that connection eventually affects the policies state governments formulate and implement.

There is plentiful literature on how partisanship and polarization affected COVID-19 policies, with studies focusing on all levels of government in the United States. Most studies dive more specifically into what policies became significantly political, such as mask mandates, social distancing, school closings, etc. They are quite similar in their findings from an ideological perspective, as most scholars show that Democratic-leaning leaders were more likely to issue stricter policies than Republicans (Bonica 2018, 830). They indicate health policy is trending towards vertical partisan coalitions, where state leaders align their policies with the national party (Hall 2019, 44-47; Bonica 2018, 830). The presence of polarization during COVID-19 is also established in some literature, most notably through communication mediums (Hatcher 2020, 614-620; Bruine de Bruin et al. 2020, 178). There have also been several scientific studies that measure what mitigation policies significantly affected the spread of COVID-19, such as shelter-in-place orders, gathering restrictions, travel restrictions, and information campaigns that were able to curb COVID-19's acceleration. The literature establishes key political constructs during the pandemic, but it lacks further insight into how partisanship and polarization within state governments, specifically, affected COVID-19 policy. We have some evidence of how COVID-19 policies' affect COVID-19 outcomes, but further

study on how the politicization of those policies affected COVID-19 outcomes and if party and ideological policymaking can in turn affect the health of the public.

If politics played such an influential role in the U.S. during the COVID-19 pandemic, could it have been influential enough to significantly affect COVID-19 cases and deaths? This link in the causal chain will be a major component of this research, as it builds on the literature on how politics significantly affects public health. Politics is surely necessary and inevitable in public health, as scholars have argued, but when the political state of a country is highly polarized, led by two major political parties, do politics then harm the efficiency, integrity, and execution of public health policy? In this study, I seek to uncover evidence in two components. First, I examine how political factors (polarization and partisanship) in the American states may determine the policies that affect COVID-19. Second, I analyze whether and how those policies and political factors affected COVID-19 outcomes in the states. This research contributes to the politics-public health literature and fills the gap about how partisanship and polarization in the American states affected COVID-19 policy and outcomes.

Literature Review

Political Polarization

The political polarization experienced among elected officials and the public during the COVID-19 pandemic is not a new phenomenon. Especially on the federal level, scholars establish clearly that political polarization has been increasing in both the House and the Senate since the 1980s (McCarty 2007, 228; Abramowitz et al., 2008, 547). The correlation between party identification and liberal-conservative ideology has been increasing, as well as the correlation between party identification and positions on several policy issues (Abramowitz et

al., 2008, 547). Party politics is quite solid today, with help from the political divides made during the Reagan era, the Republican Revolution of 1994, the George W. Bush era, and the election of Barack Obama. Within each of these eras, partisan polarization made significant jumps and would continue to increase through the 2016 election of Donald Trump (Ibid., 547). President Trump's win in 2016 did not help the polarization problem at all, as both partisan and affective polarization kept increasing. Affective polarization, the tendency of partisans to dislike and distrust others from another party, has been notably negative since 2016, according to survey data. Both the public and elected officials say the other party is close-minded and makes them feel afraid, angry, and frustrated (Pew Research Center 2016).

Political polarization is well-established by scholars in the context of the national level. In the context of the state level, scholars argue that polarization may be even worse. For example, Nader et al (2022, 14) point to state elections as one of the roots of increasing polarization within state legislatures. They identify that from 1992 to 2020, more ideologically extreme candidates have been running for and winning state legislative elections than ever and that 80% of state general elections are not competitive (Ibid et al., 28-30). They warn this trend is a recipe for legislative gridlock, and with more extreme partisans taking the lead on hot-button issues, they may spread more extreme ideology into the U.S. Congress (Ibid et al., 28-30). Other scholars build on polarization from state elections, as Hall (2019, 44-47) shows a significant swing in ideology starting in 2010, with Republicans overtaking the Democrats' hold on the majority of safe seats in state legislative districts, and moderates losing their ideological advantages in general elections (see also Bonica 2018, 830). They fear current campaign finance laws, salaries, and legislative institutions will prevent moderation in state legislatures, which

allows more extreme legislators to draft and pass more ideologically extreme policies (Nader et al., 2022, 28-30; Hall 2021).

There is also a great deal of literature that analyzes the consequences of political polarization during the COVID-19 pandemic. Some studies analyze how political polarization affected people's risk perceptions of COVID-19, stating individuals tended to follow their own beliefs, opinions, and values before taking in the actual knowledge of COVID-19 when formulating their risk perceptions (Dryhurst et al. 2020, 994; Bruine de Bruin et al. 2020, 178). As a result, polarization during the pandemic was easily observable. Bruine de Bruin et al.'s study shows the difference between the conservative Fox News viewers and the liberal MSNBC/CNN viewers is significantly wide when looking at risk perceptions, and their support for certain COVID-19 policies (Bruine de Bruin et al. 2020, 183).

Scholars also built on this communication and media polarization during the pandemic. Federal and state governments, news outlets, social media, and partisan elites all would send conflicting and divergent messages to the public on COVID-19, which is damaging to unifying everyone towards the public health outbreak (Green et al. 2020, 1-5; Hart et al. 2020, 691; Kerr et al. 2021, 1-3). Partisan elites, in particular, are highly influential towards the public, as cues sent by elected officials can influence public attitudes and behavior (Green et al., 2020, 1). With elected officials veering more to the extremes, it is more likely that the public will follow them. Especially during the pandemic, the public would follow their ideology, as liberals emphasized COVID-19's threat to public health and workers, and conservatives emphasized blaming China for COVID-19 and advocated for businesses to remain open (Ibid et al., 1).

Public Health Partisanship

Partisanship and polarization were surely rampant during the COVID-19 pandemic, but this is not the first public health outbreak in the U.S. to be politicized. Public health outbreaks in the 20th century did not experience as much politicization as the ones in the 21st century. The past three significant public health outbreaks before COVID-19 were H1N1, Ebola, and the Zika virus, all of which had political ramifications. H1N1's politics were similar to COVID-19's politics. For example, Republicans were 2.5 times more likely to claim H1N1 was being taken too seriously by news outlets than Democrats and were twice as likely to not express confidence in the government's response than the Democrats (Baum 2011, 1034).

In the context of government confidence, there is a significant partisan flip for support of the government's preparedness to respond to the Avian flu outbreak in 2006 under Republican President George W. Bush's administration. When Democrats and Republicans were polled on how confident they were in the government's preparedness for such an outbreak, 72% of Republicans were confident, compared to the Democrats' 52% (Nyhan, 2014). Comparing this same confidence poll during H1N1, Democrats overtook Republicans in confidence, most likely due to Democratic President Barack Obama then being in office (Ibid., 2014). The same H1N1-COVID-19 connection appears for vaccine perception as well, as Republicans were again twice as likely to indicate that they would not get the H1N1 vaccine due to the risk and lack of testing (Ibid., 1035). H1N1 may have been a clear indicator that future public health outbreaks would be substantially divided between Republicans and Democrats.

These partisan trends appear similar to the 2014 Ebola crisis as well. Even though the Ebola virus was not nearly as transmissive and substantial as H1N1 and COVID-19, it still created enough concern in the U.S. about how the government would be able to handle such an

outbreak. The same confidence poll from the Avian flu and H1N1 was taken by Republicans and Democrats and revealed an even sharper divide in the Ebola crisis. Democrats were 76% confident in the government's response, and Republicans were 54% confident (Nyhan, 2014). These confidence polls indicate how people and elected officials perceive the government. Especially in emergencies, they appear to ultimately place the President responsible for managing situations, rather than the departments and agencies responsible for implementing policies to mitigate an emergency (Ibid., 2014). Nyhan writes, "Few people know about how the federal government responds to disease epidemics, but most people have views about President Obama and the job he is doing in office." (Ibid., 2014).

Ebola, however, differs from H1N1 and COVID-19, as Republicans were more concerned over the spread of Ebola than Democrats (Greer et al. 2016, 97). Republicans wanted to take stricter steps to prevent Ebola, such as imposing travel bans from countries notably infected with Ebola (Ibid., 89). This partisan trend was again a reflection of elected officials' views towards the president, and with a midterm election approaching in 2014, Republicans were able to use their influential cues to the public to make Ebola a significant and damaging issue for President Obama (Ibid., 97).

The Zika virus in 2016 was also not nearly as significant as COVID-19, but scholars have made political comparisons between the two public health outbreaks. For example, presidential approval again makes an appearance here, as Obama supporters were more likely to trust the CDC and believe scientists are objective in their guidance during the Zika outbreak (Safford et al. 2021, 2483). While for the COVID-19 pandemic, Trump supporters were more likely to distrust scientific agencies and question the integrity of scientists' guidance (Ibid et al., 2483). Republicans, again, were also more likely to approve of the government's response to COVID-

19 under the Trump Administration, and more likely to disapprove of the government's response during the Zika outbreak under the Obama Administration (Ibid et al., 2493). From the past three outbreaks in the last 14 years, scholars argue the partisan trend is clear: elected officials tend to base their support and concern for public health on whether their party controls the White House. Their public supporters will follow suit based on their partisan cues. We also see the degradation of trust in science and the public health community due to heightened partisanship, which is damaging for dealing with future public health outbreaks.

Public Health Policy

In public health crises, it is the job of the legislative and executive branches to formulate laws and executive orders to protect the health of the public, while also maintaining political, economic, and social order. However, due to the strong grip partisanship and polarization have on United States policymaking, public health policy is put at high risk of being politicized, which can prevent efficient and necessary policies from being passed. As mentioned before, state legislatures are more likely to be ideologically extreme and partisan than the federal government, making public health outbreak containment inconsistent, as seen with the COVID-19 pandemic. Grossman et al. build on partisanship's effect on COVID-19 policy within states, as they focus on governors specifically. Governors have heightened powers in states of emergency, as they issue recommendations and executive orders to counties across the state (Grossman et al. 2020, 24145). Focusing on governors' stay-at-home orders during the COVID-19 pandemic, they found both Democratic and Republican governors' recommendations to stay home significantly reduced mobility in both Democratic and Republican-leaning counties (Ibid et al., 24151). However, partisan trends did appear, as Republican-leaning counties were less responsive than

Democratic counties to governors' communications encouraging people to stay home (Ibid et al., 24151).

Democratic counties were also more responsive to recommendations from Republican governors, who broke with the national party to signal COVID-19's severity (Ibid et al., 24151). The ideology of governors appeared to play a role in formulating policy as well. For example, two of the more conservative governors in the United States, Ron DeSantis of Florida, and Greg Abbott of Texas issued loose COVID-19 protective mandates and reopened businesses well before most other states (Hallas et al. 2021, 27; Calvan, 2020). However, counties and towns within the states implemented their own, stiffer COVID-19 restrictions, which the governors immediately fought and shot down (Hallas et al. 2021, 27). Neelon et al. capture these gubernatorial partisan trends well, stating, "The political affiliation of state leaders and specifically governors might best capture the omnibus impact of state policies." (Neelon et al. 2021, 116).

Scholars have also found evidence of partisan trends in COVID-19 policy by examining the more unpopular and politicized COVID-19 policies. The shelter-in-place order and the face mask mandates were two of the more politicized policies during the pandemic due to their inconvenience and their impact on normal life. When looking at shelter-in-place orders, national public health experts vastly recommended the orders in early 2020 to "flatten the curve" immediately (Patterson Jr. 2022, 3). Many states, both Republican and Democratic, soon issued the order, but the more hesitant states, which were almost all Republican-controlled states, did not, as they argued for their people to have the freedom to make the right decision and have individual responsibility (Ibid., 3). A couple of reasons may show why they use this reasoning. One, they want to reflect their constituents' perceptions of COVID-19 and pass policies that are

ideologically accepted within their respective communities (Ibid., 3-4). Two, they do not want to accept information concerning policies adopted by the opposing party (Ibid., 3-4). These partisan trends appear again with face mask mandates, with Republican governors adopting late and short-term mask requirements. The opposition towards face masks indicated elite signaling, as the stance on face mask wearing became a litmus test for Republicans due to President Trump's lack of support for masks (Adolph et al. 2022, 26). Being out of line with President Trump's agenda was never a good sign for dissenting Republicans. Again, states passing mask requirements seemed to depend on the ideological and partisan makeup of an elected official's constituency.

With more data coming from the COVID-19 pandemic, there has been more literature that analyzes how the policies governors ordered and recommended affected COVID-19 outcomes, even in such a partisan and polarized environment. Scholars agree that Republican-led states issued looser and shorter COVID-19 protective policies, and vice versa with Democrats, but scholars have been analyzing how the strictness of policies affected COVID-19 cases and deaths. Neelon et al. concluded gubernatorial party affiliation may drive policies that impact COVID-19 cases and deaths after seeing that Republican-led states had higher COVID-19 incidence rates after June 2020, which persisted throughout the pandemic (Ibid., 115). Shvetsova et al. also find similar results, as they found that Democratic-led states with stricter COVID-19 policies were associated with slower growth of COVID-19 cases (Shvetsova et al. 2021, 433). Hallas et al. also shows generally those states with a Republican governor had more cumulative cases of COVID-19 after June 2020 than states with a Democratic governor (Hallas et al. 2021, 24). Scholars have generally concluded that COVID-19 policy was politicized, much of it by the actions of states, and warn that future policy decisions should be guided by public

health expertise instead of political ideology (Neelon et al. 2021, 115; Shvetsova et al. 2021, 433).

Theory

Prior research has been able to show that politics does have a significant effect on formulating public health policy and how that policy, based on politics, can affect public health outcomes, especially during the COVID-19 pandemic. Partisanship and polarization are two of the major components of politics that affect COVID-19 policymaking, as strong party grips on state government institutions have allowed governors and legislators to veer further into the extremes of their ideology and for states to pass policy strictly based on the controlling party's philosophy and agenda. As a result, the COVID-19 policies passed are perceived as political, rather than neutral and based on the scientific guidance of public health officials. With some states' public health policies being more political than others, the outcomes of the public health issue at hand will differ across the states. The theoretical framework in this study will both build on the politics of COVID-19 policy literature and test new theories as well. I build on the existing literature by analyzing how partisanship within state governments affected COVID-19 policy and add new theory by analyzing more COVID-19 policies. I also plan to build on the literature that explains the connection between COVID-19 policies and COVID-19 outcomes by focusing on how the policies state legislatures and governors adopted, specifically, affected COVID-19 outcomes. New theories will be added by showing the connection between partisanship and polarization and in turn their effects on COVID-19 policies and outcomes.

Partisanship Effect on Legislative Polarization

The first link in the overall causal chain of this study is the connection between partisanship and polarization in state legislatures. Relative to this study, partisanship refers to the strong presence and adherence to a certain party exhibited by governors and state legislatures. Polarization, on the other hand, has several types, but relative to this study, the focus will be on legislative polarization. Legislative polarization refers to the divergence of political attitudes and policy opinions by state legislators from more moderate ideologies to more extreme ideologies (DiMaggio et al. 1996, 692; Hall 2019, 44). Partisanship in state governments is quite observable, as people can typically distinguish which states are solidly Republican, Democratic, or mixed. Many states have had long periods where one party controlled the state legislature and the governor's office (state trifecta), such as the Republican strongholds of Florida, Georgia, Idaho, and South Carolina, or the Democratic strongholds of California, Connecticut, Delaware, and Oregon. When one party has absolute control over a tate's policymaking institutions, they are free to pass policies that strongly reflect the party's agenda, without significant opposition from the other party. Party control is strong, which may dissuade more moderate members of the controlling party from breaking away from the caucus. This partisan stronghold with fewer moderates may also allow more extreme legislators to pass more extreme policies, as the policies they formulate will gain the party's support since the legislators' preferences will be closer to those of the more extreme legislators than the more moderate ones. With fewer moderates in partisan state strongholds, polarization in a state's legislature is bound to increase.

Partisanship and Legislative Polarization Effects on COVID-19 Policies

The next link in the chain focuses on the political determinants of COVID-19 policy in the states. I separately theorize partisanship's effect on COVID-19 policies and legislative polarization's effect on COVID-19 policies. Scholars have shown evidence of the partisan effect of COVID-19 policies, so I plan to add to the literature by including several COVID-19 protective and vaccination policies, rather than just one or a few as most scholars have done (Grossman et al. 2020, 24145; Calvan, 2020). Scholars focusing have found strong relationships between party control and the strictness of one COVID-19 protective policy, but the question is: will that relationship strengthen or weaken when considering the broader COVID-19 policy portfolio states have adopted? The relationship between partisanship and COVID-19 policy strictness is clear, as Republican elected officials did not favor limiting social and economic mobility to minimize the effects of COVID-19 since most of their constituents did not perceive COVID-19 as that serious (Deane et al. 2022). Vice versa, on the Democratic side. Since Republican and Democratic states stayed consistent with their strict or loose strategies towards COVID-19 policies, I expect them to continue with these perspectives towards several other protective policies, such as the duration of stay-at-home orders, mask mandates, state of emergency orders, elective medical procedures, and traveler quarantines. Partisanship towards vaccination policies was also rampant, so I will examine the determinants and effects of those policies as well to extend our understanding of the links between partisanship, COVID-19 policy choices, and policy outcomes.

Political polarization has been a widely used concept in the literature on COVID-19, but existing studies generally focus on polarization within the electorate as compared to state-level elected officials and their effects on COVID-19 policies. The causal chain of this study links

partisanship to polarization, as partisan variables such as party control and ideology in state legislatures can indicate whether the polarization is significant in a state's legislature. Ideology scores in state legislatures can show how conservative or liberal they are and the ideological distance between the most conservative and most liberal legislators. If this link is credible and polarization can be established through ideological measures, then I can connect legislative polarization with state COVID-19 policy choices. More partisan state legislatures allow for more extreme legislators, which may lead to those extreme legislators advocating and formulating stricter or laxer COVID-19 policies. For example, more extreme Republicans may not formulate any protective COVID-19 policies, or more extreme Democrats may formulate COVID-19 policies that immobilize more aspects of society and/or the economy and stay in effect much longer. I will also use several COVID-19 protective and vaccination policies to compare the more polarized states to the less polarized states, and their policy responses to COVID-19.

COVID-19 Policy Effect on COVID-19 Outcomes

In this study, COVID-19 policies refer to the protective and vaccination laws passed by state legislatures and/or executive orders issued by state governors. Many of these policies are not permanent, as many were issued with an expiration date or expired when the state deems them suitable to end, such as state of emergency orders, shelter-in-place orders, mask mandates, etc. Some policies can be written into law, such as the ban on requiring vaccine passports or the ban on private employers requiring their workers to get vaccinated. The goal of these COVID-19 policies is to mitigate COVID-19's spread and reduce the number of cases and deaths as much as possible. States also need to protect their hospitals with these policies to prevent them from being overcrowded with COVID-19 patients.

With these goals, one would expect a state's policy choices to have some effect on COVID-19 outcomes. However, the difference in this study is that many COVID-19 preventative and vaccine policy responses are not necessarily instrumental but are based on politics and in many ways may be symbolic responses, as partisanship and polarization are likely to influence a state's COVID-19 policies. Since many state legislatures are based on solid partisan lines and are increasingly becoming more polarized, partisan state legislators are likely to make policy choices that reflect their party's philosophy and agenda as well as their reading of the will of their constituents, which may not necessarily reflect the guidance of scientists and public health officials. State legislatures with solid partisan control may also have more ideologically extreme legislators interested in adopting policies that tighten or loosen the freedom of individuals and businesses to mitigate the effects of COVID-19. Looking at the entirety of a state's COVID-19 policy portfolio, I can then examine the effects of policy choices in more liberal or conservative states on COVID-19 outcomes. COVID-19 outcomes, in this study, include COVID-19 cases, deaths, and vaccination rates. Since the scientific and public health community considers strict preventative measures to have the best ability to minimize the negative consequences of a public health outbreak, I expect states that adopt stricter COVID-19 policies will do a better job of reducing cases, deaths, and increasing vaccination rates than states that adopt looser COVID-19 policies.

Hypotheses

- *H1. Legislative Partisanship:* Republican-controlled legislatures will more likely adopt short-term and loose COVID-19-controlling measures against the advice of public health officials; Democratic-controlled legislatures, on the other hand, will favor stricter COVID-19-controlling measures of a longer duration.
- *H2. Gubernatorial Partisanship:* Republican governors will be more likely to sign short-term and loose COVID-19-controlling laws and executive orders against the advice of public health officials; Democratic governors, on the other hand, will favor stricter and longer COVID-19-controlling laws and executive orders.
- *H3. State Government Trifectas:* States where one party controls both the state legislature and the governorship will be more likely to respond more quickly than states with divided governments. In addition, states with Republican trifectas will be most likely to adopt short-term and loose COVID-19 measures whereas states with Democratic trifectas will be most likely to adopt stricter and longer COVID-19 policies.
- *H4. Partisanship Effect on Legislative Polarization:* The more control one party has on the executive and legislative branches of a state government, the more polarized that state's legislature will be.
- *H5. Legislative Polarization:* The more polarized a state's legislature is, the further strict or lax they will be when adopting COVID-19 policies, depending on which party controls the legislature of that state.
- *H6. Policy Effect on COVID-19*: States that formulate and implement stricter and longer COVID-19 policies, which are consistent with public health guidance, will be more successful in mitigating COVID-19 cases and deaths, and promoting vaccinations; States that have loose COVID-19 policies will see a greater spread of COVID-19 cases and deaths, and a slower vaccination rate, relative to other states.

Data and Methods

This study uses a cross-sectional, time-series dataset that includes all 50 states, their COVID-19 policy responses, and policy outcomes covering the period from the fourth quarter of 2019 through the fourth quarter of 2022, which is the most recent period for which data are available. Thus, the study analyzes data across 650 observations (50 states x 13 quarters).

Measuring COVID-19 Outcomes

The dependent variables focus on three types of COVID-19 outcomes in the 50 states by quarter. The first outcome variable is the number of COVID-19 cases in each state per 1,000 persons. Case data are from the Center for Disease Control and Prevention's (CDC) Weekly COVID-19 Tracker, which includes the total number of cases each state had every week. The limitation here is that this database stopped tracking outcomes on October 18, 2022, which does not comprise the full fourth-quarter data for 2022. However, since cases were flattening at this point, and most COVID-19 policies were inactive, I decided to leave the data for October 18, 2022, in and deem it as the fourth quarter case data of 2022.

The second outcome variable is the number of COVID-19 deaths per 1,000 persons in each state. Death data are also tracked on a quarterly basis in each year of the pandemic for the same purposes as the case data. The data are also drawn from the CDC's Weekly COVID-19 Tracker. The fourth quarter death data for 2022 also ends on October 18, 2022, meaning the 2022 fourth quarter death data is the COVID-19 death total as of October 18, 2022.

The third outcome variable captures the states' success in vaccinating their population to prevent further outbreaks of COVID-19. Three measures are used: the percentage of the population that received at least one dose of the COVID-19 vaccine, the percentage of the population that completed a full course of the COVID-19 vaccine, and the percentage of the population that received a COVID-19 booster vaccine. These data all come from the CDC's COVID Data Tracker.

Measuring Polarization in State Legislatures

Developing a measure for polarization within every state's legislature was not feasible for this project. Retrieving data from every state's roll call logs, legislator surveys, and other data indicating state legislative activity is time- and resource-consuming. Therefore, I rely on existing scholarly efforts to measure polarization in state legislatures. Boris Shor and Nolan McCarty have notably created such a polarization index, both scoring every individual state legislator's ideology from every state and setting up aggregate data for state legislative chambers and state legislatures overall. Shor and McCarty published their article and measures in 2011 and claimed their mapping of American state legislative ideology was a successful approach to answer scholarly questions on state politics, policymaking, and legislative politics in general (Shor & McCarty 2011, 530). They have updated their findings several times in the past decade, making updates for 2014-2015, 2018, and 2020. They published individual and aggregate state legislative data, but due to the context of this research, I will use Shor and McCarty's Aggregate State Legislator Data.

Shor and McCarty's approach to formulating ideology scores for every state legislature is primarily based on drawing data from roll-call votes, and responses from a survey called the National Political Awareness Test (NPAT), which asks legislators their stance on a wide range of policies (Ibid., 533). Using the ideological stances drawn from that data, and adjusting for party influence, Shor and McCarty put every state legislature on an ideological scale by estimating one- and two-dimensional spatial models (Ibid., 533). Their results produce a total ideological score for every state's House of Representatives and Senate chambers, the score for Democrats and Republicans in each state's House chamber, and the score for Democrats and Republicans in each state's Senate chamber. Shor and McCarty's ideological scores, in total, range from -1.7 to 1.6, with -1.7 being the most liberal score, and 1.6 being the most conservative score.

To measure state legislative polarization based on Shor and McCarty's aggregated state ideology scores, I use their strategy for assessing polarization, which is derived from the distance between the party medians in each legislative chamber in a state, and then averaging the measure between both chambers (Ibid., 546). One limitation of using this data is that the latest ideological scoring data is from 2018, meaning these scores will not be associated with the COVID-19 pandemic. However, I believe it is still a valid dataset to use since there is little other scholarly research detailing every state's legislature ideology since 2018. Polarization levels were surely higher in 2020 than in 2018, and are even higher today, but the 2018 dataset should still exhibit and effectively reflect the high polarization state legislatures showed in 2020-2022 (Boxell et al., 2020, 19; Pew Research Center, 2022).

Partisanship

Along with Shor and McCarty's ideology scores, I include four political variables to test the role of partisan legislators: state government trifectas, House party control, Senate party control, and Governor party control. Each of these dummy variables spans the years 2018-2022, one for each state. Ballotpedia provided the data for these variables, noting whether Democrats or Republicans controlled the House, Senate, and Governor's office. This study only focuses on the Democratic and Republican parties due to the minimal presence of third parties. Thus, the data is coded to show only if Democrats, Republicans, or neither are in control. A state government trifecta is when one party controls all policy-making sectors of the state government (both chambers of the state legislature and the governor's office). If there is a Democratic trifecta in a certain year, it will be coded as 1. A Republican trifecta will be coded as -1, and if there is a divided government, it will be coded as 0.

The House, Senate, and Governor party control variables are similarly measured the same as the trifecta variables. They are also dummy variables, ranging from 2019-2022 by quarter. For each state in each quarter, Democratic control of a state's House, Senate, and governor's office is coded as 1, while Republican control is coded as 2. There are two occurrences in the data where the coding is different. One, the Alaska state government experienced a completely split Senate from 2019-2022 and had an independent governor in 2018 (Ballotpedia 2023). These differences are coded as 0. Two, the Nebraska state government is the only state to have a unicameral legislature, where there is only the Senate and no House of Representatives.

Measuring State COVID-19 Policies

All of the hypotheses examined in this study are associated with either why certain state COVID-19 policies are more strict or loose, or how those strict or loose policies affected each state's COVID-19 outcomes. I describe the several variables that go into the policy categories below.

State COVID-19 Policies

The state policy variables I use are drawn from data gathered by the Kaiser Family Foundation's COVID-19 state policy tracker and updated from data available from the National Academy for State Health Policy (NASHP), the CDC, Ballotpedia, U.S. News and World Report, and the COVID-19 United States Policy (CUSP) database. All of these sites provide information on the policies states implemented during the COVID-19 pandemic, what states implemented them, when they implemented them, and when they ended and/or reinstated them. I specifically use the dates for when each state initiated and ended such policies, making it possible to calculate the presence and duration of each policy by quarter.

State of emergency

The state of emergency order was the earliest COVID-19 policy used by states and the only one (of the ones I am using) during the pandemic that all 50 states implemented. These public health emergency orders, proclaimed by governors and/or state legislatures, expand executive powers, such as access to emergency funds, suspension of existing statutes, and the ability to create new laws (National Conference of State Legislatures, 2022). All the state of emergency orders the states passed were declared and enacted by their governors. I expect the introduction, ending, and reinstating of state of emergency orders will factor into COVID-19 outcomes. So, to capture differences between each state's use of the COVID emergency order, I drew on data from the NASHP, the Kaiser Family Foundation's COVID-19 policy tracker, and CUSP's policy tracker. These databases show the exact dates for when each state declared, ended, and/or reinstated a state of emergency declaration, making it possible to calculate the order's duration for each state. Every state issued a state of emergency order with Washington being the first state to do so on February 29, 2020. The rest of the states issued their orders soon after that, as they all ordered them within March. West Virginia was the last state to issue the order, but they rolled it out only a few weeks after Washington on March 16, 2020. Michigan had the shortest duration, with their order ending on October 12, 2020. On the other hand, Illinois' emergency order is still active from 2020 and is set to end on May 11, 2023.

Shelter-in-place order

The shelter-in-place order, or stay-at-home order, was also one of the earliest and most widely used COVID-19 policies, where state governments ordered citizens to stay in their homes or property, unless it was essential for them to leave, such as for work, groceries, pharmacies,

etc. All states that did use shelter-in-place orders were issued by their governors. The data for this policy is drawn from the Kaiser and CUSP trackers and the NASHP, and I expect duration differences from each state, which should show differences in each state's COVID-19 outcome. The data is also based on dates, which I will again use to calculate the order's duration for each state. California was the first state to issue a shelter-in-place order on March 19, 2020, and would be the state to have the longest duration as well. Most states issued their orders soon after California did, but states like South Carolina, Alabama, and Missouri adopted their orders the latest, in early April. North Dakota, Utah, Iowa, Nebraska, South Dakota, Arkansas, and Wyoming never issued any shelter-in-place orders. Alabama, Tennessee, and Mississippi had the shortest durations for the order, lasting about three weeks.

Non-essential business closing order

Also, early on in the pandemic, almost every state implemented laws to close "non-essential" businesses such as restaurants, bars, recreational spaces, fitness centers, sports events, etc. All states that did use non-essential business closing orders were issued by their governors. CUSP and Kaiser policy trackers were also used as the source for this variable and updated with information from NASHP. The duration of this order varies strongly for every state, which should also show some differences between each state's COVID-19 outcomes. The order's duration is also used for this variable. All states used this order, except for South Dakota. California, Colorado, and Wyoming were the first states to close down their businesses on March 19, 2020, while Arkansas, Florida, and Nebraska lagged, starting their orders in early April 2020. New York had the longest duration, lasting about 12 weeks, while South Carolina had the shortest, lasting just about three weeks.

Elective medical procedure suspension

Due to the high influx of COVID-19 patients in hospitals, many states ordered elective medical procedures to be suspended to make room for new COVID patients and prevent hospitals from being overwhelmed. Elective medical procedures are certain repairs, surgeries, operations, etc., that are scheduled in advance and are relatively non-time critical. If the patient can wait for a procedure, then hospitals can prioritize patients in dire need, such as COVID-19 patients in early 2020. All states that suspended elective medical procedures were issued by their governors. I do not expect this variable to be as significant a factor in COVID-19 outcomes as the other variables, but it is still useful since it may show the breadth of state policy responses and whether a smaller-driving policy response can have a significant effect on COVID-19 outcomes. Kaiser and CUSP, and NAHSP also provide data for this with dates, meaning duration calculation will be used. All states used this order, as Indiana was the first state to halt elective medical procedures on March 16, 2020, and South Dakota was the last state to do so on April 9, 2020. South Dakota also had the shortest duration of about three weeks, while New York's order was the longest at about 12 weeks.

Face mask mandate

The face mask mandate is an interesting policy response since, in the early days of the pandemic, the CDC advised against the public wearing face masks to preserve enough masks for hospital workers (Netburn, 2021). All states that did use face mask mandates were issued by their governors. It was not until early April 2020 that the CDC changed its mask guidance, recommending everyone to wear them (Ibid., 2021). Due to the lack of evidence at the time of whether masks are effective at preventing the spread of COVID-19, wearing masks became politicized both among the public and with politicians. Thus, the decision to implement a mask

mandate varied significantly, based on the dates Kaiser, US News & World Report, CUSP, and NAHSP provided. Due to the highly political nature of this variable, I expect the political variables to be strongly related to the adoption of face mask requirements, as well as a factor in driving the outcomes.

Since enough time has passed for health researchers and public health officials to conduct studies and gather data on mask-wearing, new studies have been published showing new conclusions on mask-wearing. However, there is still debate due to inconclusive and ambiguous answers researchers have found. Many studies done by health experts still insist that public health officials should implement the widespread use of face masks in public, claiming they do prevent transmission, especially when compliance is high (Howard et al. 2021, 1-9; Talic et al. 2021, 1-10). Others cast doubt on mask-wearing, especially after Cochrane, an independent medical research organization, found that states with mask mandates fared no better against COVID than those without (Jefferson et al. 2023, 1-4, 34-36; Stephens 2023). Cochrane's studies are considered the "gold standard" of medical research, but some argue their results from the mask-wearing studies could be misinterpreted. The editor for Cochrane Library, Karla Soares-Weiser, claims, "The review examined whether interventions to promote mask wearing help to slow the spread of respiratory viruses…given the limitations in the primary evidence, the review is not able to address the question of whether mask wearing itself reduces people's risk of contracting or spreading respiratory viruses." (Tufekci 2023). With these disagreements, mixed conclusions, and the need for more data, states with ambiguous mask mandates are likely to be observed here.

All states besides Arkansas and Arizona implemented a face mask mandate. New Jersey was the first state to order it on April 9, 2020. Many states lagged in ordering the mandate, with

Wyoming being the last state to do so on December 9, 2020. States were also quite inconsistent with the duration of the mandate, as Mississippi's order lasted around eight weeks, while Hawaii had the longest duration of almost a year and a half.

Quarantine on travelers

To prevent people from bringing COVID-19 into the state, approximately half of the states implemented a quarantine order, which required travelers entering the state to be quarantined for 7-21 days. All states that did use travel quarantine orders were issued by their governors. With limited states using this order, I do expect variation among states in COVID-19 outcomes, but this variable may not be as significant as the others. Data is drawn from Kaiser, Ballotpedia, CUSP, and NAHSP, showing dates; duration will be the measure used. All states implemented this quarantine order, with Alaska being the first to order it on March 11, 2020. Many states started the order in March, but several lagged behind the following months, especially with Massachusetts, Maryland, and Pennsylvania starting theirs in November and December of 2020. Some states continued the order into 2021, such as New Hampshire ending their order after a year and two-month duration, while South Carolina only used their order for about two months.

Private employer vaccination mandate

Much concern was expressed in the early days of the pandemic regarding when a vaccine might be available and approved for distribution. The first vaccines were made available in late 2020, initially to healthcare workers, the elderly, and others in high-risk occupations. Vaccination policies during the COVID-19 pandemic are important to note in this research, as they can help deter COVID-19 cases and deaths. However, when states began to roll out laws that required certain people to be vaccinated, those policies became highly politicized and

debated. One of those policies was the enforcement of or ban on private employers requiring their employees to be vaccinated. Almost all states that did issue mandates or exemptions were based on bills passed by their respective legislatures, while Texas was the only state to have its governor order a law, being a private employer vaccination exemption. Data for this variable is drawn from NASHP, which gives dates and indicates whether a state took any action on this policy or not.

Montana was the only state to go as far as banning private employers from requiring vaccinations from their workers, while several states ordered private employers to allow exemptions for workers to get the vaccine. New York was the only state to require private employers to mandate their workers be vaccinated, but this order lasted for about 10 months. The rest of the states took no action on banning or mandating private employer vaccine requirements.

State employee vaccination mandate

Some states also passed laws that required state government employees to get vaccinated, while several other states passed laws that prohibited such an action towards their employees. Data for this variable is also drawn from NASHP, which gives dates and indicates whether a state took any action on this policy or not. Several states took part in this order. New Mexico, California, and Virginia were the first states to mandate state government employees in early August 2021. Many states followed suit going into September and October of 2021, while Connecticut and Illinois were the latest to adopt it in November 2021, and January 2022. The passage of such mandates was mixed, as several states had their governors sign executive orders to adopt them, while some states had their legislatures, or even their departments of health, pass the mandate into law. This order is still in effect for some states, but many states have already

ended this mandate back in mid-2022. More than half of the country did not take action on mandating state employee vaccinations.

Proof of vaccination

Once vaccinations became widely available, many businesses and programs began to require people to show they had been vaccinated against COVID-19. With vaccinations also being a politicized and polarized concept across the country, many states took action to ban businesses from requiring patrons to show proof of vaccination. Only Hawaii implemented a vaccination-proof law, while most states did not have a ban or requirement, but advised people they could access their vaccination records through a digital application. States that banned proof of vaccination were either signed into law by the governor's executive order and/or the state's legislature. The variables listed here are whether states banned the proof, required it, or took no action. I also include a measure indicating whether a state provided digital access. Data is again drawn from the NASHP.

Almost half of the country passed laws to ban any kind of proof of vaccination, with almost all of them being implemented in April and May of 2021, which is when vaccines began to be widely available. Louisiana and California were the first states to launch digital health records to show vaccination records in May and June of 2021, followed by some other states in late 2021. Some states lagged this launch into mid-2022, such as Oregon, New Jersey, and Virginia. Most states, in general, did not ban or mandate proof of vaccination requirements.

Control variables: Demographics

To control for variations in the state context and characteristics of each state before and during the pandemic, I utilize several control variables, which are primarily demographic variables to help assess variation across states in high-risk populations. I also include the total

state population to translate several of the outcome variables to rates and also include population density as a proxy for susceptibility to COVID transmission. Measures of the state's demographic makeup include race and ethnicity, poverty and elderly poverty, the elderly population, and the uninsured population. The racial variables, which are composed of the five major racial groups (White, Black, Latino/Hispanic, Asian, Native American/Alaska Native), can show whether the incidence and prevalence of COVID-19 cases and deaths are more likely to be found in states with greater concentrations of populations at risk.

Reports from the CDC and others have shown that the effects of COVID-19 have been most pronounced on vulnerable populations (elderly population, elderly poverty, poverty, people at risk for COVID-19, uninsured population)[1]. The Center on Budget and Policy Priorities (CBPP) shows COVID-19's impact on poor communities and those who cannot afford insurance, as at their apex, almost 40% of Americans had difficulty covering expenses, 21% could not afford to pay their rent, and 14% did not have enough to eat every day (CBPP 2021). The CDC also advised the elderly and people at risk for COVID-19 to be more cautious during the pandemic due to their diminished immune systems, or completely immunocompromised systems. They show most deaths from COVID-19 come from immunocompromised people, and those over the age of 65 (CDC 2023).

The United States Census Bureau's database provides nearly sufficient data for this study, as not all variables are filled with data from each year in the period studied. For example, there is little data for 2022 from the Census, so the data will either be interpolated as an estimate, retrieved from other sources, or left non-applicable. Data for the demographic variables were

[1] The uninsured population data consists of people between the ages of 19-64 since most people over the age of 65 have Medicare/Medicaid.

derived from the U.S. Bureau of the Census, American Community Survey. The population at risk of COVID-19 data comes from the CUSP data.

Results/Analysis

Descriptive Results

Before going into the models for analysis, partisan patterns can be observed simply by showing how quickly states adopted COVID-19 policies, and how long they deployed such policies. Based on the data from CUSP and NASHP, I rank the top five earliest and latest adopters of COVID-19 policies, and the top five states with the longest and shortest durations of those policies. In Table 1, partisan patterns do emerge, especially for the more politicized policies. When looking at the duration columns, several of the policies show state partisan differences among the shortest and longest durations. Almost all of the policies show Democratic-controlled states having longer durations of COVID-19 policies, specifically those that are meant to mitigate transmission. Republican-controlled states show prominence in COVID-19 policies that can weaken the goal of mitigating transmission, which are the private employer vaccination exemption, and the proof of vaccination ban.

Not only does Table 1 show the partisan differences, but it also shows the prominence of state government trifectas as the leaders in adopting or not adopting COVID-19 policies. For example, two of the more politicized policies in the table, the shelter-in-place order and the face mask mandate show that the top five earliest and longest state adopters were Democratic trifectas. On the other hand, the top five states with the latest and shortest policies were Republican trifectas. Republican trifectas also lead the way with not adopting COVID-19 mitigating policies as well. Very few states with divided governments were up with the leaders

Table 1. Early and late state adopters of COVID-19 policies

Policy	Early Adopters	Longest Duration	Late/No Adopters	Shortest Duration
State of emergency (50 states adopted)	1. Washington (02/29/2020) 2. California (03/04/2020) 3. Hawaii (03/04/2020) 4. Maryland (03/05/2020) 5. Pennsylvania (03/06/2020)	1. Illinois (1158 days) 2. Texas (1098 days) 3. Rhode Island (1097 days) 4. Georgia (1092 days) 5. Colorado (1092 days)	1. West Virginia (03/16/2020) 2. Oklahoma (03/15/2020) 3. Maine (03/15/2020) 4. Mississippi (03/14/2020) 5. Georgia (03/14/2020)	1. Michigan (216 days) 2. Wisconsin (384 days) 3. North Dakota (413 days) 4. Oklahoma (415 days) 5. Utah (452 days)
Shelter-in-place (43 states adopted)	1. California (03/19/2020) 2. Illinois (03/21/2020) 3. New Jersey (03/21/2020) 4. New York (03/22/2020) 5. Washington (03/23/2020)	1. California (312 days) 2. New Mexico (251 days) 3. New York (97 days) 4. Kentucky (96 days) 5. Oregon (88 days)	1. South Carolina (04/07/2020) 2. Missouri (04/06/2020) 3. Alabama (04/04/2020) 4. Mississippi (04/03/2020) 5. Georgia (04/03/2020)	1. Mississippi (24 days) 2. Alabama (26 days) 3. South Carolina (27 days)) 4. Tennessee (27 days) 5. Alaska (27 days)
Closed non-essential businesses (50 states adopted)	1. California (03/19/2020) 2. Colorado (03/19/2020) 3. Wyoming (03/19/2020) 4. North Dakota (03/20/2020) 5. Illinois (03/21/2020)	1. New York (78 days) 2. Pennsylvania (76 days) 3. Illinois (69 days) 4. Washington (68 days) 5. District of Columbia (65 days)	1. South Dakota (Did not adopt) 2. Nebraska (04/09/2020) 3. Arkansas (04/06/2020) 4. Missouri (04/03/2020) 5. Mississippi (04/03/2020)	1. South Dakota (Zero days) 2. South Carolina (19 days) 3. Oklahoma (23 days) 4. Mississippi (24 days) 5. Tennessee (26 days)
Face mask mandate (41 states adopted)	1. New Jersey (04/08/2020) 2. Maryland (04/15/2020) 3. New York (04/17/2020) 4. Connecticut (04/20/2020) 5. Michigan (04/27/2020)	1. Connecticut (679 days) 2. Illinois (668 days) 3. New York (663 days) 4. New Mexico (642 days) 5. Washington (624 days)	1. Wyoming (12/09/2020) 2. North Carolina (11/23/20) 3. New Hampshire (11/20/2020) 4. Iowa (11/17/2020) 5. Pennsylvania (11/17/2020)	1. Mississippi (56 days) 2. North Dakota (65 days) 3. Iowa (82 days) 4. Wyoming (97 days) 5. New Hampshire (147 days)
Travel quarantine (28 states adopted)	1. Alaska (03/11/20) 2. Hawaii (03/17/20) 3. Kansas (03/18/20) 4. Florida (03/24/20) 5. Texas (03/26/20)	1. Rhode Island (465 days) 2. Vermont (410 days) 3. District of Columbia (405 days) 4. Maine (393 days) 5. Hawaii (374 days)	1. Maryland (12/17/2020) 2. Pennsylvania (11/20/20) 3. Massachusetts (08/01/2020) 4. District of Columbia (06/27/2020) 5. Connecticut (06/25/2020)	1. Idaho (30 days) 2. Arkansas (32 days) 3. Wyoming (34 days) 4. South Carolina (35 days) 5. Arizona (35 days)
Private employer vaccine requirement (1 state adopted)	1. New York (12/27/2021)	1. New York (310 days)	N/A	N/A

Policy	Early Adopters	Longest Duration	Late/No Adopters	Shortest Duration
State employee vaccination requirement (17 states adopted)	1. New Mexico (08/01/2021) 2. California (08/02/2021) 3. Virginia (08//05//2021) 4. Vermont (08/10/2021) 5. Hawaii (08/16/2021)	1. Vermont (592+ days) 2. Hawaii (08/02/2021) 3. Maryland (586+ days) 4. District of Columbia (552+ days) 5. Delaware (541+ days)	1. Illinois (01/24/2022) 2. Connecticut (11/04/2021) 3. New Jersey (10/20/2021) 4. Wisconsin (10/18/2021) 5. Washington (10/18/2021)	1. Colorado (162 days) 2. Connecticut (162 days) 3. Virginia (163 days) 4. New York (249 days) 5. Minnesota (310 days)
Proof of vaccination ban (24 states adopted)	1. Utah (03/16/2021) 2. Florida (04/02/2021) 3. Texas (04/05/2021) 4. Idaho (04/07/2021) 5. Montana (04/13/2021)	1. Utah (739+ days) 2. Florida (722+ days) 3. Texas (719+ days) 4. Idaho (717+ days) 5. Montana (711+ days)	1. Mississippi (04/21/2022) 2. West Virginia (03/30/2022) 3. Michigan (09/29/2021) 4. New Hampshire (07/23/2021) 5. Arizona (06/30/2021)	1. Mississippi (338+ days) 2. West Virginia (360+ days) 3. Michigan (542+ days) 4. New Hampshire (610+ days) 5. Arizona (633+ days)
Proof of vaccination digital record accessibility (13 states adopted)	1. Louisiana (05/05/2021) 2. California (06/18/2021) 3. Minnesota (09/15/2021) 4. Colorado (11/05/2021) 5. Washington (11/23/2021)	1. Louisiana (689+ days) 2. California (645+ days) 3. Minnesota (556+ days) 4. Colorado (504+ days) 5. Washington (486+ days)	1. Virginia (09/16/2022) 2. New Jersey (07/12/2022) 3. Oregon (04/26/2022) 4. New York 03/26/2022) 5. Nevada (02/02/2022)	1. Virginia (189+ days) 2. New Jersey (255+ days) 3. Oregon (333+ days) 4. New York (364+ days) 5. Nevada (416+ days)

of adopting COVID-19 policies. With Democratic trifecta states leading the states to implement COVID-19 policies earlier and longer, and Republican trifecta states implementing later (or not at all) and shorter COVID-19 policies, Table 1 helps build the case for Hypothesis 3, but cannot quite confirm the connection.

There are nuances in Table 1 that show red states being quicker to adopt policies, and blue states being slower. For example, Indiana, Kentucky, and Alabama were in the top five

earliest adopters of elective medical procedure suspensions. These are notable Republican states, and though they did not use this policy for very long, they may have adopted it sooner due to worries of hospitals being overwhelmed with COVID-19 patients. World Population Review ranks these states' hospital systems as some of the most below-average in the country, which could explain their caution early on (World Population Review 2023). Regarding the travel quarantine, Alaska, Texas, and Florida are also in the top five earliest adopters, even though they are heavy Republican state trifectas. Again, these states did not use the policy for that long, but since they are states that take in a lot of airline passengers and tourists, it would make sense that they used a quarantine policy to slow the spread, while also appeasing their base of voters who do not support heavy COVID-19 policies.

Table 2 displays a summary of how long each COVID-19 policy included in this study lasted through the quarterly period. Since the models used in this study heavily rely on the quarterly time period, this table can be useful to visualize what policy adoption and duration look like over such a time period. Though it is difficult for this table to help build on any of the hypotheses, it can still provide a general reference on the significance of policy duration. Some policies stand out, such as the state of emergency order, as that policy was the most used policy among states, and many states still have this order in effect, which will soon end in the coming months. The policies that have ended or those with shorter durations also stand out, such as the shelter-in-place and closed non-essential business orders, as they can indicate the states' goal to minimize the restrictions as much as they could, while also making an impact on COVID-19 outcomes.

Table 2. Duration of state COVID-19 policies visualized by quarters

Policy	2019 Q4	2020 Q1	2020 Q2	2020 Q3	2020 Q4	2021 Q1	2021 Q2	2021 Q3	2021 Q4	2022 Q1	2022 Q2	2022 Q3	2022 Q4	# of states adopted policy
State of emergency		51	51	50	50	50	36	34	30	19	15	12	10	51
Shelter-in-place		45	45	3	2	1								45
Closed non-essential businesses		50	50											50
Travel Quarantine		28	28	15	14	14	6	2						28
Elective medical procedure halt		32	32											32
Face mask mandate			41	40	33	10	9	8	7	7				41
Private employer vaccination requirement									1	1	1	1	1	1
Private employer vaccination exemption							16	16	16	16	16	16	16	16
State employee vaccination requirement								17	17	16	14	6		17
Proof of vaccination ban						24	24	24	24	24	24	24	24	24
Proof of vaccination digital record accessibility							13	13	13	13	13	13	13	13

Note: Cell entries indicate number of states with policy in effect each quarter

The vaccination policy durations also show when the debate on vaccination mandates became a hot-button issue among the states in early 2021. Some of the vaccination orders, such as the ban on proof of vaccination or state employee vaccination requirements, are still in effect today, which explains why the bars in the table reach through the last quarter of 2022.

One factor to keep in mind with this table is how even one state can elongate the entire row of the policy duration in the table. For example, the shelter-in-place order visual in Table 2 shows it reaching into 2021, even though almost all states ended their stay-at-home orders 2-4 weeks after they started. California's shelter-in-place order was the longest among all states, going all the way until January 25, 2021, so this table may be misleading to conclude how all states utilized its COVID-19 policies. The face mask mandate row in the table is also elongated by some states with longer mandates. The liberal states are the ones extending this visualization, but since the table does not show exactly which states adopted these policies, observing this table should be taken with caution.

I also produce descriptive results for the dependent variables of this study: COVID-19 case rates, death rates, and vaccination rates. The goal of the results in Tables 3 and 4 is to examine how the dependent variables vary through different types of government and leadership, which can help set up the explanation connecting partisanship to COVID-19 policy, and COVID-19 policy to COVID-19 outcomes. Table 3 focuses on COVID-19 cases and deaths, which are configured to be per 1,000 people to help observe the noticeable differences. When connecting the

Table 3. COVID case and death rates by type of government as of December 31, 2022

	n	Cases per 1,000 population	
		COVID Cases	COVID Deaths
Type of Government			
Divided government	11	296.54	3.02
Republican trifecta	22	294.89	3.33
Democratic trifecta	17	267.66	2.69
Total	50	285.99	3.04
Republican Governor			
Yes	28	290.52	3.17
No	22	280.22	2.89
Republican-controlled			
House of Representative			
Yes	31	299.57**	2.57
No	19	263.83	3.33**

* $p < .05$ ** $p < .01$

relationship between the type of government and COVID-19 cases and deaths, the difference between Democratic and Republican trifecta states is notable, with Republican trifecta states experiencing higher COVID-19 case and death rates, but they are not statistically significant.

The same differences are found when looking at the type of leadership, as states with Republican governors experience more cases and deaths as well, but also without significance. However,

Table 4. Percent of Population Vaccinated by Type of Government as of December 31, 2022

		Percent of Population Receiving		
	N	*At least one vaccine*	*A complete vaccine series*	*Bivalent booster vaccine*
Type of Government				
Divided government	11	80.0	67.5	71.7
Republican trifecta	22	69.9	60.2	64.2
Democratic trifecta	17	83.6	72.0	76.3
Total	50	76.8*	65.8*	70.0*
Republican Governor				
Yes	28	74.0	63.6	67.7
No	22	80.2	68.7	72.9
Republican-controlled				
House of Representatives				
Yes	31	72.3*	61.8**	65.8**
No	19	84.0	72.4	76.8
State Vaccination Policies				
Prohibit proof of vaccination				
Yes	24	70.7**	60.7**	64.7**
No	26	82.3	70.6	74.8
Provide digital vaccine application				
Yes	13	87.7**	75.0**	79.6**
No	37	72.9	62.6	66.6

* $p < .05$ ** $p < .01$

Republican-controlled Houses do show statistical significance, as cases, on average, increase by about 300 per quarter as states move to Republican House control. Deaths, on the other hand, increase as states move under Democratic House control, which conflicts with my predictions. Nonetheless, the results here can help set up evidence for Hypotheses 1-2 and 6, by indicating that Republican leadership has some influence on COVID-19 cases and deaths.

Table 4 is about the same as Table 3, which focuses instead on vaccination outcomes by type of government and leadership, and also includes some policy variables to begin supporting the policy to COVID-19 outcomes hypothesis. Table 4 is useful to display the connection between partisanship and outcomes to both shows that the policies that affect outcomes are largely political, and the general patterns of how partisan influence affects people getting the COVID-19 vaccine.

Table 4 shows this connection, summarizing the average percentage of each state's population being vaccinated by type of government. Both political and policy variables are used here to emphasize the partisan difference in COVID-19 vaccination ideology and outcomes. The differences in Table 4 are again quite noticeable, starting with the trifecta variables, as states with Democratic trifectas have significantly higher percentages of vaccinated people than Republican trifectas and divided governments in all the stages of vaccination. The partisan differences are clear with the other political variables as well, as states with Republican-controlled Houses have significantly lower vaccination rates than those that do not. The same pattern appears for states with Republican governors, but the model did not find these values to be statistically significant. Regardless, these values can also build evidence for Hypotheses 1-3.

The policy variables in Table 4 can also build the case for Hypothesis 6, which argues in one aspect that states with looser and shorter COVID-19 policies will see lower COVID-19

vaccination rates. Table 4 uses two state vaccination policies to show the partisan differences: a proof of vaccination ban, and a policy to provide digital vaccine applications. Both variables show statistical significance, as states that ordered bans on proof of vaccination, which were mostly adopted by Republican-controlled states, experienced significantly lower vaccination rates than states that did not order such bans. On the other hand, states that provided digital vaccine applications, which were adopted by many Democratic states, experienced significantly higher vaccination rates in all vaccination stages. Table 4's values help show the partisan differences between vaccination rates, as Democratic states seem to have higher vaccination numbers than Republican states.

Multivariate Analysis

As mentioned earlier, Table 1 provides insightful descriptive results on how partisanship and state government trifectas affected COVID-19 policy through the states that implemented certain policies first, last, and how long they used them. However, conclusions cannot be drawn from there since the partisanship and policy connection cannot be statistically correlated. But, Table 5 can provide some evidence for the trifecta hypothesis since it is run through a regression model. Table 5 and the following tables in this section implement a multivariate fixed effects regression model. Table 5 shows the average number of days each COVID-19 policy was in place by quarter and by type of government: divided, Democratic trifecta, and Republican trifecta. Each policy was tested through an analysis of variance to find a p-value. Almost every COVID-19 policy tested through this model was found to be statistically significant with a p-value under 0.05 or 0.01. Only closed non-essential businesses and elective medical procedure orders were found to be statistically insignificant here.

Two of the more politicized COVID-19 policies during the pandemic, shelter-in-place and face mask orders, have noticeable differences between them in the average number of days. With the shelter-in-place orders, Democratic trifecta states were far more likely to have a longer duration of the order, averaging about 14 more days of the policy's duration by each quarter the policy was in effect than Republican trifecta states. Democratic trifecta states also averaged about seven more days than divided governments. The face mask order displays the same story, with Democratic trifecta states being more likely to extend their mandate's duration than both divided governments and Republican trifecta states. Democratic-controlled states averaged about 43 more days than Republican-controlled states and about 23 more days than states with divided governments. The closed business variable may be statistically insignificant due to almost every state ending their orders by the end of the second quarter of 2020, and the elective medical procedures insignificance may be explained by the lack of politicization and debate by the states.

Another important aspect of this research is to display the influential role of the several demographic variables I planned to investigate. State policy-makers, of course, have an influential role in passing policies due to their party politics and ideologies, but they also base their ideologies on the characteristics of their constituents, meaning several demographic groups have a role in influencing policy. The question is whether those demographic groups have more influence over the other variables. Table 4's values reflect a regression model meant to test the relationship between several demographic groups and their influence on COVID-19 policy through the quarters when each policy was in effect.

Several predictors are statistically significant at some level for at least one of the policies. For example, the population density and percentage of elderly people variables are statistically

Table 5. Average number of days policy active by quarter and by type of government[1]

Policy	Number of States Adopting	Divided Government	Republican Trifecta	Democratic Trifecta	Total
State of emergency	50	53.0	50.3	67.7	56.4**
Shelter-in-place	44	11.0	4.8	18.3	10.5**
Closed non-essential businesses	50	21.7	16.9	26.5	21.1
Face mask mandate	41	31.0	11.9	54.4	29.7**
Elective medical procedures suspended	32	14.8	12.5	12.4	13.1
Travel quarantine	28	17.5	7.7	24.3	15.4*
Private employer vaccine requirement	1	N/A	N/A	3.7	1.2*
Private employer vaccine exemption	16	9.5	32.3	N/A	16.7**
State employee vaccine requirement	17	18.9	N/A	48.6	20.0**
Proof of vaccination ban	24	20.5	72.9	3.2	38.4**
Proof of vaccination digital availability	13	14.2	N/A	31.3	13.4**

[1]Means calculated by quarterly time period when each policy was in effect

*p<0.05; **p<0.01

significant for several COVID-19 policies. The population and population density variables are noticeable in several of the variables. For every unit of population and population density that increases in a state, policies tend to extend for several policies. The percentage of elderly is

interesting since there is a negative relationship between the percent elderly and the COVID-negative variables against vaccine mandates, which is likely since elderly people are more at-risk for COVID-19, meaning they will likely be more supportive of vaccine use. There are also statistically significant values for the people of color variables, with state of emergency orders (10.4 days per quarter) and face mask mandates (14.4 days per quarter) showing a longer duration as the percentage of Hispanics increases, and the duration of the state of emergency orders decreasing on average 17 days per quarter as the percentage of non-Hispanic Black people increases.

There are two political variables in Table 6 as well: states with Republican governors and states where Republicans controlled the lower legislative chamber. These are important variables here, as they can help build evidence towards confirming Hypotheses 1 and 2. The results for the political variables help confirm some predictions. There are strong and statistically significant negative relationships between the Republican control of state policymaking institutions, particularly the governor's office, and several of the COVID-19 policies. For example, in states with Republican governors, the state of emergency order lasts about 25 fewer days per quarter fewer on average than in states with Democratic governors, controlling for all the other predictors included in the model. Similarly, states with Republican-controlled House chambers issued shelter-in-place orders that on average were about four fewer days per quarter than states with Democratic-controlled lower legislative chambers.

Table 7 provides similar statistical results to Table 6, displaying the same demographic and political determinants of COVID-19 policies, but since this study utilizes both COVID-19

Table 6. Demographic and political predictors of state COVID-19 policies
Note: Only reporting statistically significant predictors.

	Covid1	Covid2	Covid3	Covid4	Covid5	Covid6	Covid7e	Covid8	Covid9a	CovidPos	Covidneg
Density						.98**				2.17**	-.896**
Population		.000022**	.000028**		.000048**						.000052*
% Black	-17.26*								32.82**		
% Hispanic	10.37**			14.37*		-11.89**					
% Elderly									-53.44**		-90.07**
% No health insurance											
% Poverty						6.36*			-32.83*		-36.68**
Republican Governor	-25.59**			-45.87**			-24.57**	-62.31**		-46.47**	
Republican House		-4.32**	-12.26**	23.67**	-11.89**	8.14**					
n	650	300	150	400	150	400	350	300	450	650	650
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

* p < .05 ** p < .01

Key:

Covid1	Emergency order
Covid2	Stay at home order
Covid3	Close non-essential businesses
Covid4	Require face masking
Covid5	Ban elective surgical procedures
Covid6	Travel ban
Covid7	Private employer vaccine required
Covid7e	Private employer vaccine exemption
Covid8	Require state employees to be vaccinated
Covid9a	Prohibit proof of vaccination
Covid9c	Provide Covid vaccine digital portal

policies that are positive and negative towards reducing COVID-19 outcomes, it can be useful for a table to visualize the determinants of a state's overall COVID policy portfolio. Table 7's regression model tests the relationship between the demographic and political predictors and the sum number of days of both the COVID-mitigating (positive) and COVID-fueling (negative) policies. The table also sums the values of both categories by quarter to show the net total number of days per quarter of a state's overall COVID response; positive values represent a state's overall response was COVID-mitigating whereas negative values indicate a state's

Table 7. Determinants of State COVID-mitigating (positive) and COVID-fueling policies (negative)

Predictors	COVID-positive	COVID-negative	COVID-total
Population Density	2.17**	-.896**	3.07**
Population	-.00004	.00005*	-.00009
Percent non-Hispanic Black	10.80	15.74	-4.93
Percent Hispanic	6.74	-8.26	15.00
Percent Elderly	19.72	-90.07**	109.79*
Percent Uninsured	17.24	22.36	-5.12
Percent in Poverty	33.71	-36.68*	70.39**
Republican Governor	-46.47**	-4.85	-41.62
Republican-Controlled State House	-15.01	26.32	-41.32
_cons	-1230.94	1548.47**	-2779.41**
State fixed effects	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes
Rho	.9938	.9959	.9960
N	650	650	650
F	80.94**	.	68.75**

*p<0.1; **p<0.05; ***p<0.01

response was COVID-fueling. There are similar significant relationships both here and in Table 7, regarding predictors, such as the population density variable, as the sum number of days per quarter for COVID-mitigating policies increases by about two for a one-unit change in population density; on the other hand, a one unit change in population density is associated with almost a one day decrease, on average, in COVID-fueling policies. Also, for every one percent increas e in a state's non-Hispanic Black population and uninsured population, the COVID-

Table 8. Determinants of COVID Outcomes, October 1, 2019 - December 2022

	COVID cases per 1,000 persons			COVID deaths per 1,000 persons	
Predictors	**Model 1**	**Model 2**		**Model 3**	**Model 4**
Demographic characteristics					
Population density	.58**	3.74		.013*	.0004
Population	1.15e-08	5.21e-06		-3.44e-07	-1.97e-07
Percent non-Hispanic black	-13.21*	-12.19		-.52**	-.54*
Percent Hispanic	-.80	-.20		.04	.04
Percent elderly	.46	10.04		-.75*	-.86*
Percent with no health insurance	16.31*	23.51		.32*	.46
Percent poverty	-16.32	-16.18		-.056*	-.03
COVID policies					
Cumulative COVID positive policies	-.035			-.0009*	
Lag cumulative COVID positive policies		-.04			-.0009*
Cumulative COVID negative policies	.135**			.0025**	
Lag cumulative COVID negative policies		.10*			.0023**
Political Characteristics					
Republican governor	-20.64**	-11.38*		-.14	-.004
Republican lower legislative chamber	-14.48	-20.13		-.32	-.36
_cons	104.20	-824.85		15.58**	17.81
State fixed effects	Yes	Yes		Yes	Yes
Time fixed effects	Yes	Yes		Yes	Yes
Rho	.9915	.9997		.9971	.9971
n	650	600		650	600
F	596.81**	454.25**		115.73**	115.12**

*p<0.05; **p<0.01

mitigating policies increase by about 11 and 7 days, respectively, though neither relationship is statistically significant.

The political variables provide mixed support for Hypotheses 1 and 2. States with Republican governors have 46 fewer days per quarter, on average, of COVID-mitigating policies than states with Democratic governors. A similar relationship holds for states with Republican-controlled lower legislative chambers, though that coefficient is not statistically significant.

The regression model is then run to examine the determinants of COVID-19 outcomes, which can help build evidence for connecting COVID-19 policy to COVID-19 outcomes. In Table 8, the policies are aggregated by quarter as seen in Table 7. Some models lag the COVID policy variables by one quarter. I also again include the demographic and political variables in Table 6 to examine whether certain demographic and political characteristics had an independent influence on COVID-19 outcomes. Regarding the policy side, COVID-positive policies, both contemporaneously and lagged, were associated with a decline in COVID cases per 1,000 cases, though neither variable was statistically significant. On the other hand, the table shows COVID positive policies, lagged and unlagged, had similar effects in reducing the number of COVID deaths per 1,000 persons, on average, by quarter and controlling for the other factors included in the regression model. COVID-negative policies, on the other hand, had a statistically significant effect nearly three times as large in the opposite direction; each additional day of COVID-fueling policy per quarter, on average, increased the COVID death rate by .0025 per 1,000 persons.

The statistically significant values noted for the COVID-19 policies in Table 8 could help support the claims of Hypothesis 6, but it is also important to note the influence of the demographic and political variables here. Several demographic variables do show significant

effects such as the elderly and the Black population, the percentage of the population without health insurance, the percentage of poor, and population density.

Regarding population density, the results show states with higher population densities have higher rates of COVID cases and COVID deaths. There is an inverse relationship between a state's non-Hispanic Black population and its COVID case and death rates; as a state's percentage of African Americans increases its COVID case and death rates decrease. A similar pattern holds for the elderly population and its relationship with COVID death rates. On the other hand, states with higher percentages of the elderly population also have higher COVID case rates, though that relationship was not found to be statistically significant. States with higher percentages of uninsured persons had both higher COVID case rates and death rates.

The only political characteristic that exhibits an independent effect is the Republican governor. Table 8 shows states with Republican governors have between 11 and 21 fewer COVID cases per quarter, on average, controlling for all of the other factors included in the models. A similar relationship holds for COVID death rates, though the findings are not statistically significant.

Table 9 displays the results concerning the determinants of state COVID vaccination rates, which is the same layout as Table 8. I only use the percentage of people receiving at least one dose as all of the vaccination measures were highly correlated with one another. Each of the vaccination policies as well as cumulative COVID-positive and negative policies was included separately to see which policies had a significant influence on people getting the vaccine. The strongest effects of state COVID policies on state vaccination rates were found for COVID negative policies; for each additional day per quarter of COVID policies aligned against public health recommendations, state vaccination rates decline by .05 percent.

For the pro-vaccine policies, only the digital vaccine application provision was statistically significant. These findings build more evidence for Hypothesis 6 in both of its

Table 9. Determinants of State Vaccine Outcomes, January 2021 - December 2022
Percent receiving at least one dose, October 1, 2020 - December 31, 2022

Predictors	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Demographic characteristics						
Population density	-2.04*	-2.00*	-1.81	-1.94*	-1.97*	-2.06*
Population	.00001	.00001	.00001	.00001	.00001	.00001
Percent non-Hispanic black	-9.62	-9.84	-6.33	-10.99	-7.69	-8.24
Percent Hispanic	-1.00	-1.05	-1.61	-.74	-1.38	-1.34
Percent elderly	4.96	5.97	1.44	4.68	1.35	1.18
Percent with no health insurance	-3.21	-4.35	-1.89	-4.11	-1.67	-2.24
Percent poverty	-14.53	-13.69	-16.94	-14.06	-16.51	-15.31
COVID policies						
Private employer vaccine exemption	-.045*					
Require state employees vaccinated		.029				
Prohibit proof of vaccination			-.105**			
Provide vaccine digital portal				.10**		
Cumulative COVID positive policies					-.008	
Lag COVID positive policies						-.011
Cumulative COVID negative policies					-.057**	
Lag cumulative COVID negative policies						-.050**
Political Characteristics						
Republican governor	-9.03*	-7.98*	-10.66***	-9.10*	-11.19*	--11.28**
Republican-Controlled State House	15.02**	15.24**	15.28**	14.76**	15.66**	15.67**
_cons	562.00	544.03	559.77	545.07	595.55	624.16
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Rho	.9998	.9998	.9998	.9998	.99978	.9998
n	450	450	450	450	450	450
F	619.89**	5896.28**	850.29**	3614.75**	450.23**	471.19**

*p<0.05; **p<0.01

aspects, as states that adopted policies that are strict and follow public health guidance experienced higher vaccination rates than the states that had policies that were loose and against public health guidance.

The demographic and political characteristics in Table 9 are also aspects to keep in mind since they do display statistically significant values. However, for the demographic variables, none of the values are significant except for the population density variables, which may indicate density in a state has an influential role in affecting vaccination rates. The political characteristics are interesting, as states with Republican governors have lower vaccination rates, on average than states with Democratic governors, controlling for the other characteristics included in the analysis. In contrast, states with Republican-controlled lower legislative chambers have higher vaccination rates than states with Democratic-controlled lower houses, on average, controlling for the other factors included in the models. This anomaly may be due in part to the fact pointed out earlier that most of the COVID policies states adopted were enacted by executive orders issued by governors as opposed to legislative acts.

Polarization Analysis

The polarization concept is one of the key concepts in this study which was designed to connect with the policy and outcome variables according to Hypotheses 4 and 5. However, analyzing polarization through the multivariate analysis of the panel data set (50 states, 13 quarters) could not be done, due to data limitations. I used the most recent measure of state legislative polarization available from Schor and McCarty's study (average distance between the party medians in both legislative chambers), which was for 2016, four years before the COVID-19 pandemic. To assess the effects of polarization on COVID outcomes, Table 10 reports the

results of a cross-section regression analysis of the determinants of COVID case and death rates over the entire course of the study (October 1, 2019 – October 18, 2022). The findings show that by itself legislative polarization measure does not have a statistically significant relationship with either COVID case rates or death rates. That finding, however, is likely because states with high degrees of legislative polarization can be found in both Republican and Democratic state legislatures.

To further examine the effects of legislative polarization, I create an interaction variable to test whether states with Republican governors and high levels of legislative polarization differ from states with Democratic governors and high levels of legislative polarization. The findings from Model 2 show that to be the case in states with Republican governors and high degrees of legislative polarization has COVID case rates that are, on average, equivalent to about 36 additional COVID cases per quarter per 1,000 persons than in states with Democratic governors and high degrees of legislative polarization. These findings suggest that political factors do matter, having both a direct and indirect (through the adoption of state COVID policies) effect on state COVID outcomes.

Regarding the determinants of COVID death rates, the results show that both demographic and political factors were statistically significant predictors. States with greater population density, higher percentages of Hispanic/Latinx residents, and higher poverty rates had higher COVID death rates, on average, controlling for the other factors included in the model. The results also show that state COVID policies were an important predictor of COVID death rates. States that adopted COVID policies aligned with public health guidelines had lower COVID death rates. Though the magnitude of the coefficient is small, due in part to how both the dependent and the COVID policy variables are measured, its effect was strong (beta=.47), second only to percent

Table 10. Determinants of COVID Outcomes, October 1, 2019 - December 2022

Predictors	Cases per 1,000 persons		Deaths per 1,000 persons	
	Model 1	Model 2	Model 3	Model 4
Demographic characteristics				
Population density	.054	.069*	.001**	.002**
Population	-1.53e-06	-1.95e06	-2.58e-08	-3.03e-08*
Percent non-Hispanic black	-1.04	-.92	.008	.009
Percent Hispanic	.778	.978	.035**	.037**
Percent elderly	-6.102	-4.81	.030	.044
Percent with no health insurance	-.342	.535	-.038	-.029
Percent poverty	4.434	3.722	.195**	.187**
COVID policies				
Cumulative COVID positive policies	-.0072	-.0069	-.0006*	-.0006**
Political Characteristics				
Republican governor	-1.049	3.25	-.013	.033
Republican-Controlled State House	3.73**	4.49**	.046*	.054*
Legislative polarization	-11.51	6.48	.089	.279
Republican Governor*Legislative Polarization		35.76*		-.378
_cons	345.57	286.01**	.112	-.517
n	50	50	50	50
R^2	.43	.47	.74	.75
F	3.95**	4.01**	11.46**	13.16**

* p < .05 ** p < .01

poverty (beta=.60). Consistent with the earlier analysis regarding COVID cases, states with Republican-controlled lower legislative chambers had higher COVID death rates.

If this study was to be replicated, it would make sense to parse out more fully the linkages between partisanship and polarization as the key political variable. Polarization by itself is only weakly correlated with COVID policy (r=.07) and also weakly correlated with partisanship (r=-.08 with Republican governor and r=-.04 with Republican lower legislative chamber). Using both party and ideology variables, separately, is just too connected for this study. Given the strong correlation between party and ideology in state legislative chambers

(e.g., r=.80), it is difficult to parse out the independent effects of each on COVID policies and outcomes. However, as shown in Table 10, there is evidence of a differential effect of legislative polarization depending on the governor's party.

Discussion

Based on the insight shown in the descriptive results and the values shown in the multivariate analyses, I believe there is suitable evidence to establish that state partisanship and state government trifectas did significantly influence COVID-19 policy, and the policy those partisan elected officials made significantly influenced COVID-19 cases, deaths, and vaccination rates. The evidence from the results helps build the cases for Hypotheses 1, 2, 3, and 6. Due to data limitations regarding the legislative polarization variable, I was not able to confirm Hypotheses 4 and 5. As mentioned above, the partisanship and polarization concepts are just too connected to analyze in this multivariate model. A replicated study should separate these concepts further, or just analyze one of them. I did not find some evidence to support a modified version of Hypothesis 5; Table 10 showed a statistically significant interactive effect on COVID case rates for states with Republican governors and high levels of legislative polarization.

Hypothesis 1 claims Republican-controlled legislatures will be more likely to adopt short-term and loose COVID-19 policies against the guidance of public health officials. The descriptive results shown in Tables 1, 2, and 3 can support the hypothesis since there are clear and partisan differences but cannot quite confirm it. Table 1 displays the dates and durations of the earliest and latest adopters of COVID-19 policies, and just from observation, the partisan distinction is quite clear for most of the variables. As predicted, heavy Republican states were consistently in the top five latest states to adopt COVID-19 policies, and in the top five for the

shortest duration of policies. Tables 2 and 3 provide some statistical, but still descriptive connections between types of government, cases, deaths, and vaccination rates. Tables 2 and 3 do not provide the duration or the dates adopted by states, but the results that Republican-controlled states were associated with higher cases and deaths, and lower vaccination rates indicate that those states did not pass policies to emphasize COVID-19's severity.

Tables 4 and 5 also confirm my predictions with more statistical power. Table 4 finds the COVID-19 policies Republican-controlled states adopted lasted significantly shorter than Democratic-controlled states. Table 5 displays the same statistically significant results, but several demographic groups were found to be significant there as well, diminishing the absolute influence of partisanship. Nonetheless, these tables confirm my predictions for Hypothesis 1 and provide suitable evidence to show that Republican-controlled states were slower to adopt COVID-19 policies, and faster to stop them.

Hypothesis 2 focused on how Republican governors would be more likely to sign loose and short-term COVID-19 policies against the guidance of public health officials. I used the Republican governor variable in several of the tables, both to find significant relationships between governors and policy, and their influential impact on COVID-19 outcomes. Table 1's policy adoption dates do involve governors since they have to sign those policies into law, meaning Republican governors responsible for signing policies were also the latest to adopt COVID-19 policies compared to Democratic governors. Table 2 and 3's descriptive outcome results do show higher cases, deaths, and lower vaccination rates under Republican governors, but these values were not statistically significant, which cannot support my hypothesis. The trifecta results in Table 4 also hold Republican governors responsible since the governor's office

makes up one part of the trifecta. Table 4, again, shows Republican trifectas, led by Republican governors, had shorter policy durations than Democratic states.

A lot of evidence for Hypothesis 2 also lies within Tables 4-7, which tested Republican governors' influence on COVID-19 policy and outcomes. Towards the policy side, Tables 4 and 5 show statistically significant results that Republican governors were associated with shorter durations of almost every COVID-19 policy in this study (Table 4), and for policies to help mitigate the spread of COVID-19 (Table 5). On the outcome side, Table 6 contradicts my predictions, as it shows states with Republican governors experienced fewer COVID-19 cases and deaths. However, Table 7 was able to show Republican governors significantly influenced the decline in vaccination rates in their respective states. Both the descriptive and multivariate analysis results build suitable evidence to confirm Hypothesis 2.

Hypothesis 3 predicts states with Republican trifectas will adopt short-term and loose COVID-19 policies, and vice versa with Democratic trifecta states, which is supported by Tables 1, 4, and 3. Table 1 shows states individually, but for several of the variables, the states that ranked the highest for the shortest policy durations were states with Republican trifectas, and the states with the longest durations were likely to be Democratic trifectas. Table 3 does show Republican trifecta states to have more case and death rates per quarter, but they are not statistically significant. Table 4 does show statistical significance, as Republican trifecta states had much lower vaccination rates than Democratic trifecta states. Table 3 compares all the policies in this study with types of government and finds Republican trifecta states had significantly shorter durations of COVID-19 policy than Democratic trifecta states. Overall, there is some statistically significant evidence here to confirm Hypothesis 3.

Hypothesis 6 predicts states that adopt strict and long-term COVID-19 policies will be more successful in slowing COVID-19 cases and deaths and promoting vaccination rates. Table 4 provides the initial and descriptive evidence for this hypothesis, showing that states that provided digital access to vaccine records had significantly higher vaccination rates than those that did not. Also, states that had a ban on proof of vaccination, they experienced significantly much lower vaccination rates. Tables 6 and 7 provide more statistical results from the multivariate analysis, as Table 6 showed a significant negative relationship between COVID-mitigating policies and COVID-19 cases and deaths when the policies lagged by a quarter. Table 7 showed fewer people getting the COVID-19 vaccine when states adopted vaccination policies that were against public health guidance. More evidence may be needed to confidently connect COVID-19 policy to COVID-19 outcomes, but the statistical significance shown in these results helps bring some certainty to confirm Hypothesis 6.

Though there is statistically significant evidence to support Hypotheses 1-3 and 6, it is important to keep in mind the role of the demographic variables that acted as the control variables in this study. I used several demographic groups in several of the tables to determine their influence in their respective tables, and almost all of the tables showed at least some significant values for the demographic groups. The higher influence they had in some areas may conflict with my findings for the hypotheses. The role they play here is an internal validity threat, since demographic groups may be confounders in the causal chain for this study. It is also important to note that not every value and statistic fits with my predictions. For example, Republican-controlled Houses had a positive relationship with vaccination rates, and many Republican-controlled states were some of the earliest policy adoptions. These differences are

likely to be explained by the nuances of each state's characteristics and contexts, but the associations I predicted still outweigh these irregularities.

Conclusion

The COVID-19 pandemic is still a significant problem today in both the United States and around the world. It has put hospitals on the brink of collapsing, taken the lives of millions, caused long-term issues for some infected people, and continues to grow through variants. As time passes, scholars, health experts, and elected officials can more thoroughly reflect on what could have gone differently, and what we need to change for the future. Politicization only poured more gasoline onto the fire, as party and ideological politics in the United States conflicted citizens on what and who to believe. Plenty of literature essentially warned us of how Americans react to public health outbreaks, especially in this age of hyperpolarization in politics. People tend to mimic the rhetoric of their leaders, which only hardens partisanship as elected officials today tend to stick with their party's agenda instead of the input of experts. Scholars found these factors easily within the pandemic, analyzing the power state elected officials have over public health policy-making, and the effects of one-sided politicians making the more influential policies during a public health outbreak.

My work intends to build on the findings connecting politics and public health policy. I attempt to find direct relationships between partisanship and COVID-19 policy, polarization and COVID-19 policy, and COVID-19 policy and COVID-19 outcomes. I specifically sought to uncover the differences between Democratic and Republican-controlled state governments since state governments were more influential in formulating and implementing COVID-19 policy. I also use several COVID-19 policies to compare with political variables and COVID-19

outcomes, which consisted of both more politicized policies and more neutral policies. I put together panel data, consisting of demographic characteristics, party control variables, several COVID-19 policies, and COVID-19 outcomes, all of them respective to their states. From the data, I uncovered evidence from both descriptive results and multivariate analyses linking these constructs together to influence COVID outcomes.

Almost all of my hypotheses were supported by statistically significant values, confirming my predictions that Republican governors and legislatures were more likely to implement short-term and loose COVID-19 policies, while Democratic governors and legislatures adopted more long-term and stricter COVID-19 policies. I also found notable evidence to support my prediction that states that had stricter and longer COVID-19 policies would help decrease COVID-19 cases and deaths more than states with shorter and looser COVID-19 policies. Stricter states also experienced better vaccination rates than looser states. However, I could not confirm polarization's effect in this study due to its conceptual similarity to partisanship. Most of my findings here also do line up with the prior research I investigated in the literature review. My findings on Republican legislatures and governors being associated with late and short-term adoptions lined up with scholars' findings on partisan tendencies of Republican governors and certain politicized policies during the pandemic (Adolph et al. 2022, 3-4; Calvan, 2020; Hallas et al. 2021, 27; Patterson Jr. 2022, 26-30). These findings also align with the literature on comparing policies to outcomes, as I supported the evidence that Republican-controlled states experienced worse case, death, and vaccination rates due to the lack of COVID-positive policies, or the emphasis on COVID-negative policies (Neelon et al. 2021, 115; Shvetsova et al. 2021, 433).

These findings do generally help build the connection between partisanship, COVID-19 policy, and COVID-19 outcomes, but future work is very likely to be needed to fully grasp these connections. For example, even though the polarization concept could not be fully tested, I believe I was able to show some evidence of why it is still important for future studies to capture polarization's effect on public health policy and outcomes since the United States still appears to be sliding in an ideologically extreme way, which puts public health in a vulnerable position. Another aspect future work could explore is to broaden the framework to fully capture the role of American demographic groups and their effect on the politics of public health policy. This study's data could also be expanded to include several more policies since there were so many more policies during the pandemic that were deemed political. More politicized policies could shed more light on parties' effects on policy and policy's effects on public health outcomes.

Overall, I believe more time, data, and a better framework allowing for more concise measures and analysis would have allowed me to conclusively claim that Republican states were more likely to adopt short-term and loose policies and that those policies passed by partisan governments significantly influenced COVID-19 cases, deaths, and vaccination rates. However, there is still some confidence in the strength of the hypotheses due to their consistency with the literature on partisanship, policy, and health outcomes, and the decent amount of statistically significant values across several figures.

Appendix

Table A1. Pearson Correlations among Predictor Variables, 2019Q4 – 2022Q4

	Density	Pop	%Black	%Hisp	%Old	%Noins	%Poor	Covpos	Covneg	Lcovpos	Lcovneg	Govrep	Hourep
Density	1.00												
Pop	.17**	1.00											
%Black	.19**	.19**	1.00										
%Hisp	.15**	.54**	-.14**	1.00									
%Old	.10**	-.24**	-.11**	-.24**	1.00								
%Noins	-.36**	.21**	.24**	.33**	-.39**	1.00							
%Poor	-.24**	.07	.49**	.08*	.10**	.40**	1.00						
Covpos	.26**	.16**	-.04	.28**	.02	-.23**	-.06	1.00					
Covneg	-.21**	-0.06	-.04	-.09*	-.03	.25**	.06	-.43**	1.00				
Lcovpos	.25**	.15**	-.04	.28**	.03	-.22**	-.05	.68**	-.41**	1.00			
Lcovneg	-.20**	-.06	-.04	-.08*	-.03	.24**	.04	-.49**	.94**	-.41**	1.00		
Govrep	-.22**	-.13**	.06	-.25**	-.12**	.38**	.05	-.39**	.41**	-.38**	.38**	1.00	
Hourep	-.42**	-.04	.16**	-.33**	-.13**	.48**	.36**	-.45**	.41**	-.43**	.39**	.53**	1.00

n=650 * p < .05 ** p < .10

Key:

Density	Population per square mile
Population	Total population
%Black	Percent Non-Hispanic Black
%Hisp	Percent Hispanic
%Old	Percent elderly (persons age 65 and older)
%Noins	Percent of population without health insurance
%Poor	Percent of persons with income below the poverty line
Covpos	Cumulative days of COVID policies consistent with public health guidelines
Covneg	Cumulative days of COVID policies inconsistent with public health guidelines
Lcovpos	One-quarter lag of COVID policies consistent with public health guidelines
Lcovneg	One-quarter lag of COVID policies inconsistent with public health guidelines
Govrep	Republican governor
Hourep	Republican control of lower state legislative chamber

Table A2. Pearson Correlations among Policy Variables, 2019Q4 – 2022Q4

	COVID1	COVID2	COVID3	COVID4	COVID5	COVID6	COVID7	COVID7e	COVID8	COVID9a	COVID9c	COVIDpos	COVIDneg	COVIDtot
COVID1	1.00													
COVID2	.22**	1.00												
COVID3	.21**	.79**	1.00											
COVID4	.47**	.07	-.03	1.00										
COVID5	.15**	.63**	.76**	-.03	1.00									
COVID6	.26**	.23**	.33**	.33**	.09*	1.00								
COVID7	.05	-.02	-.02	-.02	-.02	-.02	1.00							
COVID7e	-.26**	.09**	-.10**	-.20**	-.09	-.11**	-.03	1.00						
COVID8	-.04	.09**	-.11**	-.04	-.09*	-.11**	.11**	-12**	1.00					
COVID9a	-.25**	-.15**	-.17**	-.32**	-.15**	-.17**	-.05	.56**	-.19**	1.00				
COVID9c	-.01	-.08*	-.09**	-.09*	-.08*	-.09*	.18**	-.10**	.30**	-.17**	1.00			
COVIDpos	.75**	.42**	.37**	.65**	.29**	.49**	.14**	-.31**	.29**	-.43**	.25**	1.00		
COVIDneg	-.29**	-.15**	-.16**	-.30**	-.14**	-.16**	-.04	.84**	-.18**	.92**	-.16**	-.43**	1.00	
COVIDtot	.67**	.37**	.34**	.61**	.27**	.43**	.12**	-.59**	.29**	-.72**	.25**	.92**	-.75**	1.00

n=650 * p < .05 ** p < .10

Key:

COVID1 State of emergency order
COVID2 Stay at home order
COVID3 Close non-essential businesses
COVID4 Require face masking
COVID5 Ban elective surgical procedures
COVID6 Travel ban
COVID7 Private employers require employees to be vaccinated
COVID7e Exempt private employers from vaccine requirement
COVID8 Require state employees to be vaccinated
COVID9a Prohibit proof of vaccination
COVID9c Provide vaccine digital application
COVIDpos COVID policies consistent with public health guidelines
COVIDneg COVID policies inconsistent with public health guidelines
COVIDtot All COVID policies (COVIDpos – COVIDneg)

Data Sources

Political/Polarization Variables

- *State government trifecta, 2018-2022*. Source: Ballotpedia. A state government is considered a trifecta when one party controls both chambers of the state's legislative branch, and the executive branch. It is a divided state government when there is a mix of parties controlling these sectors, and will be in a "left out" category.

  Republican trifecta: 1=yes 0=no

  Democratic trifecta: 1=yes 0=no

- *House/Senate/Governor control, 2018-2022.* Source: Ballotpedia. Each state's legislative and executive branches' control is coded by whether Republicans, Democrats, or evenly split between the parties. 0=split, 1=Democratic, 2=Republican. Note: The state of Nebraska does not have a House chamber, which will be regarded as non-applicable.

- *House/Senate Republican ideology score, 2018*. Source: Boris Shor and Nolan McCarty. 2011. "The Ideological Mapping of American Legislatures." American Political Science Review. House and Senate Republicans from each state are scored based on their ideological position. The most up to date scores are only found through 2018. Information on the methodology used by Shor and McCarty in obtaining this data can be found at

  https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/AP54NE

- *House/Senate Democratic ideology score, 2018*. Source: Boris Shor and Nolan McCarty. 2011. "The Ideological Mapping of American Legislatures." American Political Science Review. House and Senate Democrats from each state are scored based on their ideological position. The most up to date scores are only found through 2018. Information on the methodology used by Shor and McCarty in obtaining this data can be

found at

https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/AP54NE.

Demographic variables

- *Population*, *2018-2022*. Source: U.S. Decennial Census of Population, 2020. American Communities Survey 2018-2019, 2021-2022. A general count of each state's total population.
- *Percentage of population at risk for COVID-19, 2020*. Source: COVID-19 U.S. State Policies (CUSP) Database. The percentage of each state's adult population that fits the criteria of who is at risk of being hospitalized and dying from COVD-19. Information on the methodology for CUSP's risk of COVID-19 data can be found at https://github.com/USCOVIDpolicy/COVID-19-US-State-Policy-Database.
- *Percentage of population under the federal poverty line, 2018-2022.* Source: U.S. Census American Community Survey, "Poverty status in the past 12 months", 2018-2021. World Population Review, 2022. Each state's percentage of population that lives below the federal poverty line.
- *Percentage of population over the age of 65, 2019-2022*. Source: U.S. Census American Community Survey, "Population 65 years or older in the United States", 2019-2021. Consumer Affairs, "Elderly population in U.S. by state", 2022. Each state's percentage of population that is over the age of 65.
- *Percentage of each major race, 2019-2022*. Source: U.S. Census Decennial Redistricting Data, "Hispanic or Latino, and not Hispanic or Latino by race", 2020. U.S. Census American Community Survey, "Selected Characteristics of Foreign and Native-born populations", 2019, 2021. World Population Review, "US States by Race", 2022.

Percentage of each state's racial demographics based on non-Hispanic Whites, Blacks, Asians, Native American/Alaska Natives, and Hispanic/Latino.

- *Percentage of elderly below the poverty line, 2019-2022.* Source: U.S. Census Decennial Redistricting Data, "Poverty status in the past year", 2020. U.S. Census American Community Survey, "Poverty status in the past year", 2019, 2021. Percentage of each state's elderly population below the federal poverty line.
- *Percentage of people that are 19-64 that are uninsured, 2019-2022.* Source: U.S. Census Decennial Redistricting Data, "Age by health insurance coverage status", 2020. U.S. Census American Community Survey, "Age by health insurance coverage status", 2019, 2021.

COVID-19 Variables

- *Cases of COVID-19*, *2020-2022*. Source: Center for Disease Control and Prevention COVID-19 Data Tracker. Each state's total number of confirmed COVID-19 cases, categorized by each quarter of the year starting in March 2020.
- *Deaths of COVID-19*, *2020-2022*. Source: Center for Disease Control and Prevention COVID-19 Data Tracker. Each state's total number of confirmed COVID-19 deaths, categorized by each quarter of the year starting in March 2020.

Health Policy variables

- *State of Emergency*, *2020-2022*. Source: COVID-19 U.S. State Policies (CUSP) Database. Sorted by both when each state implemented a state of emergency order and when each state lifted its state of emergency order by specific dates. Data is left blank if states did not implement a state of emergency order, or if they have not lifted the order.

- *Stay-at-home order*, *2020-2021* Source: COVID-19 U.S. State Policies (CUSP) Database. Sorted by both when each state implemented a stay-at-home order and when each state lifted its stay at home order by specific dates. Data is left blank if states did not implement a stay-at-home order, or if they have not lifted the order.
- *Closed non-essential businesses order, 2020-2021*. Source: COVID-19 U.S. State Policies (CUSP) Database. Sorted by both when each state implemented the order to close non-essential businesses and when each state lifted that order by specific dates. Data is left blank if states did not implement an order to close non-essential businesses, or if they have not lifted the order.
- *Face mask mandate, 2020-2021*. Source: COVID-19 U.S. State Policies (CUSP) Database. Sorted by both when each state implemented a face mask mandate and when each state lifted a face mask mandate by specific dates. Data is left blank if states did not implement a face mask mandate, or if they have not lifted the order.
- *Elective medical procedures, 2020-21*. Source: COVID-19 U.S. State Policies (CUSP) Database. Sorted by both when each state implemented an order to suspend elective medical procedures and when each state lifted the suspension by specific dates. Data is left blank if states did not implement a suspension order, or if they have not lifted the order.
- *Quarantine mandate for out-of-state travelers*, *2020-2021*. Source: COVID-19 U.S. State Policies (CUSP) Database. Sorted by both when each state implemented a quarantine mandate for travelers entering the state and when each state lifted the quarantine mandate by specific dates. Data is left blank if states did not implement a quarantine order, or if they have not lifted the order.

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