

A 20/20 HINDSIGHT REVIEW OF COVID-19:  
TO MASK OR NOT TO MASK?  
WITH A POLITICAL TWIST

By

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Abstract: The present study investigated mask mandates during the recent COVID-19 pandemic and the factors driving these orders. State level data was collected for all 50 states from the date of the first adoption by New Jersey on April 8, 2020 to Wyoming on December 8, 2020. Typical policy diffusion studies examine state adoption of policy on an annual basis, but rapid spread saw different states adopting mask mandates at different intervals. Therefore, this study uses a discrete time logit model, data coded on a bi-weekly basis as policy changed due to rapid COVID-19 infection rates. Political party and infection rates were found to have statistical significance on mask mandates, while age of population was not a significant indicator.

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## CHAPTER I

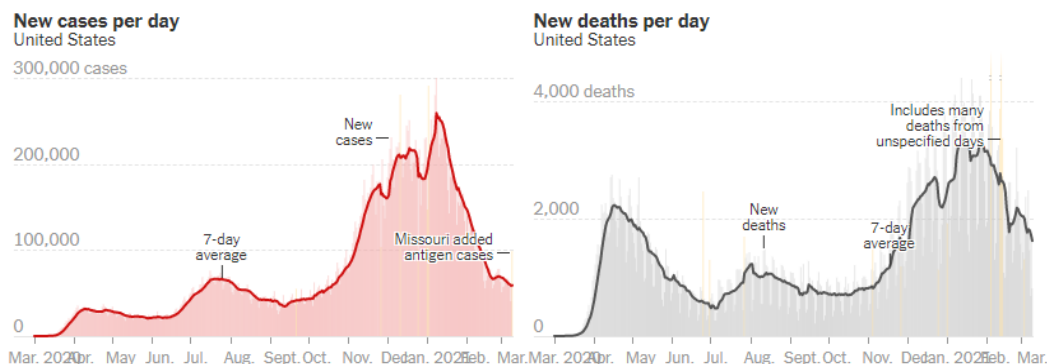
### INTRODUCTION

The COVID-19 pandemic disrupted the world economy, quickly overwhelmed health care systems, and blanketed the United States with illness, stress, homelessness, and unemployment (Figure 1.1 and 1.2). COVID-19 has disturbed global supply chains, international trade, and passenger air travel (Mishra, 2020). As of July 13, 2021, the United States has the third highest confirmed cases and death count in the world with 33,895,493 confirmed cases and 607,523 deaths (John Hopkins Coronavirus Resource Center, 2021). Humanity was blindsided by COVID-19. It rapidly permeates porous borders with ease for this disease sees no economic or ethnic boundaries, is easily transmitted, and threatens our national economy and infrastructure.

Many in the public health community advocated wearing masks as a preventive mean to slow the spread of the COVID-19 virus in a population. The legal framework of the United States makes it almost impossible for the federal government to implement a nation-wide mask mandate. The tenth amendment protects the states' rights, therefore placing the responsibility of face mask mandates under gubernational authority. The gubernational responsibility of face mask mandates lead to the lack of national direction in the United States. Scientists say that masks work to slow

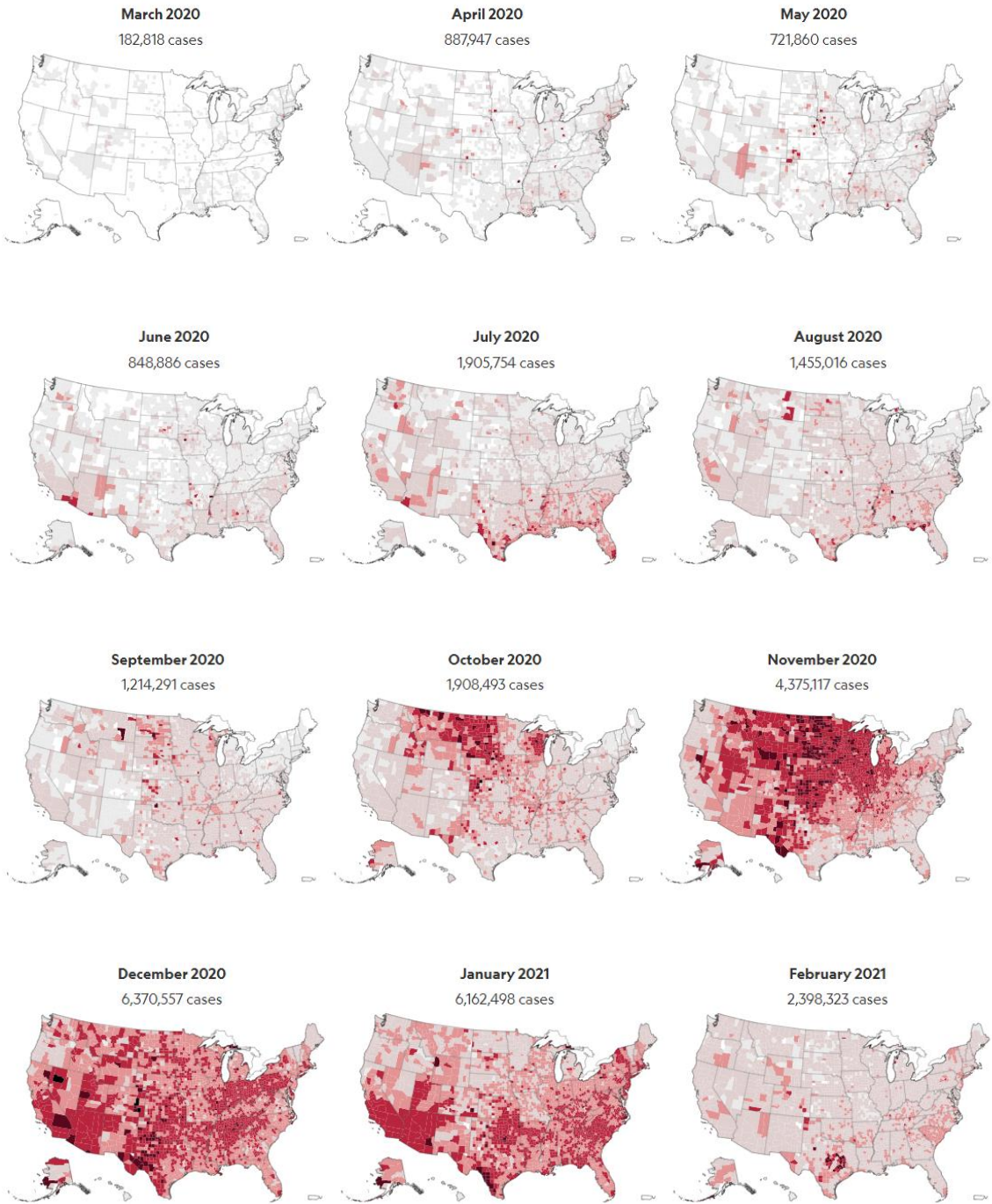
the spread of COVID-19, therefore as states see an increase in positive cases of COVID-19 states should implement a face mask mandate to protect the population. The Center for Disease Control and Prevention (CDC) first recommended wearing face masks on April 3, 2020 as a supplement to hygiene and social distancing (Dwyer and Aubrey, 2020). COVID-19 is more threatening to the citizens that are 65 years and older and those with other health conditions such as cancer, chronic kidney or lung disease, dementia, diabetes (1 or 2), Down Syndrome, heart conditions, HIV, immunocompromised state, liver disease, overweight and obesity, pregnancy, Sickel Cell disease, smoker (now or previously), stroke, and substance abuse (CDC, 2021) therefore, states that have a higher population of 65 and older should implement state-wide face mask mandates. Of which the higher population age also effects nursing homes and retirement communities. On April 8, 2020, the first state government to implement a mask mandate was New Jersey. As seen in Illustration 1.1 and 1.2 below, positive cases grew with the death count climbing daily, but some states no matter the number of positive cases and deaths, a state-wide face mask mandate was not implemented. State face mask policy implementation to combat the spread of COVID-19 did not go as expected.

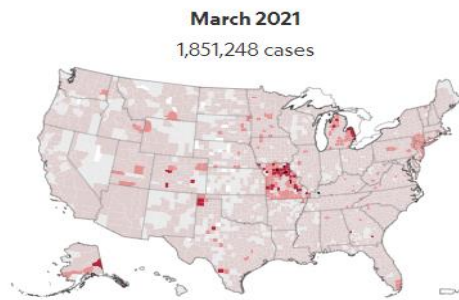
**Figure 1. The overall picture of the United States, new cases and deaths, March 9, 2021 (New York Times, 2021).**





**Figure 2. Confirmed Cases by the month, United States (National Geographic, 2021).**





## **A Short History**

Face masks have been used in public health responses to viral outbreaks and plagues over the last century. For example, in 1910, Wu Lien Teh's work during the Manchurian Plague influenced his conclusion that the cloth face mask was "the principle means of personal protection" (Goh et.al., 1987). In 1918, the Great Influenza Pandemic, commonly referred to as the 'Spanish Flu,' made its way to the United States (Allcott, et.al., 2020). The Spanish Flu with an estimated death toll of 675,000 in the United States (Barro, Ursua and Weng, 2020) was identified in March of 1918 in Kansas at an army base. Medical authorities encouraged the use of face masks to combat the spread of the respiratory virus (Kahane, 2021). Before the use of face masks, within the week, the initial 100 infected soldiers grew fivefold (Hauser, 2020). On October 22, 1918, San Francisco's mayor, James Rolph was the first city to implement a face mask ordinance (Hauser, 2020). By the fall of 1918, seven cities had enacted face mask mandates including: San Francisco, Seattle, Oakland, Sacramento, Denver, Indianapolis, and Pasadena (Hauser, 2020). City's public gathering places, bars, theaters, schools, ice cream parlors, and movie theaters were all closed (Zeitzy, 2020). The public generally accepted the face mask mandate, some opposed the ordinances as a "symbol of government overreach" (Hauser, 2020). This opposition led to the formation of the 'Anti-Mask League' in San Francisco leading to protests (Kahane, 2021).

Dolan (2020) wrote in reference to the Anti-Mask League protests against masking, “might be cloaking deeper ideological or political divides.” Kahane (2020) explains in another way, “opposition to mask wearing during the Great Influenza Pandemic may have reflected both disbelief by some that masks were effective in reducing the spread of the deadly virus, as well as an example of government’s infringement on one’s personal liberty.” This opposition is identical to what is seen in the United States when it comes to face masks and face mask mandates.

At present, we have found ourselves in the same predicament. This time it is labeled the Novel Coronavirus Disease, or COVID-19. In Asia, face mask wearing is socially acceptable and a norm (Leung H., 2020), but the once discarded practice of face mask wearing has now been readopted because of COVID-19 (Howard et.al., 2021). The battle for the health of our nation is on two fronts. The first being the eradication of the actual COVID-19 virus. This disease is a mutative pathogen and will continue to spread as the battle rages. The second front, amongst the U.S population, disagreement continues over policies such as face masking, social distancing, and economics.

Experts suggest widespread mask wearing in public helps to mitigate the spread of disease. Several types of masks are available, although the most popular mask types are non-medical grade cloth versions. Wearing a face mask has been shown to slow and even halt the transmission of COVID-19 and no mask is effective if not worn (Van Der Sande et. al., 2008; Mitze et al., 2020; Wang et. al., 2020; Greenlough et. al., 2020; Hendrix et. al., 2020; Leung et. al., 2020; Chu et. al., 2020; MacIntyre and Chughtai, 2020; Sleator et. al., 2020; Howard et. al., 2021).

The purpose of this study is to critically evaluate contrasting mask mandate implementation dates from state to state in order to ascertain the relationship between mandatory masking at the state and the confirmed cases of COVID-19. The efficacy of face masks has been disputed in this study. Forty states adopted a statewide mask mandate in all public spaces at various times in 2020. Ten states never adopted any statewide mask mandate. This study explores the factors that explains when a state chose to implement a mask mandate.

The remainder of the paper is organized as follows. The next chapter discusses literature related to the past use of face masks in health pandemic. This is used to develop hypotheses about why states may or may not have adopted face mask mandate policies at specific times. Chapter three follows with methodology, results, and discussion. Chapter four discusses concluding thoughts, limitations of the study and recommendations.

## CHAPTER II

### LITERATURE REVIEW

In the beginning, COVID-19 was a mystery. On December 31, Chinese authorities alerted the World Health Organization of a pneumonia case that had an unknown cause (Ravelo and Jerving, 2021). The earliest reported and confirmed case of COVID-19 was December 1, 2019 in Wuhan, China. (Kantis, Kiernan, and Bardi, 2020). The World Health Organization (WHO) declared COVID-19 a pandemic on March 11, 2020 (Ducharme, 2020). The first positive case of COVID-19 in the United States was on January 21<sup>st</sup>, 2020, in Everett, Washington and the second reported case on January 24 ,2020, in Chicago, Illinois (Kantis, Kierman and Bardi, 2020). By May 27, 2020, the United States confirmed the first 100,000 deaths (Harmon and Healy, 2020). The second 100,000 deaths occurred roughly over three months (Harmon and Healy, 2020). During this interval, confirmed cases lowered over the summer as people preferred to by outside. In the fall and winter, people were indoors, but also some cities were reopening the cases began to rise again. A lasting solution was sought worldwide to protect populations. On December 12, 2020, The Food and Drug Administration's approved the Pfizer-BioNTech

COVID-19 vaccine (Johnson and McGinley, 2020). Two days later, the first round of COVID-19 vaccinations arrived at their destinations on December 14<sup>th</sup>, 2020. Positive COVID-19 cases continued to rise. The United States hit a grim record. The number of people that had died from COVID-19 had surpassed 300,000 (Harmon and Healy, 2020). On February 22, 2021, the United States' death toll from COVID-19 passed the 500,000 mark (Wilson, 2021). On June 15, 2021, the United States death toll passed the 600,000 mark (Neuman, 2021). Federal and state leaders sought to find protective measures to combat COVID-19, since nothing was known about COVID-19, these protective measures resorted precautionary principles of foundational scientific measures of hand washing, social distancing and public face mask wearing.

Public health and safety are gubernatorial, not a federal responsibility under the tenth amendment, forty out of the fifty states decided to implement precautionary principles towards face masks. The implementation of the precautionary principle of wearing face masks as a protective measure opened to the door leading to a statewide face mask mandate. Some state governors, specially, New Jersey's governor, Phil Murphy, New York's governor, Andrew Cuomo, Connecticut's governor, New Lamont, and Hawaii's governor, David Ige all took a defensive stance by implementing face mask polices before COVID-19 effects were generally felt, but holdout states to the mask mandate continued to resist. The holdout states of the mask mandate include: Tennessee, South Dakota, South Carolina, Oklahoma, Nebraska, Missouri, Idaho, Florida, Arizona, and Georgia. Misinformation, absence of administrative communication, changing and evolving policies, lack of scientific evidence, lack of public education, and the publics' feelings of personal infringement of rights has led to a heated debate of face mask wearing in the United States (Katz, Sanger-Katz & Quealy, 2020).

Just like the Spanish Flu of 1918, health authorities are encouraging face masking to protect against the COVID-19 respiratory virus. Face masks have two vital roles in prevention of infection of COVID-19. First, the use of masking reduces respiratory droplet transmission from infected individuals to others, even those showing no symptoms or “asymptomatic.” Likewise, infected individuals who will develop symptoms but as yet are pre-symptomatic are prevented from easily transmitting the virus in the early stages when transmission is peaked. Secondly, face masking on uninfected individuals is an integral part of best practices for preventing infection in combination with social distancing and hand washing. Mitigation strategies such as face mask usage, social distancing and increased hand washing that have been implemented throughout the United States and are based on scientific research (Center for Disease Control and Prevention, 2021).

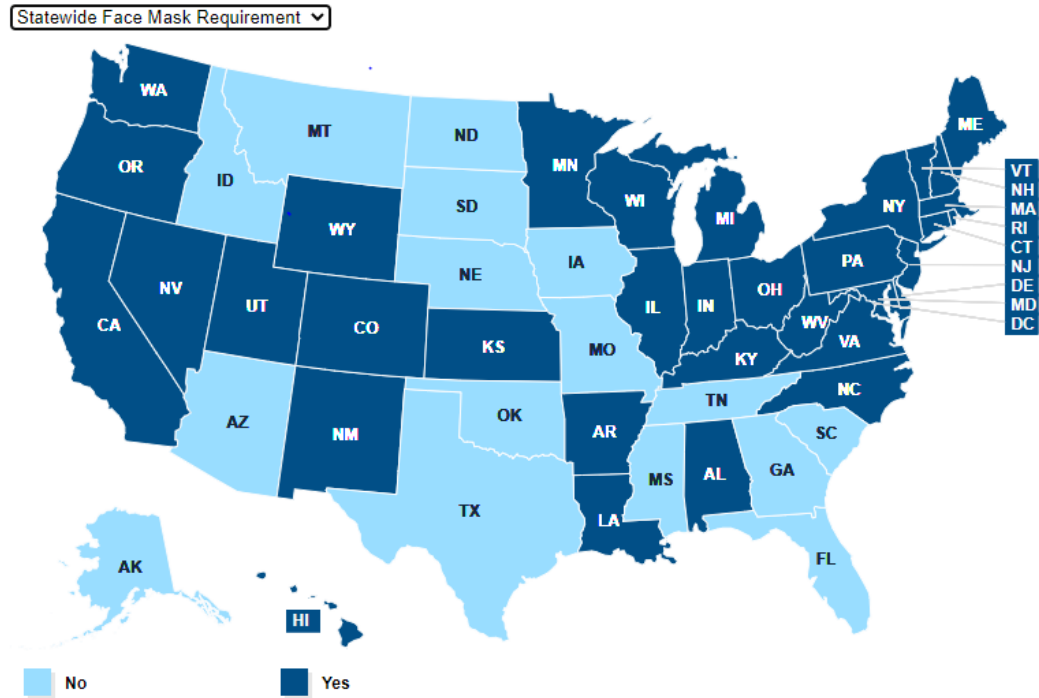
Problematically, face mask usage during the COVID-19 has been sporadic and inconsistent depending on policies and attitudes of the region (Feng et. al., 2020). For example, the state of New Jersey adopted a state-wide face mask mandate on April 8, 2020. The state of North Carolina adopted a state wide face mandate on June 24, 2020. The state of Michigan varies implementation dates of face masks depending on what city you are in. For instance, the city of Ann Arbor adopted a face mask mandate on July 7, 2020, but Grand Rapids adopted on July 13, 2020 but Lansing did not adopt until August 9, 2020, and Detroit adopted on November 18, 2020. In Figure 1.3 state face mask mandates differ depending on one’s location and specific date of the visit. Each city within the state may have different guidelines for businesses such as restaurants, bars, and state-run agencies. For example, each state has a contrasting reopening plan, such as in the state of Wisconsin, masks are still worn in businesses and all employees are wearing face masks on July 13, 2021. On that same date, in the state of Oklahoma, there is no

mask mandate, and employees do not have to wear face masks (Stanwood, 2021). However, the city of Tulsa has a separate requirement for all restaurant and bar employees to wear face masks, but that will expire on midnight on July 16, 2021 (Stanwood, 2021). Oklahoma City's and Stillwater's mask mandates are no longer in effect (Stanwood, 2021). In the United States, face mask wearing by the public to curb the transmission of COVID-19 continues to come under scrutiny. Different states, even varying cities with contrasting guidelines has led to confusion. In the beginning of the pandemic in the United States, not one state had a state-wide face mask mandate, but by March of 2020, in Figure 1.3, all but 16 states had a state-wide face mask mandate. By late December of 2020, nearly 90% of the world population resided under mask mandates (What Countries Require or Recommend Masks in Public, 2020). This is a significant reversal from the beginning of the pandemic when face masks were generally not used (Howard et.al., 2021).



**Figure 3. State Social Distancing Actions, Mask Mandates as of March 3, 2021. Kaiser Family Foundation (KFF), 2021.**

**State Social Distancing Actions, as of March 3, 2021**



The debate regarding the perceived versus actual health of mask wearing continues. There is a sizable amount of data supporting the public use of face masks. “...not wearing a face mask increased one’s infection rate by 36.9 times higher compared to those who did wear a face mask” (Wang et. al., 2020). Public use of face masks is supported by data (Furukawa et.al.,2020; Mizumoto et.al., 2020; Abboah-Offei et.al., 2020; Gupta et.al.,2020; Van Der Sande et. al., 2008; Mitze et al., 2020; Wang et. al., 2020; Greenlalg et. al., 2020; Hendrix et. al., 2020; Leung et. al., 2020; Chu et. al., 2020; Sleator et. al., 2020; Howard et. al., 2020; MacIntyre & Chughtai, 2020; Clapham & Cook, 2021). Face masks have been used for decades during surgery as a source control to protect surgical wounds from staff-generated bacteria from the wearer’s nose

and mouth (Brooks, 2020). Face masks do the same for COVID-19 as they would during surgery if used consistently, worn appropriately, and discarded properly.

### **Protection Provided by Face Mask**

A precautionary principle of face mask mandates was implemented until more could be found out of COVID-19. Since the supply chain was affected by COVID-19, cloths masks were being used by the public. Wearing a face mask protected the wearer from infection. According to a 2013 study of influenza, “homemade” cloth masks are not as effective as surgical masks when it comes to protecting the wearer from droplets, but they are better than no protection at all (Rengasamy et. al., 2010; Davies et.al., 2013). A 2010 study found that mask wearing coupled with handwashing, but not either one by itself, reduced the household transmission by 35-51% (Aiello, et.al., 2010). Based on a 2015 study, flu-like symptoms occurred 13 times more often when a healthcare worker wore a cloth mask compared to a surgical mask” ...97% of particles penetrated cloth masks, compared to 44% penetrating surgical masks” (MacIntyre et. al., 2015). A 2009 study of influenza, found while caring for a sick child in the same household, the caregiver wearing a mask decreased the infection rate by 60-80%, but mask adherence was well below 50% leading to the conclusion that better adherence to correct mask wearing protocols would lead to a higher decrease in infection (MacIntyre et.al., 2009). A 2013 influenza simulation showed that the surgical mask blocked droplets with a degree of efficacy on an average that amounts to six-fold (Booth et.al., 2013). When a new virus is discovered and infecting a population, face masks provide a safeguard.

Wearing a face mask, even if you do not feel sick, is considered imperative to stop the spread of COVID-19, as studies have shown that 40-80% of the transmission of COVID-19 is from pre or

asymptomatic individuals (Javid and Balban, 2020; Ferretti et al., 2020; Li et al., 2020). The COVID-19 virus transmits a contagious viral load in asymptomatic, pre-symptomatic, and mildly-symptomatic cases (Han and Yang, 2020; Zou, et al., 2020). Turbulent gas cloud dynamics (from a sneeze or cough of an infected individual) can trap and carry droplets from the warm and moist environment of one's mouth, which can prolong the lifetime of the droplet (Bourouiba, 2020) and cause the virus payload to travel 23 to 27 feet (Brienen et al., 2010; Zhang et al., 2013). Droplets settle out and evaporate at different speeds and lengths along the trajectory depending on environmental factors such as temperature, humidity, and airflow (Bourouiba, 2020). If a person is within this window of spread, infection can quickly infiltrate an area leading to a higher rate of infection if individuals are not taking personal precautions.

### **Controlling the Spread**

The patient is considered most infectious during pre-symptomatic transmission because of the shorter serial interval of five days (World Health Organization, 2020). A serial interval is either an incubation period or an infectious period between stages of virus. A five-day interval is a briskly advancing virus. This short incubation period could account for the rapid spreading nature of COVID-19. Older age was correlated with a higher viral load (To et al., 2020) which might account for the numerous cases in nursing homes and assisted living facilities. High cases in nursing homes may be attributed to; large population density, higher viral load before symptoms occur without face masking or isolation of resident, and increased viral loads with older age (To et al., 2020). A study with a sample size of 9,395 nursing homes, revealed that 2,949 (31.4%) had a documented cases of COVID-19 (Abrams et al., 2020). The facility size, location, caregivers moving from room to room, staff continuing to work while exhibiting symptoms, and staff not following basic personal hygiene, are all factors in nursing home

transmission (Barnett and Grabowski, 2020). The average confirmed cases of COVID-19 in nursing homes was 19.8, states such as New Jersey (88.6%) and Massachusetts (78.0%) had the greatest number of cases (Abrams et. al., 2020). Subsequently, secondary transmission of the COVID-19 virus could have taken place before symptoms were noticed and therefore isolated (Nishiura et. al., 2021; Ganyani et. al., 2020), furthering the spread of COVID-19 in nursing homes. Mathematical models propose that 40-80% of the transmission of COVID-19 events occur from presymptomatic or asymptomatic individuals (Ferretti et. al., 2020; Solis et. al., 2020).

### **An Example of Face Mask Wearing in the United States**

Howard (et.al., 2021) and Greenhalgh (et.at., 2020) both conclude that mass masking is necessary to prevent further infection as many who spread the virus are asymptomatic. Public mask wearing is the most effective at reducing the spread of COVID-19 when compliance is high (Tian et.al., 2020). Given the fact that masks reduce the transmission of COVID-19, it seems reasonable to assume that mandatory masking may be warranted. Also, transmission needs to have source control, meaning those people that are presymptomatic and are not aware, need to wear a mask. An example from the Center for Disease Control and Prevention (CDC) of mass masking in Springfield, Missouri, with two hair stylists with confirmed cases of COVID-19 attended to 139 clients, both the stylists and the clients wore face masks, no clients were infected (Hendrix et.al., 2020). Without face masks, community spread cannot be easily contained, leading to overrun health care facilities (Leung et.al., 2020). Overwhelmed facilities lead to insufficient resources and equipment, arbitrary decisions over life and death, other emergency patients such as heart attack or a car accident victims languish unnecessarily, and patients die that would otherwise survive.

## **Face Mask Wearing in Other Countries**

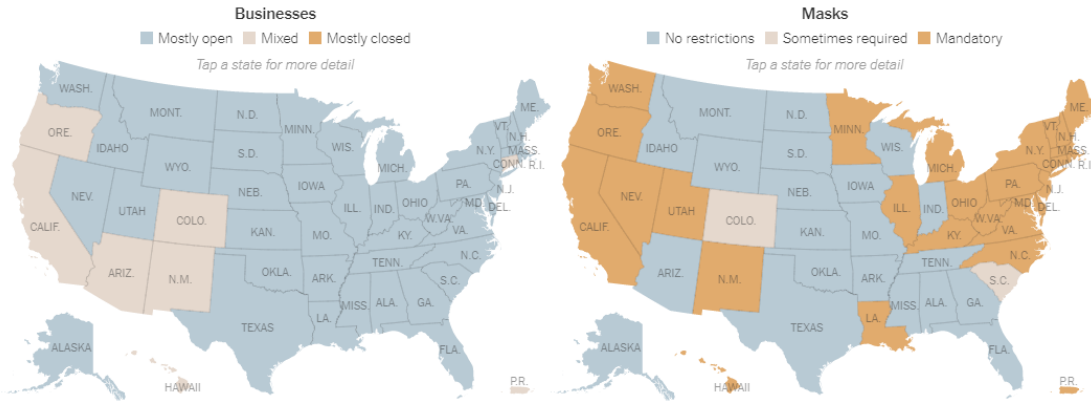
Germany acknowledges that the wearing of face masks reduces COVID-19 from spreading, specifically looking at the city of Jena (Mitze et. al., 2020). In Jena, face masks were mandatory between April 1 through April 10, 2020, and the number of new infections of COVID-19 dropped to almost zero. On April 29, 2020, the German government issued a federal mask mandate for the entire country (Mitze et.al., 2020). All the studies and experiments that compared face mask usage to the non-usage, discovered a conclusively higher rate of infection among the participants who did not wear a mask (Abboah-Offei et.al., 2020).

The University of Edinburgh Usher Institute, UNCOVER (2020) review concluded that homemade masks worn by infected individuals could "...reduce transmission through droplets." A systematic review found face masks offered a compelling benefit of preventing the transmission of COVID-19, but the use of the face masks was "...limited by inconsistent adherence to mask usage." (Gupta, 2020). Compliance will not reach one hundred percent but using common sense rational, some protection is better than no protection. Recent studies submit that wearing a face mask reduces the rate of infection of COVID-19 along with reducing the growth of the epidemic curve (Chu et.al., 2020; Leung et.at., 2020). It is considered vital by health authorities to wear a mask because COVID-19 is easily transmittable through speaking, sneezing, coughing, shouting, or singing (Frodel, 2020). The science shows that wearing a face mask is effective.

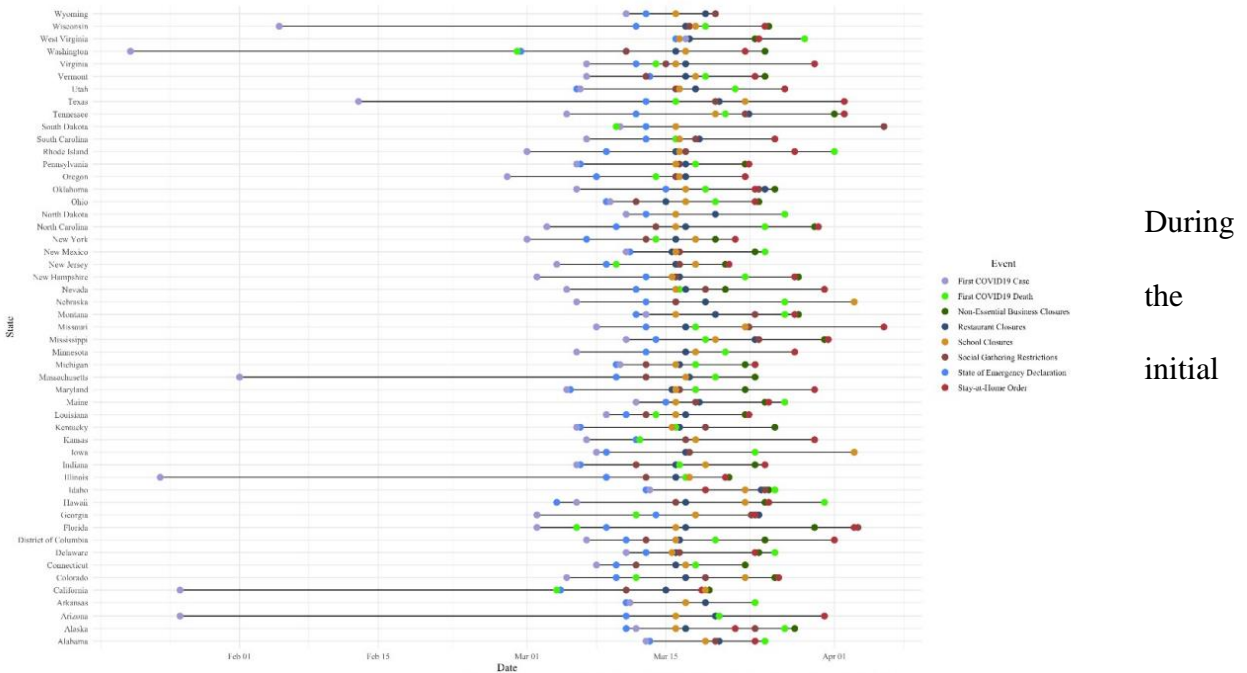
## **Conflicting Information**

Differing states had different protective measures in place. (Figure 1.4 and 1.5). Many states conceded few or no protective measures which increased confusion among the public. While others, “perceived that...health guidelines (were) a direct threat(s) to their freedoms...” (Blanford, 2020). They were unprepared for an event of this magnitude. This mishmash of diverse responses to face mask mandates which were adopted over the spring and summer of 2020, led to controversy and contention. Public skepticism has run high because states had contrasting guidelines. In February and March of 2020, Dr. Anthony Fauci, head of the U.S. National Institute of Allergy and Infectious Diseases and the U.S General Surgeon, Jerome Adams told Americans face masks are not effective and should not be wearing them (Panetta, 2020). By early April, the Centers for Disease Control and Prevention (CDC) began recommending that Americans wear face masks in public (Breslow, 2020). As of February 10, 2021, the CDC updated guidelines according to a new study by the CDC, they states, two masks are better than one, “for better fit and extra protection” (Stobbe, 2021). On July 13, 2021, the CDC now has updated guidelines to include: wear a mask, 6 feet-social distancing, get vaccinated, avoid crowds and poorly ventilated spaces, wash your hands, cover coughs and sneezes and clean and disinfect (CDC, 2021). This confusing communication does not induce public confidence in mask wearing.

**Figure 4. Mask Mandates, April 9, 2021 (New York Times, 2021)**



**Figure 5. State Policy and Information Timeline (Gupta et.al., 2020)**



hysteria, citizens began challenging others in public who were or were not following mask mandates which led to incidents of violence. (Hutchinson, 2020; Porterfield, 2020; Muschick, 2020). Conflicting information from the state has led to power challenges in public forums, for

instance a mayor going against the governor and instituting a mask mandate for their city (Dunham, 2021).

### **The Choice**

Individuals may choose not to wear a face mask for a variety of reasons. Wearing a mask can be an emotionally charged decision. First, culture plays a crucial role, for example East Asia has grown accustomed to wearing face masks because of SARS, it is socially acceptable plus there are other risks in the environment such as pollution and allergies (Haelle, 2020). Second, the individual may not have any symptoms, but may be pre- symptomatic, unknowingly spreading COVID-19. Third, wearing a face mask does not increase the amount of carbon dioxide inhaled by the individual (Frodl, 2020). Health care workers have been wearing face masks for decades without adverse effects because surgical masks are very breathable and carbon dioxide will diffuse easily (Frodl, 2020). Fourth, public health administrators have been hesitant to support unpopular public masking (Martin et.al., 2020). Fifth, pandemic fatigue. Citizens want to “go back to normal.” COVID-19 has changed our routines at home, at work, and socially creating a “new normal” (Center for Disease Control, 2021).

### **To Mask**

Wang (et.al. 2020) discovered not wearing a face mask increased one’s infection rate by 36.9 times compared to those who did wear a face mask. A recent meta-analysis that included 172 observational studies and 16 countries on six continents “...strongly suggest that face masks reduce the spread” of COVID-19 (Chu et. al., 2020). Face masks should be used by all of society (Chu, et. al., 2020; MacIntyre and Chughtai, 2020; Van Der Sande et. al., 2008; Sleator et. al., 2020).



Another study that included 67 randomized controlled trials and observational studies on physical interventions to reduce the spread of respiratory viruses found “...overall masks were the best performing intervention across populations, settings, and threats” (Jefferson et.al.,2011). MacIntyre and Chughtai (2020) concluded after reviewing masks as a protective intervention that “...community mask use by well people could be beneficial, particularly for COVID-19, where transmission be may pre-symptomatic.” He et al (2020) observed highest viral loads at the first symptom onset and deduced that the infectiousness “peaked on or before symptom onset,” leading to the conclusion that mass masking would have the greatest impact in the community given the high risk of an asymptomatic and pre-symptomatic transmission (He et.al., 2020).

### **Policy Diffusion of Face Masks**

What leads a government body to replicate a COVID-19 state-wide face mask mandate policy from another government body? Toft’s isomorphic learning is evident through policy diffusion, observing concepts and policies from other locations and deriving lessons from what is observed (Toft and Reynolds, 2005). A simple definition of “policy diffusion” is a policy or course of action adopted by a government in one city, state, or county is influenced by policy from other city, state, or country. Previous studies of learning studied by Berry and Baybeck (2005) state, “when confronted with a problem, decision makers simplify the task of finding a solution by choosing an alternative that has proven successful elsewhere.”

First, we expect that policy makers play an imitation game. Other cities and states have adopted the policy of face masks, creating pressure for that state to do the same, the caveat being an abbreviated duration of the policy (Shipan and Volden, 2008). For example, a handful of states

that initially passed a statewide face mask mandate are letting the mandate expire or lifting the mandate early are: Utah, Texas, Mississippi, Iowa, Montana, and North Dakota.

The concept of regional diffusion has been weakened over time by the advancement of technology and social media. Social links and communication between policy actors increase policy adoption (Crow, 2012). There are two theories of thought based on this hypothesis. The first theory in regional diffusion is policy makers borrow solutions from a neighboring state (Walker, 1969). State and local governments no longer depend on bordering states, instead have access to policy information through social media, internet, professional conferences and new sources. This world-wide access of knowledge opens the floodgates of solutions. The second theory, a state will only adopt a policy if their own “political, economic, and social environments” are in line (Gray, 1973). This theory is left up to the leaders of the state government, the governor in the case of the statewide face mask mandates. Some of the more populous cities within states that did not pass a statewide mask mandate, did pass a local mask mandate. Party affiliation and state-wide face mask mandates go hand in hand. All of the hold-out states and all of the states that are letting the mask mandate expire or lifting it have republican governors, which begs the question if there is a relationship between the party affiliation of the state governor and state-wide face mask mandates. Considering the governor of each state has the responsibility of health and safety because of the tenth amendment, he or she has the power to instill a state-wide face mask mandate or not. Specially, looking at the states that did not implement a state-wide face mask mandate, there is a relationship. Political lines have been drawn in the sand because of COVID-19 polices because of the core beliefs of each separate political party.

Government officials are invested in ways the policy will be perceived by their constituents because that will affect their chances of reelection (Grossback et. al., 2004). Historically, policy diffusion is examined under a yearly timeframe. This is not a factor when studying COVID-19, as this is a worldwide, rapidly moving pandemic leaving the states to their independent decisions. This led the states to have to implement protective measures without town hall meetings, feedback, and hearing the pushback of the policy only after it was enforced. Executing the state-wide face mask policy drove the values and priorities of state leaders onto the public. Safety and health were a higher value than individual rights, which was replicated throughout several of the states. Previous conceptions of policy diffusion seem to advance within the same region and states that share a border (Ingle et.al., 2007). Public policy diffuses across America, such as the indoor anti-smoking, reforming education, and tax law policies (Berry & Baybeck, 2005; Berry & Berry, 1990, Mooney & Lee, 1995).

### **Politics and Policy of Masking**

“Politics determine policy” is a phrase coined by Theodore Lowi (1964, 1972), to describe the interaction or relationship between regulatory law, as in “quarantine and public health” and public policy. Lowi’s theory describes the intersection between the public political field and the making of policies for the general population as driven by political aspirations and attachments. However, researchers have suggested a different kind of policy called “morality policy,” which has considerably contrasting politics and adoption patterns from the education or economic policies (Meier and McFarlane, 1992; Meier and Johnson, 1990; Morgan and Meier, 1977). This is the case with policy adoption of state wide face masks for the COVID-19 virus. Morality policy adoption has a very narrow scope and looks essentially at the negative side of policy adoption (Mooney and Lee, 1995). It entails social norms and an individual’s personal moral

response to the policy at hand (Tatalovich & Daynes, 1988). For instance, social norm policies would include recreational drug use, prostitution, and the prohibition of alcohol. Moral norm policy response issues would include gun control or the death penalty. The regulation of abortion conjures feeling of both social norms and moral response (Tatalovich & Daynes, 1981).

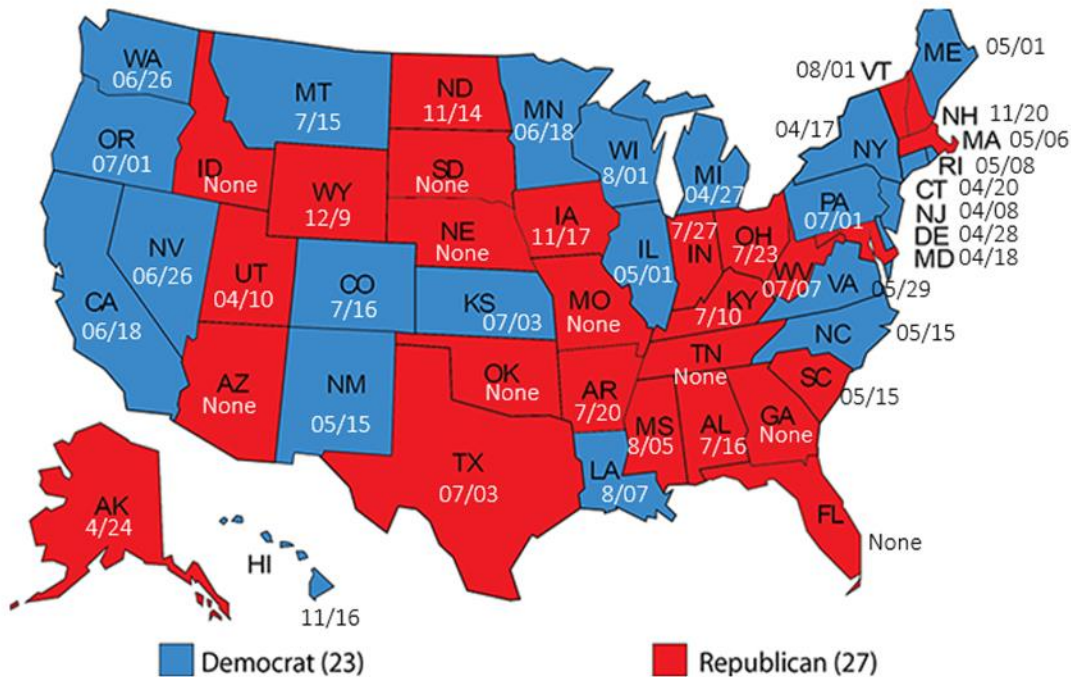
Morality policy sparks debates which leads to a collusion of values and morals in which compromise becomes an anathema (Moen, 1984; Fairbanks, 1975). In a pregnancy, when does life begin? When does free speech step over the line of privacy laws? How much gun control is too much? Does the government have the right to tell you when, where, and how to wear a face mask? Citizens in the United States have been speaking out, voicing their opinions on face masks and face mask mandates (MSN, 2020; A Green Road Daily News, 2021). The United States' social norms have not previously included the wearing of face masks, while individual citizens assumed the moral responsibility for masking options. The consequence of viewing mask wearing as "right" or "wrong" has led to violence amongst the population as Americans notoriously resist governmental intervention (Hutchinson, 2020; Porterfield, 2020; Muschick, 2020).

## **Personal Rights**

Promoting masks, especially in countries such as the United States, that hold in high regard "individual expression, and personal rights," etc.; will have foreseeable resistance from these interventions (Ewing, 2020). In 1918, the Anti-Mask League protested and today people are protesting in places such as Tulsa, Oklahoma, Houston, Texas, and Provo, Utah (Archer, 2020; Jones, 2020; Hill, 2020).

It is unconstitutional to implement a federal face mask mandate because of the tenth amendment, but states can pass such a policy. The governor of 40 states have implemented face mask mandates. Looking at Figure 1.6, of the 10 states that have not issued a statewide face mask mandate, all have Republican governors. The states that never had a state wide mask mandate are: Arizona, Florida, Georgia, Idaho, Missouri, Nebraska, Oklahoma, South Carolina, South Dakota, and Tennessee (Lenthang, 2021). Boxell (et.al., 2020) states there is general confirmation of growing partisan divide between Democrats and Republicans over the last four decades. In addition, the Pew Research Center in 2017 showed the apportionment has increased under the Donald Trump presidency.

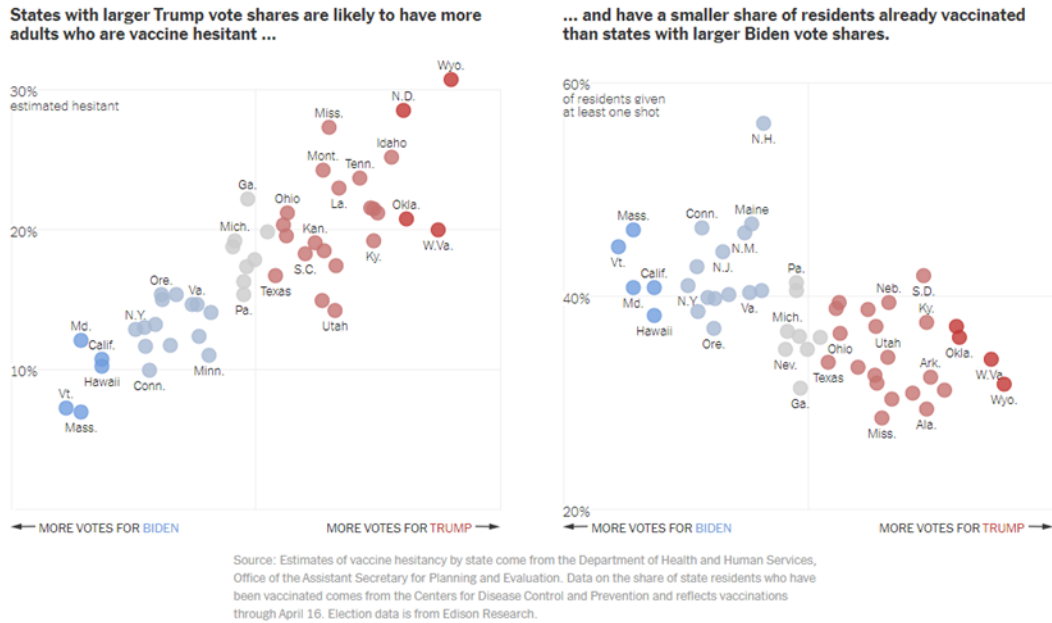
**Figure 6. 2020 Map of the United States by Governor’s Party and Mask Mandate Date (Burkhart, 2021).**



Discussing face masks and statewide mask mandates also brings up personal rights. Some members of the public feel both protective measures of face masks and vaccinations are infringing on their personal rights. Free speech, abortion, gun control, face masks, statewide mandates, and the COVID-19 vaccination are all factors of which side of the political line one stands on. Core personal beliefs influence political party membership.

The United States is trying to get the COVID-19 vaccination in the arms of the public. Some states are prevailing against the odds while others are having a harder time undertaking the task. "...Vaccinations are starting to look like the nation's political map: deeply divided between red and blue states," stated Russ Bynum of the Associated Press (Figure 1.7). The pattern of vaccinations, Americans in Republican states appear to be more hesitant to receive the vaccination (Bynum, 2021). An individual is a member of a specific political party because of their own political beliefs; therefore, those core beliefs influence one's actions. In this case, to receive a COVID-19 vaccination or not. Looking at current vaccination rates, there is an imbalance which is broken down between political lines (Ivory, Leatherby, and Gebeloff, 2021). Vaccination rates and the willingness to receive a vaccination were reduced in the counties where the majority of the population voted for Donald Trump in 2020, leaving some locations in short supply while others had an abundance (Ivory, Leatherby, and Gebeloff, 2021). Ivory, Leatherby, and Gebeloff (2021) state, "The relationship between vaccination and politics reflects demographics." Vaccination reluctance is highest in rural, low-income rates and lower college graduation levels; however, the partisan gap is still upheld after taking income, race, age, population density, a country's infection and death rate (Ivory, Leatherby, and Gebeloff, 2021). The population appears to be making health decisions based on which political party they align themselves.

**Figure 7. Vaccination Disparity, Broken Down on Political Lines (Ivory, Leatherby, and Gebeloff, 2021).**



The Republican governors were more resistant to enact of statewide face mask mandate. The Republican party’s core beliefs are based on that each person is responsible for their oneself in society (Republican Views.org, 2018). Republicans believe the government’s role is to empower the people to gain benefits from society for themselves, their families, and those that cannot do so for themselves (Republican Party.org, 2018). A core Republican belief is the government should only interfere when society is not able to function. Outlined on the Republican national committee website expounds, “ ...the strength of the nation lies within the individuals who live in the country, and therefore feel that the individuals’ freedom, dignity, and responsibly must come first and foremost in our government” (Republican National Committee, 2021). These core believes speak to why the Republican governors were less likely in implement a statewide face mask mandate. They believe that it is up to an individual to decide, not up to the state

government. The belief that Americans can make their own choices and not let government interfere with a person's rights. Democrats believe more strongly in the power of the government compared to Republicans. According to the democratic website, " ...this country succeeds when everyone gets a fair shot, everyone does their fair share, and everyone plays by the same rules." Party identification has a sense of emotional attachment rooted in the common images of the parties (Campbell et.al.,1960; Green, Palmquist, and Schickler, 2002). Core values reflect beliefs humanity, a society as a whole, and public policy beliefs (Feldman, 1988; Kinder, 1998; Rokeach, 1973).

Along with these forementioned hold-out states, other republican-led states jumped on the state-wide face masks mandate bandwagon, only to allow them to expire earlier than other states or were lifted completely. These states are: Texas on March 10, 2021, Mississippi on March 3, 2021, Iowa on February 7 (Schlesslman, 2021) Montana on February 11, and North Dakota on January 15 (Turley, 2021), Alabama will lift their state mask mandate on April 9, 2020 (Allen & Boyette, 2021) and Utah will let their face mask mandate expire on April 10, 2020 (Jacobs, 2021). Current CDC guidelines recommend every citizen to wear a mask to decrease the spread of COVID-19 by lowering the transmission of respiratory droplets. Which leads to how policy diffusion of state-wide face mask mandates to protect the population is not complete because of the hold-out states but then a further step back with above listed states pulling the face mask mandate and sitting on the figurative fence.



## **Hypotheses**

In summary, scientific data states that face masks slow the spread of COVID-19, consequently, states that see an increase in cases would be more apt to implement a face mask mandate. The first state to implement a face mask mandate was New Jersey, other states learned from this implementation of this policy and adopted the policy in their own state to protect the public. COVID-19 is more dangerous to the population that is 65 years old and older, hence, states that have an older population would be more willing to adopt state-wide face mask mandates. There is a push back to wearing a face mask from the United States population. The majority of the push back has to do with a person's individual right to choose to wear a mask. There is a political interpretation held in high regard by conservatives or republican governors, therefore, states with conservatives or republican governors may be less likely to have mask mandates and vice versa with the legislatures.

By March 27, 2020 the federal government and every U.S. state had declared emergencies for the COVID-19 pandemic, and states' policies and response measures were muddled (Gupta et.al., 2020; Hodge, 2020). The scientific literature suggests masking will slow the spread of COVID-19 therefore, I expect the states to adopt a face mask mandate as cases continue to rise in order to slow the spread of COVID-19.

**H1: As positive COVID-19 cases begin to exponentially increase on a weekly average in a state, the state is more likely to institute a mask mandate.**

The science on the effectiveness of mask wearing began spreading early in the pandemic. That science suggests that mask wearing will decrease the spread and reduce the number of infections. The policy diffusion literature would suggest that states adopt policies through learning, and a

superficial view of the number of confirmed cases in states suggests that many states adopted mask mandates as the number of cases in their states rose. Likewise, COVID-19 negatively affects elderly individuals over the age of 65 at a higher rate than other population groups. Therefore, states may adopt mask mandates at a higher level as a result of having a higher percentage of the population over the age of 65.

**H2: States with higher percentage of population over the age of 65 will more likely implement statewide mask mandates.**

Kahane (2020) found “...the New York Times, econometric results show a significant, negative relationship between mask wearing behavior and county-level voting for Donald Trump in the 2016 presidential election.” This evidence of political divide along party lines seems to suggest that Democrats would act in favor of forced masking for health and safety, while Republicans would act in favor of no masks to protect individual rights. Accordingly, Franki (2020) cites a Commonwealth Fund survey showing that, “Mandatory mask use gained 91% support among black respondents, 90% in Hispanics, and 82% in whites.” However, supporting individual mask usage and supporting mask mandates are two different things. One can support individual usage while disagreeing that the government has the right to force one to wear a mask. A policy of face masking equals the public has to wear a face mask in public.

**H3: States with Republican governors are less likely to institute a mask mandate.**

**H4: State legislatures controlled by Democrats are more likely to institute a mask mandate.**

This next chapter describes the data collection and methodology used to understand what factors explain state adoption of mask mandates. If states are learning from science, then the research

suggests that the actual spread of the virus through states' population, politics, and size of vulnerable populations will be the most important factors that affect the adoption of statewide mask mandates to slow the spread of COVID-19.

## CHAPTER III

### METHODOLOGY

Policy diffusion studies examine the likelihood that a state will adopt a policy at a given time based on a number of factors. This theory uses a variety of methods to determine what factors influence policy adoption the discrete time logit was used for this study. This requires that state-level data be collected for all 50 states from the date of first adoption, in this case, New Jersey on April 8, 2020, until the last state adopts, Wyoming on December 8, 2020. Typical diffusion studies examine state adoption on an annual basis, but the rapid spread of COVID-19 saw states adopting mask mandates at differing intervals throughout 2020, of which ten states never adopted statewide mandates.

The dependent variable for this study is a dummy variable for whether a state had adopted a statewide mask mandate in all public places within a bi-weekly time period beginning April 8, 2020, when the first state adopted, until December 8, 2020. The dummy variable is coded 0-no adoption and 1-adoption. Once a state adopts a mask mandate that state is dropped off the data set because it is accepted that the state cannot take the “risk” of adopting a statewide mask mandate more than once (Berry and Berry, 1990). The ten states that never adopted a mask

mandate remained in the data set for all weekly dates starting April 15 and ending December 15. The ten states that never adopted a mask mandate include: Tennessee, South Dakota, South Carolina, Oklahoma, Nebraska, Missouri, Idaho, Florida, Arizona, and Georgia. Since they never adopted the mandate, their “risk” of adopting a mandate is always coded as 0. A logistic regression for this method is acceptable since the dependent variable is binomial.

The independent variable for number of positive COVID cases is an actual count of the average number of cases over a 7-day period for each state on a given date. The data was collected from Google’s COVID Trends Tracker and includes confirmed and probable cases as reported by government health ministries, the New York Times, and other authoritative sources. The 7-day average was used in order to smooth inconsistencies in reporting data on a day-to-day basis. For example, the State of Oklahoma did not report positive cases over the weekend. Case counts tended to be artificially low on Monday and artificially high on Tuesday. COVID-19 is a fast-moving virus and date ranges may start on different dates. The data set includes confirmed and probable cases. Data is continually updated from government health ministries, The New York Times, and other authoritative sources. The data may differ from other websites and sources because their various sources and aggregating COVID-19 data. Each source has a different updating dates and times and have various ways of gathering the data. Confirmed positive cases and deaths, which are advised to be an undercount of the true total, are of those of individuals whose coronavirus infections were confirmed by a molecular laboratory test.

The model includes one control variable: total state population. This is an important control variable given the inclusion of the number of infected and the population over aged 65. This data was collected from the Census bureau for the year 2019. The independent variables are: the

date of the mask mandate, mayor and governor political affiliation, and social vulnerability index.

Data is compiled and compared to ascertain differences in confirmed COVID-19 cases per 100,000 population count, political boundaries mandating mask usage, confirmed COVID-19 cases, age of the population of 65 years and older, population, legislative party, and governor's party affiliation. The results were not what was expected.

In order to test the hypotheses developed in Chapter 2, data was collected on a number of independent variables. First, in order to test Hypothesis 1 and 2, data was collected for each state that remained in the data set for each bi-weekly date.

Hypotheses 3 and 4 suggest that politics will be a significant indicator of a states' adoption of a mask mandate. In order to test H3, that states with Republican governors would be less likely to adopt a mask mandate, data was collected on state governor party identification in 2020, the year all mask mandates were adopted. States with a governor identifying as a democrat were coded as 0 and states with a governor identify as republican were coded as 1. Likewise, to test H4, that states with a legislature controlled by the democratic party would be more likely to adopt mask mandates, data was collected on the party control of state legislature in 2020. States with a legislature controlled by democrats were code 1 and states with a legislature controlled by republicans were coded 2. Nebraska has a non-partisan legislature and was coded 0. Likewise, Minnesota had an evenly split legislature and was coded 3. Nebraska and Minnesota dropped from the analysis due to too few cases for analysis.

## CHAPTER IV

### FINDINGS

#### Summary Statistics

**Table 1: Variable Means for Each of the Variables Included in the Model**

	<b>Mean</b>
<b>7-day Average of Positive Covid Cases</b>	973
<b>Total State Population 2019</b>	5,903,755
<b>Party Control of State Legislature</b>	1.7
<b>Governor Political Party</b>	1.7
<b>Percent of Population over Age 65</b>	17.1%

Table B1 below shows the correlations between each of the variables in the model. There is a statistically significant and positive relationship between total population and the 7-day average cases, as well as, a statistically significant and negative relationship between total state population and percent population above age 65. There is a statistically significant and positive relationship between the 7-day average of positive cases and the dominant party in the state

legislature. Finally, there is a statistically significant and positive relationship between the dominant party in the legislature and the Governor’s party identification.

**Table 2: Correlation Table for All Model Variables**

	<b>7 Day Avg Cases</b>	<b>Total Population</b>	<b>State Legis. Party ID</b>	<b>Governor Party</b>	<b>% Pop &gt;age 65</b>
<b>7 Day Avg Cases</b>	1.000				
<b>Total Population</b>	0.523**	1.00			
<b>State Legis. Party ID</b>	0.112*	0.091	1.00		
<b>Governor Party</b>	0.119	-0.075	0.237**	1.00	
<b>% Pop &gt;age 65</b>	0.04	-0.114*	-0.055	-0.015	1.00

Sig \*p>0.05 \*\*p>0.01

### **Findings**

The findings of the logistic regression model are presented in Table C1 below. The findings partially support the political explanation of mask mandate adoption. Hypotheses 1 and 2 were concerned with the relationship between positive cases and vulnerable populations and the adoption of mask mandates. H2 suggests that as the number of positive cases, as measured by the 7-day average, rose states would be more likely to adopt a statewide mask policy. The coefficient for the 7-day average of cases is positive and statistically significant, confirming that the rise in cases likely influenced the adoption of mask mandates in states that adopted them. However, H1 suggested that a higher percentage of the population that was vulnerable to the virus, those over aged 65, would also influence the adoption of mask mandates. The coefficient for population over aged 65 was not statistically significant in the model.



Hypothesis 3 stated that states with Republican governors would be less likely to adopt a statewide mask mandate. The coefficient for governor's party identification is negative and statistically significant at the  $p < 0.05$  level, suggesting that Republican governors were less likely to adopt statewide mask mandates. However, H4 suggested that states with legislature controlled by democrats would be more likely to adopt statewide mask mandates. This coefficient did not reach the level of statistical significance. It is likely that the governor's party identification has more of an effect, because most states adopted emergency powers for their executive, which gave governor's wide latitude to implement statewide COVID-19 restrictions and policies.

**Table 3: Determinants of Issuance of Statewide Mask Mandate for all Public Places in Response to COVID-19 Pandemic**

	<b>Coefficient</b>
<b>7 Day Average of Positive Cases</b>	.00025** (.00011)
<b>Total Population</b>	-4.32e-08 (3.12e-08)
<b>Legislative Party Control</b>	
<b>Democrat</b>	0.8834 (1.107)
<b>Republican</b>	0.0684 (1.142)
<b>Governor Party ID*</b>	-1.1063** (0.4418)
<b>% Population of Age 65</b>	-0.158 (0.1108)

\*Democrat is referent category

\*\*sig <0.05

N=417

Prob>chi2 = 0.0004 Pseudo R2 = 0.09 Standard Error in Parenthesis

The final chapter discusses the conclusions drawn from the findings, as well as the limitation of the study, and areas for future research. The thesis concludes with two recommendations for practitioners.

## CHAPTER V

### CONCLUSION

According to the events, it is likely the governor's party had more of an effect because most states that adopted emergency powers through an emergency declaration gave the governor latitude in order to implement policies including statewide face mask mandates. Governor party identification shows that Democrats were more likely to order a mask mandate as a response to Covid-19 however, party affiliation and personal opinions of state governors must be taken into consideration. The core beliefs of Republicans of each person is responsible for themselves and the government should not intervene led me to the conclusion that Republicans are less likely to social distance and wear a face mask because of their personal beliefs, even if it is proven by science. Personal ideologies are a higher priority and will influence an individuals' behavior. The 7-day average of positive cases of the virus was statistically significant only when state populations were considered, meaning as positive cases of COVID-19 began to grow exponentially, governors of both parties were more likely to institute masking mandates, however, Democratic governors were more likely to issue such orders, while some Republican governors refused or resisted such health measures no matter the number of positive cases. The jumble of social distancing policies makes it almost impossible to define which policy/policies

actually made a difference within the population. The United States' patchwork of policies hindered efforts.

A pandemic's response is based on leadership. Leadership defined by Chemers (2001) is defined as, "a process of social influence through which an individual enlists and mobilizes the aid of others in the attainment of a collective goal." A collective goal of the COVID-19 pandemic is to protect life. The best practice to protect life is a public health practice of face mask wearing coupled with social distancing and hand washing. An individual uses their personal values and morals to make decisions along with following leadership. It is a personal debate as well as a public debate. An individual's personal morals and social norms get evaluated. When the state introduced a statewide face mask mandate, it took away the moral responsibility from the individual citizen in favor of legal force, at this point the individual sees a compromise as the enemy and Anti-Mask leagues are formed and there are protests in the streets. No one likes to be told what to do, no matter their age.

In conclusion, the hindrance to this integral behavior in pandemic alleviation is two-fold; the public distaste for the behavior, and the political inconsistency of the masking policy. It is not until confirmed cases of virus reached epidemic levels that Republican lawmakers could no longer ignore the health and safety benefits of masking, and were finally succumbed to admit to either state-wide mandates or allowing local leaders to institute masking policy, and at the very least, urging caution to their constituents.

## **Recommendations**

### **1. A foundational community understanding, and education campaign needs to be built.**

Policy makers should consider launching a public education campaign on mask wearing including proper mask care, donning, doffing, and mask fit (Illustration 1.8). Even with the COVID-19 vaccine, non-pharmaceutical interventions such as face masking reduces respiratory droplet spread therefore reducing the transmission of the COVID-19 virus.

### **2. Public education and myth-busting of COVID-19 vaccines.**

Vaccines offer hope that normal life might be resumed. As we come closer to the goal of reopening, with continued variants of COVID-19 circulate the world, it is important for government and health officials to enact clear and united guidelines.

Figure 8. How to Put on and Take Off a Mask with Mask Care (Desai et. al., 2020).



Policy should be driven by data, rather than as a political reaction to an issue. Governance should be based on administering resources in an open and accountable manner. Nonetheless, it is hoped that this study demonstrates that politics should not be involved in polices.

## **Limitations**

Limitations include small sample size and reporting and testing inconsistencies regarding confirmed COVID-19 cases. This study is on state level data for mask mandates. A state may not have a mask mandate but cities or counties within the state boundaries may have implanted a mask mandate, which could in fact skew the data to positive cases of COVID-19. The governor's ideology is the most important when the state is under an emergency declaration, the power of executing policy is in their hands.

There is also a consideration for geographical variation in societal and cultural patterns. Population density also should be examination. The states that did not institute a mask mandate, but many larger cities within those state boundaries did. Higher population leads to increased population density giving COVID-19 a chance to spread at a faster pace. Public travel patterns should be taken into consideration. For instance, a City A may have a mask mandate, while another city, City B is 20 miles away does not have a mask mandate. People from City B travel to City A for grocery shopping, dentist appointments, is there an effect on confirmed positive cases? A more deliberate analysis is needed in order to exclude the effects of other potentially confounding factors.

The data collected for COVID-19 is a fast moving and date ranges may start on different dates. The data set includes confirmed and probable cases. Data is continually updated from government health ministries, The New York Times, and other authoritative sources. The data may differ from other websites and sources because their various sources and aggregating COVID-19 data. Updating is done at different times and have various ways of gathering the data.

To eradicate COVID-19, the states must work together, but with 50 different states and a large physical land mass, it has been impossible.

The literature and other information researched relates to current COVID-19 and previous flu epidemic mask mandates in the United States. All research and analysis of this study was conducted during the 2020 pandemic and quarantine of COVID-19, during which time this researcher conscientiously wore a mask.

### **Future Research**

Topics that should be included in future research are: examining if face masks impacted infection rates with isolated factors, public education of viral infections, nursing home protective measures during a health pandemic, and reinvestment into health care infrastructure.



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## APPENDICES

2.0 State Status of Reopening, as of March 3, 2021. Kaiser Family Foundation (KFF), 2021.

### State Social Distancing Actions, as of March 3, 2021

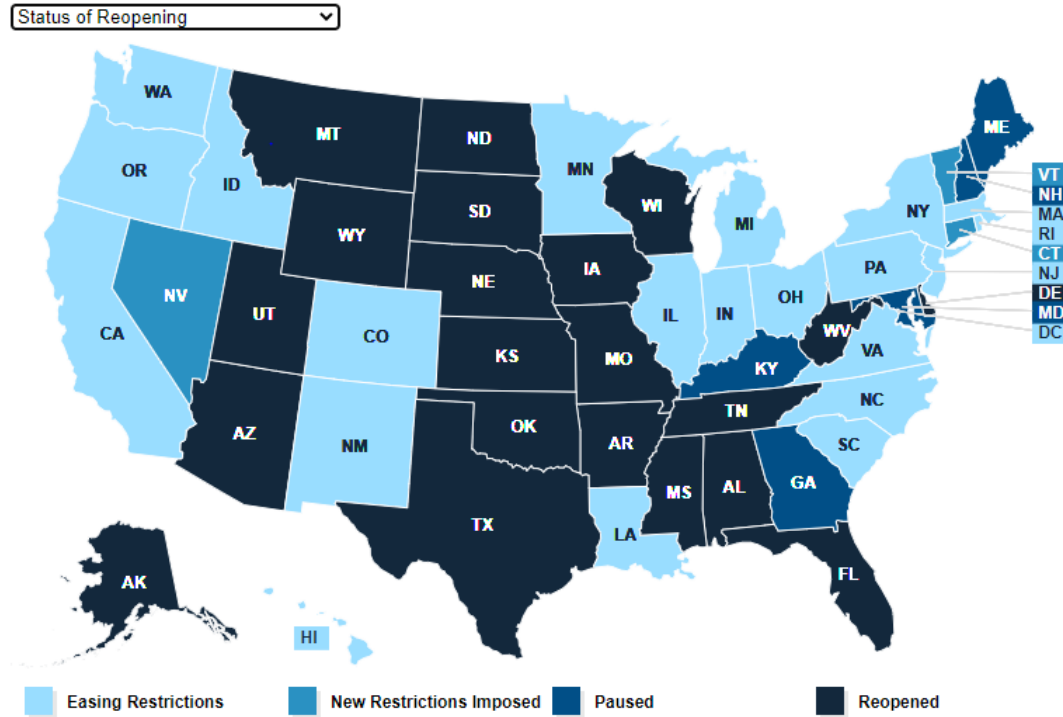
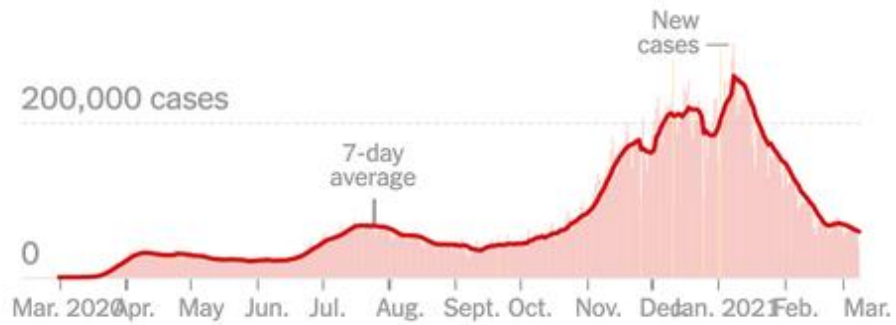
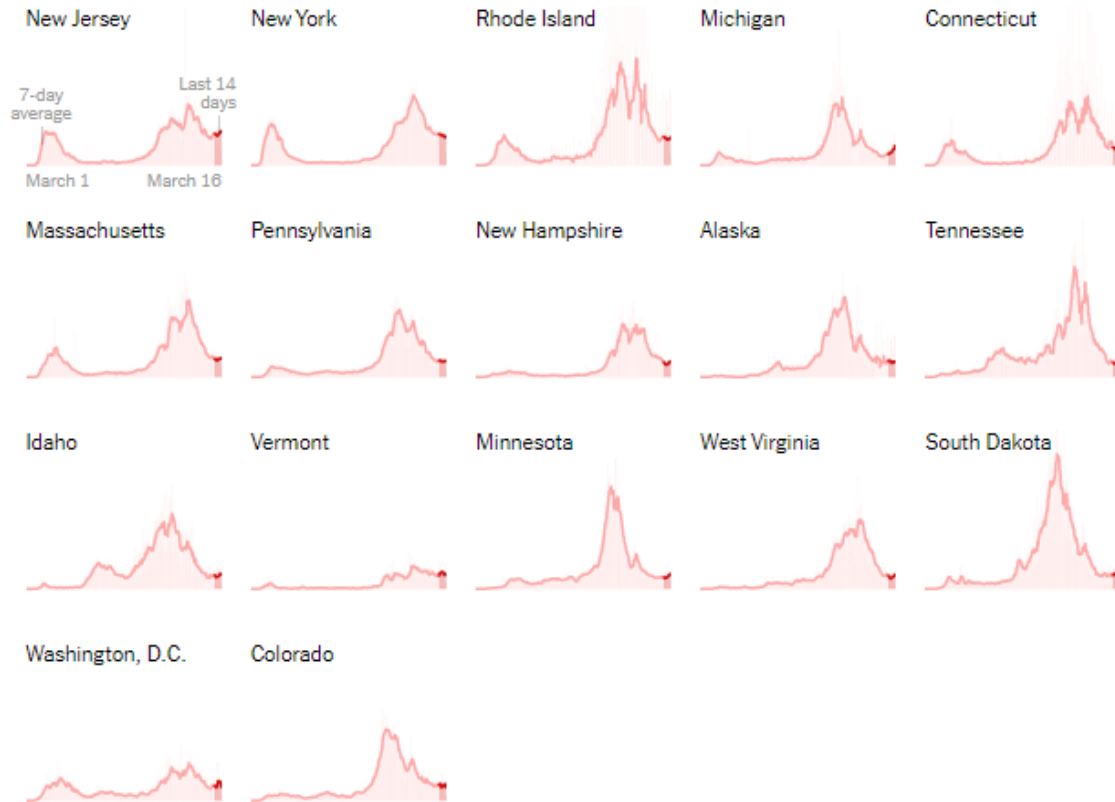


Figure 2.1 New Reported Cases by Day in the United States, March 9, 2021 (New York Times, 2021)

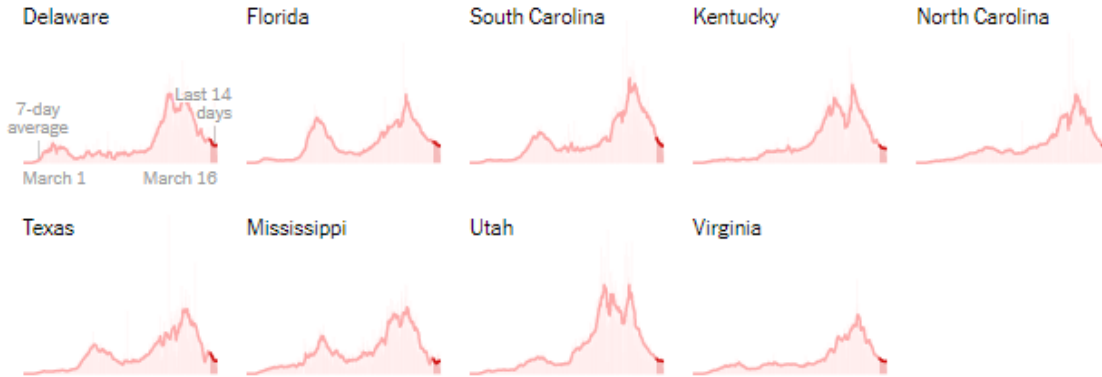
## New reported cases by day in the United States



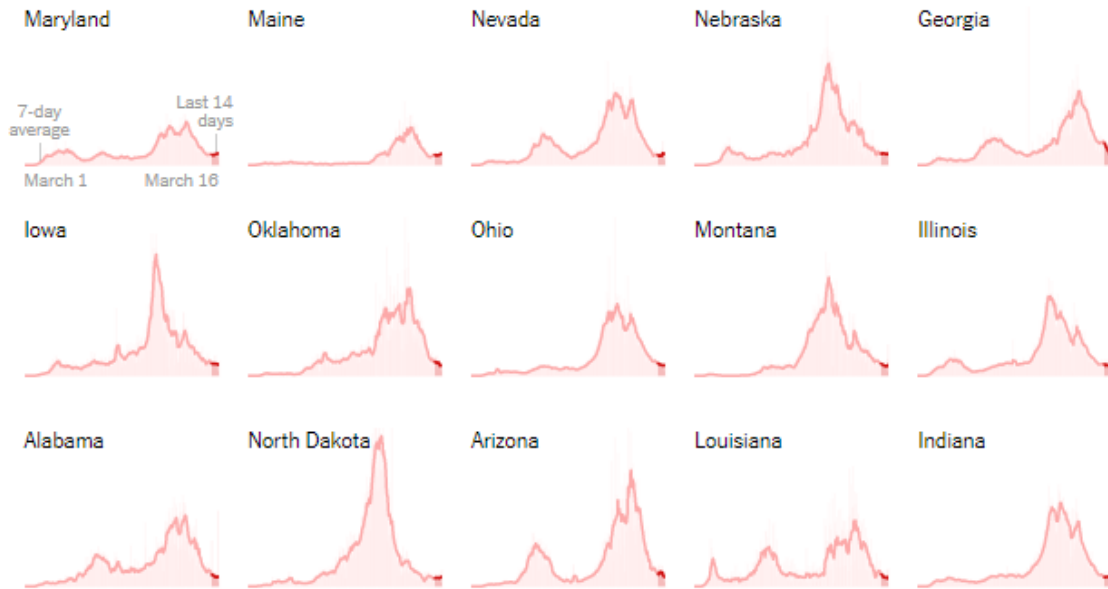
2.3 Where COVID-19 Cases were high and continue to be high, March 17, 2021. (New York Times, 2021)



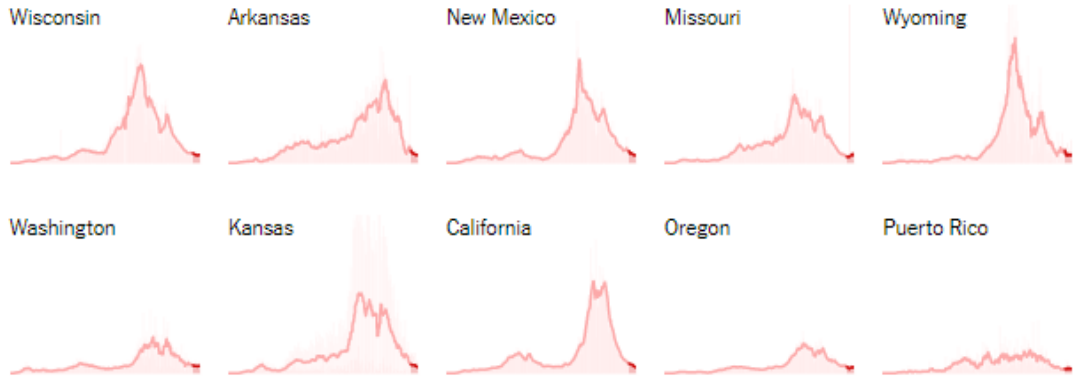
2.4 Where COVID-19 Cases Were High and Are Going Down, March 17, 2021. (New York Times, 2021)



2.5 Where covid-19 Cases Were Low and Continue to Stay Low, March 17, 2021. (New York Times, 2021)







2.6 Where COVID-19 Deaths Are Increasing, March 17, 2021. (New York Times, 2021)

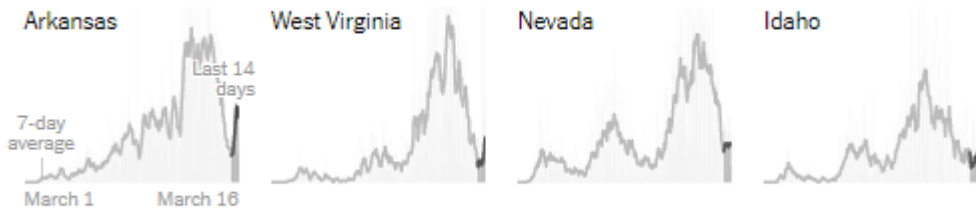


Table A1 - State Policy Enactment and Information Event Dates

State	Emergency Declaration	School Close	Restaurant/Other Restrict	Gathering Restrict Any	NE Business Close	Stay At Home	First confirmed case
AK	11-Mar-20	16-Mar-20	17-Mar-20	28-Mar-20	24-Mar-20	22-Mar-20	12-Mar-20
AL	13-Mar-20	19-Mar-20	20-Mar-20		20-Mar-20	24-Mar-20	13-Mar-20
AR	11-Mar-20	17-Mar-20	19-Mar-20				11-Mar-20
AZ	11-Mar-20	16-Mar-20	20-Mar-20			31-Mar-20	26-Jan-20
CA	4-Mar-20	19-Mar-20	15-Mar-20	19-Mar-20	11-Mar-20	19-Mar-20	26-Jan-20
CO	10-Mar-20	23-Mar-20	17-Mar-20	26-Mar-20	19-Mar-20	26-Mar-20	5-Mar-20
CT	10-Mar-20	17-Mar-20	16-Mar-20	23-Mar-20	12-Mar-20		8-Mar-20
DC	11-Mar-20	16-Mar-20	16-Mar-20	25-Mar-20	13-Mar-20	1-Apr-20	7-Mar-20
DE	13-Mar-20	16-Mar-20	16-Mar-20	24-Mar-20	16-Mar-20	24-Mar-20	11-Mar-20
FL	9-Mar-20	16-Mar-20	17-Mar-20	30-Mar-20	3-Apr-20	3-Apr-20	2-Mar-20
GA	14-Mar-20	18-Mar-20	24-Mar-20		24-Mar-20	24-Mar-20	2-Mar-20
HI	4-Mar-20	23-Mar-20	17-Mar-20	25-Mar-20	16-Mar-20	25-Mar-20	6-Mar-20
IA	9-Mar-20	3-Apr-20	17-Mar-20		17-Mar-20		8-Mar-20
ID	13-Mar-20	23-Mar-20	25-Mar-20	25-Mar-20	25-Mar-20	19-Mar-20	13-Mar-20
IL	9-Mar-20	17-Mar-20	16-Mar-20	21-Mar-20	13-Mar-20	21-Mar-20	24-Jan-20
IN	6-Mar-20	19-Mar-20	16-Mar-20	24-Mar-20	12-Mar-20	25-Mar-20	6-Mar-20
KS	12-Mar-20	18-Mar-20			17-Mar-20	30-Mar-20	7-Mar-20
KY	6-Mar-20	16-Mar-20	16-Mar-20	26-Mar-20	19-Mar-20		6-Mar-20
LA	11-Mar-20	16-Mar-20	17-Mar-20	23-Mar-20	13-Mar-20	23-Mar-20	9-Mar-20
MA	10-Mar-20	17-Mar-20	17-Mar-20	24-Mar-20	13-Mar-20		1-Feb-20
MD	5-Mar-20	16-Mar-20	16-Mar-20	23-Mar-20	16-Mar-20	30-Mar-20	5-Mar-20
ME	15-Mar-20	16-Mar-20	18-Mar-20	25-Mar-20	18-Mar-20	25-Mar-20	12-Mar-20
MI	10-Mar-20	16-Mar-20	16-Mar-20	23-Mar-20	13-Mar-20	24-Mar-20	10-Mar-20
MN	13-Mar-20	18-Mar-20	17-Mar-20			28-Mar-20	6-Mar-20
MO	13-Mar-20	23-Mar-20	17-Mar-20		23-Mar-20	6-Apr-20	8-Mar-20
MS	14-Mar-20	20-Mar-20	24-Mar-20	31-Mar-20	24-Mar-20	31-Mar-20	11-Mar-20
MT	12-Mar-20	16-Mar-20	20-Mar-20	28-Mar-20	24-Mar-20	28-Mar-20	13-Mar-20
NC	10-Mar-20	16-Mar-20	17-Mar-20	30-Mar-20	14-Mar-20	30-Mar-20	3-Mar-20
ND	13-Mar-20	16-Mar-20	20-Mar-20				11-Mar-20
NE	13-Mar-20	3-Apr-20	19-Mar-20		16-Mar-20		6-Mar-20
NH	13-Mar-20	16-Mar-20	16-Mar-20	28-Mar-20	16-Mar-20	28-Mar-20	2-Mar-20
NJ	9-Mar-20	18-Mar-20	16-Mar-20	21-Mar-20	16-Mar-20	21-Mar-20	4-Mar-20
NM	11-Mar-20	16-Mar-20	16-Mar-20	24-Mar-20	16-Mar-20		11-Mar-20
NV	12-Mar-20	16-Mar-20	17-Mar-20	21-Mar-20	19-Mar-20	31-Mar-20	5-Mar-20
NY	7-Mar-20	18-Mar-20	16-Mar-20	20-Mar-20	13-Mar-20	22-Mar-20	1-Mar-20
OH	9-Mar-20	17-Mar-20	15-Mar-20	24-Mar-20	12-Mar-20	24-Mar-20	9-Mar-20
OK	15-Mar-20	17-Mar-20	25-Mar-20	26-Mar-20	24-Mar-20	24-Mar-20	6-Mar-20
OR	8-Mar-20	16-Mar-20	17-Mar-20		16-Mar-20	23-Mar-20	28-Feb-20
PA	6-Mar-20	16-Mar-20	17-Mar-20	23-Mar-20	16-Mar-20	23-Mar-20	6-Mar-20
RI	9-Mar-20	16-Mar-20	16-Mar-20		17-Mar-20	28-Mar-20	1-Mar-20
SC	13-Mar-20	16-Mar-20	18-Mar-20		18-Mar-20	26-Mar-20	7-Mar-20
SD	13-Mar-20	16-Mar-20			6-Apr-20		10-Mar-20
TN	12-Mar-20	20-Mar-20	23-Mar-20	1-Apr-20	23-Mar-20	2-Apr-20	5-Mar-20
TX	13-Mar-20	23-Mar-20	20-Mar-20		20-Mar-20	2-Apr-20	13-Feb-20
UT	6-Mar-20	16-Mar-20	18-Mar-20		16-Mar-20	27-Mar-20	6-Mar-20
VA	12-Mar-20	16-Mar-20	17-Mar-20		15-Mar-20	30-Mar-20	7-Mar-20
VT	13-Mar-20	18-Mar-20	17-Mar-20	25-Mar-20	13-Mar-20	24-Mar-20	7-Mar-20
WA	29-Feb-20	17-Mar-20	16-Mar-20	25-Mar-20	11-Mar-20	23-Mar-20	21-Jan-20
WI	12-Mar-20	18-Mar-20	17-Mar-20	25-Mar-20	17-Mar-20	25-Mar-20	5-Feb-20
WV	16-Mar-20	16-Mar-20	17-Mar-20	24-Mar-20		24-Mar-20	17-Mar-20
WY	13-Mar-20	16-Mar-20	19-Mar-20		20-Mar-20		11-Mar-20

Notes: Compilation based on (Gupta et. al.,2020; Fullman, 2020), the public map/tracker of K-12 school closures (Education Week), data collected on first case announcements from local news and media reports

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