Tennessee's COVID-19 Response:
The Relationship Between Case Numbers and Public Opinion

By
Chandni Naidoo
Advisor: Dr. Christopher Ojeda

The University of Tennessee-Knoxville
Baker Scholars Program
Chancellor's Honors Program
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Abstract

COVID-19 has impacted how people view public health and protective measures. One prominent example is mask wearing and its perceived benefits. It is well-documented that these viewpoints are influenced by personal beliefs, policy recommendations, and the media, but are they also influenced by the number of COVID-19 cases? This question is important because it would be concerning if preferences over public health were not at all dictated by the actual health risk Americans faced. The key question for this study was therefore: does the current amount of caseloads per capita influence public opinion on mask mandates and benefits? The hypothesis was that rising case numbers will lead public opinion to become increasingly supportive of mask mandates and their benefits. To test this hypothesis, public opinion data was gathered from the Tennessee Pulse Survey, and caseload data was calculated using the COVID-19 data from the Tennessee state government. Initial analysis of the public opinion data indicates a general support for masks in terms of public health. Further analysis shows a slight positive relationship between an increase in case numbers and support for masks. The exact relationship depends on inclusion of control variables and the specific timing of the public opinion data being analyzed. The results initially support the hypothesis, but show that there are other factors, age and gender, influencing the change in public opinion.

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Introduction

It has been over two years since the start of the COVID-19 pandemic. As of 2022, there have been at least 77 million cases of COVID-19 and 920,000 deaths in the United States (United, 2022). Around 1.9 million cases have been from the state of Tennessee (State, 2022). Comparatively, each of the 95 counties in Tennessee has a rate of at least 22,500 cases per 100,000 people making Tennessee have one of the highest rates of COVID-19 cases in the country (Tennessee, 2022). Tennessee is therefore a significant location for studying why their case numbers have surged in some parts of the country. An important part of this story is understanding how the public reacted to COVID-19 and state policies.

The Howard H. Baker Jr. Center for Public Policy partnered with the state government's Economic Recovery Group to survey people across the state from May 2020 to April 2021 (CORE-19, 2020). This survey, known as the Tennessee Pulse survey, provides information on public opinion about many aspects of the pandemic, including mask policies, job security, access to medical care, and concerns about the economy. This paper specifically focuses on whether public opinion on mask mandates was influenced by the case rate at the time..

This study continues to be relevant to the current pandemic, especially as the mask mandate has been lifted and the country continues to face the threat of new coronavirus variants. Moreover, this research is also relevant information to understanding how state officials will manage health crises and balance public opinion in the future.

Background

Attitudes Toward Pandemic-Related Policies

What factors contribute to attitudes towards pandemic-related policies, whether protective measures are effective, and COVID-19 policy history? To date, scholars have focused on three sources of attitudes towards the pandemic, including: political ideology, the influence of media, and the perceived effectiveness of mask wearing.

Political Ideology

Political ideology can be a powerful factor on a person's preferences, because it "influences the way people seek out information" as well as the "levels of trust they have in various sources of information" (van Holm et al., 2020, p. 4). It can act as a social identity, and people may use it as a guide to form attitudes on current events and to select and support candidates and policies. This holds true in relation to COVID-19. It's been found that "partisanship influences behavioral responses to recommendations for COVID-19 prevention in the United States" (Grossman et al., 2020). Indeed, van Holm and colleagues concluded that "partisan differences emerged early on" in this crisis (2020, p. 7). This is important because of the differences between the two parties' response to and recommendations for handling COVID-19. An example of this is seen with social distancing. Recommendations of government officials to limit movement were more effective in Democratic than Republican counties. This is because whether individuals adopt these types of measures depends on how they evaluate the risk level of the virus (van Holm et al., 2020). If Republican party members claim the risk level is low or that they have little trust in the CDC, then measures advised by the CDC are likely to not be followed in Republican counties, with the opposite being true in Democratic counties.

Influence of Media

In conjunction with political ideology, the media increasingly affects what information individuals are exposed to and how they view current events. With certain news sources being biased one way or another, there are now discrepancies in what information viewers receive. The discrepancy between what former President Trump and the conservative media had said versus liberal media and various health organizations has led to polarization over COVID-19, mixed messages on health recommendations, and concern over vaccination effectiveness and safety. Compared to normal ratings, news consumption increases during times of a crisis or threat (Althaus, 2002). As news consumption increased with the start of the pandemic, people turned to political leaders and health officials for information and to guide them.

The issue with polarization arose from the public disagreement between certain political leaders and health officials. The Trump administration compared COVID-19 to the seasonal flu and claimed it was under control (Gadarian et al., 2021). This came at the same time they were disagreeing with public health experts over the seriousness of the virus and which policies would best manage it (Tankersley, 2020). Typically, people put their trust in medical experts during a disease outbreak rather than political leaders (Albertson & Gadarian, 2015). However, with the mixed messages from health experts and the Trump administration, this pulled individuals to different sides, thus contributing to the polarization over COVID-19. An example of how much this polarization has continued to impact views towards COVID-19 is vaccination rates. A study in Tennessee found that 45.7% of respondents were concerned about the "trustworthiness of vaccine-related information" (Gatewood et al., 2021, p. 882). Furthermore, the Gatewood et al., (2021) study found that 23.2% reported that their decision to get or not to get the vaccine was

largely due to the media, showing the influence the media has had on views about COVID-19 in a short amount of time.

Attitudes Towards Mask Policies

Are Masks Effective?

The debate over using masks as a protective measure against viruses is not a new one. In 1918, the influenza pandemic led to debate over masks and other non-pharmaceutical policies (Brienen et al., 2010). Non-pharmaceutical measures have four main goals: limiting international spread of the virus, reducing spread within populations, reducing the spread of individual infection, and raising awareness of the risks associated with the virus (Non Pharmaceutical, 2006). Before influenza vaccines were made available, non-pharmaceutical measures were the main protection from the virus. Brienen and colleagues found that use of face masks in the population made an "important contribution in delaying the influenza pandemic" and was able to reduce the reproduction of the virus (2010, p. 1210). The influenza pandemic thus serves as an important real-world example of masks deterring an increase in cases.

With COVID-19 being known to spread more easily than the flu, studies have been done to determine if masks are effective in reducing its spread (Similarities, 2022). Eikenberry et al., (2020) used mathematical modeling to show that a universal use of masks is the best way to prevent spreading of COVID-19. They found that "mask use decreases transmission rate" of the virus linearly to "the product of mask effectiveness and coverage rate" and that masks are useful in preventing illness and asymptomatic transmission (Eikenberry et al., 2020, p. 1). Studies such as this as well as recommendations from public health officials led many state and local officials to impose mask mandates. As much as mask mandates are of benefit to the general population,

Haischer et al., (2020) stated that mask mandates are also important for policymakers to increase compliance to where it can flatten the epidemiological curve.

Both Eikenberry et al., (2020) and Haischer et al., (2020) concluded that mask wearing is effective in slowing down the pandemic when coupled with social distancing and other protective measures. This could explain a difference in case numbers by states and counties if different protective measures were used in different areas. In their study, Haischer et al., (2020) also discussed mask wearing in relation to the long term effects of COVID-19. With these effects still unknown, protective measures such as wearing a mask could be vital in reducing the future burden of any "comorbidities that may result within individuals who were infected" (Haischer et al., 2020, p. 8). Finally, with this study being from when the pandemic had just started, Haischer et al., (2020) claimed that without a vaccine masks were important as they served as a control for the virus since it puts a physical barrier between people. This remained a point of contention when the COVID-19 vaccine and booster was available and vaccinated individuals were still advised to wear a mask, with the policies varying by location. As of May 2022, vaccines and boosters are still available, but the state mask mandate has been lifted, and now it is mostly left up to the discretion of the individual.

Why Individuals Don't Wear Masks

Studies have found that people choose to not wear a mask for a variety of reasons, including gender perceptions, social or regional reasons, and anxiety. In some regional studies, women have been found to be more likely to wear a mask than men by a small percentage (Haischer et al., 2020). However, in general, men and women are equally as likely to not wear a mask. The main difference is in their perceptions. Men are likely to not wear a mask because they view it as infringing on their independence or personal rights. Women are likely not to wear

a mask because they view them as uncomfortable (Howard, 2021). This shows that the perception of masks, which could be influenced by a variety of factors such as ideology, public health policies, or location, contribute to whether people wear them or not.

Social or regional differences contribute to mask wearing in many ways. If a mask mandate is in place, this increases compliance and not wearing a mask can be seen as a stigma, while wearing one is seen as adhering to a social contract. If wearing a mask is voluntary, then a person's decision could be based on region. If it is highly acceptable to wear a mask, this could cause social pressure that influences people to wear them. If it is more common to not wear a mask, then this could create a similar situation with the opposite effect (Betsch et al., 2020). In urban and suburban settings it was found to be four times more common to observe a mask on a shopper than in rural settings. Explanations for this could be differences in policies or the fact that a larger population size would mean more interactions and wearing a mask could be more beneficial than in a rural setting where people may be more spaced out.

In terms of age, masks were seen at a higher percentage in older than middle age (+16.1%) and younger individuals (+19.8) (Haischer et al., 2020). The older age group could be explained by that being a vulnerable population to COVID-19 thus needing more protection. The younger population could be explained by political ideology or a tendency to adhere to guidelines more so than adults. The middle age group that is less likely to wear masks could also be explained by political ideology or the belief that their population isn't as vulnerable as the older generation.

An increase in psychological stress has led to behaviors that decrease mask wearing. The study done by Zhang et al., (2020) was conducted in the Guangdong province. It was found that for the general public and individuals who have experienced the COVID-19 infection, they were

more likely to have anxiety-like behavior including becoming easily annoyed or irritable. Becoming easily annoyed or irritable could be further induced by having to wear a face covering. Affecting some senses and adjusting to breathing with a mask might be a trigger for those who have dealt with the infection or who have been in quarantine.

The Case of Tennessee

The Tennessee Pulse Survey was conducted from May 18, 2020 to April 26, 2021 (CORE-19 2020). This time frame is divided into waves based on the specific days the survey was administered. In this thesis, the questions being focused on are specifically from wave four to nine which cover the time frame of July 17, 2020 to December 15, 2020. By July 17, there had been almost 74,000 cases and by December 15, there had been just above 473,000 cases in the state of Tennessee, showing an increase of almost 400,000 cases in 5 months. (Times, 2022) Tracing back the policies passed during this time frame provides context to how the government reacted and what the public was being told. Tennessee confirmed its first case of COVID-19 on March 5, 2020 (COVID-19 2021). Following this, Executive Orders (EO) were passed in response.

Table 1: Tennessee COVID-19 Timeline (COVID-19, 2020)

Time I: Prior to Wave 4	
Date	**Executive Order**
March 12, 2020	Executive Order No. 14: A state of emergency was declared to free up funds for treatment and containment.
March 22, 2020	Executive Order No. 17: Prohibited gatherings of 10 or more people, temporarily closed gyms, limited restaurants to take-out, and limited visitation to long-term care facilities.
March 26, 2020	Executive Order No. 20: Worked to better mobilize healthcare workers
March 30, 2020	Executive Order No. 22: This issued “Safer at Home” guidelines which remained in effect until April 14, 2020.

April 2, 2020	Executive Order No. 23: Required Tennesseans to stay at home except for essential activities.
April 17, 2020	Executive Order No. 28: Removed regulatory barriers to facilitate treatment of COVID-19
April 20, 2020	Previous Stay at Home order to expire on April 30th
April 24, 2020	Executive Order No. 29: Allowed restaurants to reopen on April 27th.
April 28, 2020	Executive Order No. 30: Repeals EOs 17, 21, 22, 23, 27, and 29.
May 12, 2020	Executive Order Nos. 36 and 37: Extended the state of emergency till June 30.
May 22, 2020	Executive Order No. 38: Allowed groups of up to 50 people to participate in social activities while encouraging social distancing.
June 29, 2020	The State of Emergency is extended to August 29 Executive Order No. 50: Allowed continued suspension of regulations to facilitate treatment and contained of COVID-19 Executive Order No. 51 and 52: Extended provisions to allow for electronic government meetings subject to transparency safeguards and remote witnessing of documents
July 1, 2020	Executive Order No. 53: Provided COVID-19 related limited liability protections for healthcare providers
July 3, 2020	Mayors in 89 counties are granted authority to issue mask requirements
Time II: Wave 4 begins July 17, 2020	
Date	**Executive Order**
July 31, 2020	Executive Order No. 55: Allowed contact sports and extend local authority for mask requirements and extension of EO53
August 28, 2020	Executive Order No. 59: Extended state of emergency, regulates flexibility provisions, and local authority on face coverings Executive Order No. 60: Allowed governing bodies to meet electronically about essential businesses if there is access to the public to ensure transparency

	Executive Order No. 61: Allowed for remote notarization and witnessing of documents
September 29, 2020	Executive Order No. 63: Extended certain provisions of previous executive orders through October 30, including authority of local governments to institute mask requirements. The remaining restrictions on businesses and gathering sizes in counties with a state-run health department were removed.
October 30, 2020	Executive Order No. 67: Facilitated the continued response to COVID-19 by extending EO63 through December 29, 2020.
December 4, 2020	Executive Order No. 68: Facilitated continued response to COVID-19 by increasing health care resources and capacity.
Time III: Wave 9 Ends December 15, 2020	
Date	**Executive Order**
April 27, 2021	Executive Order No. 80: Ended the authority to issue mask mandates. This was based on the claim that COVID-19 was no longer a statewide emergency with the availability of vaccinations, and the desire to focus on economic recovery (COVID-19, 2021).

Given that TN had some of the highest case numbers in the US, it would seem as if people in Tennessee leaned towards not viewing the pandemic as a serious matter or did not adhere to the guidelines and restrictions. Based on the literature, this response could be due to party affiliation. Partisanship affects behavioral responses and with Tennessee being a historically conserative state, this could have influenced how people individually responded to COVID-19. Along with this, state level party affiliation influences policy preferences. Decisions on mask mandates and other protective measures may have been reflective of party affiliation. Individual responses could also be based on the type of media they consume since information and opinions on COVID-19 varied by channel. Depending on the news source, this could lead to receiving mixed messages between the source and the government and health officials.

However, upon initial glance, the results from the TN Pulse Survey show that on average that people supported a mask requirement and trusted the CDC as their resources for information. Based on this, there seems to be a discrepancy between how the public felt versus the data of cases and fatalities. The current literature explains why policy choice and public behavior can be explained by sources of information or party affiliation. There is a gap in literature as to explaining why case numbers would be high if the public is seemingly supporting mask requirements and using health agencies as their main source of information as opposed to the local and federal government. This study serves to examine the relationship between COVID-19 cases in Tennessee and public opinion on masks more closely and determine how these two variables affected each other.

Methodology

Caseload Data

The case numbers per country were recorded using the COVID-19 Data Dashboard (2022) provided by the Tennessee government. For each of the 95 counties, the 7 day average of COVID-19 cases was taken the day before each of the 6 waves being analyzed started. For example, the 7 day average for wave 4 was taken July 16. In total, each county had six measures of cases. These were then divided by the total population of each county to calculate cases per capita. Each county's population was recorded from the General Health Data (2020) published by the Tennessee government.

Tennessee Pulse Survey

The Tennessee Pulse Survey contains data on attitudes and behaviors towards COVID-19 from the 95 counties in Tennessee. The survey was taken from May 18, 2020 to April 26, 2021 and this time frame was divided into waves as follows (CORE-19, 2020):

- Wave 1: May 18 - May 24, 2020
- Wave 2: June 1- June 7, 2020
- Wave 3: June 15 - June 21, 2020
- Wave 4: July 17 - July 26, 2020
- Wave 5: August 17 - August 25, 2020
- Wave 6: September 18 - September 23, 2020
- Wave 7: October 20 - October 26, 2020
- Wave 8: November 17 - November 22, 2020
- Wave 9: December 10 - December 15, 2020
- Wave 10: January 14 - January 18, 2021
- Wave 11: February 24 - March 1, 2021
- Wave 12: March 24 - March 29, 2021
- Wave 13: April 21 - April 26, 2021

Waves 4 through 9 were specifically chosen for their questions regarding public opinion on the benefits of face masks. For each of the three questions analyzed, there were around 6,500

respondents. The general viewpoint on the benefit of mask wearing is measured by the question, "Which of these do you think is the main benefit of wearing a face mask?" Five response options were given: "protecting you from germs carried by others, "protecting others from germs carried by you, "it equally protects yourself and others," "there is no benefit," and "not sure" (CORE-19, 2020). I call this the *mask benefits* variable. Whether support for mask mandates exists in the counties in Tennessee is measured by a second question, which asks "Are you supportive of a mask requirement in your local community," with three responses of "yes," "no," and "not sure" (CORE-19, 2020). I call this the *mandate support* variable. The final question measured what individuals view as the deciding factor in wearing a mask. It asks "Do you think deciding whether or not to wear a face mask is more:" with the three responses of "public health," "political message," or "personal choice" (CORE-19, 2020). I call this the *mask decision* variable.

Key Variables

The key independent variable is caseloads per capita. The three dependent variables are the mask benefits, mandate support, and mask decision variables from the TN Pulse Survey data. The control variables are age, gender, and county. For some of the analyses, the dependent variables were coded into binary variables that indicate the presence (1) or absence (0) of a pro-public health attitude. Any "not sure" answer is coded as missing since it does not fit into either category.

Table 1: Binary Variable Coding

Mask Benefits		*Mandate Support*		*Mask Decision*	
Which of these do you think is the main benefit of wearing a face covering?	**Code**	**Are you supportive of a mask requirement in your local community?**	**Code**	**Do you think deciding to wear a mask is more:**	**Code**
Protecting you from germs carried by others	1	Yes	1	A matter of public health	1
Protecting others from germs you may be carrying	1	No	0	A matter of personal choice	0
It equally protects yourself and others	1			A political message	0
There is no benefit	0				

For the binary analysis and regression, the dependent variables are kept as binary, and the independent variable is categorical for the tabular analysis and continuous for the regression. To make the caseload data categorical, each value is assigned a number.

Table 2: COVID-19 Cases Categorical

Value (cases per 100 persons)	Code
0 to .1	1
.1 to .2	2
> .2	3

Descriptive Statistics

The frequency distribution of the three dependent variables are reported in Figures 1, 2 & 3 for the six waves of the survey. Figure 1 shows that 88.35% of respondents agreed that masks offer some form of protection from the coronavirus. Figure 2 shows the majority of respondents

(79.11%) supported the mask mandate in their local community, while Figure 3 shows that a majority believe wearing a mask was a matter of public health (69.94%).

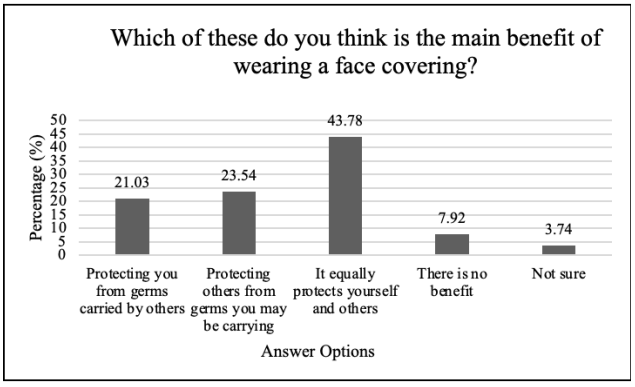

Figure 1: Frequency distribution of "mask benefits" variable

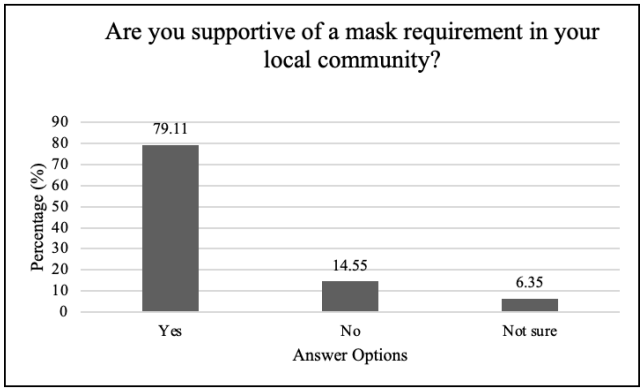

Figure 2: Frequency distribution of "mask support" variable

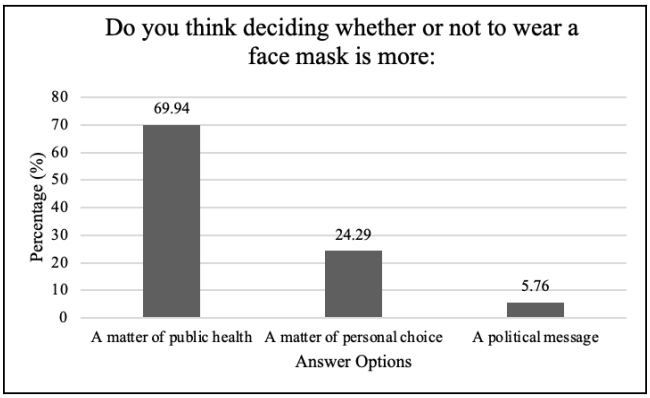

Figure 3: Frequency distribution of "mask decision" variable

Figure 4 shows the frequency distribution for the number of COVID-19 cases per 100 persons and includes the values from the six waves being analyzed for each of the 95 countries in Tennessee. The model number of cases per 100 persons is in the range of 0 to 0.03.

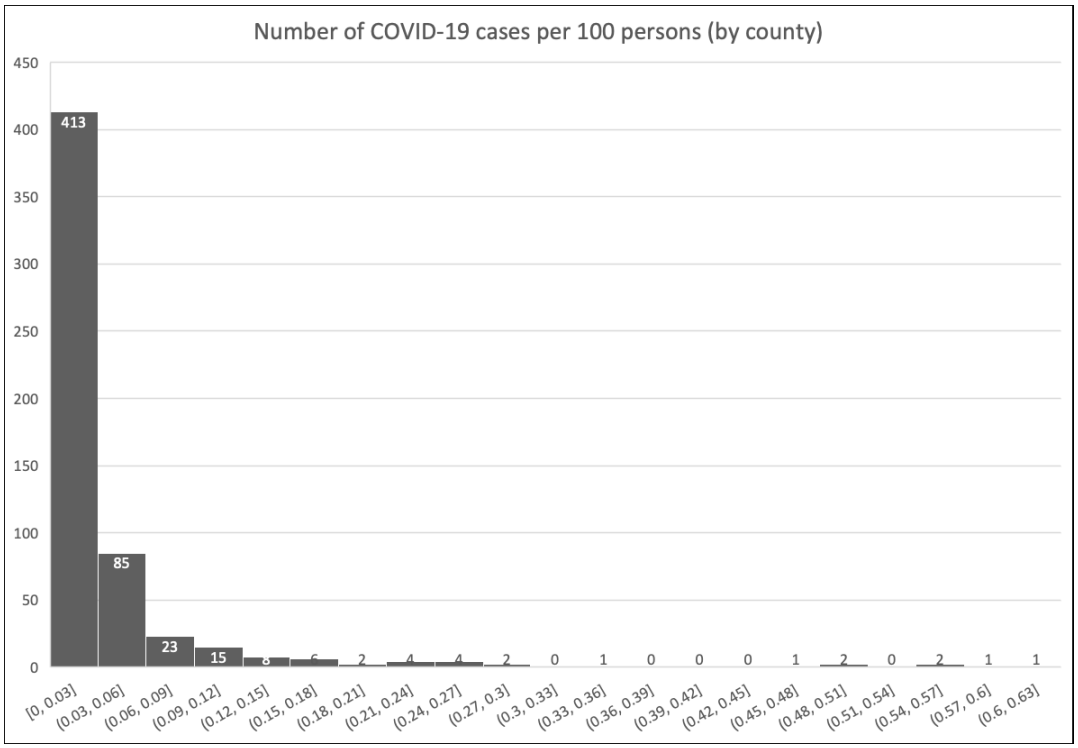

Figure 4: Frequency distribution of COVID-19 cases per 100 persons

Table 3 reports mean attitude on masks preferences and policies for each of the three binary dependent variables. On average, respondents show support for public health. Notably the mean is substantially higher for gauging the perceived benefit of mask wearing and support for mask policies than it is for the perceived reason individuals wear masks.

Table 3: Public Health Attitudes by Question

Question	Percentage of Respondents Reporting a Pro-Public Health Attitude
Which of these do you think is the main benefit of wearing a face covering?	91.8%
Are you supportive of a mask requirement in your local community?	84.5%
Do you think deciding whether or not to wear a face mask is more: A matter of public health, A personal choice, or a political message	70.0%

Table 4 displays descriptive statistics for the continuous caseload variable and reveals that the average caseloads per 100 persons over the time period of waves 4-9 is 0.0363. The positive skewness is 5.05, which indicates that the mean being greater than the mode. That is, there are more cases per 100 persons above the mode than below it.

Table 4: Descriptive statistics of COVID-19 Cases

Descriptive Statistics	Mean	Median	Mode	Standard Deviation	Skewness	Kurtosis
Number of COVID-19 cases per 100 persons	.036319	.015	.006	.072101	5.05458937	30.6514274

Results

I analyze the relationship between cases and mask preferences by conducting bivariate tabular analysis as well as bivariate and multivariate ordinary least squares regression. Below, I first report the results of the tabular analysis before turning to the results of the regression.

Tabular Analysis

A tabular analysis tells us whether two variables are statistically independent or dependent. I focus here on the relationship between caseloads and mask benefits for Wave 4 as an initial test of my hypothesis that caseloads are related to mask preferences. To conduct the tabular analysis, I use the binary dependent variable, mask benefits, and the categorical independent variable, caseloads per capita to generate a cross tabulation.

Table 5: Observed Frequencies for Mandate Support v. Cases per Capita

Row Labels	Count of Caseloads 0	1	Count of Q38c 0	1	Total Count of Caseloads	Total Count of Q38c
1	97	397	97	397	494	494
2	52	181	52	181	233	233
3	45	303	45	45	348	348
Grand Total	194	881	194	881	1075	1075

Table 6: Expected Frequencies for Mandate Support v. Cases per Capita

Row Labels	Count of Caseloads 0	1	Count of Q38c 0	1	Total Count of Caseloads	Total Count of Q38c
1	89.15	405	89.15	405	494	494
2	42.05	191	42.05	191	233	233
3	62.80	285	62.80	285	348	348
Grand Total	194	881	194	881	1075	1075

Tables 5 & 6 show that a greater percentage of respondents support public health as case numbers increase. For the respondents that support public health, there is a decrease in support in

counties with medium caseloads, but then an increase in support in counties with high caseloads. The chi-square value of 10.08 with 2 degrees of freedom. This value is greater than 9.21– the threshold for a p-value of 0.01– which means that the difference between the expected and observed values seen in Tables 5 & 6 will occur less than 1% of the time by chance.

Ordinary Least Squares Regression

I estimate six regression models– one bivariate and one multivariate model for each of the three dependent variables. The key coefficients and confidence intervals from these regression models are reported in Table 7.

Table 7: Key Results from OLS Regression Models

	Bivariate Models			*Multivariate Models*		
DV	**Key Result**	**R-Squared**	**N**	**Key Result**	**R-Squared**	**N**
Mask Benefits	.0473 (.0064-.0882)	.0001	5929	.0014 (-.0030-.0058)	.0002	5929
Mandate Support	.0020 (-.0259-.082)	.0013	6089	.0069 (.0012-.0125)	.0014	6089
Mask Decision	.1376 (.0756-.1996)	.0040	6504	.0056 (-.0011-.0123)	.0040	6494

The results show that there is a positive relationship between viewing masks as beneficial and case numbers. The positive relationship indicates that if an individual is in a county with a high number of cases per capita, then they are more likely to view masks as beneficial. With the confidence interval excluding 0, we can conclude that the estimate is statistically significantly different from 0. However the coefficient of 0.0473 being close to zero shows that although there is a relationship, this relationship is weak.

For the models of mandate support, the coefficient of 0.0020 indicates a positive but weak relationship between case numbers and support for a community mask mandate. An individual is more likely to support a mask mandate in their community when case numbers

increase. However, the confidence interval is -0.0259 to 0.082, which means that we are 95% certain the true estimate exists in this range. The range includes zero, and if the true estimate was 0, there would not be a relationship between mandate support and case numbers. Therefore, we cannot be certain that a relationship exists between the "mandate support" variable and the number of cases.

Compared to the previous two dependent variables, the coefficient of .1376 for the variable of "mask decision" indicates a positive and stronger relationship between decision on wearing masks and case numbers. An individual is more likely to claim that wearing masks is a matter of public health when there is an increase in case numbers in their county. The confidence interval of 0.0756 to 0.1996 excludes 0, and therefore we can be confident that the estimate is statistically significantly different from 0. We can be confident that there is a relationship.

The multivariate models include the control variables of gender, age, and county. The regression coefficient for the "mask benefits" variable is still positive, but closer to zero once the control variables are added to the model. Additionally, the confidence interval now includes 0, and therefore we cannot be certain that the true estimate is not 0 to indicate a relationship. The regression coefficient for the "mandate support" variable remains positive, and increases, maintaining a positive relationship between case numbers and mandate support. Furthermore, the confidence interval now excludes 0, so we can be confident that the true estimate is statistically significantly different from 0. The regression coefficient for the "mask decision" variable remains positive, but decreases to .0056. This shows that the relationship is still positive, but it is weaker. The confidence interval of -0.0011 to 0.0123 includes 0 so we cannot be certain that the true estimate is not 0 which would indicate that there is no relationship between the "mask decision" variable and case numbers.

Discussion

This study demonstrates a relationship between public opinion on mask preferences and mandates and case numbers per county in Tennessee. The frequency distributions show that the majority of respondents support the idea of masks and view them as a way to support public health. The initial analysis of Wave 4 alone indicates that as case numbers increase, the percentage of respondents who support public health increase as well. This supports the hypothesis that public opinion will increase in support for masks as case numbers rise. Results from the regression model, which looks at all the waves, suggests that there is a positive relationship between increasing case numbers and perceived benefits of wearing a mask and the perceived decision for wearing a mask. This finding seems to support the hypothesis that caseloads are related to pro-public health attitudes, but this relationship weakens to a point where we cannot be certain that the true estimate is different from zero when the control variables are introduced into the regression models. Therefore, the previous relationship from the bivariate model is determined to be spurious, and the relationship between the independent and dependent variable is non-existing. The opposite is true for support for a mask mandate. The results from the bivariate model indicate that there is no relationship between increasing case numbers and increased support for community mask requirements, while the multivariate model indicates that there is a positive and statistically significant relationship. The key results therefore seem to depend on the control variables rather than solely the independent and dependent variable.

The study provides insight into how the different variables possibly affect each other. The reason for the positive relationship between increasing case numbers and increasing support for public health identified during wave four could be due to what was happening in politics at the time. Two weeks prior to wave four, mayors in 89 of Tennessee's 95 counties were granted

authority to issue mask requirements. This was just a few months after the first case of COVID-19 was confirmed in Tennessee. People turn to the government and public health officials during uncertain health emergencies. The respondents' choices reflecting support for public health could have been in response to this dynamic, while the importance of caseloads to preferences about masking declined over time as the issue became more politicized. Additionally, the control variables, age and gender, play a role in the relationship between case numbers and public opinion on masks. Therefore, the results could support the claims in Haischer et al. (2020) that age, specifically older and younger adults, plays a role in whether an individual supports protective measures. These results should be taken into account when considering how people will respond to a pandemic based on their differences, where they live, and additional outside factors.

This study has some limitations. The methodological choices were constrained by the time frame in which the study needed to be completed. Additional time could have allowed for evaluation of the regression models by wave in order to see how the results changed over short periods of time. This could be a method for future studies that look at the change in the relationship between case numbers and opinions on masks by each wave. Furthermore, the generalizability of the results is limited to the time frame of waves 4 through 9 as well as the focus on Tennessee. A more in depth study could expand on these results by analyzing waves 10 through 13 and well as looking for data to analyze these patterns in other states to further determine the relationship between caseloads and pro-public health attitudes.

Further research is needed to establish the effect of age and gender on opinions on mask preferences. This can confirm previous studies on the effect of age on mask preferences as well as contribute to understanding the effect of gender on mask preferences. Given the polarization

over views on protective measures from the influence of political parties, further studies should take into account political preference and source of media intake. The impact of political messages has had a significant impact on the COVID-19 pandemic in comparison to previous public health crises, and therefore is an important area to study to have a better understanding for similar instances in the future. To further explore the relationship between case numbers and mask preferences, more variables within the longitudinal study need to be tested.

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