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Social Equity Through Vaccinations During COVID-19: A Study of Equitable Utilization of Resources During Emergencies and Crises

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SOCIAL EQUITY THROUGH VACCINATIONS DURING COVID-19: A STUDY OF
EQUITABLE UTILIZATION OF RESOURCES DURING EMERGENCIES AND CRISES

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ABSTRACT

Governments provide resources that enable people and neighborhoods to return to normalcy after emergencies, which enhances community resilience. Past research found that such resources are not always equitably utilized by communities, where oftentimes communities with high social vulnerability receive fewer resources. COVID-19 was one of the largest and most widespread public health emergencies. In response to the emergency, the United States (U.S.) government sponsored the creation and administration of COVID-19 vaccines. COVID-19 vaccines reduce the probability of severe illness and death, making them an important resource for community resilience. This study uses an explanatory sequential mixed methods research design to examine three research questions related to social equity in vaccine administration: (1) What is the relationship between community social vulnerability and COVID-19 vaccine administration?; (2) Did individuals trying to access the COVID-19 vaccine encounter administrative burdens?; and (3) How do the administrative burdens experienced by individuals when trying to access the COVID-19 vaccine provide a better understanding of the relationship between social vulnerability and COVID-19 vaccine administration? County level data for all U.S. counties were analyzed to examine the first research question. Findings indicate that there was an association between counties with higher wealth-related social vulnerability and lower county vaccination rates, but counties with higher employment-related and ethnicity-related social vulnerability were associated with higher vaccination rates. Qualitative interview data from 31 individuals revealed that few individuals faced administrative burdens when trying to access the COVID-19 vaccines, but a variety of resources and support services were used to access the vaccines. However, not everyone had equal access to resources, as individuals indicated that

resources required wealth for access, and many resources were provided by employers. In addition, results revealed that ethnicity often presented psychological barriers to getting vaccinated. These results suggest that the resources invested in vaccination efforts materialized for some, but not all types of vulnerability. Emergency managers and policymakers should consider these results when providing resources meant to enhance community resilience following future emergencies and crises.

This dissertation is dedicated to Planet Earth and Humankind.

ACKNOWLEDGMENTS

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS (or) ABBREVIATIONS

ABBREVIATION

ATSDR	Agency for Toxic Substances and Disease Registry
CDC	United States Centers for Disease Control and Prevention
FEMA	Federal Emergency Management Agency
GWR	Geographical Weighted Regression
IHP	Individuals and Households Program
ISBS	Institute for Social and Behavioral Science
NAPA	National Academy of Public Administration
NACCHO	National Association of County and City Health Officials
NCSL	National Conference of State Legislatures
OLS	Ordinary Least Squares
SBA	Small Business Administration
SoVI	Social vulnerability index created by researchers at the University of South Carolina
SVI	Social vulnerability index created by the U.S. Centers for Disease Control and Prevention/Agency for Toxic Substances and Disease Registry
U.S.	United States

CHAPTER ONE: INTRODUCTION

This dissertation explores the relationship between social vulnerability and resource utilization during COVID-19 as a method of examining social equity in response to COVID-19. COVID-19 is the biggest public health crisis of modern times, with over 78 million cases and over 933,000 deaths in the United States as of February 20, 2022 (Anwar et al., 2020; New York Times, 2022). The COVID-19 vaccines reduce the probability of death and severe infections, making vaccines one of the most important tools for fighting the COVID-19 pandemic (Liang et al., 2021; Phillips, 2021), and as such, vaccines enable communities to transition to normalcy, as much as possible. Although the COVID-19 vaccine was initially scarce, over time the vaccine became ubiquitous. The COVID-19 vaccination remained a key resource to reducing the impact of COVID-19 but was not universally utilized in the United States (U.S.), where, as of February 20, 2022, only 65% of those in the United States were fully vaccinated (New York Times, 2022). As such, this dissertation focuses on COVID-19 vaccines as a resource during the contemporary public health crisis and examines how equitably those resources were utilized in two primary ways. First, the dissertation quantitatively examines whether there was a relationship between social vulnerability and the number of vaccines administered in the first year of vaccine administration. Second, the dissertation examines the administrative burdens people encountered when trying to access the COVID-19 vaccine in the first year of the vaccine administration. Focusing on the first year of vaccine utilization captures social equity in vaccine utilization at a time when access is no longer an issue, but the resource is still needed. This information can provide lessons on how to improve equity during current and future public health emergencies and insights regarding whether social equity issues identified in past emergencies also apply to public health emergencies.

Significance of Research

As a field, public administration is dedicated to equity or fairness (National Academy of Public Administration, 2021; Wooldridge & Gooden, 2009). In addition to equity, the field is dedicated to resilience, or the ability to return to normalcy when confronted with disruptions caused by disasters and crises (Cutter et al., 2008; National Academy of Public Administration, 2021). Resilience is not always specifically sought out by public administrators, but it is oftentimes embraced as a method of survival, where flexibility and changes are needed when confronted with changes in an organization (Hall, 2022). External events, such as pandemics, hurricanes, and tornados force communities and organizations to adapt, persist, and make changes to continue existing (Hall, 2022). Regardless of whether resilience is an intentional goal or reaction to an external event, governments and public administrators take action toward both equity and resilience during emergencies. As such, during emergencies and crises, governments provide interventions and resources to improve community responses. Through these services, ideally, community resilience would be enhanced, and communities could return to normalcy following the event. However, past research found that resources provided after an emergency or crisis were not always distributed or utilized equitably, which can impact the ability of all communities to be resilient (Emrich et al., 2020). For example, following the 2015 South Carolina Floods, Emrich et al. (2020) found that some government resources available to flood victims benefitted primarily communities and individuals with lower social vulnerability ratings, suggesting some resources were not equitably distributed.

Research has examined the equitable utilization of resources following emergencies (see for example, Drakes et al., 2021; Emrich et al., 2020), but there is a need to examine whether the

relationship between social vulnerability and equitable resource utilization exists during a public health emergency, especially a prolonged public health emergency. Moreover, there is a lack of research examining the administrative burdens encountered when accessing resources to respond to COVID-19. For government interventions to improve both resilience and equity in the face of disasters, we need to understand the relationship between social vulnerability and resource utilization during COVID-19. With this information, interventions can be tailored to enhance equity and emergency managers can concentrate their efforts in communities of greatest need.

COVID-19 ravaged the world, significantly impacting socially vulnerable communities (Dasgupta et al., 2020). Existing research found a relationship between social vulnerability and COVID-19, where socially vulnerable communities have more significant consequences from the pandemic than communities with greater resources. Gaynor and Wilson (2020) compared two counties (one in Ohio and one in Michigan) and found that socially vulnerable communities, specifically those with high minority populations, are more susceptible to COVID-19 infections and deaths. Findings from nationwide studies have not been quite as consistent but suggest that at least parts of social vulnerability (such as minority status and speaking a language other than English), make communities at greater risk for COVID-19 (Karaye & Horney, 2020).

<u>Research Questions</u>

This dissertation examines the relationships between social vulnerability and COVID-19 resource utilization (vaccines), and administrative burdens in accessing resources by examining the following research questions: (1) What is the relationship between community social vulnerability and COVID-19 vaccine administration? (2) Did individuals trying to access the COVID-19 vaccine encounter administrative burdens? If yes, what administrative burdens were encountered? (3) How do the administrative burdens experienced by individuals when trying to

access the COVID-19 vaccine provide a better understanding of the relationship between social vulnerability and COVID-19 vaccine administration?

To answer these research questions this dissertation uses (1) publicly available data on COVID-19 vaccinations (2) social vulnerability data from the U.S. Census, and (3) qualitative data on administrative burdens related to obtaining a COVID-19 vaccine through interviews of adults in Orange County, Florida.

<div align="center">Originality</div>

The current study embarks on new original research for emergency managers and public administrators in multiple ways. First, the study provides a new understanding of the relationship between social vulnerability and resource allocation during the response to COVID-19, especially vaccine administration. The findings are useful to both researchers and practitioners. The findings can inform how existing and future interventions can be altered to enhance equity, thus improving the overall community resilience to future emergencies or crises. Second, the study also is the first to combine the two most used social vulnerability indices: the social vulnerability index (SVI) created by the U.S. Centers for Disease Control and Prevention (CDC) and the social vulnerability index (SoVI), created by researchers at the University of South Carolina. The two indices are similar but have different components, and this study combines the two indices. By combining the indices, additional potential aspects of social vulnerability are considered together, which has the potential to capture socially vulnerable populations that could be excluded when only using a single index. Researchers and public administrators can use similar methodologies to examine social vulnerability in new ways based on this study. Third, the study creates new indices related to social vulnerability, which provide new ways of understanding and conceptualizing social vulnerability. By specifically examining wealth, age,

ethnicity, and employment related social vulnerability, this study reconceptualizes different ways that communities can be vulnerable and future research can examine these different types of social vulnerability. Finally, the study examines administrative burdens during the largest public health crisis of modern times. Administrative burdens are an emerging concept in public administration and have not yet been examined in the context of COVID-19 vaccines. Public administrators and emergency managers can use the findings from this study when planning for future public health emergencies to reduce the administrative burdens faced by the public when accessing services to promote resilience.

CHAPTER TWO: LITERATURE REVIEW

The literature review is divided into six main sections. First, this dissertation presents relevant literature on community resilience. In the second section, the research examines social vulnerability as a concept, including detailed discussions on the relationship between resilience and social vulnerability, the relationship between social vulnerability and disaster recovery resources, and the different measures used to examine social vulnerability. Third, the dissertation explores existing research on social equity, including literature on social equity, social vulnerability, and administrative burdens. Fifth, the dissertation explores COVID-19 as a contemporary emergency and crisis. This section includes a discussion of social equity issues that emerged during COVID-19, an examination of existing literature on the relationship between social vulnerability and COVID-19, and a summary of research to date exploring social vulnerability and vaccine utilization. Finally, the literature review presents a theoretical framework that was developed based on conflict theory and social construction and policy design theory. The section first presents relevant literature on each theory and then summarizes the theoretical framework and its application in the current study.

Community Resilience

Scholars recognize the elusive nature of defining the term "resilience" and although there is no agreed-upon definition, it generally refers to the idea of returning to normal business and functions following a disruptive event (Boin & Lodge, 2016). Resilience involves responding to an emergency or crisis, adapting, and returning to normalcy following emergencies or crises, including the ability to adapt and change when confronted with a threat or risk (Cutter et al., 2008). Some scholars consider resilience as something that occurs after an event has occurred,

where resilient organizations are those that are able to recover from harm (Boin et al., 2010). Some scholars consider resilience as something that happens before an emergency, where resilient organizations are those which adapt and make changes prior to the event to improve their ability to cope with the emergency when it arrives (Boin et al., 2010). However, others consider this mitigation, with the goal of using mitigation as a tool to enhance resilience (Godschalk, 2003). Resilience does not only involve 'building back', but instead communities should 'build back better' to provide communities with the tools and abilities to better cope with future emergencies and crises (Frerks, 2015, p. 491). This involves more than just focusing on emergencies, but also addressing social, political, and economic issues that could potentially impact emergencies and crises in the future (Rivera & Kapucu, 2015). Yet, others combine both perspectives, where resilient organizations have "the capacity to adapt, improvise, and recover" (Boin et al., 2010, p.8).

Resilience is a focus in both the public administration and emergency management fields (Entress et al., 2020). In public administration, resilience is understood as being able to govern and maintain quality of life when confronted with a disaster (Boin & Lodge, 2016). In the emergency management and disaster crisis field, resilience is understood as adapting to hazards, incorporating community values and goals in the response, and developing an understanding of threats from external forces (Rivera & Kapucu, 2015). Building resilient communities is one of the 12 grand challenges that the National Academy of Public Administration (NAPA) developed for the public administration field, further illustrating its importance (NAPA, 2021). The Federal Emergency Management Agency (FEMA), the main federal agency charged with leading emergency responses in the United States, like NAPA, has a goal of having a prepared and resilient nation, and aims to achieve this through its programs and partnerships (FEMA, 2021).

Resilience is consistent with traditional emergency management goals. For example, emergency management scholars stress that improving critical infrastructure (systems meant to keep society operational, such as roads, bridges, food supply chains, etc.) contributes to societal resilience when faced with an emergency, suggesting that these systems are worthy of investment (Boin & McConnell, 2007). More specifically, Boin and McConnell (2007) cite joint training and preparation, working with the media for messaging about a crisis, and working with communities as methods of enhancing resilience, but these approaches are also used in traditional emergency management. This means that many emergency management goals will also benefit societal resilience. Consistent with this perspective, Comfort et al. (1999) suggest that improving conditions in socially vulnerable areas would reduce disaster impacts and increase disaster resilience. For example, improving the infrastructure in a socially vulnerable area located in a floodplain with flood mitigation improvements during times of normalcy would result in less loss during a flood and ultimately improve the resilience of that community.

Although resilience is a focus of both public administration and emergency management fields, there is a need for additional research. For example, Springer (2012) called for research in public administration specifically on resilience and noted that although the concept has existed in other fields, there was a need for public administrators to work in an interdisciplinary manner to improve community resilience in emergency management. This dissertation views vaccines as a tool to promote community resilience, as communities experiencing fewer infections and fewer deaths are better able to absorb shocks and return to normalcy from the COVID-19 pandemic.

Social Vulnerability

Social vulnerability refers to the risk of harm that a community faces when confronted with an emergency or disaster which is the result of community characteristics (Flanagan et al.,

2011). A single measure, such as income, is insufficient to measure risk because there are multiple intersecting and overlapping factors that impact risk like race, age, gender, and household structure (Cutter & Finch, 2008; Nukpezah, 2020). Instead, social vulnerability captures multiple constructs in one measure (Cutter & Finch, 2008). When confronted with a disaster, the risk of harm is related to the extent to which these factors are present or absent (Nukpezah, 2020). Social vulnerability implies that risk is more than solely a product of the built environment; instead, risk is influenced by complex social phenomena, including societal structure and values (Myers et al., 2008). It is important to understand multiple potential risk factors because when multiple vulnerabilities are present, the intersection of these vulnerabilities can make those individuals less likely to seek public services and experience greater discrimination when seeking public services. For example, Butz and Gaynor (2022) found that transgendered women of color tend to "avoid social welfare offices and face discrimination" when they do seek services in social welfare offices (p. 433). Social vulnerability as a concept attempts to capture the combination of "physical, social, economic, and environmental factors" which can impact the ability to respond to events (Nukpezah, 2020, p. 44).

Social vulnerability also captures a community's potential to respond to emergencies (Cutter, 1996; Cutter & Finch, 2008). For example, when communities have fewer resources (a contributing factor to social vulnerability), they are unable to quickly remove debris following a hurricane, rebuild housing following a wildfire, or access follow-up medical care after a public health emergency. Some scholars consider social vulnerability a causal process, where underlying social conditions create social inequities (Cutter, 1996). When a stressful event, such as a disaster occurs, the social inequities that existed before the emergence of the disaster leave those without resources less able to respond to the disaster safely, meaning the underlying social

inequities increase the likelihood of harm to socially vulnerable populations (Cutter, 1996). From this perspective, socially vulnerable populations may have elevated risks in their communities because of the high prevalence of individuals in a community with risks related to their employment, live in buildings that are unable to withstand hazard impacts, have low levels of disaster preparedness, or be less likely to receive assistance following an emergency (National Research Council of the National Academies, 2006). These factors essentially "cause" harm, meaning social vulnerability is a causal concept. Other scholars focus more narrowly on potential exposure to hazards, where populations located closer to the risk of a hazard have higher social vulnerability (Cutter, 1996). This dissertation conceptualizes social vulnerability as a causal structure, where underlying social conditions create potential harm when confronted with a hazard. By examining the relationship between social vulnerability and vaccine utilization, we can see potential scenarios where social conditions are causing harm during the COVID-19 pandemic. Specifically, if certain groups are not equitably receiving the vaccine, they are essentially experiencing harm during the emergency as they are less protected from serious illness or death, and ultimately this can diminish their ability to return to normalcy.

<div align="center">Resilience and Social Vulnerability</div>

When there is risk of a disaster, reducing vulnerability is key to enhancing resilience (Guo & Kapucu, 2020). Because public administrators are concerned with maintaining quality of life and governing systems, as previously stated, Boin and Lodge (2016) argue that "public administration scholars should study the causes, characteristics, and consequences of crises" (p. 294). Social vulnerabilities then directly impact resilience because inequities and vulnerabilities are "barriers to disaster resilience" (Kapucu et al., 2013a, p. 7). Socially vulnerable communities tend to have greater risk exposure and are less able to "anticipate, plan, react, and learn from

stresses or shocks" and as a result, they suffer greater consequences during a crisis (Rivera & Kapucu, 2015, p. 6). This is largely determined by their community characteristics. Boin and van Eeten (2013) consider an organization to have precursor resilience if they are able to "absorb shocks and prevent emerging problems from escalating into full-blown crises" (p. 432). This preventative approach largely involves reducing social vulnerabilities. When communities have high income, high educational levels, and healthier populations (lower social vulnerability), they are better able to absorb shocks, which according to Boin and van Eeten's (2013) definition of resilience, would then be more resilient as they would be better able to deal with catastrophes.

Some scholars consider resilience and vulnerability as opposites, where low vulnerability leads to low resilience and vice versa (de Bruijne et al., 2010). Others consider resilience and vulnerability as two separate overlapping, intertwined, concepts (Cutter et al., 2008). Cutter et al.'s (2008) disaster resilience of place (DROP) model explains the relationship between resilience and vulnerability during emergencies. According to the model, community social systems, built environments, and natural systems determine the community's inherent vulnerability and inherent resilience (antecedent conditions). When an event occurs, such as a crisis or emergency, the community uses coping resources, the availability of which are impacted by the antecedent conditions. The coping resources used impact the overall disaster impact. If the impacts exceed the community's absorptive capacity, then recovery (and resilience is low), but if this is not the case, then the recovery (and resilience is high). The model suggests that while resilience and vulnerability are separate concepts, when confronted with an emergency, they tend to impact one another. Cutter et al. (2008) further clarify that vulnerability and resilience developed from two different schools of thought, where vulnerability emerged in the social

11

sciences with a focus on the risk of harm, and resilience developed in the ecological sciences with a focus on the ability to "absorb shocks and recover" (p. 257).

<center>Social Vulnerability and Disaster Recovery Resources</center>

Community resilience to disasters is related to social vulnerability and ultimately resilience is the result of deliberate choices and actions (Kapucu & Sadiq, 2016). To enhance resilience, governments must take action to reduce disaster risks (Kapucu & Sadiq, 2016). This includes actions to distribute and utilize resources. Following emergencies, people impacted by a hazard need assistance and Comfort et al. (1999) suggest that this should be done responsibly and equitably. However, there is concern that resources allocated for disaster recovery do not equally benefit populations with high and low social vulnerability. Indeed, prior research suggests that even in times of normalcy, White populations (an aspect of low social vulnerability) tend to utilize greater public resources (such as parks) largely because they have greater social capital which helps with organization and self-governance (Cheng et al., 2022). Similarly, Drakes et al. (2021) found that FEMA Individuals and Households Program (IHP) funding (short-term disaster funding for individuals and households) is related to race, where Black and Asian populations are less likely to receive funding. Van Zandt et al. (2012) found that neighborhoods in Galveston, Texas, with high social vulnerability were not as likely to apply for both FEMA and Small Business Administration (SBA) funds, the two main funding streams available to recover from Hurricane Ike, meaning these areas are not being served adequately with resources to recover from disasters. Emrich et al. (2020) similarly found that following the 2015 South Carolina floods, social vulnerability was related to funds received to recover from the emergency for some types of socially vulnerable populations. Emrich et al. (2020) analyzed a combination of funds including those from the national flood insurance program, the SBA, and

<center>12</center>

the community development block grant. When analyzed together, the social vulnerability aspects examined (per capita income, percent renters, percent Black, percent English as a second language, percent mobile homes, age, and percent public sector employees) individually were not statistically related to funding, but when the percent of people living in mobile homes and the percent of the population that was Black were analyzed together as an interaction variable, there was a relationship with the amount of funding received. This suggests that examining a single indicator of social vulnerability may not reveal trends experienced by people who are socially vulnerable in multiple ways.

<div align="center">Measures of Social Vulnerability</div>

Social vulnerability indices and measures can be used by governments and practitioners when making decisions regarding where to target resources or services before, during, or after an emergency or crisis (Flanagan et al., 2011). There is no single measure of social vulnerability; instead, researchers have developed a variety of social vulnerability indices, which vary slightly. The two most common social vulnerability indices are the Social Vulnerability Index created by Cutter et al. (2003) (SoVI) and the CDC/Agency for Toxic Substances and Disease Registry (ATSDR) social vulnerability index (SVI) (Rufat et al., 2019).

Cutter et al. (2003) developed the SoVI through a factor analysis, which includes 29 different variables. SoVI scores range from -9.6, indicating low social vulnerability to 49.51, indicating high social vulnerability (Cutter et al., 2003). The CDC/ATSDR developed the SVI as a tool to help emergency managers and public health officials to deliver support to the neediest communities in the United States (CDC, 2021a). The CDC/ATSDR SVI is based on four themes: socioeconomic status, household consumption, race/ethnicity/language, and housing/transportation (CDC, 2021a). From these four themes, the CDC/ATSDR identified 15

social factors through inductive analysis, which are used as the 15 variables in the model (CDC, 2021a; Rufat, 2019). SVI scores range from 0, indicating low social vulnerability, and 1 indicating high social vulnerability. The key characteristics of the social vulnerability measures are summarized below in Table 1.

Table 1: Primary Measures of Social Vulnerability

Measure	Authors	Variables Included	Methodology to develop index
SoVI	Cutter et al. (2003); Hazards & Vulnerability Research Institute, 2021	29 variables	Inductive model/ Factor analysis
SVI	U.S. Centers for Disease Control and Prevention/ATSDR; Flanagan et al. (2011)	15 variables	Inductive model/thematic pillars

Rufat et al. (2019) found potential validity issues with the SVI as a measure when studying Hurricane Sandy outcomes. Although the CDC responded to the criticisms, there were aspects of the construct validity concerns that remain unanswered (Rufat et al., 2020). Interestingly, Rufat et al. (2019) found construct validity issues with most accepted social vulnerability indices, as did Goodman et al. (2021) for the SoVI index. Although there are concerns, scholars recognize that there are few studies examining the validity of social vulnerability measures and that additional studies are needed (Rufat et al., 2019). Such scholars do not recommend against using these measures, but instead urge caution when making high-stakes programmatic decisions based on such measures (Rufat et al., 2019). Despite these concerns, SoVI and SVI remain widely used and valued in research and SoVI specifically remains the leading methodological approach for capturing social vulnerability (Burton et al., 2018; Jackson et al., 2021). Some scholars specifically note the weaknesses identified in these social vulnerability measures but argue that these weaknesses exist in any composite index and

that the benefits of a social vulnerability index (summarizing a complex phenomenon into an easily digestible measure) outweigh the issues identified with the measure (Mafi-Gholami et al., 2020). Advocates of these measures cite their robustness, ability to be replicated, and successful application to multiple contexts as advantages of social vulnerability indices, specifically SoVI (Alem et al., 2021; de Loyola Hummell et al., 2016). Other scholars recommend using social vulnerability indices as a guide, but suggest that these models might not be ideal for policy recommendations (Tellman et al., 2020).

<div align="center">Social Equity</div>

From a social equity perspective, public administrators have an obligation to enhance equity and fairness in their work (Wooldridge & Gooden, 2009). Like many concepts in social science, social equity does not have an agreed upon definition (Durant & Rosenbloom, 2017), but various definitions focus on fairness, justice, and equality. Guy and McCandless (2012) define social equity as the notion that everyone's voice should be considered, not only the voice of the privileged. They specify that social equity involves more than just income; it also involves the fair distribution of services (Guy & McCandless, 2012). Norman-Major (2011) defines social equity as "simple fairness and equal treatment" which includes structuring resource utilization to reduce inequities in universal and targeted programs (p. 328). Emrich et al. (2020) consider social equity as a measure of distributed justice where social equity is a function of whether the people most in need are those who are receiving services. Gooden (2015) defines social equity as democratic justice, where all groups, not just some, are treated with fairness. Moreover, some public administration scholars focus primarily on the distribution of goods and services to define social equity (Wang & Mastracci, 2014). In this study, the term social equity refers to fairness

and justice and is measured through fairness in utilization of goods and services, where in socially equitable scenarios, people at greatest risk are utilizing needed services.

As a concept, social equity developed from John Rawls, who argued that all people are entitled to fairness, but these ideas date back to John Locke's argument that people are entitled to natural rights and Jean-Jacque Rousseau's view that liberty and equality are inevitably linked (Guy & McCandless, 2012; Woolridge & Gooden, 2009). In public administration, social equity gained prominence during the New Public Administration movement (Wooldridge & Gooden, 2009). The term social equity was first used in public administration by H. George Fredrickson and was discussed in context of fair public management, organization, and delivery of services (Guy & McCandless, 2012). Some scholars consider social equity to be of utmost importance to public administration and consider it a pillar of public administration (Riccucci, 2009; Svara & Brunet, 2005).

According to Blessett et al. (2016), public administration scholars must look beyond what is immediately apparent and study the context and systems that create injustices when studying social equity. Indeed, more than addressing individual programs, policies and institutional changes are needed to create systematic changes in improving social equity (Pynes & Rissler, 2017). For example, diversity, equity, and inclusion programs are often used in the workplace to improve diversity, enhance justice, and ultimately lead to greater social equity in organizations (Hoang et al., 2022). According to Fredrickson (2005), the vast income, wealth, and opportunity disparities in the U.S. undermine the ideals of democracy. The constitution guarantees equal rights and inequality exacerbates disparities. Fredrickson suggests that if disparities in participation and influence worsen, this can result in unequal citizenship, where some will give up on democratic government, which in essence weakens democracy.

Most evidence on social equity focuses on the fact that there are social inequities, not whether they are being addressed (Gooden, 2017). This dissertation acknowledges that there are significant social inequities in the United States and that health disparities are associated with social inequities (Gooden, 2015; Martin-Howard & Farmbry, 2020). For example, racism created structures, policies, and practices that caused social vulnerabilities, and social vulnerabilities caused more deaths and infections in Black communities during COVID-19 and wide health disparities (Gaynor & Wilson, 2020). This dissertation addresses social equity by examining equity in COVID-19 vaccine utilization. Since the delivery of these vaccines was tightly controlled and managed by governments and the delivery of public services impacts the extent to which there is social equity (Frederickson, 2005), examining the delivery of vaccines allows for an examination of social equity.

Social Equity and Social Vulnerability

Social vulnerability and social equity are inherently interconnected. Although social vulnerability captures risk, Cutter and Finch (2008) argue that these vulnerabilities exist because of "inequality and its social and political consequences" (p. 2305). Consistent with Domingue and Emrich (2019), this dissertation defines social equity in terms of resource utilization. Specifically, a social equity issue arises when areas with high social vulnerability, (those areas where the social vulnerability components—ex. percent of households without a car—are higher than the average county) utilize fewer resources when compared with areas with low social vulnerability (those areas where the social vulnerability components are lower than the average county). Examining social equity through resource utilization is especially important because when socially vulnerable areas are not provided resources following an emergency or crisis, they are more vulnerable to future emergencies (Domingue & Emrich, 2019), as they neither have the

17

resources needed to recover, nor would they have the resources needed to prevent damage during a future emergency or crisis.

Not all scholars define and measure equity in line with Emrich et al. (2020). Equity is essentially a measure of how to divide resources, and equity in terms of policies can be defined in many ways (Stone, 2002). Some consider a policy to be equitable when those with the greatest need receive the most resources, others consider even distribution of benefits between members of a particular group to imply equity, yet others consider policies to be equitable when those who invested the most (usually via taxes) receive the greatest resources (Stone, 2002). While the latter two conceptualizations of equity "appropriately match" resources to members of a group, they largely ignore the needs of individuals and the larger context of the distribution; instead, these conceptualizations focus on the "end result" (Stone, 2002, p. 52). This dissertation conceptualizes equity in line with Stone's (2002) first definition of equity, where those with the greatest need receive the most resources.

Administrative Burden

Administrative burdens refer to difficulties, inefficiencies, and costs involved in the interactions between governments and organizations or individuals external to government, but seeking government services (Heinrich, 2016). The literature on administrative burden explains the concept in three broad categories: learning costs (or the costs involved in learning about the program, policy, etc.), psychological costs (or the costs which are a result of a negative stigma or loss of autonomy when participating in a program, such as a stigma associated with using SNAP benefits), and compliance costs (or the costs involved with following the requirements, for example, the time involved in filling out paperwork) (Moynihan, Herd, & Harvey, 2014). For this study, administrative burdens will be defined consistent with Moynihan et al. (2014). As

such, administrative burdens will be defined as processes, requirements, and procedures that make interactions between governments and individuals more difficult by creating or worsening a learning, psychological, or compliance cost.

Administrative burdens create social equity problems, especially for socially vulnerable populations (Bell et al., 2021; Connolly et al., 2021). Administrative burdens disproportionately impact people with low cognitive capital and those in most need of the services they are seeking, meaning administrative burdens can create equity issues (Christensen et al., 2020). Administrative burdens reduce the extent to which eligible recipients can access services and increase the barriers that vulnerable populations must overcome (Bell et al., 2021). Compliance burdens can increase the discretion of street-level bureaucrats and ultimately increase discrimination (Jenkins & Nguyen, 2021). Bell et al. (2021) found that political ideology impacts the extent to which street level bureaucrats perceive administrative burdens as social equity issues, meaning discretion will likely be applied differently, and discrimination and social equity issues can result in increased discretion over compliance burdens.

The rules and requirements which create administrative burdens can reinforce social inequity by reducing the ability of a group to use a government benefit (Nisar, 2018). When the burdens to participate in a program or get a service are too high, people tend to give up and not pursue the service or benefit to which they are legally entitled (Connolly et al., 2021). Some scholars argue that these high burdens were put in place to discourage utilization, especially since many government programs are intended to serve individuals with little political power (Moynihan et al., 2016). This is especially problematic for socially vulnerable populations because those with low political power are typically those most in need of services. Linos et al. (2022) found that newer technology presents challenges in accessing services among people in

low-income individuals in Greece. Bertram et al. (2022) found that people with low income tend to view government employees with negative stereotypes (i.e., they are corrupt or lazy), more so than people with high income. Bertram et al. (2022) theorize that this is at least in part because they deal with significant administrative burdens when accessing government services. Similarly, Hall (2010) studied grant burden, as a precursor to the current literature on administrative burdens and found the grant burden of counties (amount of matching funds spent on grants relative to the amount of grant funding received) was impacted by wealth, among other factors. While Hall's (2010) research focuses on burdens in terms of counties, not individuals, it suggests that burdens can be concentrated in socially vulnerable areas, such as low-income areas. Existing literature suggests that administrative burdens can be reduced with high levels of social capital, especially in terms of psychological costs (Doring & Madsen, 2022), but social capital can be diminished during times of crisis (Albrecht, 2018). During emergencies and crises, people are already taxed in the ability to comply with requirements, as many are dealing with immediate issues and trying to return to normalcy, meaning the ability to overcome burdens is increasingly difficult.

<div align="center">COVID-19 as a Public Health Emergency</div>

COVID-19 emerged in China in late 2019 and quickly circled the globe becoming a global pandemic by March 2020 (Entress et al., 2020). COVID-19 ravaged the economy and halted modern society because the virus could only be controlled by limiting social interactions, which inhibits businesses and economic health (Comfort et al., 2020). COVID-19 was especially difficult to manage because it was a 'creeping crisis' or a crisis that extends over a long period (Boin, McConnell, & t'Hart, 2021). Creeping crises emerge slowly, few interventions are adopted to intervene with the crises, and last longer than traditional crises and emergencies

(Boin, Ekengren, & Rhinard, 2021). Complicating matters, COVID-19 was a new disease and early in the crisis there was limited information regarding how to manage the crisis, as little was known about who was vulnerable, how to treat patients, and the disease trajectory (Boin, McConnell, & t'Hart, 2021). Again, this makes COVID-19 a non-traditional emergency for governments to manage.

Although COVID-19 was a unique crisis, governments needed to make decisions typical of any emergency management scenario. Such decisions included how to influence collective behavior, manage resources, and control economic disruptions (Boin, McConnell, & t'Hart, 2021). However, implementing policies to address the COVID-19 pandemic is different from traditional emergencies because instead of the emergency being concentrated in one area, it impacts the entire world at once (Boin, Ekengren, & Rhinard, 2021).

Wilson (1980, 1989) categorized politics as either majoritarian, client, entrepreneurial, or interest group. The categorization is determined by the degree to which the costs and benefits were either distributed or concentrated (Wilson, 1980; Wilson, 1989). Traditional emergency management for emergencies declared disasters under the Stafford Act concentrates benefits to the group impacted by an emergency, meaning the benefits are concentrated to a small group, but the costs are largely distributed, as FEMA funds much of the emergency response. According to Wilson's (1980, 1989) categories, traditional emergency management response then falls under client politics. However, with the current COVID-19 public health emergency, essentially everyone in the U.S. needs benefits and the costs are still shared, meaning both the costs and benefits are distributed, rather than concentrated to a small group. Under Wilson's (1980, 1989) model, this shifts to a different typology, majoritarian politics. This changes the politics surrounding the emergency, which can impact how resources are distributed and utilized. With

21

client politics, interest groups hold significant power in policymaking, which can include resource distribution and utilization (such as vaccinations) (Sharp, 1994). With majoritarian politics, there is usually public concern, which politicians use to their advantage (Sharp, 1994). Client politics and majoritarian politics can result in different policy outcomes because with majoritarian politics, governments tend to make policies based on public sentiment, and with client outcomes governments tend to make policies based on organized support (Hong & Lee, 2018). Thus, policies, including those regarding resource distribution and utilization, will be different during COVID-19 when compared to traditional emergencies and crises. Thus, it is important to understand vaccine utilization, in addition to the existing literature on resource utilization during traditional emergencies and crises.

COVID-19 and Social Equity Issues

COVID-19 disproportionately impacted communities of color, partly because many of the risk factors for COVID-19 inevitably placed people of color at higher risk for contracting the virus (Gadson, 2020). People of color are disproportionally represented as essential workers who are required to interact with others during the pandemic and offer few opportunities for social distancing, placing them at higher risk of contracting the virus (Gadson, 2020). Communities of color do not have equal access to clean water needed for proper handwashing, are more likely to live in areas with high population density (living in close quarters increases the possibility of COVID-19 spread), and are more likely to depend on public transportation, conditions that speed viral transmission (Berry-James et al., 2021). People of color tend to have higher rates of underlying health conditions because of structural and historical racism and many chronic diseases put individuals at higher risk of severe COVID-19 (Berry-James et al., 2021).

Existing literature suggests that there is a relationship between COVID-19 impacts and socially vulnerable populations. Dasgupta et al. (2020) found that between June 1 and July 23, 2020, counties in the United States with higher social vulnerability, were more likely to be COVID-19 hotspots. That is, more likely to have a large outbreak of COVID-19 cases in a defined geographical area. As Dasgupta et al. (2020) postulate, this could be because the same factors that contribute to a high social vulnerability score also make people more susceptible to catching COVID-19 (multi-person crowded housing, poverty, etc.). Similarly, Song et al. (2021) found that counties with higher social vulnerability tend to have higher cumulative COVID-19 incidence, as well as higher case-fatality risk.

Public administrators need to protect the community from the negative impacts of the pandemic, especially the most vulnerable (Gadson, 2020). This involves taking actions to reduce the number of infections and deaths in communities of color, to a level similar to that of other racial communities (Gadson, 2020). Collecting racial data on COVID-19 and partnering with organizations trusted by communities of color would reduce racial inequities related to COVID-19 (Wright & Merritt, 2020).

<div align="center">Social Vulnerability and COVID-19</div>

There is a relationship between social vulnerability and how certain communities behaved during the COVID-19 pandemic. Fu and Zhai (2021) a relationship between social vulnerability of New York City census tracts and whether individuals in those areas complied with stay at home orders. Recent studies also suggest that social vulnerability is related to risk of COVID-19. Indeed, many of the aspects of what makes a community socially vulnerable make it difficult to reduce the spread of COVID-19 (low income, lack of health insurance, crowded housing, lack of private transportation, etc.) (Karaye & Horney, 2020). Early in the pandemic

(1/12/20-5/12/20), there was a statistically significant relationship between social vulnerability and number of cases in the United States at the county level (Karaye & Horney, 2020). Findings from Neelon et al. (2021) suggests that the relationship between social vulnerability and COVID-19 impact is not static and instead changes over time. Neelon et al. (2021) examined the relationship between county social vulnerability and COVID-19 cases/deaths and found that toward the beginning of the pandemic counties with high social vulnerability tended to have fewer COVID-19 cases, but that this trend reversed in late March 2020. Between March and October 2020, counties with high social vulnerability tended to have high cases/deaths. Then between October and December, the trend reversed again, where areas with high social vulnerability tended to have lower cases/deaths (Neelon et al., 2021). This suggests that the relationship changes over time. Similarly, Jackson et al. (2021) studied standardized cases and deaths and found that both were associated with higher levels of social vulnerability. Existing literature on social vulnerability and COVID-19 in the United States is summarized in Table 2 below.

Table 2: Summary of empirical research on social vulnerability and COVID-19 in the United States.

Author	Measure Used	Dates Examined	Unit of Analysis	Analysis	Finding
Karaye & Horney, 2020	CDC SVI	1/12/2020-5/12/2020	County	OLS Regression	Counties with high SVI had high COVID-19 rates
Neelon et al., 2021	CDC SVI	3/15/2020-12/31/2020	County	Bayesian hierarchical negative binomial models	Cases and deaths were lower for high SVI counties in the beginning of COVID-19, then those cases rose in March, and declined again in October.
Jackson et al., 2021	SoVI	1/20/2020-1/30/2021	County	Geographical Weighted	Standardized cases and deaths were overall higher

Author	Measure Used	Dates Examined	Unit of Analysis	Analysis	Finding
				Regression (GWR)	in counties with high SoVI scores.

Vaccine Administration/Utilization and Social Vulnerability

The first COVID-19 vaccination was approved for distribution in the United States on December 11, 2020 (Gee et al., 2021), and two additional vaccinations were approved shortly after. The COVID-19 vaccine administration process in the United States was disjointed, confusing, and not uniform (Freed, 2021). This is largely because the COVID-19 response, which included the vaccine utilization, was political and placed burdens on local government and individuals to access resources (Kapucu & Moynihan, 2021). Barriers faced by individuals include proximity to vaccination sites, lack of flexibility in working schedules, and lack of childcare, among others (Gonzalez et al., 2021). Such barriers could be overcome by planning and administering vaccination programs with such barriers in mind. However, the federal government relied on states to distribute vaccines, with little federal guidance (Freed, 2021). As a result, each state had its own plan to distribute vaccines, including how to prioritize who received the vaccine first, and implemented the plans differently (Freed, 2021; Kapucu & Moynihan, 2021).

Many Governors' responses to COVID-19 were based on politics (Sadiq et al., 2020), not science, which can make implementation much more difficult, especially for those who are socially vulnerable. There were reports throughout the pandemic about tensions between decisions based on science and those based on politics, which intersect the authority of public health agencies at the state and federal levels. For example, in Orange County, Florida, there are reports that the County Health Administrator was removed from his post because of his ardent

support for COVID-19 vaccinations (BBC, 2022). Thus, politics and political influence over public health employees can be related to vaccination rates, as those in public health roles could be incentivized to make decisions aligned with the political whims of those in positions of authority rather than decisions that would ease burdens and make vaccines more accessible.

Vaccine administration is dependent on a variety of factors, including vaccine hesitancy, political ideology, and distribution processes. Vaccine hesitancy has been noted as part of the COVID-19 vaccine discussion as a contribution to limited vaccine uptake rate in the U.S., and preliminary studies suggest that there is a relationship between vaccine hesitancy and decisions regarding whether adults become vaccinated (El-Mohandes et al., 2021; Khubchandani et al., 2021). Counties with high rates of vaccine hesitancy and high rates of social vulnerability have lower rates of vaccination (Crane et al., 2021). Vaccine hesitancy is associated with concerns about safety, mistrust, and demographic factors such as race, income, and political affiliation (El-Mohandes et al., 2021; Tram et al., 2021). Alfierei et al., (2021) found that parents who were Black, low-income, and publicly insured had more vaccine hesitancy than White parents, but that parents who received information from many different sources had lower levels of vaccine hesitancy. Khairat et al. (2022) found that among communities with high levels of vaccine hesitancy, low education levels and concern about the availability of the vaccine were associated with low vaccine rates. In those communities, individuals reported a lack of trust in both the vaccine and the government, and fear about side effects, as reasons for not obtaining a COVID-19 vaccine.

Before a COVID-19 vaccine was approved, discussions regarding how to distribute the vaccine took place, including discussions on potential inequities in vaccine utilization (Subbaraman, 2020). The World Health Organization (WHO) provided guidance regarding

prioritization of the vaccine to health care workers, medically vulnerable, and the elderly, and suggested that more advanced countries should also allocate vaccines to less advanced countries, but the guidance largely ignored how to address income and racial inequities within a country (Subbaraman, 2020). The CDC has specifically stated that vaccine access should be equitable in the United States and equitable utilization is a priority for the agency (Hughes et al., 2021). Even before a vaccine was approved, the CDC suggested using social vulnerability data in prioritizing vaccine access (see for example, Dasgupta et al., 2020).

Scholars have echoed the call for equity in vaccine access. Bibbins-Domingo et al. (2021) suggested that vaccine equity could be enhanced by prioritizing vaccinations to zip codes with the greatest number of infections and deaths, vaccinating the entire community in those areas (as opposed to only the elderly or people with underlying conditions), and partnering with community leaders to promote and encourage vaccinations. People in the United States tend to support equitable vaccine distribution (Persad et al., 2021). Persad et al. (2021) used survey data from two different surveys (n=4,735) administered to individuals in the United States on how vaccines should be allocated and found that both Democrats and Republicans believed that "racial/ethnic communities disproportionately impacted by COVID-19 should receive priority for a vaccine" (p.4). The surveys used by Persad et al. (2021) were sampled as nationwide surveys administered to adults over the age of 18 in the U.S.

Preliminary results from the COVID-19 vaccine utilization in the U.S. suggest inequities could exist in the administration process, as summarized below in table 3. Initial reports on COVID-19 vaccination administration suggest possible inequities, where the majority of those who received a vaccination in the first month of administration were female (63%) and White (60%) (Painter et al., 2021). Between December 14, 2020, and March 1, 2021, Hughes et al.

(2021) found that throughout the United States, counties with low social vulnerability either had higher rates of COVID-19 vaccinations or rates equal to that of areas with high social vulnerability. This suggests that early in the vaccine administration (the first two and a half months), there was social inequity in vaccine distribution. These findings are consistent with some later studies, including research by Brown et al. (2021) and Rifai et al. (2021), which found a relationship between social vulnerability and vaccines between December 2020 and May 2021, and between December 2020 and August 2021, respectively. Crane et al. (2021) found a relationship between social vulnerability and vaccination utilization between March and August 2021 and found that the gaps between the vaccination rates and vulnerability status widened over time.

Other studies found that when the individual social vulnerability components were examined, rather than the composite measure, only some were related to vaccination rate. For example, Thakore et al. (2021) found that only SES, household composition/disability, and minority status/language were statistically related to lower vaccination rates, and Wang et al. (2021) found that only six of eight components were related to vaccination rates. Although these studies suggest a possible equity problem, the studies are limited to the initial phase of the vaccine rollout, the latest of which represents data through August 2021 (only nine months of data). The early utilization by individuals with low social vulnerability could be because those individuals were in priority vaccination groups, meaning we could be seeing the prioritization of utilization, while an equity problem may not exist.

Research suggests that the relationship between social vulnerability and vaccines is not consistent in all areas. For example, Hughes et al. (2021) found that in five states: Arizona, Alaska, Minnesota, Montana, and West Virginia, high social vulnerability was associated with

higher vaccination rates (although the relationship between social vulnerability for Arizona and Montana was found at the state level, not the county level). This means that areas where people are the most vulnerable received a higher number of vaccinations. Hughes et al. (2021) credit efforts such as prioritizing high risk groups for the vaccination, providing transportation to vaccination sites, partnering with community organizations, sending vaccines to socially vulnerable areas, and addressing barriers to vaccines as methods used by states with social equity in vaccine distribution.

The CDC through its Morbidity and Mortality Weekly report revisited the extent to which vaccines were delivered with social equity in May 2021 and found that the vaccination gap between counties with high and low social vulnerability widened between March and May 2021 (Barry et al., 2021). The relationship between social vulnerability and vaccination rate persisted among all age groups (Diesel et al., 2021). This is notable because as of May 2021, all adults in the U.S. were eligible to receive the vaccination (Barry et al., 2021). This trend was also present in subgroups. When analyzing vaccination rates for only older adults (above the age of 64) who were vaccinated between December 14, 2020, and April 10, 2021, counties with high social vulnerability still had lower vaccination rates (Whiteman et al., 2021). Counties with older adult vaccination rates below 50 percent also had higher rates of elderly adults without computer/internet access, poverty rates, and percent of older adults living alone. This means that even among a subset of the socially vulnerable population (the elderly), those with greater social vulnerability still have lower vaccination rates, or that the pattern persists among multiple levels of analysis. Again, we must be careful in interpreting these results, as we could be seeing an equity issue, but because we cannot know what populations within each county are vaccinated, it is possible that people who are socially vulnerable (ex. minorities, people without a vehicle)

could be vaccinated at fairly high rates and people living in the socially vulnerable counties who

are not socially vulnerable (high income, white, etc.) could not be vaccinated, perhaps because of

ideological opposition to the vaccine. While it is not entirely clear whether there is equity in

vaccine distribution, the existing research, which is summarized below in table 3, suggests equity

issues to some extent in vaccine distribution, there is a need for further research to capture 1)

more recent trends in equity as the vaccine distribution continues and 2) equity with additional

social vulnerability measures (such as the SoVI).

Table 3: Summary of empirical research on social vulnerability and COVID-19 vaccinations in the United States

Authors	Social equity measure	Sample size	Dates examined by the study	Findings
Barry, 2021	CDC SVI	3,129 (counties)	3/21-5/21	The vaccination gap between counties with high and low social vulnerability widened between March and May 2021.
Brown et al., 2021	CDC SVI	2,415 (counties)	12/20-5/21	Counties with lower community vulnerability scores had higher vaccination rates.
Crane et al., 2021	CDC SVI	2,868 (counties)	3/21-8/21	Counties with higher social vulnerability scores had lower vaccination rates and the differences in vaccination rate increased over time.
Hughes et al., 2021	CDC SVI	49,264,338 (people)	12/20 -3/21	Vaccination rates in counties with low social vulnerability either had higher rates of COVID-19 vaccinations or rates equal to that of areas with high social vulnerability.
Painter et al., 2021	Gender, race	12,928,749 (people)	12/20-1/21	Most people who received a vaccination in the first month of administration were female (63%) and White (60%).
Rifai et al., 2021	CDC SVI	50 (states)	12/20-8/21	When examining social vulnerability on a state level, states with higher social vulnerability tended to receive fewer COVID-19 vaccines.
Thakore et al., 2021	CDC SVI (each domain	1,738 (counties)	12/20-4/21	Counties that were most vulnerable in terms of SES, household composition/disability, and minority status/language had lower vaccination rates.

Authors	Social equity measure	Sample size	Dates examined by the study	Findings
	separately considered)			
Wang et al., 2021	CDC SVI (8 domains considered)	168 (towns)	12/20-4/21	Six domains of social vulnerability had a negative relationship with vaccination rates in towns in Connecticut among older adults (65+).
Whiteman et al., 2021	CDC SVI	42,736,710 (people)	12/20-4/21	Among a subset of the socially vulnerable population (the elderly), those with greater social vulnerability still have lower vaccination rates, or that the pattern persists among multiple levels of analysis.
Wong et al., 2021	Race	100 (counties)	12/20-4/21	Between March and April 2021, a greater proportion of Black residents in North Carolina were vaccinated when compared to December-January 2021. This coincided with outreach and policies focusing on underserved communities.

Although past studies examined the relationship between social vulnerability and vaccine administration, more research is needed. The existing studies do not cover the entire first year of vaccine administration, which the current study will address. This is important because early in the pandemic, vaccines were scarce and over time, they became more easily accessible (American Journal of Managed Care, 2021). Most prior research focus on time periods when vaccines were scarce, and this study will focus on one year after the vaccine was released, a time when vaccines were still needed, and resources were available.

In addition, the existing studies are centered in health care literature, with few contributions to the emergency management/public administration disciplines. This study explores vaccine equity from an emergency management/public administration perspective. Public administration and emergency management literature and theories will lead the study and the findings will be focused on contributing to these two disciplines.

Finally, existing studies use either the CDC SVI as a measure of social vulnerability or individual indicators, such as age or gender. This study uses all individual components of the CDC SVI and SoVI measures, meaning this study utilizes a more comprehensive social vulnerability measure than existing studies.

Theoretical Framework

The literature review thus far focused on exploring the concepts in the research questions and the context around which they will be studied, mainly social vulnerability, social equity, resilience, administrative burdens, and COVID-19. This section uses two main theories, conflict theory and social construction and policy design theory, to explore why the researcher expects to see results predicted in the hypotheses below. This sub-section provides a theoretical framework developed for this study, then explains both theories individually, including their application to the framework and the research questions in the dissertation.

This dissertation approaches social vulnerability from a political economy and ecology perspective, where political and economic system failures result in inequality (Burton, Rufat, & Tate, 2018). From this perspective "organizational, institutional, and political contexts shape local capacities," which ultimately impacts vulnerability (Birkmann et al., 2013, p.198). A lack of resources increases vulnerability, which increases risk when confronted with a hazard (Burton et al., 2018). The vulnerability exists regardless of whether there is an emergency, but once an emergency (or another stressor) occurs, the vulnerability differences of communities becomes clear (Burton et al., 2018). Context is also relevant to addressing social vulnerability from a political economy and ecology perspective, as societal issues combine with hazards to create a disaster (Burton et al., 2018). The theoretical framework for this study is illustrated in figure 1 and relies on two main theories: conflict theory and social construction and policy design theory.

Conflict theory explains why community social vulnerability varies and social construction and policy design theory explains that the policies to distribute resources are designed to prioritize providing resources to communities with low social vulnerability. Each theory will be explored below, as well as its application to the current study.
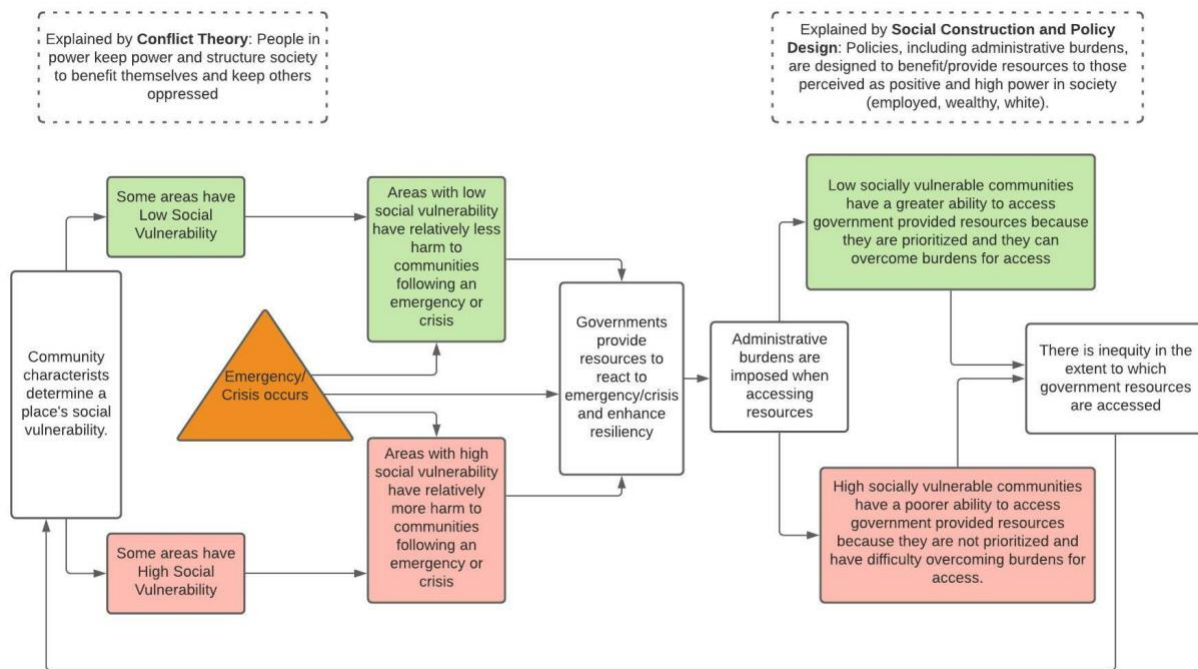
Figure 1 Theoretical framework.

Source: Author

Conflict Theory

According to conflict theory, resources are not equally distributed throughout society and societal structures are designed to keep those with power in power (Simon, 2016; Turner, 1975). As the distribution of resources becomes less equal, conflict between groups increases (Turner, 1975). Based on this theory, the theoretical framework of this dissertation theorizes that society develops into areas of high and low social vulnerability, based on concentration of resources. Areas of low social vulnerability tend to have resources and community characteristics that make those areas more prepared for and able to respond to emergencies and crises. Areas of high social

vulnerability have fewer resources and are less able to prepare for and respond to emergencies and crises. This leads to varying degrees of harm when faced with an emergency or crisis because areas, where typically communities with low social vulnerability endure less harm and communities with high social vulnerability endure more harm. In response, the government typically steps in to provide resources to react to an emergency or crisis with the goal of increasing resources. Accessing those resources is essential in communities with high social vulnerability because they have a lower capacity to respond to emergencies and a greater risk of harm endured because of the emergency/crisis.

Social Construction and Policy Design Theory

Social construction and policy design theory explores how and why different groups do or do not benefit from laws and policies (Pierce et al., 2014). According to the theory, laws and policies are developed based on socially constructed values. Those social constructions impact how groups are perceived, the amount of power a group is afforded, and how policies are developed (Pierce et al., 2014). Groups with high power and positive connotations are deemed worthy of government benefits, while groups with low power and negative connotations are worthy of limited benefits. This ultimately influences policies that impact how resources are allocated and utilized (Schneider & Ingram, 1993; Schneider & Sidney, 2009).

Schneider and Ingram (1993) developed a matrix to illustrate how groups fall into four categories according to the theory, as shown in figure 2. Groups are categorized as advantaged, contenders, dependents, or deviants. The categorization depends on a group's level of power, and whether the group has a positive or negative connotation. According to Ingram et al. (2007), policies primarily benefit advantaged groups with high power and positive connotation, which includes people who are employed, police, teachers, and homeowners. Contenders include

groups with high power and negative connotation, such as the wealthy, people of color, the

insurance industry, and political activists (Ingram et al., 2007). Policies tend to benefit

contenders, but their benefits are not openly identified in policies because of the negative

connotations associated with these groups. However, they still tend to receive benefits, especially

when compared to deviants. Dependents, groups with positive connotations and low power, tend

to receive fewer benefits because of their low power, but are considered worthy of the benefits

they receive (Ingram et al., 2007). Dependents include people with disabilities, mothers,

children, and Native Americans. Finally, deviants are groups with low power and negative

connotation, which includes criminals, undocumented immigrants, people in poverty, and

minimum wage workers (Ingram et al., 2007). Policies are developed to punish or limit services

for deviants (Ingram et al., 2007).

	Positive	Negative
High Power	People who are employed, police, teachers, homeowners (Advantaged)	The wealthy, people of color, insurance industry, political activists (Contenders)
Low Power	People with disabilities, mothers and children, native Americans (Dependents)	Criminals, undocumented immigrants, people in poverty, minimum wage earners (Deviants)

Figure 2: Matrix application of social construction and policy design to theoretical framework

Source: Schneider & Ingram, 1993; Ingram et al., 2007; Author

This dissertation theorizes that policies to distribute resources during an emergency or

crisis are designed to favor groups with high power and positive connotations. Prior to an

emergency or crisis, there are communities with high social vulnerability and communities with

low social vulnerability (Cutter & Finch, 2008). When an emergency occurs, governments

provide resources aimed at enhancing resilience following an emergency or crisis (Kapucu &

Sadiq, 2016), and this dissertation theorizes that consistent with social construction and policy design, the policies to distribute those resources are designed to prioritize communities that have power and have a positive connotation. Typically, these communities have many members of groups with low social vulnerability (employed, homeowners, white, etc.) (Schneider & Sidney, 2009). When providing resources and designing policies to distribute such resources, administrative burdens can be placed on those receiving resources (learning, compliance, and psychological costs) (Plein, 2019). Please note, that although many studies on administrative burdens focus on bureaucratic encounters, where governments are directly interacting with citizens, this study approaches administrative burdens from the perspective of extra-organizational to extra-organizational interactions, or interactions between organizations external to the government and citizens. Such relationships can contribute to the administrative burdens in accessing government services (Heinrich, 2016). This dissertation theorizes that communities with high social vulnerability are less able to overcome those administrative burdens, and the policies, including the administrative burdens imposed, are designed to favor access in communities with low social vulnerability.

Essentially, government policies make it difficult for communities with high social vulnerability to utilize resources. This is consistent with existing literature, which found that access to FEMA assistance following past crises has been especially difficult for socially vulnerable communities because of isolation in rural communities, language barriers, and difficulties navigating regulatory processes (Clark-Ginsberg et al., 2020). This could be a failure to allocate resources to communities with high social vulnerability, but it could also be that a lack of trust in these communities inhibits access to resources that are in the socially vulnerable community. Trust in government tends to be lower in marginalized populations, such as African

Americans (Koch, 2019), low-income individuals (Houston & Harding, 2013), and individuals with low education levels (Schoon & Cheng, 2011). During emergencies, distrust of emergency managers and government representatives has been documented and even impacted the extent to which individuals took protective actions, such as evacuating when confronted with an emergency (McEntire, 1999). Thus, if there is a lack of trust in the government among socially vulnerable populations, they could be less likely to receive services because they could have less trust in the public programs and officials providing such services and resources.

The policies to access government resources available after an emergency are the same for both communities with high and low social vulnerabilities, but this dissertation theorizes that the ways the policies are designed favor communities with low social vulnerability. As such, this dissertation theorizes that policies ignore access difficulties in communities with high social vulnerability. This leads to inequity in the extent to which government resources are accessed. Without those resources, communities with high social vulnerability will be unable to be resilient and return to normalcy, meaning their community characteristics can change because of the emergency, ultimately leading to higher social vulnerability (Bergstrand et al., 2015).

While this theoretical framework describes the relationship between social vulnerability, government resources, and administrative burdens during an emergency or crisis, this dissertation will focus on social equity as an outcome, not changes in social vulnerability following a crisis. There is not a clear understanding regarding whether resources are equitably distributed following a disaster or crisis and the role played by administrative burdens, so this dissertation will focus on a portion of the theoretical framework. However, the entire theoretical framework is needed to understand the context and significance of this study.

This dissertation aims to examine the relationship between social vulnerability and emergency management as a method of examining the extent to which there is social equity in vaccine resource utilization during an emergency. Specifically, the dissertation examines the relationship between social vulnerability and vaccine resource utilization during COVID-19. If a significant negative relationship exists, the researcher interprets this as evidence of social inequity and the study further examines what barriers contribute to this inequity. To examine this relationship, three specific research questions will be examined: (1) What is the relationship between community social vulnerability and COVID-19 vaccine administration? (2) Did individuals trying to access the COVID-19 vaccine encounter administrative burdens? (3) How do the administrative burdens experienced by individuals when trying to access the COVID-19 vaccine provide a better understanding of the relationship between social vulnerability and COVID-19 vaccine administration?

The research questions, associated hypotheses, and application to the theoretical framework are explored below in Table 4. This study focuses on COVID-19 as the context for an emergency/crisis and explores COVID-19 vaccines as the resource provided by governments to enhance resiliency.

Table 4: Research Questions and Associated Hypotheses

Research Question	Hypothesis	Application to framework
RQ_1:What is the relationship between community social vulnerability and COVID-19 vaccine administration?	H_1: Counties with higher social vulnerability will receive fewer vaccines compared to counties with lower social vulnerability.	Vaccine distribution policies have social inequity issues. As such, policies are designed to provide easy access in communities with low social vulnerability and make accessing the vaccine difficult in communities with high social vulnerability because policies are designed to benefit groups that

		have high power/positive connotations.
RQ2: Did individuals trying to access the COVID-19 vaccine encounter administrative burdens?	N/A (Qualitative Question)	N/A (Exploratory)
RQ3: How do the administrative burdens experienced by individuals when trying to access the COVID-19 vaccine provide a better understanding of the relationship between social vulnerability and COVID-19 vaccine administration?	**H2**: The relationships between components of social vulnerability and county vaccination rate is further explained by the administrative burdens identified qualitatively.	The social vulnerability of a geographic area is related to vaccine utilization where the administrative burdens imposed are issues that primarily impact communities of high social vulnerability because policies tend to favor people perceived as positive and powerful, who are generally concentrated in communities with low social vulnerability.

CHAPTER THREE: RESEARCH DESIGN

Research Design

This dissertation uses an explanatory sequential mixed-methods design to address the research questions explored above, which is detailed below in figure 3. Explanatory sequential mixed methods studies are used when the quantitative results are explained by the qualitative results to provide a more in-depth explanation of the quantitative findings (Creswell & Plano Clark, 2018). This research design can be used to gain insight into the quantitative results, more specifically why they occurred and how they can be explained (Creswell & Plano Clark, 2018). With explanatory sequential mixed methods studies, quantitative data are collected and analyzed, then, in the next phase of the study, the qualitative process is developed based on the quantitative results. The qualitative data are then collected and analyzed, and then the qualitative findings are used to further explain the quantitative results (Creswell & Plano Clark, 2018).

In the current study, the quantitative phase was conducted to determine which components of social vulnerability are related to community vaccination rate through a regression analysis. Those components were used to develop an interview protocol regarding administrative burdens specific to those components. For example, if the OLS regression found a statistically significant relationship between median income in a county and percent of the population that is vaccinated, the researcher would develop at least one interview question specific to income, such as "Did you experience any financial constraints when getting or trying to get the COVID-19 vaccine? Please explain your answer." The interviews were administered to a convenience sample of 31 adults who have been vaccinated. The researcher then analyzed the results of the interviews in Dedoose, a qualitative software, for themes. The researcher then compared the quantitative and qualitative findings, including how the qualitative findings provide an enhanced understanding of the quantitative findings.

Phase	Procedure	Product

Quantiative Data Collection
- Secondary data analysis (N = 3,143)
- Numeric data

Quantiative Data Analysis
- Data screening
- Frequiencies
- Regressions
- STATA 13.0

- Descriptive statistics, missing data, linearity, homoscedasicity, normality
- Descriptive statistics
- Significance values

Interview Protocol Development
- Develop interview protocol to explore what administrative burdens in accessing vaccines exist
- Interview questions examining social vulnerability components statistically related to county vaccine rates

- Interviews
- Sample (n=31)

Qualitative Data Collection
- Select 31 participants
- Conduct interviews

- Interview transcripts

Qualitative Data Analysis
- Coding and thematic analysis
- Dedoose

- Major themes and codes
- Description of the administrative burdens related to social vulnerability that impact getting a vaccine

Integration of the Quantative and Qualitative Results
- Explain how the quantative and qualitative results answer the research questions

- Discussion
- Implications/policy recommendations
- Future research

Figure 3: Explanatory sequential mixed methods diagram.

Source: Creswell & Plano Clark, 2018; Author

The quantitative research design uses cross-sectional county-level data to answer research question 1. To answer research question 2, a qualitative research design is used. To answer research question 3 the findings from research questions 1 and 2 are combined using a triangulation multilevel mixed-methods design. Please note the specific type of mixed methods design is a triangulation multilevel design because two different units of analysis for the quantitative and qualitative data are used (Creswell & Plano Clark, 2018). This approach allows

topics to be analyzed within different levels of a system, rather than relying on a single level for analysis (Gelo et al., 2008; Salemi et al., 2015). In this study, rather than relying solely on the community level, this dissertation also examines the individual level. Because individuals make up communities, understanding their experience with administrative burdens at the individual level will help to explain why there is an observed relationship between vaccine rates and social vulnerability (assuming there is such a relationship) and what types of specific interventions can be implemented by governments to ease the barriers and potentially reduce any inequities in vaccination rates. The research designs for this study are summarized below in Table 5.

Table 5: Summary of Research Designs Used in Dissertation

Research Question	Research Design	Unit of Analysis	Data Source
RQ$_1$: What is the relationship between community social vulnerability and COVID-19 vaccine administration?	Cross-sectional quantitative	Counties	Publicly available data from the U.S. Census and the CDC
RQ$_2$: Did individuals trying to access the COVID-19 vaccine encounter administrative burdens?	Qualitative	Individuals	Participant interviews
RQ$_3$: How do the administrative burdens experienced by individuals when trying to access the COVID-19 vaccine provide an enhanced understanding of the relationship between social vulnerability and COVID-19 vaccine administration?	Explanatory Sequential Mixed-Methods	Individuals	Participant interviews

Population and Sample Selection

The current study is a national study. Counties, rather than zip codes or states, were selected as the unit of analysis for the quantitative portion of the study for several reasons. First, states are large geographic units with wide ranges of social vulnerability and the researcher was

concerned that conducting the study at the state level would not capture many of the nuances in the social vulnerability measure. Rather than capturing the areas with high and low social vulnerability, an average social vulnerability for the state could skew the results of the study. Second, COVID-19 vaccine data at the zip code level were only available in seven states (Zylla et al., 2021), and the researcher was concerned that those seven states, mostly moderate to high income coastal states, would not be representative of other areas in the U.S. Finally, measurement at the county level intuitively makes sense for this study because data are available for all counties in the U.S. and because emergency management functions are generally positioned at the county level (Kapucu et al., 2013b; Waugh, 1994), meaning the findings can be used by practitioners at the county level. This study uses total population sampling to collect the quantitative data. Total population sampling occurs when the entire population is included in a sample (Maul, 2018). Because vaccination data are available for every U.S. county, total population sampling is possible. In total, all 3,143 counties and county equivalents are included in the study (U.S. Census, 2021).

The unit of analysis for the qualitative portion of this study is individuals because individuals experience administrative burdens (Moynihan et al., 2016). The researcher worked with the University of Central Florida's Institute for Social and Behavioral Science (ISBS) to recruit participants for interviews. The ISBS is a community centered research institute, which regularly partners with community organizations to conduct qualitative and quantitative research. The ISBS worked with their existing community partners to recruit adults in Orange County, Florida, who have received the COVID-19 vaccine and conduct interviews with them. Orange County, Florida was selected because of accessibility to participants and because the ISBS has existing relationships with organizations in Orange County, which made data collection more

efficient. While examining the experience of Orange County residents provides insights into administrative burdens, the findings are not statistically generalizable. In qualitative research, generalization takes shape as transferability (or allowing those learning about the research to understand and relate to the findings) and naturalistic generalizations (or making changes based on the understanding of the research) (Tracy, 2010). The qualitative findings from this research are not meant to be generalizable to all other counties, but aim for naturalistic generalizations for public servants and policymakers in counties with social vulnerabilities similar to that of Orange County. In 2018, Orange County was ranked 1,289 out of 3,143 in terms of its social vulnerability by the CDC, with approximately 59.2% of residents being minorities, 22.5% being under the age of 17, 21.4% living in housing structures with 10 or more units, and 16.1% living below the poverty line. Thus, while the qualitative findings are not necessarily useful to all policymakers and public servants, those in counties with mid-level vulnerability, and high percentages of minorities, children under the age of 17, housing structures with many units, and poverty levels may relate to the qualitative findings and make changes based on their understanding of the research.

Because the researcher used the ISBS to recruit participants, and the participants were those who the community partner was able to recruit, convenience sampling, a nonprobability sampling design, was used to collect the qualitative data. Probability sampling methodologies are preferential because they use "statistical theory to examine the properties of sample estimators" (Kalton, 1983, p. 90). Responses using non-probability sampling methodologies can be biased and cannot be analyzed for biases and errors (Kalton, 1983; Henry, 1990). Despite the limitation of nonprobability sampling, such sampling methods are widely used in research because of cost and time limitations (Kalton, 1983). Although probability sampling is preferable, nonprobability

sampling was used in this dissertation because of time and resource constraints. This study

sampled 31 individuals in the U.S. over the age of 18. The sample size is reasonable for the

researcher given the cost of administering interviews. Unlike quantitative research, with

qualitative research, a specific sample size is not needed for validity (Yin, 2016). Instead, a

sample is generally considered sufficient once the responses are redundant (Yin, 2016). Yin

(2016) acknowledges that due to time and resource restraints, researchers estimate the sample

size needed for a qualitative study. For this study, 31 interviews were sufficient to reach

redundancy.

Data Collection and Variables

This section explores the data collection processes and variables for the study. Each

variable for the quantitative portion of this study is explored, including its purpose in the study,

reason for inclusion, measurement, and data source. Following the quantitative variables, the

concept explored in the qualitative portion of the study is explored, including its purpose in the

study, reason for inclusion, and data source.

Quantitative Variables.

Vaccines Administered

Purpose and Reason for Inclusion

Vaccines administered is the dependent variable for this study. Vaccines represent a

resource provided to help communities cope with and recover from COVID-19. There can be a

relationship between vaccines and social vulnerability as explained in the literature review.

Vaccines are resources that can enhance community resilience during emergencies (Chandra et

al., 2011) and because of their importance in community recovery, vaccines are the key dependent variable of interest in this study.

Measurement and Source

For this study, vaccine administration is defined as the percent of adults over the age of 18 in a county who received the complete series of the COVID-19 vaccine (2 doses for MRNA platforms and 1 dose for adenovirus-based vaccine platforms) as of 12/12/21. Information was collected on people who received a full vaccine series instead of information on the first dose because the vaccine is more effective when the series is complete (see for example Lopez Bernal et al., 2021). These data were gathered from the CDC vaccine delivered and administration data. These data from the CDC were reported by providers administering vaccines, and have been condensed into a centralized database, cleaned, and analyzed by the CDC (CDC, 2021b). This is a continuous variable.

Social Vulnerability

Purpose and Reason for Inclusion

Social vulnerability is the primary independent variable in this study. Its significance and relationship to vaccine access were explored in the literature review and theoretical framework. Social vulnerability has been used as a proxy measure for social equity (see for example Emrich et al., 2020) and will be used as a proxy measure in the current study. Social vulnerability impacts the ability of communities to respond to emergencies, their need for additional resources, and their ability to be resilient (Comfort et al., 1999; Cutter 1996; Cutter & Finch, 2008). Thus, social vulnerability could impact the extent to which vaccines are administered in a geographic area, and such a relationship would indicate the extent to which there is a social

46

equity issue. Because this study examines the relationship between social vulnerability and vaccine administration, social vulnerability is the primary independent variable of interest.

<u>Measurement and Source</u>

Thirty-four individual measures are used for social vulnerability: percent of households in a county below the poverty line, per capita income in a county, percent of people in a county who are under the age of five, percent of people in a county who are under the age of 17, percent of people in a county who are over the age of 65, median age, percent of people in a county who are unemployed, percent employment in extractive industries, percent employment in service industries, percent female in the labor force, percent households receiving social security benefits, percent households earning over $200,000 annually, percent of people in a county who are who do not have a high school diploma, percent of people in a county with a disability, number of nursing home residents per capita in a county, percent of households in a county that are single-family households, percent female, percent of households in a county that speak English less than well, percent of households in a county without a car, number of people per housing unit, percent renters in a county, median housing value, median gross rent, percent of households spending more than 40% of their income on housing costs, percent mobile homes, percent unoccupied housing units, percent of housing units in a county with 10 or more units in the structure, percent total occupied housing units with more than one person per room, percent of persons who are in institutionalized group quarters, percent of county population that is a minority, percent of county population that is Asian, percent of county population that is Black, percent of county population that is Hispanic, percent of county population that is Native American, and percent of population without health insurance. These measures are used in either the SoVI or SVI, the two primary indices that measure social vulnerability as explored in the

literature review. The indices themselves were not used, and instead, the components of the SoVI and the SVI were used because of validity issues raised by past research studies (see for example, Goodman et al., 2021 and Rufat et al., 2019). Data for the SVI were originally gathered by the CDC from the U.S. Census. The researcher gathered the census data from the CDC website, which provides data on each component for counties in all 50 states. Data for the SoVI were also originally gathered from the U.S. Census and the researcher gathered the data from the Vulnerability Mapping Analysis Platform, the organization that houses SoVI data. This study uses data from 2018, which is the most recent data available for the SVI and SoVI components.

Vaccine Hesitancy

Purpose and Reason for Inclusion

There could be a relationship between vaccine hesitancy for the COVID-19 vaccine and the number of vaccines administered in a county, which is why vaccine confidence is included in this study as a control variable. There have been few studies at the time of this study on vaccine hesitancy and confidence in the COVID-19 vaccine, but initial studies found that vaccine hesitancy is common. For example, Khubchandani et al. (2021) found that among a convenience sample of 1,878 individuals surveyed in June 2020, only 52% reported that they were very likely to get the COVID-19 vaccine.

Measurement and Source

For this study, vaccine hesitancy refers to the percent of people in a county who reported they would definitely not, probably not, or were unsure whether they would receive the COVID-19 vaccine. This is a continuous variable, and the data were gathered from the CDC County

Hesitancy Estimates. These estimates were based on data from the U.S. Census Household Pulse Survey, which was administered to U.S. households from May 26 to June 7, 2021 (CDC, 2021c).

County Political Affiliation

Purpose and Reason for Inclusion

Existing research has found a relationship between political affiliation and decisions regarding whether to seek and receive a COVID-19 vaccine. During the COVID-19 pandemic, political affiliation impacted COVID-19 risk perception, confidence in the vaccine approval process, and reported intention to receive a vaccine (Lin et al., 2021). Latkin et al. (2021) found that individuals who reported that they were Democrats and liberal had greater trust in the COVID-19 vaccine when compared to Republications and conservatives. Because there could be a relationship between political affiliation and vaccine attitudes, county political affiliation is included as a control variable in this study.

Measurement and Source.

County political affiliation is measured through county preference for the presidential candidate during the 2020 presidential election. The data for this control variable were gathered from the New York Times reporting on the 2021 presidential election. This variable is a categorical variable.

<u>Governor Political Affiliation</u>

<u>Purpose and Reason for Inclusion</u>

As leaders of their states, governors set pandemic policies and played pivotal roles in pandemic responses during the COVID-19 pandemic (Sadiq et al., 2020). Governors played a major role in setting pandemic and vaccine policies (such as setting vaccine mandate policies, dedicating resources to vaccinations, and promoting vaccines within states) and their decisions impacted the actions taken by other state and local government officials (Lofaro & Sapat, 2022; Osman & Sabit, 2022). Pandemic related policies set by governors were largely partisan, where democratic governors tended to implement more stringent pandemic policies, such as implementing stay-at-home orders and mask mandates earlier in the pandemic, when compared to republican governors (Baccini & Brodeur, 2020; Chen et al., 2022; Sadiq et al., 2020). To account for the potential relationship between governor affiliation and county vaccination rate, governor affiliation is included as a control variable.

<u>Measurement and Source</u>

Governor political affiliation is categorized as either being democrat or republican, based on the political party affiliation of the state governor. The data for this control variable were gathered from the National Conference of State Legislatures (NCSL) (2021). This is a categorical variable.

State Legislative Minority Representation

Purpose and Reason for Inclusion

Existing research suggests that the racial makeup of elected officials can impact policy

development and agenda setting, and that increased diversity is associated with greater

prioritization of issues important to minority communities (Griffin, 2014; Meier et al., 2005;

Minta & Sinclair-Chapman, 2013; Preuhs, 2006). This suggests that state legislatures with more

minority representation could set COVID-19 response and vaccination policies differently (and

possibly with greater equity toward minority communities) than state legislatures with less

minority representation. Because there could potentially be a relationship between minority

representation and COVID-19 vaccination and response policies, minority representation is

included as a control variable.

Measurement and Source

Information regarding state legislative minority representation was gathered from NCSL.

The data represent the percent of the state legislature that was Black, Hispanic, Asian, Native

American, multi-racial, or race other than White/Caucasian in 2020 (NCSL, 2020). This is a

continuous variable.

Divided State Government

Purpose and Reason for Inclusion

When the state government is divided, or when the state governor and legislature are not

controlled by the same political party, tensions can arise, which can impact the policy outcomes

during a crisis. Previous research found that the extent to which there was divided control of

state governments impacted COVID-19 policy decisions, such as whether and when to implement a lockdown to slow the spread of COVID-19 (Kettl, 2020; Warner & Zhang, 2021). Whether the state government is divided can also potentially impact vaccine distribution and utilization policies, which is why the dissertation includes a control variable to specify whether the county is part of a state with a divided government.

Measurement and Source

Divided state government is categorized as either having a divided or unified government. For this study, governments are categorized as divided if the state legislature and the governor were of different political parties in 2021 (for example, if the legislature is republican and the governor is a democrat). When state legislatures and governors are both part of the same political party, the government is considered unified. In cases where the legislature is equally divided among democrats and republicans, the government is also considered divided. The data for this control variable were gathered from NCSL (2021). This is a categorical variable.

Local Health Department Structure

Purpose and Reason for Inclusion

Because many COVID-19 pandemic strategies and decisions were guided by politics, not science (Sadiq et al., 2020), there could be a relationship between political influence and vaccine distribution decisions at the local level. By including a variable specifying the structure of the local health department, independent authority for local health departments is controlled, which could potentially be related to equitable vaccine distribution.

For this study, local health department structure is categorized as either having local governance or not having local governance. Local governance indicates that health departments are units of local government, rather than state government. Data for this variable were gathered from the National Association of County and City Health Officials (NACCHO) 2019 National Profile of Local Health Departments report. The NACCHO (2019) report categorized states as having either (1) local governance, where all health departments in a state are units of local government, (2) state governance, where all health departments in a state are units of state government, (3) shared governance, where all health departments in a state are governed by both state and local authorities, or (4) mixed governance, where health departments in a state have more than one governance type. Each state was recategorized as either having a local health department governance structure or other. I applied the state categorization to each of the counties in the state, as indicated in the 2019 NACCHO report.

Qualitative Variable

Administrative Burdens

Purpose and Reason for Inclusion

Administrative burdens inhibit the ability of individuals to access government services (Bell et al., 2021). Since vaccines are a government provided service, they could impact the extent to which individuals can access services. Thus, this study examines the types of administrative burdens individuals encounter when trying to access vaccines.

Administrative burdens in this study are defined as learning, psychological, and/or compliance costs encountered when trying to obtain a COVID-19 vaccine. This is consistent with the definition of administrative burdens developed by Moynihan et al. (2014), which conceptualized administrative burdens in these three categories. To collect data, this study used interviews with a convenience sample of adults in Orange County, Florida, through ISBS. A summary of the variables, measurements, data sources, and analyses used in this study are listed below in Table 6.

Data Analyses

This study uses OLS regression and thematic analysis to analyze the data collected. Data for research question 1 were analyzed with OLS regression to determine whether there is a relationship between community social vulnerability and COVID-19 vaccine administration.

Because of the large number of variables, there is a risk of multicollinearity, and the researcher used exploratory factor analysis as a data reduction strategy to limit the number of variables in the model. The researcher used exploratory factor analysis to reduce the number of variables based on their intercorrelation. This approach is commonly used when there is no prior empirical work or strong theory suggesting that the variables in the model could have latent factors and has been used in past social vulnerability studies (Finch, 2020; Holand et al., 2011). Each dimension of social vulnerability was examined as part of the exploratory factor analysis. After the factor analysis was complete, the researcher conducted a varimax rotation, which transforms the factors into a more interpretable format (Borden et al., 2007). Following the exploratory factor analysis, the researcher created an index for each factor by calculating the factor scores for each factor. The index is a factor score, where each item in the index was

weighted based on its relationship to the first factor. A weighted approach was used because all components do not contribute to vulnerability equally (Jagarnath et al., 2020).

Then, the researcher ran an OLS regression model using the factors as independent variables and the percent of the county that was vaccinated as the dependent variable. Equity was evaluated for each factor index based on statistical significance. This relationship is analyzed using STATA 15.1. The equation for this relationship is:

$Y = \beta_0 + \beta_1$ (social vulnerability factor(s) identified through factor analysis) + β_2 (Vaccine Hesitancy) + β_3 (County Political Affiliation) + β_4 (Governor Political Affiliation) + β_5 (State Legislative Minority Representation) + β_6 (Divided State Government) + β_7 (Local Health Department Structure) + e

Data for research question 2 were analyzed with thematic analysis to determine the administrative burdens related to obtaining the COVID-19 vaccine and any specific burdens related to social vulnerability. The interview transcripts were entered into Dedoose, a qualitative coding analysis software, and the researcher used open coding, where major categories are developed and coded, and axial coding, where subcategories are developed and coded under the major codes (Creswell et al., 2007). Following these steps, the researcher used selective coding to develop themes based on the open and axial codes (Creswell et al., 2007). Please note that while often qualitative coding is completed by more than one coder to encourage validity (Schreier, 2020), in this dissertation, coding was completed only by the researcher. Scholars recognize that it is not always possible for multiple coders to analyze qualitative data, such as when analyzing data for a dissertation (Kuckartz, 2013), and that because of monetary or logistical limitations, often, early career researchers use a single coder (MacPaheil et al. 2016). In public administration research, single coders are often successfully used in published research (see for example, Fyall, 2016; Knox, 2016; Knox, 2022; Small, 2012).

After the qualitative and quantitative data were analyzed, the findings were compared and integrated to explore the extent to which there was consistency between the qualitative and quantitative findings and how the qualitative data provided an enhanced understanding of the quantitative findings. According to Creswell et al. (2007), explanatory sequential research designs can integrate results through a joint display. The researcher developed a side-by-side joint display comparison to examine consistency between qualitative and quantitative findings.

Table 6: Summary of Variables, Measurements, Data Sources, and Analyses

Research Question	Variable/ Concept	Definition	Measurement	Source	Sample	Analysis
RQ₁: What is the relationship between community social vulnerability and COVID-19 vaccine administered?	Dependent: Vaccines administered	Percent of adults over the age of 18 in a county who received the complete series of the COVID-19 1st vaccine as of 12/12/21.	Continuous	CDC vaccine delivered and administration data	All U.S. Counties	OLS Regression
	Independent: Social Vulnerability	Percent below poverty	Continuous	U.S. Census		
		Per capita income	Continuous	U.S. Census		
		Percent of people under the age of 5 and over the age of 65	Continuous	U.S. Census		
		Percent of people in a county who are under the age of 17	Continuous	U.S. Census		
		Median age	Continuous	U.S. Census		
		Percent unemployed	Continuous	U.S. Census		
		Percent employment in extractive industries	Continuous	U.S. Census		
		Percent employed in service industry	Continuous	U.S. Census		
		Percent female participation in labor force	Continuous	U.S. Census		
		Percent households receiving social security benefits in a county	Continuous	U.S. Census		
		Percent households earning over $200,000 annually	Continuous	U.S. Census		

Research Question	Variable/ Concept	Definition	Measurement	Source	Sample	Analysis
		Percent of people without a high school diploma (over the age of 25)	Continuous	U.S. Census		
		Percent of people with a disability	Continuous	U.S. Census		
		Nursing home residents per capita in a county	Continuous	U.S. Census		
		Percent of households that are single-parent households	Continuous	U.S. Census		
		Percent female	Continuous	U.S. Census		
		Percent that speak English less than well	Continuous	U.S. Census		
		Percent of households without a car	Continuous	U.S. Census		
		Number of people per household	Continuous	U.S. Census		
		Percent renters	Continuous	U.S. Census		
		Median value of owner-occupied housing units	Continuous	U.S. Census		
		Median gross rent	Continuous	U.S. Census		
		Percent of households spending more than 40% of their income on housing costs	Continuous	U.S. Census		
		Percent mobile homes	Continuous	U.S. Census		
		Percent vacant housing units	Continuous	U.S. Census		
		Percent of housing units in a county with 10 or more units in the structure	Continuous	U.S. Census		

Research Question	Variable/ Concept	Definition	Measurement	Source	Sample	Analysis
		Percent total occupied housing units with more than one person per room	Continuous	U.S. Census		
		Percent of persons who are in institutionalized group quarters	Continuous	U.S. Census		
		Percent of county population that is a minority	Continuous	U.S. Census		
		Percent Asian	Continuous	U.S. Census		
		Percent Black	Continuous	U.S. Census		
		Percent Hispanic	Continuous	U.S. Census		
		Percent American Indian or Alaska Native	Continuous	U.S. Census		
		Percent of population without health insurance (under 65)	Continuous	U.S. Census		
	Control: Vaccine hesitancy	Number of people per capita in a county that reported they would definitely not, or probably not, or were unsure if they would receive a COVID-19 vaccine	Continuous	CDC Vaccine Hesitancy for COVID-19: County and local estimates	All U.S. Counties	
	Control: County Political Affiliation	County preference of presidential candidate in the 2020 presidential election.	Categorical (0= Donald Trump, 1=Joe Biden)	New York Times	All U.S. Counties	
	Control: Governor Political Affiliation	Whether the state governor is part of the democratic or republican party.	Categorical (0= republican, 1=democrat)	NCSL	All U.S. Counties	

Research Question	Variable/ Concept	Definition	Measurement	Source	Sample	Analysis
	Control: State Legislative Minority Representation	The percent of the state legislature that is a racial minority.	Continuous	NCSL	All U.S. Counties	
	Control: Divided State Government	Whether the state government where the county is located is divided or unified.	Categorical (0= unified, 1=divided)	NCSL	All U.S. Counties	
	Control: Health Department Structure	The structure of local health department in the state.	Categorical (0=at least some amount of state governance, 1=all health department are governed locally)	NACCHO	All U.S. Counties	
RQ₂: Did individuals trying to access the COVID-19 vaccine encounter administrative burdens?	Administrative Burden	Learning, psychological, and/or compliance burdens encountered when trying to obtain a COVID-19 vaccine	Open-ended question	Participant interviews	Convenience sample of individuals through ISBS	Coding
RQ₃: How do the administrative burdens experienced by individuals when trying to access the	Quantitative results on social vulnerability and vaccine access	Extent to which there is a relationship between social vulnerability and vaccine access on the county level.	Counties	U.S. Census	All U.S. Counties	Analysis of results between both methods using a joint display to compare the

Research Question	Variable/ Concept	Definition	Measurement	Source	Sample	Analysis
COVID-19 vaccine provide an enhanced understanding of the relationship between social vulnerability and COVID-19 vaccine administration?	Interview findings on administrative burdens	Codes for administrative burdens encountered when accessing vaccines.	Individuals	Participant interviews	Convenience sample of individuals through ISBS	county-level and individual level findings

CHAPTER FOUR: FINDINGS

This chapter first presents the quantitative results of the study. First, the descriptive statistics for the variables included in the study are presented to better understand the variables. Then, the results of the factor analysis are presented. As a reminder, the factor analysis was conducted as a data reduction method to reduce potential multicollinearity in the study. After the factor analysis is presented, the results from the multivariate models are presented.

Following the quantitative findings, the chapter presents the qualitative results of the study. First, the researcher's positionality is discussed. Then, the sampling and data collection are presented. Next, the participant demographics are discussed, followed by the qualitative data analysis and coding procedures. Finally, the findings from the qualitative analysis are presented and discussed.

Quantitative Findings

Descriptive Statistics

Prior to running the descriptive statistics, datasets from the CDC and the Vulnerability Mapping Analysis Platform were merged. These datasets included U.S. Census demographic data, vaccination data, and vaccine hesitancy data. The datasets were merged in Microsoft Excel and each county was matched based on the FIPS codes. Once the datasets were merged, data on county political affiliation from the New York Times; data on state government division, governor political affiliation, and state legislative minority representation from NCSL; and data on health department structure from NACCHO were manually added. These data were added to STATA 15.1 and missing data were removed. All counties in Nebraska were excluded because the political and governing structure in Nebraska is unique and fundamentally different from that

of every other state, in that Nebraska has a unicameral legislature, so there are only two bodies to compare (legislature and governor) while there are three in every other state (house, senate, and governor), and because the Nebraska legislature is nonpartisan. The researcher also removed data for all counties which reported that 0% of their population was fully vaccinated as of December 11, 2021. The CDC reported that some counties had inaccuracies early in the vaccination process, which were corrected over time (CDC, 2022a) and the researcher concluded that these cases represented data inaccuracies.

Table 7 presents the summary statistics for the variables included in the study. The first 34 variables are measures of social vulnerability. On average, about 15.8% of county residents live below the poverty line, the average per capita income in a county is approximately $26,960, and on average, nearly 3.5% of households earn over $200,000. In terms of age, approximately 22.4% of people in counties are under the age of 17, approximately 24.1% are either below the age of 5 or over 65, and the median age is 41. In terms of employment, on average, the county unemployment rate is approximately 5.9%, about 6.4% of people work in extractive industries, nearly 18.1% of people work in service industries, and approximately 46.8% of females participate in the labor force. The mean percentage of households receiving social security benefits is 37%, but this is higher in some counties, with a maximum of about 77%. On average, nearly 13.6% of residents do not have a high school diploma, about 16% have a disability, approximately 3.6% are in institutionalized group quarters, there are about .01 nursing home residents per capita, and 8.4% are single-parent households. Counties are made up of approximately 49.9% women and 1.7% of residents speak English less than well. In terms of housing, on average, there are approximately 2.5 people in each household, about 6.4% of households do not have cars, nearly 13.1% of homes are mobile homes, about 23.4% of homes

are rented, approximately 37.7% of households spend more than 40% of their income on housing, nearly 2.4% of people live in housing units with more than one person per room, about 4.7% of housing units have at least 10 units in the structure, and approximately 18.8% of housing units are vacant. The median housing value is approximately $147,483 and the median gross rent is approximately $759. On average, approximately 23.8% of the population in a county is a minority, with approximately 9.5% of the county population being Hispanic, 9.2% being Black, 1.8% being American Indian or Native Alaskan, and 1.3% being Asian.

In terms of vaccination status, on average about 56.4% of adults received the full COVID-19 vaccine series. On average, approximately 19.4% of a county's population was vaccine hesitant, with a low of about 5.3% and a high of nearly 32.3%. Approximately 83% of counties lean republican, as measured by votes cast for President Trump versus President Biden in the 2020 election, 76% of counties have republican governors, and 75% of counties are located in a state with a unified government, meaning the governor, the state house of representatives, and the state senate are of the same political party.[1] Finally, 54% of health departments were controlled locally, rather than by the state.

Table 7: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Percent of adults vaccinated	3,032	56.44	13.88	1.80	95.00
Percent below poverty	3,032	15.76	6.51	2.30	55.10
Per capita income	3,032	26,960.23	6,566.56	10,148.00	72,832.00
Percent households earning over $200,000 annually	3,032	3.47	3.10	0	31.24
Percent of people in a county who are under the age of 17	3,032	22.36	3.49	7.30	40.50

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[1] Divided government means that the state legislature and the governor's office are controlled by different political parties or if the state house and senate are controlled by different political parties.

Variable	Obs	Mean	Std. Dev.	Min	Max
Percent of people under the age of 5 and over the age of 65	3,032	24.09	4.00	9.98	57.37
Median age	3,032	41.20	5.38	21.70	67.00
Percent without health insurance	3,032	10.15	5.14	1.70	45.60
Percent unemployed	3,032	5.87	2.81	0	28.90
Percent employment in extractive industries	3,032	6.42	7.05	0	60.53
Percent employed in service industry	3,032	18.08	3.59	6.14	43.61
Percent female participation in labor force	3,032	46.81	3.00	30.71	62.72
Percent households receiving social security benefits in a county	3,032	37.00	7.45	12.84	77.19
Percent of people without a high school diploma (over the age of 25)	3,032	13.57	6.34	1.20	66.30
Percent of people with a disability	3,032	15.99	4.43	3.80	33.70
Percent of persons who are in institutionalized group quarters	3,032	3.56	4.62	0	55.70
Nursing home residents per capita in a county	3,032	.007	.01	0	.08
Percent of households that are single-parent households	3,032	8.40	2.73	0	25.70
Percent female	3,032	49.92	2.40	21.00	58.61
Percent that speak English less than well	3,032	1.70	2.80	0	30.40
Number of people per household	3,032	2.53	.27	1.82	4.97
Percent of households without a car	3,032	6.42	4.48	0	87.77
Percent mobile homes	3,032	13.13	9.63	0	59.30
Percent renters	3,032	23.43	8.03	1.30	76.26
Percent of households spending more than 40% of their income on housing costs	3,032	37.66	9.19	0	70

Variable	Obs	Mean	Std. Dev.	Min	Max
Percent total occupied housing units with more than one person per room	3,032	2.44	2.42	0	49.30
Percent of housing units in a county with 10 or more units in the structure	3,032	4.68	5.68	0	89.40
Percent vacant housing units	3,032	18.79	11.13	3.01	88.26
Median value of owner-occupied housing units	3,032	147,483.31	89,644.50	20,700.00	1,056,500.00
Median gross rent	3,032	759.59	216.15	318	2,158.00
Percent of county population that is a minority	3,032	23.78	20.17	.20	99.30
Percent Hispanic	3,032	9.46	13.99	0	99.17
Percent Black	3,032	9.20	14.62	0	87.41
Percent American Indian or Alaska Native	3,032	1.83	7.60	0	90.96
Percent Asian	3,032	1.33	2.55	0	39.48
Vaccine hesitancy	3,032	19.37	5.31	4.99	32.33
County political affiliation (0=Republican, 1=Democrat)	3,032	.17	.38	0	1.00
Governor political affiliation (0=republican, 1=democrat)	3,032	.24	.49	0	1
State legislative minority representation	3,032	.204	.11	.02	.46
Divided state government (0=not divided, 1=divided)	3,032	.25	.43	0	1.00
Health department structure (0=not local control, 1= local control)	3,032	.54	.50	0	1.00

Factor Analysis

An exploratory factor analysis was conducted on the 34 variables signifying social vulnerability in STATA 15.1. Prior to running the analysis, the researcher converted each variable to a z-score to standardize the variables. Because the variables are not all measured on the same scale, standardization is needed to improve the reliability of factor scores (DiStefano et al., 2009). While there are different types of factor analyses, the principal-component factor analysis was used. Principal-component factor analysis is appropriate to explain multiple variables within a single dimension and is used commonly for data reduction purposes (Acock, 2018). After the factor analysis was complete, a varimax rotation was completed, which uncorrelates the factors from one another to ease the interpretation of the factor analysis (Acock, 2018).

The initial exploratory factor analysis revealed eight factors with eigenvalues above 1, meaning eight factors were developed from the variables. In addition, the researcher examined the factor loading of each variable, as typically, factor loadings above .4 suggest that the variable should be included as part of the factor (Acock, 2018). Every variable included as part of the exploratory factor analysis had factor loadings above .4, meaning all variables were included in the factors. The researcher removed eight variables and reran the factor analysis. The eight variables were removed because there was significant cross-loading, where each of the eight variables loaded significantly into more than one factor, meaning the researcher could not differentiate which factor each of the seven variables fit into. Factors with significant cross-loading can be removed from the analysis to improve the extent to which the variables fit the factors (Osborne et al., 2008).

The second iteration of the factor analysis based on the remaining 26 variables revealed seven factors with eigenvalues above 1. The researcher repeated the process, removing 3

variables. One variable was removed because it was a factor consisting of only a single variable and two variables were removed because of cross-loading. The third iteration of the factor analysis based on the 23 remaining variables revealed six factors. The grouping of variables in four of the six factors made logical sense and had eigenvalues above 2. The fifth factor grouped together percent native American and percent of total occupied housing units with more than one person per room and the sixth factor grouped together percent female and percent living in institutionalized group quarters. Contrary to the first four factors, these two groupings of variables did not make sense, so the researcher did not include these as factors, meaning in total there were four, rather than six factors. Factor analysis requires researcher judgment and although an eigenvalue of one is typically used as a threshold for including a factor, it is not always used as the threshold (Ruscio & Roche, 2012). The eigenvalues of the four factors that made logical sense were higher than the two factors excluded. The fifth and sixth factor had eigenvalues below two, which is significantly lower than the fourth factor, which had an eigenvalue of 2.2. In addition, in social sciences, a threshold of 60% is an acceptable variance threshold in factor analysis (Hair et al., 2012), and approximately 63% of the variance is explained by the four remaining factors, suggesting that raising the eigenvalue threshold is appropriate. The four factors and the variables that are contained within the factor are listed below in Table 8.

Table 8: Social Vulnerability Factors

	Factor	Variables Contained	Eigenvalue	Difference	Variance Explained
1	Wealth-related social vulnerability	Median value of owner-occupied housing units Percent households earning over $200,000 annually Median gross rent	6.193	2.768	26.93%

Factor	Variables Contained	Eigenvalue	Difference	Variance Explained
2 Age-related social vulnerability	Percent of housing units in a county with 10 or more units in the structure Per capita income Percent Asian Median age Percent of people under the age of 5 and over 65 Percent of people in a county who are under the age of 17 Percent households receiving social security benefits in a county Percent vacant housing units Percent renters	3.425	.709	14.82%
3 Employment-related social vulnerability	Percent of households spending more than 40% of their income on housing costs Percent female participation in labor force Percent employment in extractive industries Percent employed in service industry Percent Black	2.716	.524	11.81%
4 Ethnicity-related social vulnerability	Percent Hispanic Percent that speak English less than well	2.192	.503	9.53%
Total				63.16%

Table 9 below presents the rotated factor loading matrix for the four factors. Six variables were loaded into the wealth-related social vulnerability factor with factor loadings between .558 and .909. Specifically, the first factor includes median value of owner-occupied housing units (.904), percent of households earning over $200,000 annually (.897), median gross rent (.856), percent of housing units in a county with 10 or more units in the structure (.630), per capita income (.897), and percent Asian (.630). The second factor represents age-related social vulnerability, which includes six variables: median age (.891), percent of people under the age of

5 and over the age of 65 (.856), percent of people under the age of 17 (-.600), percent of households receiving social security benefits (.798), percent vacant housing units (.725), and percent renters (-.669). The third factor, ethnicity-related social vulnerability reduces two variables to one common factor. These include the percent Hispanic (.909), and the percent that speak English less than well (.895). Employment-related social vulnerability is the final common factor, which reduces five original variables to create the factor. The variables and their factor loadings are percent of households spending more than 40% of their income on housing costs (.744), percent female participation in labor force (.715), percent Black (.558), percent employed in extractive industries (-.633), and percent employed in the service industry (.599).

Table 9: Rotated Factor Loading Matrix

	Factor 1 Wealth-related social vulnerability	Factor 2 Age-related social vulnerability	Factor 3 Ethnicity-related social vulnerability	Factor 4 Employment-related social vulnerability
Median value of owner-occupied housing units	0.904			
Percent households earning over $200,000 annually	0.897			
Per capita income	0.895			
Median gross rent	0.856			
Percent Asian	0.658			
Percent of housing units with 10 or more units in the structure	0.630			
Median age		0.891		
Percent of people under the age of 5 and over 65		0.856		
Percent households receiving social security benefits in a county		0.798		
Percent vacant housing units		0.725		
Percent renters		-.669		
Percent of people in a county who are under the age of 17		- 0.600		
Percent Hispanic			0.909	
Percent that speak English			0.895	

	Factor 1	Factor 2	Factor 3	Factor 4
less than well				
Percent of households spending more than 40% of their income on housing costs				0.744
Percent female participation in labor force				0.715
Percent employment in extractive industries				-0.633
Percent employed in service industry				0.599
Percent Black				0.558

Factor scores were computed for each of the four factors in STATA 15.1 and each county was assigned an index score for each of the four factors. These factor scores represent the social vulnerability dimensions for the study. Higher scores are associated with greater vulnerability. After the factor scores were computed, the researcher assessed the directionality of these factors and made cardinality adjustments to "appropriately describe the tendency of the phenomena to increase or decrease vulnerability" (Hazards and Vulnerability Research Institute, 2016). Wealth-related social vulnerability was the only factor requiring a cardinality adjustment.

The descriptive statistics for the social vulnerability indices are listed below in Table 10. As shown in the table, the indices range from a low of -4.898 to a high of 8.653. Higher scores are associated with greater vulnerability.

Table 10: Descriptive Statistics for Social Vulnerability Indices

Variable	Obs	Mean	Std. Dev.	Min	Max
Wealth-related social vulnerability	3,032	.000	.996	-1.388	8.653
Age-related social vulnerability	3,032	-.010	.997	-2.859	5.419
Employment-related social vulnerability	3,032	.030	.982	-4.898	4.118
Ethnicity-related social vulnerability	3,032	.002	1.007	-.674	8.539

Ordinary Least Squares (OLS) Regression

OLS regression is a statistical test used to assess the association between variables when the dependent variable is continuous and the independent and control variables are continuous or dichotomous (Hutcheson, 1999; Ruel, 2019). With an OLS regression, multiple independent variables as well as control variables can be included in the analysis (Ruel, 2019). OLS regression was employed, using the percent of people in a county who are vaccinated as the dependent variable and the four social vulnerability factors (wealth-related social vulnerability, age-related social vulnerability, employment-related social vulnerability, and ethnicity-related social vulnerability) as the independent variables. Four control variables were also included, as explored in the methods section. The results from the multivariate regression model are presented below in Table 11.

After running the OLS regression, a series of post-hoc tests were performed to ensure that the assumptions for the OLS model were met. First, a series of scatterplots confirmed that there was linearity between the dependent and independent variables. The Shapiro Wilk was used to test normality and found that the residuals were not normally distributed. While this could be an issue with small datasets, normality is not necessary in large datasets, typically samples with at least 500 observations (Lumley et al., 2002), such as the dataset used here. Skewness of the dependent variable was examined. When a dependent variable is highly skewed, it lacks the bell-shaped frequency distribution observed in normally distributed data, which can create issues with inferential statistics (Allen, 2017; Russell & Dean, 2000). The skewness for the dependent variable in the current study is -.212, suggesting that it is slightly negatively skewed. The distribution of the outcome variable is presented below in Figure 4, which confirms that the distribution is slightly negatively skewed. There is no clear consensus regarding what measure of skewness becomes problematic for data, but literature suggests that skewness between 1 and -1 is

not problematic, meaning when skewness falls between 1 and -1 there is not a normality issue related to skewness (Farmer & Farmer, 2021; Lewis-Beck, 2022). In public administration, scholars tend to have higher thresholds for skewness, where typically skewed data are not viewed as problematic if skewness is between -2.0 and 2.0 (Bright, 2005; Caillier, 2017; Giaugue et al., 2012). Because the skewness for the dependent variable falls within the -2.0 and 2.0 range (-.212), the skewness does not indicate a problem in the current study.
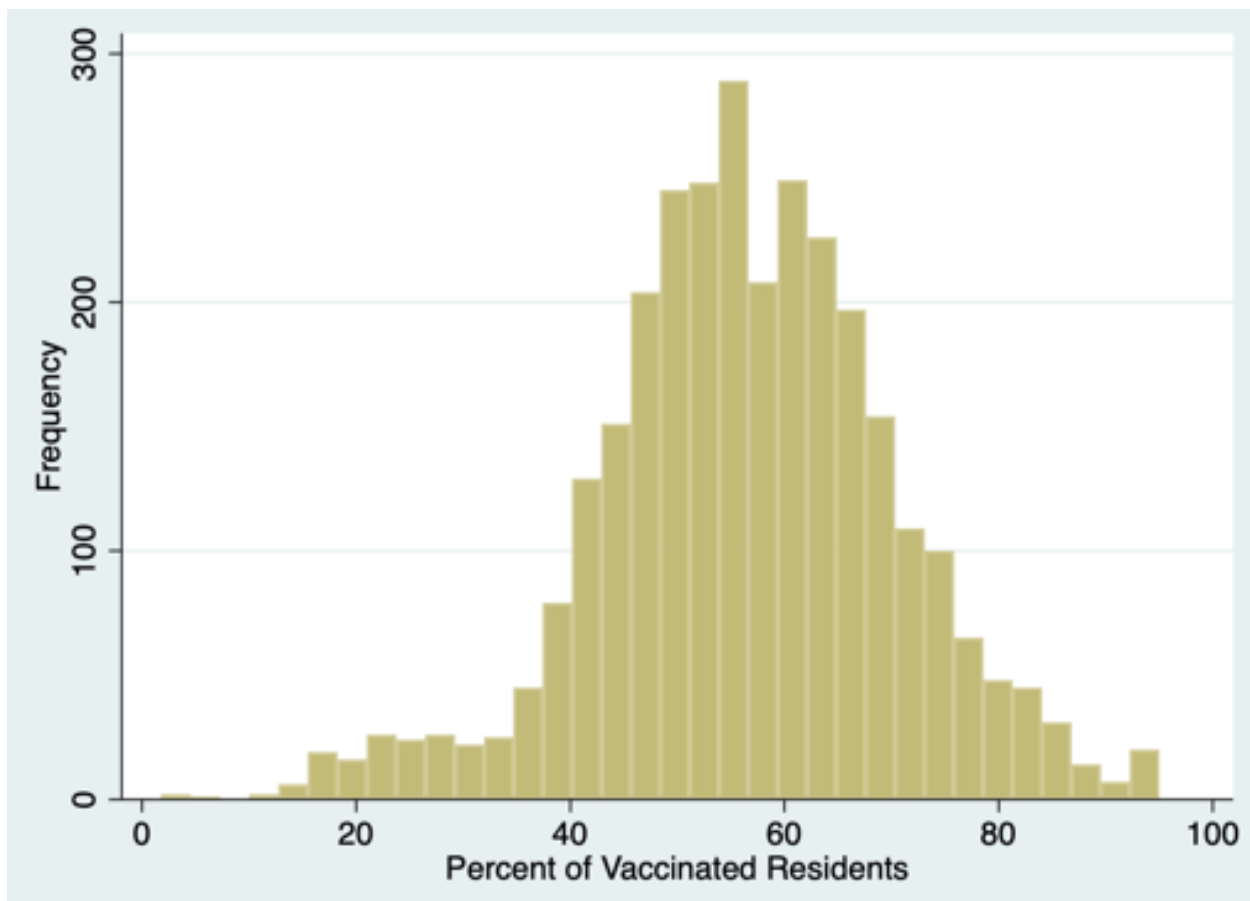

Figure 4: Distribution of the dependent variable.

Source: Author

Variance Inflation Factors (VIF) were examined to determine whether multicollinearity was an issue in the model. Multicollinearity exists when "an explanatory variable is related to one or more of the other explanatory variables in the model" (Hutcheson, 1999, p. 26) and VIF

scores above 10 indicate a higher likelihood of multicollinearity (Lewis-Beck & Lewis-Beck, 2016; Salkind, 2007). VIF scores in the model ranged from 1.44 to 2.09 with a mean VIF of 1.69, meaning there was no evidence of multicollinearity. Finally, the Beush-Pagan/Cook-Weisbert test for heteroskedasticity revealed that the data were problematic, as it was heteroskedastic, or that "the variance of the error is no longer constant but may vary from observation to observation" (Allen, 2017, p. 1). This commonly occurs when data are grouped, rather than collected at the individual level (Allen, 2017), as is the case in this analysis. To compensate, the model was adjusted to include robust standard errors, as they can be used to account for heteroskedasticity (Allen, 2017; Yamano, 2009).

The OLS results show a relationship between the percent of the population that is vaccinated and three of the four social vulnerability indices. First, the results indicate that there is a significant negative relationship between the percent of the population that is vaccinated and wealth-related social vulnerability, meaning counties with higher wealth-related social vulnerability are associated with lower percentages of residents of a county who are vaccinated. Specifically, a one-unit increase in wealth-related social vulnerability is associated with a 3.696 percentage points decrease in the number of adults who are vaccinated in a county, which relative to the mean translates to a 6.549% decrease in percent vaccinated. This is consistent with hypothesis 1, which stated that counties with higher social vulnerability will receive fewer vaccines compared to counties with lower social vulnerability. Second, the results indicate that there is a significant positive relationship between the percent of the population that is vaccinated and employment-related social vulnerability. As a reminder, the employment-related social vulnerability index represents a variety of employment-related variables (such as the percent of people employed in the service industry). A one-unit increase in employment-related social

vulnerability is associated with a 1.622 percentage points increase in the number of adults who are vaccinated in a county, which relative to the mean translates to a 2.874% increase in percent vaccinated. Thus, the results indicate that higher employment-related social vulnerability is associated with higher vaccination rates, which is not consistent with hypothesis 1. Finally, the results indicate that there is a significant positive relationship between the percent of the population that is vaccinated and the ethnicity-related social vulnerability index. The positive relationship means that greater ethnicity-related social vulnerability is associated with a higher percent of vaccinated residents. A one-unit increase in the ethnicity-related social vulnerability index is associated with a 2.659 percentage points increase in the number of adults who are vaccinated in a county, which relative to the mean translates to a 4.711% increase in percent vaccinated. This again is inconsistent with hypothesis 1. Notably, the r2 of the model is .3332, meaning the model explains approximately one third of the variation in the dependent variable.

Although not included in hypothesis 1, each of the six control variables are also statistically significant. The model shows a negative relationship between vaccine hesitancy and the percent of vaccinated residents in a county, meaning counties with higher percentages of people who are vaccine hesitant have lower rates of vaccinated residents. There is also a positive relationship between county political affiliation and the percent vaccinated, or counties that are dominantly democratic counties are associated with higher percentages of people who are vaccinated. Similarly, counties with democratic governors also had higher vaccination rates, as did counties that were in states with divided governments and that had higher percentages with minority representation in state legislatures. Finally, counties with control of the local health department were associated with higher vaccination rates.

Table 11: OLS Regression

	Coef.	St.Err.
Wealth-related social vulnerability	-3.696***	(.363)
Age-related social vulnerability	.514	(.310)
Employment-related social vulnerability	1.622***	(.302)
Ethnicity-related social vulnerability	2.659***	(.278)
Vaccine hesitancy	-33.264***	(6.367)
County political affiliation (0=Republican, 1=Democrat)	3.940***	(.844)
Governor political affiliation (0=Republican, 1=Democrat	2.150**	(.782)
State legislative minority representation	-14.525***	(2.395)
Divided state government (0=not divided, 1=divided)	1.330*	(.774)
Health department structure (0=not local control, 1= local control)	4.501***	(2.394)
Number of observations: 3,032		
R-squared: .333		
*** p<.01, ** p<.05, * p<.1		

<div align="center">Qualitative Findings</div>

<div align="center">Researcher Positionality</div>

When conducting qualitative research, the researcher's experience can impact the research process and outcomes (Berger, 2013). To account for this influence and enhance trust in the researcher's process and findings, researchers' positionality should be accounted for and monitored (Berger, 2013). Reporting potential biases and positionality can "improve the credibility of qualitative analysis" (Hendren et al., 2018, p. 914).

The researcher is a white woman, holds a Master's degree, and is employed part-time while attending school full-time. She has experience working in health policy, including experience working for a large health care system and working in state and local governments on health care issues. The researcher is fully vaccinated against COVID-19, has received two booster shots, and was first vaccinated in March 2021. When initially seeking the COVID-19 vaccine, the researcher faced learning costs related to scheduling the vaccine and understanding the documents needed to receive a vaccine. The researcher has not had COVID-19, but knows

many friends and family members who had COVID-19. The researcher knew of one friend who had COVID-19 before being vaccinated. This could impact how the researcher perceives administrative burdens faced and how the findings are reported. To reduce potential subjectivity from this experience, the researcher focused the study more broadly on the three types of administrative burdens identified in the literature: compliance costs, learning costs, and psychological costs, rather than focusing only on the learning costs that the researcher experienced. The researcher also reflected on her own experience and background throughout the research process and intentionally sought interviewees of multiple races, ethnicities, ages, and backgrounds to reduce the extent of any potential subjective biases in the research.

<div align="center">Sampling and Data Collection</div>

To collect data, the researcher developed an interview protocol and survey. The interview protocol was developed to collect information on the types of administrative burdens participants faced when trying to access the COVID-19 vaccine. The interview protocol was developed to identify the three types of administrative burdens examined in existing literature (compliance costs, learning costs, and psychological costs) (Moynihan, Herd, & Harvey, 2014), as well as to identify how those costs were related to the four types of vulnerabilities identified in the quantitative analysis (age-related, employment-related, ethnicity-related, and wealth-related social vulnerability). The questions were designed to first explore whether participants experienced any of the three types of administrative burdens. Second, the interview questions served as a tool to further examine whether the four types of vulnerabilities identified in the quantitative findings could potentially be related to administrative burdens experienced when trying to access a COVID-19 vaccine.

The survey was designed to collect participants' demographic data, including information on age, race, education, employment, and ethnicity. The survey also collected information on the participants' vaccination status, experience with COVID-19, and details about vaccination. The interview protocol is provided in Appendix A and the survey is provided in Appendix B.

Prior to conducting any interviews, the interview protocol was submitted to the University of Central Florida Institutional Review Board (IRB). The IRB approved the interview protocol and determined that the research was exempt from regulation. The IRB exemption determination letter is provided in Appendix C. To collect data, 31 interviews were conducted with individuals who received at least one dose of the COVID-19 vaccine. The interviews were conducted in Orange County, Florida, and the researcher partnered with the University of Central Florida's ISBS to recruit participants for interviews. The ISBS is a community centered research institute, which regularly partners with community organizations to conduct qualitative and quantitative research. Orange County, Florida was selected as the data collection site because of accessibility to participants and because the ISBS has existing relationships with organizations in Orange County, which made data collection more efficient.

Examining the experience of Orange County residents provides insights into administrative burdens, but the findings are not statistically generalizable. In qualitative research, generalization takes shape as transferability (or allowing those learning about the research to understand and relate to the findings) and naturalistic generalizations (or making changes based on the understanding of the research) (Tracy, 2010). The qualitative findings from this research are not meant to be generalizable to all other counties, but aim for naturalistic generalizations for public servants and policymakers in counties with social vulnerabilities similar to that of Orange County. In 2018, Orange County ranked 1,289 out of 3,143 in terms of its social vulnerability

according to the CDC, with approximately 59.2% of residents being minorities, 22.5% being under the age of 17, 21.4% living in housing structures with 10 or more units, and 16.1% living below the poverty line. Thus, while the qualitative findings will not necessarily be useful to all policymakers and public servants, those in counties with moderate to high social vulnerability, and high percentages of minorities, children under the age of 17, housing structures with many units, and poverty levels may relate to the qualitative findings and make changes based on their understanding of the research.

The ISBS worked with United Against Poverty, a community non-profit organization that provides support services to people living in poverty, to recruit participants. United Against Poverty is located in Orange County, Florida, and provides a variety of services, including crisis care, case management, food subsidies, and employment training (United Against Poverty, 2022). The ISBS used convenience sampling, a nonprobability sampling design, to recruit participants who were utilizing services at United Against Poverty. Probability sampling methodologies are preferential because they use "statistical theory to examine the properties of sample estimators" (Kalton, 1983, p. 90). Responses using non-probability sampling methodologies can be biased and cannot be analyzed for biases and errors (Kalton, 1983; Henry, 1990). Despite the limitation of nonprobability sampling, such sampling methods are widely used in research because of cost and time limitations (Kalton, 1983). Although probability sampling is preferable, nonprobability sampling is used in this dissertation because of time and resource constraints. This study sampled 31 individuals in Orange County, Florida, who are over the age of 18. The sample size is reasonable for the researcher given the cost of administering interviews. Unlike quantitative research, with qualitative research, a specific sample size is not needed for validity (Yin, 2016). Instead, a sample is generally considered sufficient once the

responses are redundant (Yin, 2016). The researcher found that 31 interviews were sufficient to reach redundancy.

To recruit participants, a representative from the ISBS asked individuals entering the grocery store at United Against Poverty to voluntarily participate in the research. They were told verbally that they qualified if they were over the age of 18 and received at least one dose of the COVID-19 vaccine. If they agreed, they were provided information about the study and led to a private office at the United Against Poverty training center. To incentivize participants, the researcher offered cash as compensation. Participants were initially offered $5 and 24 participants received $5 compensation. Through this process, the researcher and the ISBS representative discussed the difficulties involved recruiting participants and concerns about some participants providing short answers, with few details because of time commitment and low financial compensation. To further incentivized and recruit participants, the compensation was increased to $20, of which seven participants took advantage. The number of individuals who declined the interviews was not tracked, but the researcher observed that participants seemed more enthusiastic about the interviews, more willing to participate, and provided more details after the financial incentives increased. Participants were provided an explanation of research before the interviews took place and the participants signed a consent form. Twenty-seven interviews were individual interviews, where one participant was present and answered questions individually. Two interviews were held as two-person interviews, at the request of the participants, where two individuals answered questions during an interview together. On average, the interviews lasted 14 minutes, with the shortest interview lasting five minutes and the longest interview lasting 33 minutes. Prior to beginning the interviews, participants completed a survey collecting basic demographic information using an iPad provided by the ISBS. Because

many participants had difficulty navigating and using the iPad, the ISBS employee conducting

the interview verbally asked the questions in the survey prior to the start of the interview and

completed the survey on behalf of the participants.

Participant Demographics

Table 12 presents a summary of the demographic information of the participants. The

median age of the participants was 54 and most participants were male (61%). Thirty-nine

percent of participants were Black, 39% were white, 6% were multi-racial, and 13% were

another race. Few participants were Hispanic (16%). In terms of employment status in 2021,

26% were employed full-time, 58% of participants were not employed full-time, and 16% were

retired. Most participants attended some college (45%), while some participants had less than a

high school diploma (16%), held a high school diploma (13%), held an Associate's Degree

(13%), held a Bachelor's degree (10%), or held a Master's degree (3%).

Thirty-nine percent of participants were fully vaccinated, while 29% received one

booster, and 23% received two boosters. Only 10% of participants were partially vaccinated and

no participants were unvaccinated, as receiving at least one vaccine was a requirement for

participating in the study. Most participants did not have COVID-19 before receiving the vaccine

(90.3%), but most did have a friend or family member who had COVID-19 before they received

their vaccine (65%). Slightly less than half of participants qualified for a vaccine before the

general public (42%). Eighty-one percent of participants received their initial vaccine in the first

year of the vaccine administration (before December 2021), 13% received their initial vaccine

after the first year of the vaccine administration, and 6% could not recall when they received

their first vaccination dose.

Although Orange County has moderate to high social vulnerability according to the CDC, based on the information collected, these individuals are likely part of neighborhoods and communities with high social vulnerability. Among the sample of individuals interviewed, more than half of participants did not work a full-time job (58%), more than half were racial minorities (61%), and almost three-quarters did not have a college degree (74%). Income information was not captured in the survey, but participants are likely low-income earners as the interviews took place at a social service agency and were recruited from the agency's grocery store. Individuals cannot shop at the grocery store unless their income is below 200% of the poverty line.

Further details about the participants are provided in Appendix D. The participants did not provide any identifying information and participants are identified through a unique identifier.

Table 12: Participant Demographic Information

Demographic Characteristic		Percent
Education Level	Less than High School Diploma	16%
	High School Diploma	13%
	Some College	45%
	Associate's Degree	13%
	Bachelor's Degree	10%
	Master's Degree	3%
Employment Status	Employed Full-Time	26%
	Not Employed Full-Time	58%
	Retired	16%
Hispanic	Hispanic	16%
	Not Hispanic	84%
Sex	Female	39%
	Male	61%
Race	Asian	3%
	Black	39%
	White	39%
	Multi-racial	6%
	Other	13%
Vaccination Status	Received one dose of a 2-dose series	10%
	Fully Vaccinated, no booster	39%
	Fully Vaccinated and 1 booster	29%

Demographic Characteristic	Percent
Fully Vaccinated and 2 boosters	23%

Findings

Slightly less than half of individuals (45%) reported facing at least one administrative burden when accessing the COVID-19 vaccine. Participants reported all three types of administrative burdens: psychological costs (45%), compliance costs (20%), and learning costs (6%). Although few participants faced administrative burdens when accessing the COVID-19 vaccine, most individuals (90%) reported avoiding at least one potential administrative burden. When asked about barriers faced, participants reported a variety of compliance, learning, and psychological costs that could, but did not materialize when accessing the vaccine.

Many Individuals Faced Psychological Barriers, but Some Avoided Psychological Barriers when Accessing the COVID-19 Vaccine

Psychological costs were the most commonly cited type of administrative burden that participants faced when trying to access the vaccine. Almost half of participants (45%) reported facing psychological costs (costs which are a result of a negative stigma or loss of autonomy when participating in a program), and specifically, vaccine hesitancy was cited as a psychological cost. Participants were hesitant about the vaccine and worried about health outcomes that might result from taking the vaccine, but still decided to get the vaccine despite this burden. Participant 30, a 44-year-old white male who received one dose of the vaccine explained:

> …I was a little stressed out. I mean, I didn't know what they were, you know, if I was gonna get sick from it, or if it was gonna cause any other problems. So, I was a little stressed out about that.

83

Similarly, Participant 31, a 59-year-old male who was fully vaccinated, but did not receive a booster explained, "I've known two people that took it, and then a week's time, maybe a month's time or different times, they died from the vaccine. So that was to me, was, was kind of wary."

Some of those who experienced the psychological burden explained that although they were concerned for their health, they still thought the benefits outweighed the risks. For example, Participant 10, a 68-year-old Black woman who was fully vaccinated and received one booster dose explained, "well, a little bit concerned that I might, you know, be poisoned by the government, but I just [thought] it's better to be safe than sorry."

Although no participants specifically stated that their ethnicity contributed to their psychological costs, 42 percent of those who reported psychological costs related to vaccine hesitancy anecdotally mentioned their ethnicity when discussing their psychological costs. For example, Participant 31, a Hispanic male, stated that "the Spanish population are known to be a little, you know, they're not too aware of their health and stuff like that," when asked about hesitancy in his culture. Similarly, Participant 5, a Hispanic male, explained, "… people of color typically are more skeptical towards government mandated things and programs you know, there have, there's ever like historically they injected syphilis into people and did all this stuff."

Fifty-five percent of participants did not report psychological burdens when getting the COVID-19 vaccine. Specific to psychological costs related to concerns about negative health, 39% of participants reported that they did not have concerns about negative health outcomes from the COVID-19 vaccine or that their concerns were eased during the vaccination process, avoiding a potential psychological cost. Those reporting that they avoided psychological costs related to negative health outcomes explained that the risk of being sick and/or dying from

84

COVID-19 without the vaccine eased the psychological burden to get the vaccine, which essentially avoided the administrative burden. Participant 14, a 54-year-old Black female who received one dose of the vaccine explained that "a lot of the African American people were passing before any of the other races were, therefore, it made it even more important for me to have it." Similarly, Participant 16, a 53-year-old Black male who was fully vaccinated explained:

> I know the risk of getting [the vaccine] and stuff outweighs death. You know what I'm saying. I mean, there is the high possibility that [at this] moment in time that you could die from it because those people just dropping like flies.

Fifty percent of those reporting that they avoided psychological costs related to negative health outcomes explained that they were supported or encouraged to get the vaccine, which essentially avoided the administrative burden. For example, Participant 24, a 62-year-old Black male who is fully vaccinated reported that his brother sent him an email encouraging him to get vaccinated, which eased some of his health concerns, and Participant 4, a 56-year-old Black male who was fully vaccinated and received two booster shots explained that after he saw other people vaccinated without issues, his concerns subsided.

Few Individuals Faced Compliance Costs When Accessing the COVID-19 Vaccine, but Many Did Not

Fewer participants (20%) reported facing compliance costs (costs involved with following requirements) when accessing the COVID-19 vaccine. More specifically, compliance costs existed when making an appointment or signing up for the vaccine, but most of the respondents who reported having difficulty signing up for the vaccine, explained that the issues were only problematic when the vaccine was first released and subsided over time. Participant 6, a 59-year-old Black male who was fully vaccinated explained that he qualified for a vaccine

early in the vaccine distribution process because he is HIV positive, but experienced compliance costs with accessing the site. Participant 6 had an appointment before the general public, but the appointment was in a neighboring county, where he would have to take multiple buses to access the vaccine site. These compliance costs were too high for Participant 6, and instead of accessing the vaccine, he waited until it was widely available near his home. He explained:

> I mean, I could have just jumped on another bus and went further out. But I was just like I'll wait, and try to get set up with Target as an appointment. As time passed, you didn't need [an] appointment by the time either. So, it made it easier for me to do both [doses] as a walk-in.

Eighty percent of participants did not report that they faced compliance costs. More specifically in terms of compliance costs, participants reported that they did not face financial, access, or paperwork issues when accessing the COVID-19 vaccine, three areas of potential compliance costs involved in vaccinations. Fifty-five percent of participants reported that they did not face financial issues when accessing the vaccine, which could have presented compliance barriers for participants. When asked about any financial constraints involved in getting vaccinated, participants responded that the vaccine was free, which increased access. Thirty-nine percent of participants reported that the convenient access to vaccine sites made it easy to get vaccinated, avoiding another potential compliance cost. Participants explained that there were vaccination sites all over the community, making it easy to access a vaccine. Participant 17, a 58-year-old female who was fully vaccinated and received one booster explained:

> They put up a lot of sites, and I still see some sites…they still have tents and so I saw tents everywhere…So I think everybody got a chance. Like there were a lot of locations where it was possible. Yeah, it was possible to get it.

Forty-eight percent of participants reported that compliance costs related to paperwork requirements did not materialize because the paperwork was simple to complete, and they could get help if needed. When asked about any difficulties with filling out paperwork to receive the vaccine, Participant 27, a 45-year-old Black male who is fully vaccinated explained that "it was very quick, online. It was online and I didn't even spend even that much time." This sentiment was echoed by other participants, such as Participant 12, a 61-year-old multiracial male who is fully vaccinated and received one booster, who stated that "they didn't ask me to produce any documentation. It took about 10 minutes [to] fill out the form." Perhaps the process was best explained by Participant 7, a 40-year-old white male who is fully vaccinated and received a booster shot, "basically, in a nutshell, it was easy. It was all around it was easy. So, I mean, I had no problems."

Most Individuals Did Not Experience Learning Costs When Accessing the COVID-19 Vaccine

In terms of learning costs (costs involved in learning about the program, policy, etc.), only two participants (6%) reported that they experienced learning costs related to getting the COVID-19 vaccine. Both participants reported confusion about logistical information needed to get vaccinated (where vaccines were available and whether they met eligibility requirements). However, both participants noted that these issues existed only early in the vaccination administration process and that these learning costs subsided over time. Notably, when asked about learning costs, both participants described the burden with ambivalence, suggesting that although they may have faced a learning burden, it was relatively minor. For example, when asked about difficulties getting the vaccine, Participant 20, a white male who was fully vaccinated, explained: "no, not after its like completely available to everyone. Before that, I guess it was a little hard to get."

The majority of participants (94%) did not have difficulty learning the logistical information needed to get the COVID-19 vaccine, avoiding potential administrative burdens when getting vaccinated. Most participants reported that they did not have trouble learning whether they were eligible for the vaccine and could easily figure out their eligibility by reading information online, asking friends and family, contacting their doctors, and showing up at vaccination sites to inquire. When asked about any difficulties figuring out whether they were eligible and what was needed to get vaccinated, respondents replied that it was easy, simple, and clear. Eighty-four percent of participants specifically noted that they did not express any concern learning whether they were eligible and did not experience any difficulties figuring out what was needed to get vaccinated.

Individuals Used a Variety of Resources When Accessing the COVID-19 Vaccine

All but three participants (90%) reported that they used resources to access the COVID-19 vaccine, which helped the participants overcome or avoid administrative burdens. These resources include social capital (61%), transportation (61%), governmental and social service organizations (48%), the news media (42%), health insurance (35%), and support from employers (32%).

Social Capital

In terms of social capital, participants relied on friends and family to ease compliance (16%), learning (29%), and psychological (19%) costs. Participants reported that friends and family helped ease compliance costs by providing rides to vaccination sites, helping fill out paperwork, and helping to schedule appointments for the vaccine. Thirty-two percent of participants reported that they used people in their social networks to learn about when they were

eligible for the vaccine, how to get a vaccine, and where to get a vaccine. Participant 30, a 44-year-old white male who received one dose of the COVID-19 vaccine explained that he had a friend who was a doctor help him navigate how to get vaccinated and ease learning and compliance barriers. He explained, "I think he pretty much had it all figured out beforehand. So, I just had [to], just follow the motions, or just went with him."

Twenty-one percent of individuals also reported that social capital eased their psychological costs, especially through feeling comfortable that the vaccine was safe. Participant 12, a 61-year-old mixed-race male who is fully vaccinated and received one booster, for example, explained that his sister encouraged him to get vaccinated, which helped reduce concerns he had about the vaccine. He explained, "she just said you know, with your health issues, if you get sick, you can really regret it." This was explained by others as well. Participant 16, a 53-year-old Black male who was fully vaccinated stated, "oh, yeah, my mom, my mom. They don't play. They're right on point as far as health… They're like "go get the vaccine, go get the vaccine.""

Transportation

Transportation was tied with social capital as the most commonly cited resource used to access the COVID-19 vaccine. Participants reported using transportation as a resource to avoid access issues and potential compliance costs with getting the vaccine.

Of the sixty-one percent of participants who mentioned transportation as a resource, 57% reported using a car to access the vaccine site, 29% reported using public transportation, and 5% reported using a bicycle. Although participants did not comment on how wealth could or did impact their ability to use transportation to access vaccines, the three forms of transportation

used by participants (cars, bicycles, and public transportation) required financial resources which could be impacted by wealth.

Governmental and Social Service Organizations

Almost half of participants (48%) reported using support from governmental and social service organizations to get vaccinated. Twenty-six percent of participants used organizations as a resource to reduce learning burdens. Participants reported accessing government websites to find information and asking government employees for help when needing information about vaccinations. Participants reported getting information from social service organizations they were already using to ease learning costs related to the COVID-19 vaccine. For example, Participant 28, an 87-year-old Black man who was fully vaccinated and received two booster shots explained that he learned he was eligible for the COVID-19 vaccine when a community health center, which he regularly used, called him to let him know he was eligible for a vaccine. He explained:

>...they call me from my community health center. They called me and let me know that I need to come in and get my shots. So, they actually prompted me more than anything else. You know, I didn't have to go hunting around and looking around. They just said come and get your shots.

Slightly less than a quarter of participants (23%) reported using government and/or social service organizations as resources to avoid compliance costs. Of those who reported using resources from organizations related to compliance costs, 55% reported that burdens were reduced because of government organizations and 44% reported that burdens were reduced because of social service agencies. Participants reported that government organizations made access to vaccines easy and government employees assisted participants when they had

paperwork issues related to the vaccine. Like government organizations, participants reported that social service organizations also increased access to the COVID-19 vaccine. Ten percent of respondents explained that social service organizations went into local communities to provide vaccines where it was convenient for community members. Participant 31, a 59-year-old white male who was fully vaccinated, explained that he was living in a shelter and got the COVID-19 vaccine when a Salvation Army bus came to the shelter offering vaccines to those living there. Participant 31 did not need to travel or arrange for transportation to get the vaccine, making it easy to access and meet compliance requirements.

Appointment requirements were another burden that social service organizations assisted with reducing. Participant 6, a 58-year-old Black male who was fully vaccinated, explained that a medical case manager who he regularly sees through a social service agency eased compliance costs by making him an appointment to receive the COVID-19 vaccine. Ultimately, Participant 6 was not able to get a vaccine during that appointment because of transportation issues showing that although some compliance costs were eased, others were still too high even with resources provided by social service organizations.

Finally, thirteen percent of participants reported that social service organizations provided resources that also lowered psychological burdens when getting vaccinated. Specifically, participants explained that they were nervous, stressed, and anxious about possible poor health outcomes from getting the vaccine, but that social service organizations provided services, such as counseling, providing vaccine-related information, and answering questions about the vaccine, which reduced their psychological distress.

<u>The News Media</u>

Forty-two percent of respondents reported that the news media was beneficial in helping participants learn how to get vaccinated, whether they were eligible, and where to get vaccines. When asked how they found out they were eligible for the vaccine, Participant 18, a 55-year-old white female who was fully vaccinated and received one booster shot explained, "I watched the news a lot. So yeah, there was always something on there. 24/7 pretty much." Similar statements were provided by Participant 10, a 68-year-old Black female who was fully vaccinated and received one booster shot:

> It didn't take any time, you know, it was all over the news- go here get the shot… it was like flooding the TV. You know, we was getting all kinds of information on where to go get tested, where to go get your vaccination to go get vaccinated.

Like with transportation, participants did not comment on how wealth could or did impact their ability to get information from the news media related to vaccines, but financial resources can impact the ability to consume news media. For example, television, radio, and print news media require discretionary spending and could be difficult to access without wealth or finances.

<u>Health Insurance</u>

More than a third of participants (35%) reported that health insurance was a resource that made it easier to get the COVID-19 vaccine. Of the participants who reported health insurance as a resource, 73% reported that it lowered compliance costs by covering the cost of the vaccine and medical transportation to vaccination sites. Although the COVID-19 vaccine was free regardless of whether individuals had health insurance, many participants did not know that the vaccine was free for everyone and credited their health insurance with easing financial

92

obligations related to the COVID-19 vaccine, suggesting that having health insurance made them more willing to get a COVID-19 vaccine. Participant 14, a 54-year-old Black female who received one dose of the vaccine explained that "I have insurance, whether it was not free or free, I had insurance." Similarly, Participant 7, a 40-year-old white male who was fully vaccinated and received one booster shot explained, "I do have insurance. Yes. So no, no problems with finance, financial obligations."

More than a quarter of those reporting health insurance as a resource reported that it eased psychological burdens because if they were sick or had negative health outcomes from the vaccine, their health insurance would cover the cost of the sickness or the health outcomes. Finally, 9% of participants reported that their health insurance companies provided information related to eligibility requirements and coverage for the vaccine, avoiding potential learning burdens. Participant 23, a 51-year-old Hispanic female who was fully vaccinated and received two booster shots explained that she called her insurance company to understand coverage related to the vaccine: "I called my insurance to find out if they were covering it. I think that took probably about 15-20 minutes…"

Support from Employers

Almost one-third (32%) of respondents reported that their employers were a resource that helped ease the burdens involved in getting the COVID-19 vaccine. Of those reporting employers as a resource, respondents explained that support from employers eased compliance costs (70%). Specifically, participants reported that employers provided paid time off to get the vaccine, provided additional financial compensation to get the vaccine, and even administered vaccinations on-site, at their workplace.

In terms of learning costs, 60% of respondents who indicated receiving assistance from their employers reported that their employer provided information about where to get vaccinated, how to make an appointment, and eligibility requirements. Participant 17, a 58-year-old Hispanic female who was fully vaccinated and received one booster shot explained that her employer provided information about the vaccine in the company newsletter, which is how she found out she was eligible. She stated, "…we had a [company] newsletter that came out. And you can pick it up everywhere. So yes, it was advertised everywhere inside of [the company]."

Participant 21, a 68-year-old Black female who was fully vaccinated explained that her employer was administering the vaccine, which in addition to making it easy to access the vaccine, also made it easy to learn about the vaccine. She explained that because she worked there, she was able to easily schedule the vaccine and did not need to learn the scheduling process. Participant 5, a 30-year-old multiracial man who was fully vaccinated and received two booster shots explained that his employer provided a list of sites where employees can go to access the vaccine.

Finally, in terms of impacts on psychological barriers, slightly less than half of those reporting employer support as a resource explained that the support impacted psychological burdens. Employers encouraged employees to get vaccinated and were flexible when appointments conflicted with work, easing stress and concerns that could otherwise have occurred when getting vaccinated. Participant 17 explained:

> …they [my employer] encouraged me. But they didn't push me to do it. They encouraged me and I told them, this is the day that I have to go so I'll be a little bit late to work because [of the vaccine appointment] and they were like "fine." And the next day I called

out because I still had the muscle aches and so she said "it's fine." They didn't give me any problems.

Similarly, Participant 1, a 24-year-old Asian male who was fully vaccinated and received one booster shot explained that he had to take time off work because he was sick with side effects after the vaccine, but that his employer was very understanding about taking time off work. Participant 1 reported that he ultimately did not experience anxiety or concern about taking the time off work because his employer was supportive.

Although the survey and interviews did not specifically ask whether the individuals worked in the service industry, almost one-third (30%) of participants reporting assistance from employers stated that they worked in the service industry. Participant 17 was working at a theme park when she was vaccinated, and her employer provided multiple types of support, including administering vaccinations on-site to employees, providing paid time off for employees getting vaccinated, and providing information about vaccinations in multiple ways to employees. Similarly, Participant 9, a 45-year-old white male who was fully vaccinated, was working at a bakery. His employer required employees to be vaccinated and provided paid time off the day they were vaccinated. These are two examples of employers providing multiple types of support for employees who were working in the service industry, suggesting that employers in the service industry could be providing more support than other industries, although more data are needed to understand whether this pattern exists beyond those who anecdotally mentioned their employment in the service industry.

CHAPTER FIVE: DISCUSSION

Discussion on Quantitative Findings

The quantitative portion of this dissertation explored the relationship between community social vulnerability and COVID-19 vaccine utilization. After developing four social vulnerability indices (wealth-related social vulnerability, age-related social vulnerability, employment-related social vulnerability, and ethnicity-related social vulnerability), the study found that wealth-related social vulnerability, employment-related social vulnerability, and ethnicity-related social vulnerability indices were related to vaccine utilization. In the case of the wealth-related social vulnerability index, higher vulnerability scores were associated with lower vaccine utilization, but the opposite was observed for the employment-related and ethnicity-related social vulnerability indices.

The findings related to the wealth-related social vulnerability index were expected and consistent with existing research and hypothesis 1. Consistent with existing research on disaster recovery resources, the findings suggest that resources dedicated to communities responding to emergencies or crises do not equally benefit populations with high and low social vulnerability (Drakes et al., 2021; Emrich et al., 2020; Van Zandt et al., 2012). Specific to existing research on COVID-19 vaccines, the current findings related to wealth-related vulnerability are consistent with previous research, which generally found that areas with high social vulnerability had lower vaccination rates (Brown et al., 2021; Crane et al., 2021; Hughes et al., 2021; Rifai et al., 2021; Thakore et al., 2021). Previous studies did not cover the full first year of the vaccine administration, and the findings of the current study expand on existing research to suggest that the relationship between social vulnerability and vaccinations continues specifically for wealth-related vulnerability through the entire first year of vaccine administration. The current study is

96

also the first to combine the elements of both the SoVI and SVI, the two most prominent and commonly used measures of social vulnerability, meaning the current study conceptualizes vulnerability differently than past studies. Past studies have compared both the SoVI and SVI (see for example, Flanagan et al., 2019; Rufat et al., 2019), but there has not yet been a combination of the two indices. Because this is a new frontier in the social vulnerability literature, there is a lack of research on the benefits of combining the two indices, but future studies can compare the SoVI and SVI to combined subindices.

As explained in the theoretical framework, governments tend to make policies where benefits and resources are prioritized for people who have high power and a positive connotation (Schneider & Ingram, 1993; Schneider & Sidney, 2009). This includes people with greater wealth. This study found that counties with higher social vulnerabilities related to wealth-related social vulnerability have lower percentages of people who are vaccinated, which is consistent with the theoretical framework. Governments and public administrators can use this information to develop policies encouraging vaccination utilization in counties with significant wealth-related vulnerability. To encourage vaccine utilization, governments could offer grants to trusted local community organizations in low-income counties to provide information about COVID-19 vaccinations, including information about COVID-19, the benefits of the vaccine, and logistical information about how to get vaccinated. Grants are often politically feasible as a policy tool because they are indirect and rely on the private market to deliver services (Salamon, 2002). Public information campaigns are another policy tool that can be used in low-income counties. Public information involves providing information to encourage or discourage certain behaviors (Salamon, 2002). Again, policies can be implemented to require county health departments and

other local healthcare agencies to implement public information campaigns to educate people in low-income counties about the benefits of the COVID-19 vaccine and how to obtain a vaccine.

This study found a positive relationship between the employment-related social vulnerability index and the percent of the population that was vaccinated, as well as a positive relationship between the ethnicity-related social vulnerability index and the percent of the population that was vaccinated, both of which were unexpected. Based on the theoretical framework, the researcher expected that counties with higher employment-related and ethnicity-related social vulnerability would have lower vaccination rates because like wealth-related social vulnerability, communities with higher employment-related social vulnerability and ethnicity-related social vulnerability are comprised of people with low power and negative connotations (Schneider & Ingram, 1993; Schneider & Sidney, 2009).

Based on the theoretical framework, it is likely that policies related to the COVID-19 vaccine would provide greater access to vaccinations and greater utilization in communities with low ethnicity-related and employment-related social vulnerabilities. The positive relationship between COVID-19 vaccine utilization and ethnicity-related social vulnerability observed in the findings although surprising, is consistent with initial reports on COVID-19 vaccine utilization. In May 2021, Hamel et al. found that Hispanic adults reported high levels of wanting to get vaccinated for COVID-19. Similarly, in September 2021, Hamel et al. found large increases in vaccine utilization among Hispanic adults. This could be because of community interventions used to build trust in Hispanic communities. For example, in Florida, community health workers relayed vaccine information to Hispanic residents, information was provided in Spanish, and advocates went door-to-door in Hispanic communities to provide information about the vaccination (Sheridan & Colombini, 2021).

The positive relationship between COVID-19 vaccine utilization and employment-related social vulnerability observed in the findings could be because people living in counties with higher employment-related social vulnerability could be primarily working in industries with a higher risk of contracting COVID-19 or could be required by their employer to be vaccinated, which could lead to higher vaccination rates. For example, the percent of people working in extractive industries and the percent of people working in the service industry are two of the variables that contribute to employment-related social vulnerability. While many office jobs transitioned to remote work during COVID-19, most jobs in the service industry and extractive industries were unable to do so (Dalton & Groen, 2022; Dey et al., 2020). People working in these industries could be utilizing vaccinations at a higher rate to stay safe because they are unable to socially distance through teleworking. Alternatively, the positive relationship could be because many employers initially required employees to be vaccinated (Messenger, 2021). Large employers in the service industry, such as The Walt Disney Company, MGM Resorts, NBC Universal, Starbucks, and Uber required most employees to be vaccinated in 2021 (Goldberg, 2022; Messenger, 2021). This could have a disproportionate impact on communities with high employment-related social vulnerability because some employees, especially individuals working in the service industry, might be more likely to get the COVID-19 vaccine to remain employed. Although many organizations have since dropped the vaccine mandates (Court, 2022), this still could impact the results in the current study, as many people received vaccinations when required by employers.

The findings related to employment-related social vulnerability are especially important because previous disaster research does not specifically address employment-related social vulnerability and its relationship to resource utilization following emergencies and crises.

Although the variables that make up employment-related social vulnerability are included in existing social vulnerability indices (Cutter et al., 2003; CDC, 2021a), the relationship between employment-related social vulnerability and disaster recovery resource utilization is not examined separately.

Based on the findings of this study and the theoretical framework, counties with high wealth-related social vulnerability will be less resilient, as the populations in those counties are less protected from death or severe illness from COVID-19 (Liang et al., 2021; Phillips, 2021).

<div align="center">Discussion on Qualitative Findings</div>

The qualitative portion of this dissertation explored whether individuals faced administrative burdens when accessing the COVID-19 vaccine and the specific type of burdens faced by those who did experience burdens. The study found four main findings related to administrative burdens in the vaccination process. First, many individuals faced psychological barriers, but some avoided psychological barriers when accessing the COVID-19 vaccine. Second, few individuals faced compliance costs when accessing the COVID-19 vaccine, but many did not. Third, most individuals did not experience learning costs when accessing the COVID-19 vaccine. Finally, individuals used a variety of resources when accessing the COVID-19 vaccine.

These findings were surprising because with the exception of psychological barriers, participants experienced few burdens. Previous literature suggests that administrative burdens disproportionately impact vulnerable populations (Bell et al., 2021; Christensen et al., 2020; Connolly et al., 2021). The CDC classifies Orange County, Florida, the county where interviews were conducted, as having moderate to high social vulnerability in 2018 (CDC, 2022a). Because of this, the researcher expected that the participants interviewed would face insurmountable

administrative burdens when trying to access the COVID-19 vaccine. As explained in the theoretical framework, the researcher expected that administrative burdens would be imposed when accessing COVID-19 vaccines and that burdens would impede access to vaccines in communities with high social vulnerabilities. However, this was not the case for the most part, and in cases where administrative burdens did arise, participants were largely able to overcome burdens and access vaccines by using a variety of resources.

The study found that psychological barriers were the most reported burden faced by participants. Participants reported that vaccine hesitancy was a burden, but less than half of participants (45%) reported this burden. Existing studies found a relationship between vaccine hesitancy and vaccine uptake, suggesting that vaccine hesitancy could be a psychological burden, which is consistent with the findings (El-Mohandes et al., 2021; Khubchandani et al., 2021). Past research suggests that vaccine hesitancy could be related to race or ethnicity (Alfierei et al., 2021; El-Mohandes et al., 2021; Tram et al., 2021), which is also consistent with the findings in the current study. In fact, almost half of those reporting vaccine hesitancy mentioned their ethnicity when discussing vaccine hesitancy. The U.S. government released information about health misinformation aimed at reducing vaccine hesitancy (U.S. Health and Human Services, 2022a), but more work remains, especially in communities with a large presence of racial and ethnic minorities. Similarly, some participants reported avoiding a potential psychological cost related to negative health outcomes, primarily because their concerns were eased during the vaccination process and because their insurance company covered potential sickness and negative outcome costs from receiving the vaccine.

Participants explained there were few compliance costs as vaccines were largely accessible, free, and available without burdensome paperwork. The findings highlighted very

few compliance barriers related to making appointments or signing up for the vaccine, and participants reported that such issues were only problematic early in the vaccine process. This is also consistent with existing reports. In early 2021, when the vaccine was released, the vaccine demand outpaced supply, and vaccine appointments were so difficult to access that there were reports of individuals waiting for hours trying to make an appointment, and some individuals reported even camping overnight at vaccine sites because appointments were unavailable (Glenn, 2021; King, 2021; Rogers et al., 2021). Over time vaccines became more widely available, as did making appointments for vaccines, and by May 2021, President Biden reported that the U.S. had enough vaccine supply to begin sending vaccines abroad to other nations (American Journal of Managed Care, 2021). This is consistent with the comments reported by participants that over time, it became easier to access and make appointments for vaccines.

According to participants, learning costs did not materialize for most participants, as there was plenty of information regarding how to get vaccinated and whether they were eligible. The information was provided by multiple sources and was easily understandable according to participants. This was unexpected and inconsistent with past disaster recovery resource literature. Other programs intended to help individuals during and after emergencies and crises are difficult to access, largely because it is difficult to understand how to utilize services (Edgeley et al., 2017; Duffy & Shaefer, 2022). For example, the FEMA COVID-19 Funeral Assistance Program, which provided individuals with funding assistance for funerals of those who died from COVID-19, was largely underutilized (especially in some socially vulnerable areas), likely because of administrative burdens faced when trying to access funds through the program (Entress et al., 2022). To take advantage of the program, individuals must first call a hotline to apply for the program, and then individuals must separately submit documentation through an online portal,

fax, or mail, which essentially creates a two-step process to take advantage of this program (Entress et al., 2022). Governments in the United States took great efforts toward educating the public about the COVID-19 vaccine, which may have helped ease the learning costs associated with getting vaccinated. The U.S. Department of Health and Human Services (HHS) developed a nationwide public information campaign to educate the public about COVID-19 vaccinations (U.S. Department of Health and Human Services, 2022a), and the White House COVID-19 Response Team provided regular updates regarding COVID-19 and vaccinations (see for example, The White House, 2021). State and local governments also provided information about vaccinations, as well as financial incentives to individuals to get vaccinated (National Governors Association, 2021), which likely spread awareness and reduced learning costs involved in getting vaccinated. In summary, governments around the United States worked to provide information about vaccinations in multiple ways, which likely contributed to the lack of learning costs observed by participants.

This study did not find equity issues based on administrative burdens. This is largely unexpected and inconsistent with past research on resources provided to enhance resiliency following an emergency or crisis (see for example, Drakes et al., 2021; Emrich et al., 2020; Van Zandt et al., 2012). This suggests that the COVID-19 vaccines were fundamentally different than other types of support following past emergencies and crises. COVID-19 was not a traditional emergency, as it lasted several years and impacted the entire world, rather than a specific geographic region (Boin, Ekengren, & Rhinard, 2021; Boin, McConnell, & t'Hart, 2021). This pushed governments to reduce compliance, learning, and psychological costs that individuals would normally face. For example, Congress invested funding to develop, distribute, and promote COVID-19 vaccines, which helps to reduce administrative burdens. Between the

American Rescue Plan and the Coronavirus Response and Relief Supplemental Appropriations Act of 2021, the CDC was allocated $16.25 billion to "plan, promote, distribute, administer, monitor, and track COVID-19 vaccines" (p.2) and $1 billion to educate the public and provide information aimed at increasing vaccine confidence (Congressional Research Service, 2021). The CDC was required to award at least $4.5 billion from these funds to state, local, tribal, and territorial governments to assist with these efforts. In addition to providing finances, the CDC developed strategies that state and local governments can use to encourage vaccine uptake (CDC, 2022b). Guidance released from the CDC encouraged health officials to offer vaccines in places that are convenient for the public to increase their reach and lower barriers to getting vaccines. These included homes, schools, community events, public parks, houses of worship, and community pop-up locations. Guidance also encouraged public officials and health departments to partner with community organizations with low vaccination rates, develop social media strategies to encourage vaccinations, and work with existing health care programs to incorporate vaccinations in routine visits. Along with these strategies, the CDC provided materials that could be used by government officials and agencies to ease implementation of the strategies. For example, the CDC developed social media toolkits with messages and graphics that agencies could post on their social media accounts to encourage vaccinations and respond to misinformation.

A variety of resources and support services were identified by participants, which made it easier to get vaccinated. Many of the resources identified have been discussed in current disaster recovery literature in helping with community resilience. For example, social capital is cited in disaster recovery research as a resource that helps communities bounce back and return to normalcy after an emergency or crisis (Hahn et al., 2017; LaLone, 2012; Sadri et al., 2018).

Social capital was tied with transportation as the most cited resource participants used to access the COVID-19 vaccine. Like social capital, a lack of transportation was cited in emergency management literature as an impediment to resilience (see for example, Grube et al., 2017), meaning having transportation would improve resilience and recovery from emergencies. Without proper transportation, it can be difficult for people recovering from emergencies to access sites where resources and support can be accessed (Grube et al., 2017). Government and social service agencies were also commonly cited by participants as resources used to help access vaccinations. During traditional emergencies and crises, governments and social service agencies are key players in providing resources and helping individuals access needed services. For example, following disasters declared under the Stafford Act, FEMA provides IHP funding to provide short-term disaster funding to individuals and households (Drakes et al, 2021). Community organizations, including non-profit organizations and social service agencies, are pivotal resources in responding to emergencies (Kapucu et al., 2010; Koliba et al., 2011), which was similar to what was reported by the participants in the current study. Thus, although the lack of administrative burdens and equity issues identified in the current study was surprising and inconsistent with past literature, the resources used by participants to access resources needed for resilience (vaccines), were consistent with past emergency management literature.

Governments and public administrators can use these findings to develop strategies during future emergencies and crises. The current study showed that there were few administrative burdens, potential burdens were avoided, and that resources were used to access vaccines, suggesting that resources could have reduced administrative burdens people faced when utilizing vaccines. Following future emergencies and crises, emergency managers and government officials can invest in existing resources when developing programs to enhance

resilience following an emergency or crisis. For example, the study found that most commonly, individuals cited transportation and social capital as resources that were used to access the COVID-19 vaccine. When developing and redesigning programs for disaster recovery, FEMA's IHP funding (which is used to help individuals and households with expenses following a disaster, such as a hurricane), FEMA may want to provide information about how to help friends or family obtain funding and how to provide transportation assistance to those who need it to successfully apply for the funding. Similarly, the study found that the news media was instrumental in providing eligibility and logistical information to the public about COVID-19 vaccines. Although the news media regularly runs segments on emergency events, FEMA may want to consider providing news outlets with information on how to access resources, including eligibility information, to encourage resource utilization following emergencies and crises. Based on the findings from the current study, when resources are available following an emergency or crisis, it would likely be beneficial to incorporate those resources into existing channels, specifically government/social service agencies and employers. Participants in the current study reported using employers and government/social service agencies to help get vaccinated. During the COVID-19 pandemic, many employers developed programs to encourage vaccinations. For example, Target developed a program that paid for ride-sharing transportation to vaccination sites and provided four hours of paid time off to employees to get vaccinated (Casarella, 2021). In addition, American Airlines developed a program that provided extra vacation days and financial incentives for vaccinated employees (Casarella, 2021). Based on these findings from this study, if information about the resources needed to recover from emergencies and crises were available and provided by government/social service agencies and employers (such as those

programs listed above), administrative burdens to utilize such resources could be lower,

ultimately enhancing resilience.

Integration of Quantitative and Qualitative Findings

Table 13 presents a joint display of the quantitative and qualitative data from this study.

The researcher developed this table based on the four factors identified through the factor

analysis in the quantitative portion of this study. The researcher examined the four factors and

their relationship with county vaccination rates to report the quantitative results and then

examined how the four factors were reflected in the qualitative data, if at all. The researcher

identified quotes from the interviews related to the four factors and included those to provide

context related to the factor and qualitative findings.

Table 13: Joint Display of Results

Factor	Quantitative Findings Summary	Qualitative findings and Sample Quote	Summary
Wealth-related social vulnerability	A one-unit increase in wealth-related social vulnerability is associated with a 3.536 percentage points decrease in the number of adults who are vaccinated in a county.	Wealth provides resources that can ease burdens related to vaccinations. For example, transportation to vaccine sites (compliance barrier), news media consumption (learning barrier). "It didn't take any time, you know, it was all over the news- go here get the shot… it was like flooding the TV. You know, we was getting all kinds of information on where to go get tested, where to go get your	Areas with high wealth-related social vulnerability have lower vaccination rates and resources used by individuals to ease administrative burdens require wealth.

Factor	Quantitative Findings Summary	Qualitative findings and Sample Quote	Summary
		vaccination to go get vaccinated."	
Age-related social vulnerability	There is not a statistically significant relationship between age-related social vulnerability and the number of adults who are vaccinated in a county.	Qualitative findings did not reveal insights about age and administrative burdens related to vaccine utilization.	Age-related social vulnerability was not a factor related to vaccination rates and administrative burdens, as well as resources to access and ease administrative burdens, were not related to age.
Employment	A one-unit increase in employment-related social vulnerability is associated with a 1.611 percentage points increase in the number of adults who are vaccinated in a county	Employers provided support to ease compliance, learning, and psychological costs related to getting vaccinated, including individuals employed in vulnerable industries (such as the service industry). "They [my employer] offered it [the vaccine] for free...[they] offered the vaccines free for all of its employees, and they also offer compensation when you got the vaccine."	Areas with high employment-related social vulnerability have higher vaccination rates and employers, including those in vulnerable industries, provided support to reduce administrative burdens.
Ethnicity	A one-unit increase in the ethnicity-related social vulnerability index is associated with a 2.087 percentage points increase in the number of adults who	Ethnicity is related to psychological barriers to getting vaccinated. "…in my culture, they didn't want to [get vaccinated]. They were afraid that the government was up to something or whatever."	Areas with high ethnicity-related social vulnerability have higher vaccination rates, but ethnic minorities reported administrative

Factor	Quantitative Findings Summary	Qualitative findings and Sample Quote	Summary
	are vaccinated in a county		burdens to getting vaccinated.

In evaluating the first factor of wealth-related social vulnerability, county-level quantitative data revealed that higher wealth-related social vulnerability were associated with lower vaccination rates. Based on this finding, the researcher conducted interviews and asked questions about how wealth impacted administrative burdens to getting vaccinated. Although individuals did not specifically state that wealth impacted administrative burdens, they did reference two resources that they used to access vaccines and ease burdens: transportation and news media. Both resources are difficult to access without financial resources, suggesting that with wealth, the resources are easier to use, and administrative burdens to getting vaccinated are lowered. In summary, areas with high wealth-related social vulnerability have lower vaccination rates, and resources used by individuals to ease administrative burdens require wealth. This suggests that with wealth, resources to ease administrative burdens could be reduced, which ultimately could impact the relationship observed between wealth-related social vulnerability and county vaccination rate, although more data are needed to determine whether administrative burdens ultimately impact vaccination rates for counties with high wealth-related social vulnerability. These findings are consistent with the theoretical framework presented in this dissertation. Consistent with social construction and policy design (Schneider & Ingram, 1993), this study found a social equity issue related to wealth, where areas with higher wealth-related social vulnerability have lower vaccination rates. Although individuals did not report facing administrative burdens related to wealth, their reports of using resources that require wealth to

overcome administrative burdens are consistent with conflict theory (Simon, 2016; Turner, 1975).

In evaluating the second factor of age-related social vulnerability, both the quantitative and qualitative analyses revealed that age-related social vulnerability was not a factor impacting vaccinations. Specifically, the quantitative data revealed that there was no relationship between age-related social vulnerability and county vaccination rates. Qualitatively, the interview participants did not reflect administrative burdens or resources used to avoid administrative burdens related to age. This suggests that based on the data collected, through the first year of the vaccination administration, age-related vulnerability was neither a factor related to county vaccine rates nor related to individual administrative burdens to getting a vaccine. This is inconsistent with the theoretical framework, which hypothesized that social vulnerability would negatively impact resource utilization. However, this could be because older adults, which are reflected in three aspects of age-related social vulnerability (percent of people over the age of 65, median age, percent of people receiving social security benefits), typically have high power and positive connotation, which according to Schneider and Ingram (2003), results in preferential policies. Older adults were prioritized in vaccine distribution policies, as they had early access to the vaccine (Goodnough, 2021), and this prioritization and policy focus on older adults could be a result of their societal power and positive connotation, despite their social vulnerability. Thus, this finding was unexpected, but is logical and consistent with the theoretical framework.

In evaluating the third factor of employment-related social vulnerability, county-level quantitative data revealed that higher employment-related social vulnerability were associated with higher vaccination rates. Based on this finding, the researcher conducted interviews and asked questions about how employment impacted administrative burdens to getting vaccinated.

Participants reported a variety of employer support that was used to ease compliance, learning, and psychological costs related to getting vaccinated. More specifically, almost one-third (30%) of participants reporting assistance from employers stated that they worked in the service industry, an aspect of employment-related social vulnerability. This suggests that employers play a role in reducing administrative burdens related to vaccinations, especially for individuals who are part of groups that make up employment related social vulnerability. This may explain the observed relationship between county vaccination rate and employment-related social vulnerability, but more data are needed to fully understand this relationship. However, based on the qualitative data collected, resources used to ease administrative burdens from employers could be resulting in higher vaccination rates in counties with high employment-related social vulnerability. This is also inconsistent with the theoretical framework, as according to conflict theory, resources are distributed to prioritize people with power (Simon, 2016; Turner, 1975), which would not include people in communities with high employment-related social vulnerability. However, literature suggests that during the COVID-19 pandemic, economic use value was prioritized (Zavattaro, 2021), which could be why employers helped those with employment-related social vulnerability get vaccinated and a social equity issue was not observed.

Finally, in evaluating the fourth factor of ethnicity-related social vulnerability, county-level quantitative data revealed that higher ethnicity-related social vulnerability were associated with higher vaccination rates. Based on this finding, the researcher conducted interviews and asked questions about how ethnicity impacted administrative burdens to get vaccinated. Individuals reported facing psychological burdens to getting vaccinated, specifically, vaccine hesitancy. This is inconsistent with the quantitative finding and does not provide further insights

into why a positive relationship between ethnicity-related social vulnerability and county

vaccination rates was observed in the quantitative data. This is surprising based on the theoretical

framework because according to Schneider and Ingram (1993), people of color and

undocumented immigrants, two aspects that could contribute to ethnicity-related social

vulnerability, have negative connotations and result in less favorable policies for those

populations. Further research is needed to better understand this relationship, as well as how the

administrative burdens related to ethnicity impact vaccine decisions.

In summary, the qualitative findings about administrative burdens related to wealth and

employment are helpful in better understanding the relationship between social vulnerability and

vaccination rates. These results suggest that administrative burdens could be reducing

vaccination rates for socially vulnerable populations and that resources can reduce administrative

burdens, ultimately improving vaccination rates and enhancing resiliency. This is consistent with

social construction and policy design, where policies are designed to favor people with high

power and positive connotation (Schneider & Ingram, 1993) and suggest that social equity issues

occur related to vaccine distribution, but that resources to reduce administrative burdens can

reduce the social equity issues. Emergency managers and public administrators can use these

results to reduce administrative burdens for socially vulnerable populations during future

emergencies and crises to provide aid in a more equitable way.

CHAPTER SIX: CONCLUSION

This chapter concludes the dissertation. First, a summary of the dissertation is presented. Then, the practical and theoretical implications of the research are discussed. Finally, the limitations of the dissertation are presented.

Summary

To expand current public administration and emergency management research related to social equity during emergencies and crises, this study explored the social equity of COVID-19 vaccine utilization, including the relationship between social vulnerability and COVID-19 vaccine utilization and administrative burdens faced when accessing COVID-19 vaccinations. Quantitatively, the study found that higher wealth-related social vulnerability was associated with lower county vaccination rates, but higher ethnicity and employment related social vulnerability was associated with higher county vaccination rates. The results were surprising and suggest that some types of vulnerability can result in greater resource utilization, at least for the COVID-19 vaccinations. Qualitatively, interviews revealed that individuals faced few administrative burdens when getting vaccinated, but that they relied on a variety of resources and supports to access vaccines. Many of these resources were provided by employers and/or required wealth to access those resources.

These findings contribute to the body of literature on the utilization of resources intended to promote community resilience following emergencies and crises. While many studies find that higher social vulnerability results in lower resource utilization (see for example, Emrich et al., 2020; Entress et al., 2022; Rivera, 2016), this study found the opposite was true for employment and ethnicity related social vulnerability. This warrants further studies to examine the

relationship between employment and ethnicity related social vulnerability and other types of

resources during emergencies and crises, for example, FEMA individual and household program

funds. Theoretically, these findings shed light on social vulnerability and administrative burdens.

Because there was a relationship between wealth-related social vulnerability and county

vaccination rates and because wealth was identified as necessary to access COVID-19 vaccines,

the findings suggest that aspects of social vulnerability can potentially impact the ability to

access resources intended to promote resilience. While this was not empirically tested in this

study, the reliance on wealth and the relationship between wealth-related vulnerability and

vaccination rates suggest that a relationship could exist. However, future studies are needed to

understand the relationship between wealth-related social vulnerability, administrative burdens,

and the ability to access resources following an emergency or crisis.

Theoretical Implications

The findings from this dissertation have implications for public administration and

emergency management theory. First, the findings suggest that new conceptualizations of social

vulnerability developed from this dissertation (wealth, age, ethnicity, and employment related

social vulnerability) are needed to better understand the relationship between social vulnerability

and resource utilization. Although previous studies suggest that vaccination rates are higher in

areas with low social vulnerability, this dissertation found this was not the case for employment

and ethnicity related social vulnerability, suggesting that multiple measures of social

vulnerability are needed to fully understand the relationship between social vulnerability and

resource utilization.

Second, the findings contribute to an enhanced theoretical understanding of how

administrative burdens potentially interact with social vulnerability. Based on the theoretical

114

framework, the researcher expected that people would report that they experienced

administrative burdens when getting vaccinated. However, few administrative burdens were

noted and instead participants reported that they used a variety of resources to access vaccines.

Theoretically, this suggests that after emergencies and crises rather than administrative burdens

restricting access, additional resources may be impacting accessibility of government provided

resources to enhance resilience. Again, more research is needed to better understand whether this

is the case, but this result questions the theoretical assumption that administrative burdens

impede access to resources in socially vulnerable communities following emergencies and crises,

and instead suggests that resources in the community could be an important aspect to add to the

theoretical framework.

Finally, the dissertation contributes to the growing body of literature which works across

disciplines to address public policy issues from emergency management, public administration,

and public health perspectives. Although the dissertation is focused on contributing to the

emergency management and public administration fields, the crisis examined is a public health

crisis and the resource explored is a health care resource (vaccines), which is provided by

governments. By examining a public policy problem which spans three disciplines, the

theoretical implications related to resource allocation, social vulnerability, and administrative

burdens are extended into all three disciplines and the interdisciplinary nature of public policy

issues is furthered in research and academic literature.

<u>Practical Implications</u>

The results of the study suggest that the resources provided to promote and enhance

access to vaccines were worthy endeavors. The positive relationship between county vaccination

rates and employment-related social vulnerability, coupled with comments from interview

participants about the ease of vaccination, as well as employer sponsored vaccine efforts, suggests that those efforts were successful and lowered barriers to getting vaccinated. Although not cited by participants, the significant financial investment, and efforts from the U.S. government to promote vaccines and increase vaccine accessibility could account for the positive relationship between county vaccination rates and ethnicity-related social vulnerability. In other words, the support and resources involved in easing barriers to vaccination is likely why there is a positive relationship between these two types of social vulnerability and vaccination rates.

Public administrators and emergency managers can use the findings of this study to design programs for resource distribution following future emergencies and crises. With the reliance on resources, future programs to promote resiliency during and after emergencies must include resources that make it easier to access those programs, such as outreach efforts, pop-up locations, and partnerships with employers and existing programs. The integration into everyday life and convenience is essential to enhancing utilization. Public servants and researchers should also consider incorporating new conceptualizations of social vulnerability when examining communities to better understand the nuances, needs, and characteristics of the communities they serve following emergencies and crises. More specifically, they should consider examining employment, wealth, and ethnicity related social vulnerability, and use this information when planning how to provide services.

<u>Limitations</u>

There are limitations in the current study, which must be acknowledged. First, the limitations related to the quantitative analysis are discussed. Then, the limitations related to the qualitative analysis are discussed.

Quantitative Limitations

First, the study examines the relationship between vaccine utilization and social vulnerability by using data on individuals who received a complete vaccine series (2 primary doses for vaccines on the MRNA platform and 1 dose for vaccines on the adeno-based platform), rather than data on individuals who have been vaccinated and boosted (3 or more doses). Booster shots provide better protection, with even lower rates of hospitalization and death, which would provide a better picture of resilience (CDC, 2022b; Tenforde et al., 2022). However, data on the percent of counties with boosted individuals were not available from the CDC as of December 1, 2021. Second, vaccine-hesitancy data were collected in May/June of 2021, when the vaccine was relatively new. Over time, hesitancy could have declined, but further research is needed to understand whether this is the case. Third, many people were unemployed during the pandemic, some of which lost their jobs because of vaccine policies. The current study does not account for such employment changes, limiting our ability to fully understand the relationship between vaccinations and employment. Fourth, the study did not fully account for the extent to which political influence in counties impacted vaccination rates. Including control variables regarding political affiliation and divided state government attempted to capture political influence. If public health decisions were made politically in counties where the health departments were controlled by the state, the high vaccination rates in counties with local health department control could be better explained, but further research is needed to better understand the impact of political influence. Future research can also be conducted to further explore why counties in states with divided governments have higher vaccination rates and examine the potential role played by party affiliation. While this was included as a control in the current study, this finding was unexpected and future studies can explore why this relationship exists. Fifth, the current study does not fully account for state and local COVID-19 policies. Such policies can potentially

117

impact county vaccination rate. Governor political affiliation is included in the current study, which can act as a proxy for state-level COVID-19 policies, but future research can examine more specific state and local COVID-19 policies and their relationship to county vaccination rates. Finally, the study does not account for whether a county is urban or rural. Theoretically, the relationship between county vaccination rates and the type of vulnerability could be different in urban counties, when compared to rural counties. The datasets used for this study did not include variables related to whether a county was urban or rural. Hence, future studies can examine whether the relationship between vaccination rates and social vulnerability are different in rural and urban counties.

Qualitative Limitations

The qualitative portion of this study has limitations which, are discussed next. First, the current study is limited geographically to individuals at one social service agency in Orange County, Florida. While those seeking services are likely from socially vulnerable communities, those seeking services at the social service agencies could be fundamentally different than individuals in the community who do not seek services, and those individuals who do not attempt to seek services could face a greater number of administrative burdens and/or be more impacted by the administrative burdens they face. Future research can expand the study to other communities around the United States and recruit participants who have not sought services from social service agencies. This will allow for an examination of whether results are consistent in other geographic areas and the extent to which administrative burdens are similarly experienced by individuals who do not seek services from social service agencies. Second, the qualitative data were collected in October-November 2022, nearly two years after the COVID-19 vaccine was first released in Orange County, Florida. At this point in the pandemic, the COVID-19

vaccines were widely available, and COVID-19 was not considered as lethal as earlier in the pandemic. Although most patients received the vaccine early in the administration process, over time their perception of the vaccination process could have changed. Third, because of difficulties participants encountered when completing the survey, the survey was read to participants instead of having the participants fill out the survey themselves. Although the participants were comfortable answering the survey questions verbally, this did create potential problems. By administering the survey orally, some participants began providing details about their vaccine experience during the survey, before the recording began as part of the interview portion of data collection. As a result, some participants provided less detailed responses, likely because they did not see a need to repeat answers and details stated during the survey portion of data collection. The information collected was rich but would likely be more detailed if the survey was administered independently. Fourth, all participants were located at the same location, a non-profit organization that provided social services. Although income information was not collected during the interviews, it is likely that all participants were from disadvantaged backgrounds, which could explain why equity issues based on administrative burdens were not found. Future research can compare results when additional interviews are conducted at sites where higher income individuals would likely be located. Fifth, the surveys and interviews were only administered to individuals who received at least one dose of the COVID-19 vaccine. This was intentional to understand the administrative barriers individuals faced when getting vaccinated and avoid potential interviews that were primarily about a like or dislike about vaccines, but the results would likely be different if participants also included individuals who were not vaccinated. Future research should examine administrative barriers faced by individuals who are unvaccinated. Finally, the findings related to administrative burdens individuals faced

when accessing vaccines are limited to their experience with the COVID-19 vaccine and will not necessarily be the same administrative burdens individuals may face when accessing resources following other emergencies or crises, for example, FEMA IHP funding. Future research can examine the administrative burdens faced by individuals when accessing other types of resources following future emergencies or crises.

APPENDIX A: INTERVIEW PROTOCOL

General Questions
1. How was your experience obtaining the COVID-19 vaccine? Could you please describe your experience in detail?
2. Did you experience any problems when trying to obtain a COVID-19 vaccine?
   a. If yes, what sort of problems did you encounter?

Questions about learning costs
3. Did you have any trouble understanding how to get a COVID-19 vaccine?
   a. Did you know what was needed before being able to schedule and/or get the COVID-19 vaccine?
      i. If yes, how long did it take you to figure out what you needed before being able to schedule and/or get the COVID-19 vaccine? How easy or difficult was it to gather this information?
      ii. How did you schedule the appointment (online, phone, etc.)?
      iii. Did you have any difficulties figuring out this process?
   b. Did you have any confusion regarding the costs involved in getting the vaccine? If so, what were they? How did you overcome this confusion?
   c. Were there any concerns about the language used when getting information about the vaccine or how to schedule an appointment for the vaccine?
   d. To what extent, if any, did your age impact your ability to learn the information needed to get vaccinated or learn about the vaccine?
   e. Did your employer provide any assistance in understanding the vaccine process?

Questions about compliance costs
4. Approximately how much time did it take you to fill out the forms and provide any required documentation to receive the COVID-19 vaccine?
   a. Were these forms difficult to complete? Did you have any assistance filling out the forms?
5. Please describe the requirements that you had to meet to get a COVID-19 vaccine. Were these requirements difficult to meet?
   a. Was the information about meeting the requirements presented in a language you understand?
   b. Was the information provided to you in languages other than English? If yes, please list the languages.
   c. Did you need to arrange for childcare to get the COVID-19 vaccine? How did you manage this? Was it problematic or did it delay your vaccine?
   d. Could you please describe any difficulty you had accessing the vaccine site? Was transportation an issue?
   e. Did you need to take off work to get the vaccine? If yes, how did your employer handle your request to take off work?
6. How did you find out you were eligible to receive the COVID-19 vaccine? How difficult was it to understand whether you were eligible?
   a. Were there any requirements you were unable to meet because of finances? If yes, please, describe the requirements.
   b. Was it difficult to understand if you met the age eligibility requirements for the vaccine?

    c. Did your employment impact your eligibility? If so, did your employee help you understand this?

Questions about psychological costs

7. Did you experience any stress or psychological distress when obtaining the COVID-19 vaccine? If so, please describe the situation that caused you stress.
   a. What types of stressors did you have about the cost of the vaccine or any costs involved with getting the vaccine? Prompt if needed: Were you stressed about matters, such as paying for medical care if you got sick from the vaccine?
   b. To what extent did you feel stress or concern about being sick after vaccination? Was there another person present in your home who could help care for you if you reacted to the vaccine?
   c. What about concern about leaving your children to get the vaccine? Did this cause any type of psychological stress?
   d. How about balancing your employment and getting the vaccine? Did that impact your stress or psychological wellbeing?
   e. Was there resistance to getting the vaccine in your culture or ethnicity that caused any stress getting the vaccine?

8. Were you treated with dignity when receiving your COVID-19 vaccine? Please explain.
   a. Were you stressed that your wealth would impact how you were treated?
   b. Did you feel like the vaccine was provided in a manner that was respectful of your age (for example, if you are elderly and needed extra assistance was the provided to you; if you had young children was the vaccination site a welcoming environment for your children to accompany you)?
   c. How did your employer handle any needs you had related to the vaccine (for example, did they encourage to get vaccinated or make you feel guilty or ashamed for getting the vaccine)?
   d. Did you feel like your ethnicity and culture was respected when getting the vaccine?

9. Did you feel any stigma associated with getting vaccinated? Please describe any stigma you felt.

10. Did your family and/or friends ease any of the barriers with getting vaccinated? How?
    a. What about community members?
    b. What about those outside of your social group and/or community?
    c. What about those in positions of power and authority? Did any governmental or nongovernmental organizations help ease any of the barriers with getting vaccinated?

11. Is there anything else that you would like to add?

That was my last question. Thank you for your participation.

APPENDIX B: SURVEY

1. Did you have COVID-19 <u>before you received the COVID-19 vaccine</u>?
   a. Yes
   b. No
2. [if yes] Did this impact your decision regarding whether or not to get a COVID-19 vaccine?
   a. Yes, it made me **more** likely to get the COVID-19 vaccine
   b. Yes, it made me **less** likely to get the COVID-19 vaccine
   c. No
   d. I'm not sure
3. Did someone you know have COVID-19 <u>before you received the COVID-19 vaccine</u>?
   a. Yes
   b. No
4. [if yes] Did this impact your decision regarding whether or not to get a COVID-19 vaccine?
   a. Yes, it made me **more** likely to get the COVID-19 vaccine
   b. Yes, it made me **less** likely to get the COVID-19 vaccine
   c. Yes
   d. No
   e. I'm not sure
5. Thinking back to when the COVID-19 vaccine was first approved in December 2019, at that time, once you were eligible, what was your vaccination decision?
   - Definitely get a vaccine
   - Probably get a vaccine
   - Unsure
   - Probably not get a vaccine
   - Definitely not get a vaccine
6. Imagine that you did not receive the COVID-19 vaccine, at this current moment in time, which of the following would reflect your vaccination decision?
   - Definitely get a vaccine
   - Probably get a vaccine
   - Unsure
   - Probably not get a vaccine
   - Definitely not get a vaccine
7. Why did you seek the vaccine in the first case (please check all that apply)?
   - To protect my own health
   - To protect a family member's health
   - It was required by my employer
   - It was recommended by my doctor
   - It made it easier to return to normal life
   - I felt pressure from a family member or someone else to get the vaccine
   - Other
8. Did you have any of the following concerns about the COVID-19 vaccine (please check all that apply)?
   - I was worried because it was new technology
   - I was worried I would feel sick from the vaccine

- I was worried about long-term effects to my health from the vaccine (ex. heart disease, infertility, etc.)
- I was worried I would be judged about getting the vaccine
- I was worried the vaccine wouldn't work
- I don't trust the government and/or big pharma, which made me worried about the vaccine
- I didn't think the vaccine was needed because I already had COVID-19
- Other

9. What is your vaccination status?
    a. I am **not** vaccinated
    b. I am fully vaccinated
    c. I am vaccinated and received 1 booster
    d. I am vaccinated and received 2 boosters

10. Approximately when did you receive your first COVID-19 vaccine (month and year)?

11. Were you a member of any special group that qualified you for the vaccine prior to the general public (such as a working at a hospital or a doctor's office, because of age, or medical condition)? If yes, please specify the group.
    a. No
    b. Yes
        i. Please specify the group:_____

12. What is your sex?
    - Male
    - Female

13. What is your age?

14. What county do you live in?

15. What is the zip code where you live?

16. What is your race?
    - White
    - Black or African American
    - American Indian or Alaska Native
    - Asian
    - More than one race
    - Some other race- Print race or origin
        o [Open text box]

17. Are you of Hispanic, Latino, or Spanish origin?
    - Yes
    - No

18. What is the highest degree or level of school you have completed?
    - Less than a high school diploma
    - High school diploma or GED
    - Some college credit, no degree
    - Associates degree (for example: AA, AS)
    - Bachelor's degree (for example: BA, BS)
    - Master's degree (for example: MSW, MBA)
    - Professional degree beyond bachelor's degree or Doctoral Degree (for example: MD, JD, PhD)

19. Did you work for pay at a full-time job December 2020-December 2021? If you were unemployed for more than a 3-week period during this time, please select no.
   - Yes
   - No
   - I was a student
   - I am retired
20. If yes to question 17: Which one of the following best describes your employment December 2020-December 2021?
   - Government (for example: city or county school district)
   - Private company
   - Nonprofit organization (including tax-exempt and charitable organizations)
   - Self-employed
   - Other

APPENDIX C: IRB EXEMPTION DETERMINATION LETTER

Institutional Review Board
FWA00000351
IRB00001138, IRB00012110
Office of Research
12201 Research Parkway
Orlando, FL 32826-3246

UNIVERSITY OF CENTRAL FLORIDA

EXEMPTION DETERMINATION

September 14, 2022

Dear Amy Donley:

On 9/14/2022, the IRB determined the following submission to be human subjects research that is exempt from regulation:

Type of Review:	Initial Study
Title:	Learning, Psychological, and Compliance Barriers to Receiving the COVID-19 Vaccine in Orange County, Florida
Investigator:	Amy Donley
IRB ID:	STUDY00004616
Funding:	None
Grant ID:	None
Documents Reviewed:	• Update 9.12 Vaccine Study HRP 254 Explanation of Research.pdf, Category: Consent Form; • Update 9.12 Vaccine Study HRP-255.docx, Category: IRB Protocol; • Update Recruitment Script.docx, Category: Recruitment Materials; • Update Vaccine Study Survey Questions.docx, Category: Survey / Questionnaire; • Vaccine Study Interview Protocol.docx, Category: Interview / Focus Questions;

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made, and there are questions about whether these changes affect the exempt status of the human research, please submit a modification request to the IRB. Guidance on submitting Modifications and Administrative Check-in are detailed in the Investigator Manual (HRP-103), which can be found by navigating to the IRB Library within the IRB system.   When you have completed your research, please submit a Study Closure request so that IRB records will be accurate.

If you have any questions, please contact the UCF IRB at 407-823-2901 or irb@ucf.edu. Please include your project title and IRB number in all correspondence with this office.

Sincerely,

Tamiko Fukuda
UCF IRB

Page 1 of 1

Subject: Re: IRB Request- Format Review

Date: Friday, February 24, 2023 at 1:35:44 PM Eastern Standard Time

From: Abdul-Akeem Sadiq

To: Rebecca Entress

Attachments: Outlook-x1owsas0.png, Outlook-Wear a mas.png, Outlook-bov5y4Ov.png, Outlook-Wear a mas.png

To whom it may concern,

The purpose of this e-mail is to certify that this dissertation research is connected to the IRB approval received by Dr. Donley.

Dr. Sadiq

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New Book:
Managing Emergencies and Crises: Global Perspectives

NASPAA
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Review & Accreditation

ARMOR UP, KNIGHTS.
☑ Wear a mask.
☑ Wash your hands.
☑ Practice physical distancing.
ucf.edu/coronavirus

APPENDIX D: PARTICIPANT DETAILS

ID	Age	Gender	Education	Race	Hispanic	2021 Full-Time Employment	Vaccination status	COVID before vaccine	Friend/ Family had COVID before vaccine	Vaccine date	Early vaccine access
Participant 1	24	Male	Master's degree	Asian	No	Yes	1 booster	No	Yes	5/21	Yes
Participant 2	64	Female	Bachelor's Degree	Black	No	Retired	1 booster	No	No	6/21	No
Participant 3	54	Female	Associate's degree	White	No	Retired	2 boosters	No	Yes	4/21	No
Participant 4	56	Male	High School Diploma	Black	No	No	2 boosters	No	Yes	6/21	Yes
Participant 5	30	Male	Some college	1+ Races	Yes	Yes	2 boosters	Yes	Yes	4/22	No
Participant 6	58	Male	< High School Diploma	Black	No	No	Fully vaccinated	No	No	7/21	Yes
Participant 7	40	Male	Some college	White	No	No	1 booster	No	No	9/21	No
Participant 8	68	Male	Some college	Black	No	No	Fully vaccinated	No	No	4/21	Yes
Participant 9	45	Male	Some college	White	No	Yes	Fully vaccinated	No	Yes	8/22	No
Participant 10	68	Female	Some college	Black	No	Yes	1 booster	No	Yes	2/21	Yes
Participant 11	52	Female	< High School Diploma	White	No	No	2 boosters	No	No	10/21	No

ID	Age	Gender	Education	Race	Hispanic	2021 Full-Time Employment	Vaccination status	COVID before vaccine	Friend/ Family had COVID before vaccine	Vaccine date	Early vaccine access
Participant 12	61	Male	High School Diploma	1+ Races	No	No	1 booster	No	No	1/21	No
Participant 13	52	Male	Associate's degree	White	Yes	No	2 boosters	No	No	6/21	No
Participant 14	54	Female	Associate's degree	Black	No	Yes	1 dose	No	Yes	6/21	No
Participant 15	56	Female	< High School Diploma	Black	No	Retired	1 dose	No	Yes	4/21	Yes
Participant 16	53	Male	Some college	Other	No	No	Fully vaccinated	No	No	4/21	No
Participant 17	58	Female	High School Diploma	Other	Yes	Yes	1 booster	No	Yes	12/20	Yes
Participant 18	55	Female	Some college	White	No	No	1 booster	No	No	5/21	No
Participant 19	80	Male	Associate's degree	White	No	Retired	1 booster	No	No	3/21	Yes
Participant 20	20	Male	Some college	White	No	No	Fully vaccinated	Yes	Yes	5/21	No
Participant 21	68	Female	Some college	Black	No	Yes	Fully vaccinated	No	Yes	3/21	No
Participant 22	51	Male	Some college	White	Yes	No	2 boosters	No	Yes	1/21	Yes
Participant 23	51	Female	Bachelor's degree	Other	Yes	Yes	1 booster	No	Yes	4/21	Yes

ID	Age	Gender	Education	Race	Hispanic	2021 Full-Time Employment	Vaccination status	COVID before vaccine	Friend/Family had COVID before vaccine	Vaccine date	Early vaccine access
Participant 24	62	Male	High School Diploma	Black	No	No	Fully vaccinated	No	Yes	1/22	Yes
Participant 25	65	Female	Some college	Black	No	No	Fully vaccinated	Yes	No	Could not recall	No
Participant 26	51	Female	Bachelor's Degree	1+ Races	No	No	Fully vaccinated	No	Yes	Could not recall	No
Participant 27	45	Male	Some college	Black	No	No	Fully vaccinated	No	No	2/22	No
Participant 28	87	Male	< High School Diploma	Black	No	Retired	2 boosters	No	Yes	1/21	Yes
Participant 29	50	Male	Some college	White	No	No	Fully vaccinated	No	No	5/21	No
Participant 30	44	Male	Some college	White	No	No	1 dose	No	No	9/21	No
Participant 31	59	Male	< High School Diploma	White	Yes	No	Fully vaccinated	No	Yes	8/21	No

REFERENCES

Acock, A. (2018). A Gentle Introduction to Stata. Stata Press.

Albrecht, F. (2018). Natural hazard events and social capital: the social impact of natural disasters. *Disasters, 42*(2), 336-360. https://doi.org/10.1111/disa.12246

Alem, D., Bonilla-Londono, H. F., Barbosa-Povoa, A. P., Relvas, S., Ferreira, D., & Moreno, A. (2021). Building disaster preparedness and response capacity in humanitarian supply chains using the Social Vulnerability Index. *European Journal of Operational Research*, *292*(1), 250-275. https://doi.org/10.1016/j.ejor.2020.10.016

Alfieri, N. L., Kusma, J. D., Heard-Garris, N., Davis, M. M., Golbeck, E., Barrera, L., & Macy, M. L. (2021). Parental COVID-19 vaccine hesitancy for children: vulnerability in an urban hotspot. *BMC Public Health, 21*(1), 1-9. https://doi.org/10.1186/s12889-021-11725-5

Allen, M. (2017). Heteroskedasticity. *The SAGE Encyclopedia of Communication Research Methods*. https://dx.doi.org/10.4135/9781483381411.n230

American Journal of Managed Care. (2021). A Timeline of COVID-19 Vaccine Developments for the Second Half of 2021. https://www.ajmc.com/view/a-timeline-of-covid-19-vaccine-developments-for-the-second-half-of-2021

Anwar, A., Malik, M., Raees, V., & Anwar, A. (2020). Role of mass media and public health communications in the COVID-19 pandemic. *Cureus*, 12(9).

Barry, V., Dasgupta, S., Weller, D. L., Kriss, J. L., Cadwell, B. L., Rose, C., ... & Black, C. L. (2021). Patterns in COVID-19 vaccination Coverage, by social vulnerability and urbanicity—United States, December 14, 2020–May 1, 2021. *Morbidity and Mortality Weekly Report*, *70*(22), 818. https://doi.org/10.15585%2Fmmwr.mm7022e1

Baccini, L., & Brodeur, A. (2021). Explaining governors' response to the COVID-19 pandemic in the United States. *American Politics Research, 49*(2), 215-220.

BBC. (2022). Top Florida health official on leave over support for vaccination. https://www.bbc.com/news/world-us-canada-60060308

Bell, E., Ter-Mkrtchyan, A., Wehde, W., & Smith, K. (2021). Just or unjust? How ideological beliefs shape street-level bureaucrats' perceptions of administrative burden. *Public Administration Review, 81*(4), 610-624. https://doi.org/10.1111/puar.13311

Berger, R. (2015). Now I see it, now I don't: Researcher's position and reflexivity in qualitative research. *Qualitative Research, 15*(2), 219-234.

Bergstrand, K., Mayer, B., Brumback, B., & Zhang, Y. (2015). Assessing the relationship between social vulnerability and community resilience to hazards. *Social Indicators Research, 122*(2), 391-409. https://doi.org/10.1007/s11205-014-0698-3

Berry-James, R. M., Blessett, B., Emas, R., McCandless, S., Nickels, A. E., Norman-Major, K., & Vinzant, P. (2021). Stepping up to the plate: Making social equity a priority in public administration's troubled times. *Journal of Public Affairs Education, 27*(1), 5-15. https://doi.org/10.1080/15236803.2020.1820289

Bertram, I., Bouwman, R., & Tummers, L. (2022). Socioeconomic Status and Public Sector Worker Stereotypes: Results from a Representative Survey. *Public Administration Review, 82*(2), 237-255. https://doi.org/10.1111/puar.13461

Bibbins-Domingo, K., Petersen, M., & Havlir, D. (2021). Taking vaccine to where the virus is— equity and effectiveness in coronavirus vaccinations. *JAMA Health Forum, 2*(2), e210213-e210213.

Birkmann, J., Cardona, O. D., Carreño, M. L., Barbat, A. H., Pelling, M., Schneiderbauer, S., ... & Welle, T. (2013). Framing vulnerability, risk and societal responses: the MOVE framework. *Natural Hazards, 67*(2), 193-211. https://doi.org/10.1007/s11069-013-0558-5

Blessett, B., Gaynor, T. S., Witt, M., & Alkadry, M. G. (2016). Counternarratives as critical perspectives in public administration curricula. *Administrative Theory & Praxis, 38*(4), 267-284. https://doi.org/10.1080/10841806.2016.1239397

Boin, A., Comfort, L. K., & Demchak, C. C. (2010). The rise of resilience. In L. K. Comfort, A.

Boin, A., Ekengren, M., & Rhinard, M. (2021). *Understanding the Creeping Crisis*. Springer Nature.

Boin, A., & Lodge, M. (2016). Designing resilient institutions for transboundary crisis management: A time for public administration. *Public Administration*, *94*(2), 289-298. https://doi.org/10.1111/padm.12264

Boin, A., & McConnell, A. (2007). Preparing for critical infrastructure breakdowns: the limits of crisis management and the need for resilience. *Journal of Contingencies and Crisis Management*, *15*(1), 50-59. https://doi.org/10.1111/j.1468-5973.2007.00504.x

Boin, A., McConnell, A., & t Hart, P. (2021). *Governing the Pandemic: The Politics of Navigating a Mega-Crisis*. Springer Nature.

Boin, A., & van Eeten, M. J. (2013). The resilient organization. *Public Management Review*, *15*(3), 429-445. https://doi.org/10.1080/14719037.2013.769856

Borden, K. A., Schmidtlein, M. C., Emrich, C. T., Piegorsch, W. W., & Cutter, S. L. (2007). Vulnerability of US cities to environmental hazards. *Journal of Homeland Security and Emergency Management, 4*(2). https://doi.org/10.2202/1547-7355.1279

Bright, L. (2005). Public employees with high levels of public service motivation: Who are they, where are they, and what do they want?. *Review of Public Personnel Administration, 25*(2), 138-154. https://doi.org/10.1111/padm.12328

Brown, C. C., Young, S. G., & Pro, G. C. (2021). COVID-19 vaccination rates vary by community vulnerability: A county-level analysis. *Vaccine, 39*(31), 4245-4249. https://doi.org/10.1016/j.vaccine.2021.06.038

Burton, C., Rufat, S., & Tate, E. (2018). Social Vulnerability: Conceptual Foundations and Geospatial Modeling. In S. Fuchs & T. Thaler (Eds.) *Vulnerability and Resilience to Natural Hazards* (pp. 53-81). Cambridge University Press.

Butz, A. M., & Gaynor, T. S. (2022). Intersectionality and social welfare: Avoidance and unequal treatment among transgender women of color. *Public Administration Review, 82*(3), 433-445. https://doi.org/10.1111/puar.13468

Caillier, J. G. (2017). The impact of high-quality workplace relationships in public organizations. *Public Administration, 95*(3), 638-653.

Casarella, D. (2012). 3 incentives to encourage employees to get the COVID-19 vaccine. *U. S. Chamber of Commerce*. https://www.uschamber.com/co/start/strategy/employee-vaccination-incentives

Centers for Disease Control and Prevention (CDC). (2021a). *CDC social vulnerability index*. Geospatial Research Analysis, and Services Program. https://www.atsdr.cdc.gov/placeandhealth/svi/fact_sheet/pdf/SVI_FactSheet_v10152020-H.pdf

Centers for Disease Control and Prevention (CDC). (2021b). *About COVID-19 Vaccine Delivered and Administration Data*. https://www.cdc.gov/coronavirus/2019-ncov/vaccines/distributing/about-vaccine-data.html

Centers for Disease Control and Prevention (CDC). (2021c). *Vaccine Hesitancy for COVID-19: County and local estimates*. https://data.cdc.gov/Vaccinations/Vaccine-Hesitancy-for-COVID-19-County-and-local-es/q9mh-h2tw

Centers for Disease Control and Prevention (CDC). (2022a). COVID-19 integrated county view. COVID Data Tracker. https://covid.cdc.gov/covid-data-tracker/#county-view?list_select_state=all_states&list_select_county=all_counties&data-type=Vaccinations&metric=Administered_Dose1_Pop_Pct&null=Vaccinations

Centers for Disease Control and Prevention (CDC). (2022b). Effectiveness of a Third Dose of mRNA Vaccines Against COVID-19–Associated Emergency Department and Urgent Care Encounters and Hospitalizations Among Adults During Periods of Delta and Omicron Variant Predominance — VISION Network, 10 States, August 2021–January 2022. *Morbidity and Mortality Weekly Report*. https://www.cdc.gov/mmwr/volumes/71/wr/mm7107e2.htm

Chandra, A., Acosta, J., Stern, S., Uscher-Pines, L., Williams, M. V., Yeug, D., Garnett, J., & Meredith, L. S. (2011). *Building community resilience to disasters: A way forward to enhance national health security*. RAND Corporation. https://www.rand.org/content/dam/rand/pubs/technical_reports/2011/RAND_TR915.pdf

Chen, C., Boadu, D. B., & Xiao, R. (2022). Mask or No Mask for COVID-19? Do the Individual Characteristics of Governors Affect the Adoption of Statewide Public Mask Mandates?. *Public Performance & Management Review, 45*(5), 1214-1234. https://doi.org/10.1080/15309576.2022.2093231

Cheng, Y., Yang, L., & Deng, S. (2022). Nonprofit Density and Distributional Equity in Public Service Provision: Exploring Racial/Ethnic Disparities in Public Park Access across US Cities. *Public Administration Review, 82*(3), 473-486. https://doi.org/10.1111/puar.13465

Christensen, J., Aarøe, L., Baekgaard, M., Herd, P., & Moynihan, D. P. (2020). Human capital and administrative burden: The role of cognitive resources in citizen-state interactions. *Public Administration Review, 80*(1), 127-136. https://doi.org/10.1111/puar.13134

Clark-Ginsberg, A., Easton-Calabria, L. C., Patel, S. S., Balagna, J., & Payne, L. A. (2021). When disaster management agencies create disaster risk: a case study of the US's Federal Emergency Management Agency. *Disaster Prevention and Management: An International Journal, 30*(45), 447-461. https://doi.org/10.1108/DPM-03-2021-0067

Comfort, L. K., Kapucu, N., Ko, K., Menoni, S., & Siciliano, M. (2020). Crisis decision-making on a global scale: Transition from cognition to collective action under threat of COVID-19. *Public Administration Review*, *80*(4), 616-622. https://doi.org/10.1111/puar.13252

Comfort, L., Wisner, B., Cutter, S., Pulwarty, R., Hewitt, K., Oliver-Smith, A., ... & Krimgold, F. (1999). Reframing disaster policy: the global evolution of vulnerable communities. *Global Environmental Change Part B: Environmental Hazards*, *1*(1), 39-44. https://doi.org/10.3763/ehaz.1999.0105

Congressional Research Service. (2021). Domestic Funding for COVID-19 Vaccines: An Overview. https://crsreports.congress.gov/product/pdf/IF/IF11951

Connolly, J. M., Klofstad, C., & Uscinski, J. (2021). Administrative burdens and citizen likelihood to seek local public services: the case of hurricane shelters. *Public Performance & Management Review*, *44*(3), 560-579. https://doi.org/10.1080/15309576.2020.1818588

Court, E. (2022). Workers are getting angry about companies ending vaccine mandates. *Bloomberg*. https://www.bloomberg.com/news/articles/2022-04-14/as-companies-end-vaccine-mandates-workers-are-becoming-enraged?leadSource=uverify%20wall

Crane, M. A., Faden, R. R., & Romley, J. A. (2021). Disparities In County COVID-19 Vaccination Rates Linked To Disadvantage And Hesitancy: Study examines disparities in county COVID-19 vaccination rates. *Health Affairs, 40*(11), 1792-1796. https://doi.org/10.1377/hlthaff.2021.01092

Creswell, J. W., Hanson, W. E., Clark Plano, V. L., & Morales, A. (2007). Qualitative research designs: Selection and implementation. *The Counseling Psychologist, 35*(2), 236-264.

Creswell, J., & Plano Clark, V.L. (2018). *Designing and conducting mixed methods research.* (3rd ed.). Sage publications, Inc.

Cutter, S. (1996). Vulnerability to environmental hazards. *Progress in Human Geography, 20*(4), 529-539.

Cutter, S. L., Barnes, L., Berry, M., Burton, C., Evans, E., Tate, E., & Webb, J. (2008). A place-based model for understanding community resilience to natural disasters. *Global Environmental Change*, *18*(4), 598-606. https://doi.org/10.1016/j.gloenvcha.2008.07.013

Cutter, S. L., Boruff, B. J., & Shirley, W. L. (2003). Social vulnerability to environmental hazards. *Social Science Quarterly*, *84*(2), 242-261.

Cutter, S. L., & Finch, C. (2008). Temporal and spatial changes in social vulnerability to natural hazards. *Proceedings of the National Academy of Sciences*, *105*(7), 2301-2306.

Dalton, M., & Groen, J. A. (2022). Telework during the COVID-19 pandemic. *Monthly Labor Review*, 1-15.

Dasgupta, S., Bowen, V. B., Leidner, A., Fletcher, K., Musial, T., Rose, C., ... & Oster, A. M. (2020). Association between social vulnerability and a county's risk for becoming a COVID-19 hotspot—United States, June 1–July 25, 2020. *Morbidity and Mortality Weekly Report*, *69*(42), 1535-1541. https://doi.org/10.15585%2Fmmwr.mm6942a3

De Bruijne, M. L. C., Boin, A., & van Eeten, M. J. (2010). Resilience. Exploring the concept and its meaning. In L. K. Comfort, A. Boin, & C. C. Demchak (Eds.) *Designing Resilience: Preparing for Extreme Events* (pp. 13-32). University of Pittsburg Press.

De Loyola Hummell, B. M., Cutter, S. L., & Emrich, C. T. (2016). Social vulnerability to natural hazards in Brazil. *International Journal of Disaster Risk Science*, *7*(2), 111-122. https://doi.org/10.1007/s13753-016-0090-9

Dey, M., Frazis, H., Loewenstein, M. A., & Sun, H. (2020). Ability to work from home. *Monthly Labor Review*, 1-19.

Diesel, J., Sterrett, N., Dasgupta, S., Kriss, J. L., Barry, V., Esschert, K. V., ... & Barbour, K. E. (2021). COVID-19 vaccination coverage among adults—United States, December 14, 2020–May 22, 2021. *Morbidity and Mortality Weekly Report*, *70*(25), 922. https://doi.org/10.15585%2Fmmwr.mm7025e1

DiStefano, C., Zhu, M., & Mindrila, D. (2009). Understanding and using factor scores: Considerations for the applied researcher. *Practical Assessment, Research, and Evaluation, 14*(1), 20.

Domingue, S. J., & Emrich, C. T. (2019). Social vulnerability and procedural equity: exploring the distribution of disaster aid across counties in the United States. *The American Review of Public Administration*, *49*(8), 897-913.

Döring, M., & Madsen, J. K. (2022). Mitigating Psychological Costs–The Role of Citizens' Administrative Literacy and Social Capital. *Public Administration Review, 82*(4), 671-681. https://doi.org/10.1111/puar.13472

Drakes, O., Tate, E., Rainey, J., & Brody, S. (2021). Social vulnerability and short-term disaster assistance in the United States. *International Journal of Disaster Risk Reduction*, *53*(1), 1-10. https://doi.org/10.1016/j.ijdrr.2020.102010

Duffy, M., & Shaefer, H. L. (2022). In the Aftermath of the Storm: Administrative Burden in Disaster Recovery. *Social Service Review, 96*(3), 507-533. https://doi.org/10.1086/721087

Durant, R. F., & Rosenbloom, D. H. (2017). The hollowing of American public administration. *The American Review of Public Administration*, *47*(7), 719-736. Durant, R. F., & Rosenbloom, D. H. (2017). The hollowing of American public administration. The American Review of Public Administration, 47(7), 719-736. http://doi.org/10.1177/0275074015627218

Edgeley, C. M., & Paveglio, T. B. (2017). Community recovery and assistance following large wildfires: The case of the Carlton Complex Fire. *International Journal of Disaster Risk Reduction, 25*, 137-146. https://doi.org/10.1016/j.ijdrr.2017.09.009

El-Mohandes, A., White, T. M., Wyka, K., Rauh, L., Rabin, K., Kimball, S. H., ... & Lazarus, J. V. (2021). COVID-19 vaccine acceptance among adults in four major US metropolitan areas and nationwide. *Nature, 11*(1), 1-12. https://doi.org/10.1038/s41598-021-00794-6

Emrich, C. T., Tate, E., Larson, S. E., & Zhou, Y. (2020). Measuring social equity in flood recovery funding. *Environmental Hazards*, *19*(3), 228-250. https://doi.org/10.1080/17477891.2019.1675578

Entress, R. M., Tyler, J., & Sadiq, A. A. (2020). Managing mass fatalities during COVID-19: lessons for promoting community resilience during global pandemics. *Public Administration Review*, *80*(5), 856-861. https://doi.org/10.1111/puar.13232

Entress, R. M., Tyler, J., & Sadiq, A. A. (2022). Inequity after death: Exploring the equitable utilization of FEMA's COVID-19 funeral assistance funds. *Public Administration Review*. https://doi.org/10.1111/puar.13572

Farmer, A. Y., Farmer, A. Y., & Farmer, G. L. (2020). Research methods for social work: A problem-based approach. SAGE Publications.

Federal Emergency Management Agency (FEMA). (2021). *Resilience*. https://www.fema.gov/about/offices/resilience

Finch, W. H. (2020). Exploratory factor analysis. Sage.

Flanagan, B. E., Gregory, E. W., Hallisey, E. J., Heitgerd, J. L., & Lewis, B. (2011). A social vulnerability index for disaster management. *Journal of Homeland Security and Emergency Management*, *8*(1), 1-21. https://doi.org/10.2202/1547-7355.1792

Frederickson, G. (2005). The state of social equity in American public administration. *National Civic Review*, *94*(4), 31-38.

Freed, G. L. (2021). Actionable lessons for the US COVID vaccine program. *Israel Journal of Health Policy Research*, *10*(1), 1-3. https://doi.org/10.1186/s13584-021-00452-2

Frerks, G. (2015). Help or hindrance? The contribution of the resilience approach to risk governance. In U. Fra.Paleo (Ed.), *Risk governance: The articulation of hazard, politics, and ecology*. Springer

Fu, X., & Zhai, W. (2021). Examining the spatial and temporal relationship between social vulnerability and stay-at-home behaviors in New York City during the COVID-19 pandemic. *Sustainable Cities and Society*, *67*, 1-9. https://doi.org/10.1016/j.scs.2021.102757

Fyall, R. (2016). The power of nonprofits: Mechanisms for nonprofit policy influence. *Public Administration Review, 76*(6), 938-948. https://doi.org/10.1111/puar.12550

Gadson, D. N. (2020). Advancing equity in public administration: Prioritizing equality of outcomes in the COVID-19 crisis. *Risk, Hazards & Crisis in Public Policy*, *11*(4), 449-457. https://doi.org/10.1002/rhc3.12206

Gaynor, T. S., & Wilson, M. E. (2020). Social vulnerability and equity: The disproportionate impact of COVID-19. *Public Administration Review*, *80*(5), 832-838. https://doi.org/10.1111/puar.13264

Gee, J., Marquez, P., Su, J., Calvert, G. M., Liu, R., Myers, T., ... & Shimabukuro, T. (2021). First month of COVID-19 vaccine safety monitoring—United States, December 14, 2020–January 13, 2021. *Morbidity and Mortality Weekly Report*, *70*(8), 283. https://doi.org/10.15585%2Fmmwr.mm7008e3

Gelo, O., Braakmann, D., & Benetka, G. (2008). Quantitative and qualitative research: Beyond the debate. *Integrative Psychological and Behavioral Science*, *42*(3), 266-290.

Giauque, D., Ritz, A., Varone, F., & Anderfuhren-Biget, S. (2012). Resigned but satisfied: The negative impact of public service motivation and red tape on work satisfaction. *Public Administration, 90*(1), 175-193. https://doi.org/10.1111/j.1467-9299.2011.01953.x

Glenn, J. (2021). Seniors in Florida camp overnight to get vaccine. *NPR*. https://www.npr.org/2021/01/02/952897252/seniors-in-florida-camp-overnight-to-get-vaccine

Godschalk, D. R. (2003). Urban hazard mitigation: creating resilient cities. *Natural Hazards Review, 4*(3), 136-143. Godschalk, D. R. (2003). Urban hazard mitigation: creating resilient cities. Natural Hazards Review, 4(3), 136-143. https://doi.org/10.1061/(ASCE)1527-6988(2003)4:3(136)

Goldberg, E. (2022). Starbucks ends its plan to require worker vaccination and testing. *New York Times*. https://www.nytimes.com/2022/01/19/business/starbucks-vaccine-mandate.html

Gonzalez, A, Lee, E. C, Grigorescu, V., Smith, S. R., Lew, N. E., & Sommers, B. D. (2021). Overview of Barriers and Facilitators in COVID-19 Vaccine Outreach. U. S. Department of Health and Human Services. https://aspe.hhs.gov/sites/default/files/2021-08/Vaccine%20Outreach%20Research%20Report%208-27-2021%20FINAL.pdf

Gooden, S. T. (2015). *Race and social equity: A nervous area of government*. Routledge.

Gooden, S. T. (2017). Social equity and evidence: Insights from local government. *Public Administration Review*, *77*(6), 822-828. https://doi.org/10.1111/puar.12851

Goodman, Z. T., Stamatis, C. A., Stoler, J., Emrich, C. T., & Llabre, M. M. (2021). Methodological challenges to confirmatory latent variable models of social vulnerability. *Natural Hazards*, *106*(3), 2731-2749. https://doi.org/10.1007/s11069-021-04563-6

Goodnough, A. (2021). The U.S. surgeon general warns not to let priority guidelines slow down vaccinations. *New York Times*. https://www.nytimes.com/2021/01/05/world/the-us-surgeon-general-warns-not-to-let-priority-guidelines-slow-down-vaccinations.html

Griffin, J. D. (2014). When and why minority legislators matter. *Annual Review of Political Science, 17*, 327-336. https://doi.org/10.1146/annurev-polisci-033011-205028

Grube, L. E., Fike, R., & Storr, V. H. (2018). Navigating disaster: An empirical study of federal assistance following Hurricane Sandy. *Eastern Economic Journal, 44*(4), 576-593. https://doi.org/10.1057/s41302-017-0098-x

Guo, X., & Kapucu, N. (2020). Assessing social vulnerability to earthquake disaster using rough analytic hierarchy process method: A case study of Hanzhong City, China. *Safety Science*, *125*, 1-10. https://doi.org/10.1016/j.ssci.2020.104625

Guy, M. E., & McCandless, S. A. (2012). Social equity: Its legacy, its promise. *Public Administration Review, 72*, S5-S13. http://doi.org/10.111/j.1540 6210.2012.02635.x

Hahn, D., Willis, T. L., Christie, A. R., & Mathews, S. R. (2017). The relationship between social capital and potential resilience in individuals. *Journal of Emergency Management, 15*(3), 189-194.

Hair, J. F., Black, W. C., Babin, B. J., and Anderson, R. E. (2012). Multivariate data analysis. (7th ed.). Pearson.

Hall, J. L. (2010). Giving and taking away: Exploring federal grants' differential burden on metropolitan and nonmetropolitan regions. *The Journal of Federalism, 40*(2), 257-274. https://doi.org/10.1093/publius/pjp046

Hall, J. L. (2022). Variations on a theme of resignation: Idling by, backpedaling, or driving forward?. *Public Administration Review, 82*(1), 7-11. https://doi.org/10.1111/puar.13455

Hamel, L., Lopes, L., Sparks, G., Kirzinger, A., Kearney, A., Stokes, M., & Brodle, M. (2021, September 28). KFF COVID-19 vaccine monitor: September 2021. *Kaiser Family Foundation.* https://www.kff.org/coronavirus-covid-19/poll-finding/kff-covid-19-vaccine-monitor-september-2021/?campaign_id=9&emc=edit_nn_20210928&instance_id=41490&nl=the-morning&regi_id=83666512&segment_id=70082&te=1&user_id=f7edae9562d9964e6c2c1282d2446fac

Hazards and Vulnerability Research Institute. (2016). The SoVI Recipe. https://www.sc.edu/study/colleges_schools/artsandsciences/centers_and_institutes/hvri/documents/sovi/sovi_recipe_2016.pdf

Hazards & Vulnerability Research Institute. (2021). *HRVI Home.* University of South Carolina. http://artsandsciences.sc.edu/geog/hvri/

Heinrich, C. J. (2016). The bite of administrative burden: A theoretical and empirical investigation. *Journal of Public Administration Research and Theory*, *26*(3), 403-420. https://doi.org/10.1093/jopart/muv034

Hendren, K., Luo, Q. E., & Pandey, S. K. (2018). The state of mixed methods research in public administration and public policy. *Public Administration Review, 78*(6), 904-916. https://doi.org/10.1111/puar.12981

Henry, G. T. (1990). *Practical Sampling*. Sage. http://dx.doi.org/10.4135/9781412985451

Hoang, T., Suh, J., & Sabharwal, M. (2022). Beyond a numbers game? Impact of diversity and inclusion on the perception of organizational justice. *Public Administration Review, 82*(3), 537-555. https://doi.org/10.1111/puar.13463

Holand, I. S., Lujala, P., & Rod, J. K. (2011). Social vulnerability assessment for Norway: A quantitative approach. *Norwegian Journal of Geography, 65*(1), 1-17.

Hong, S., & Lee, S. (2018). Adaptive governance and decentralization: Evidence from regulation of the sharing economy in multi-level governance. *Government Information Quarterly, 35*(2), 299-305. https://doi.org/10.1016/j.giq.2017.08.002

Houston, D. J., & Harding, L. H. (2013). Public trust in government administrators: Explaining citizen perceptions of trustworthiness and competence. *Public Integrity*, *16*(1), 53-76. https://doi.org/10.2753/PIN1099-9922160103

Hughes, M. M., Wang, A., Grossman, M. K., Pun, E., Whiteman, A., Deng, L., ... & Toblin, R. L. (2021). County-level COVID-19 vaccination coverage and social vulnerability— United States, December 14, 2020–March 1, 2021. *Morbidity and Mortality Weekly Report*, *70*(12), 431. https://doi.org/10.15585%2Fmmwr.mm7012e1

Hutcheson, G. D. (1999). The Multivariate Social Scientist. Sage. https://methods.sagepub.com/book/the-multivariate-social-scientist/d49.xml?fromsearch=true

Ingram, H., Schneier, A. L., deLeon, P. (2007). Social construction and policy design. In P.A. Sabatier (Ed.), *Theories of the Policy Process* (pp. 93-129). Westview Press.

Jackson, S. L., Derakhshan, S., Blackwood, L., Lee, L., Huang, Q., Habets, M., & Cutter, S. L. (2021). Spatial disparities of COVID-19 cases and fatalities in United States counties. *International Journal of Environmental Research and Public Health*, *18*(16). https://www.mdpi.com/1660-4601/18/16/8259#

Jagarnath, M., Thambiran, T., & Gebreslasie, M. (2020). Heat stress risk and vulnerability under climate change in Durban metropolitan, South Africa—identifying urban planning priorities for adaptation. *Climatic Change, 163*(2), 807-829. https://doi.org/10.1007/s10584-020-02908-x

Jenkins, J. M., & Nguyen, T. (2021). Keeping kids in care: Reducing administrative burden in state Child Care Development Fund policy. *Journal of Public Administration Research and Theory*, *32*(1), 23-40. https://doi.org/10.1093/jopart/muab020

Kalton, G. (1983). *Introduction to survey sampling.* Sage. http://dx.doi.org/10.4135/9781412984683

Kapucu, N., Arslan, T., & Demiroz, F. (2010). Collaborative emergency management and national emergency management network. *Disaster Prevention and Management: An International Journal, 19*(4). https://doi.org/10.1108/09653561011070376

Kapucu, N., Garayev, V., & Wang, X. (2013b). Sustaining networks in emergency management: A study of counties in the United States. *Public Performance & Management Review, 37*(1), 104-133. https://doi.org/10.2753/PMR1530-9576370105

Kapucu, N., Hawkins, C., & Rivera, F. I. (eds.). (2013a). Disaster resiliency: Interdisciplinary perspectives. New York, NY: Routledge. https://upittpress.org/books/9780822960614/

Kapucu, N., & Moynihan, D. (2021). Trump's (mis) management of the COVID-19 pandemic in the US. *Policy Studies,42,* 1-19.

Kapucu, N., & Sadiq, A. A. (2016). Disaster policies and governance: Promoting community resilience. *Politics and Governance, 4*(4), 58-61.

Karaye, I. M., & Horney, J. A. (2020). The impact of social vulnerability on COVID-19 in the US: An analysis of spatially varying relationships. *American Journal of Preventive Medicine*, *59*(3), 317-325. https://doi.org/10.1016/j.amepre.2020.06.006

Kettl, D. F. (2020). States divided: the implications of American federalism for COVID-19. *Public Administration Review, 80(*4), 595-602.

Khairat, S., Zou, B., & Adler-Milstein, J. (2022). Factors and reasons associated with low COVID-19 vaccine uptake among highly hesitant communities in the US. *American Journal of Infection Control, 50*(3), 262-267. https://doi.org/10.1016/j.ajic.2021.12.013

Khubchandani, J., Sharma, S., Price, J. H., Wiblishauser, M. J., Sharma, M., & Webb, F. J. (2021). COVID-19 vaccination hesitancy in the United States: a rapid national assessment. *Journal of Community Health*, *46*(2), 270-277. https://doi.org/10.1007/s10900-020-00958-x

King, N. (2021). Vaccination confusion: How a Florida reporter helped anxious seniors get their shots. *NPR*. https://www.npr.org/sections/coronavirus-live-updates/2021/02/03/963619100/vaccination-confusion-how-a-florida-reporter-helped-anxious-seniors-get-their-sh

Koliba, C. J., Mills, R. M., & Zia, A. (2011). Accountability in governance networks: An assessment of public, private, and nonprofit emergency management practices following Hurricane Katrina. *Public Administration Review, 71*(2), 210-220. https://doi.org/10.1111/j.1540-6210.2011.02332.x

Knox, C. C. (2016). Passing the Northern Everglades and Estuaries Protection Program Bill: A Case Study Applying Theories of Policy Change. *Public Administration Quarterly, 40*(3), 617-654.

Knox, C. C. (2022). Local emergency management's use of social media during disasters: case study of Hurricane Irma. *Disasters*. https://doi.org/10.1111/disa.12544

Koch, J. W. (2019). Racial minorities' trust in government and government decisionmakers. *Social Science Quarterly*, *100*(1), 19-37. https://doi.org/10.1111/ssqu.12548

Kuckartz, U. (2014). Three basic methods of qualitative text analysis. Qualitative text analysis: A guide to methods, practice & using software, 1-56.

LaLone, M. B. (2012). Neighbors helping neighbors: An examination of the social capital mobilization process for community resilience to environmental disasters. *Journal of Applied Social Science, 6*(2), 209-237.

Latkin, C. A., Dayton, L., Yi, G., Konstantopoulos, A., & Boodram, B. (2021). Trust in a COVID-19 vaccine in the US: A social-ecological perspective. *Social Science & Medicine*, *270*, 1-8. https://doi.org/10.1016%2Fj.socscimed.2021.113684

Lewis-Beck, M. (1995). Univariate Statistics. Sage. https://dx.doi.org/10.4135/9781412983846.n3

Lewis-Beck, C. & Lewis-Beck, M. (2016). Applied Regression: An Introduction. Sage. https://dx.doi.org/10.4135/9781483396774.n4

Liang, L. L., Kuo, H. S., Ho, H. J., & Wu, C. Y. (2021). COVID-19 vaccinations are associated with reduced fatality rates: Evidence from cross-county quasi-experiments. *Journal of Global Health, 11*, 1-9. https://doi.org/10.7189%2Fjogh.11.05019

Lin, C., Tu, P., & Beitsch, L. M. (2021). Confidence and receptivity for COVID-19 vaccines: A rapid systematic review. *Vaccines*, *9*(1), 16. https://doi.org/10.3390/vaccines9010016

Linos, K., Carlson, M., Jakli, L., Dalma, N., Cohen, I., Veloudaki, A., & Spyrellis, S. N. (2021). How do disadvantaged groups seek information about public services? A randomized controlled trial of communication technologies. *Public Administration Review, 82*(4), 708-720. https://doi.org/10.1111/puar.13437

Lofaro, R. J., & Sapat, A. (2022). Communication and leadership in times of crisis: analyzing the cultural competency of US state governors during the vaccine administration phase of the COVID-19 pandemic. *International Journal of Public Leadership, 18*(2). 173-188

Lopez Bernal, J., Andrews, N., Gower, C., Gallagher, E., Simmons, R., Thelwall, S., ... & Ramsay, M. (2021). Effectiveness of Covid-19 vaccines against the B. 1.617. 2 (Delta) variant. *New England Journal of Medicine, 385*(7), 585-594.

Lumley, T., Diehr, P., Emerson, S., & Chen, L. (2002). The importance of the normality assumption in large public health data sets. *Annual Review of Public Health, 23*(1), 151-169. https://doi.org/10.1146/annurev.publhealth.23.100901.140546

MacPhail, C., Khoza, N., Abler, L., & Ranganathan, M. (2016). Process guidelines for establishing intercoder reliability in qualitative studies. *Qualitative Research, 16*(2), 198-212.

Mafi-Gholami, D., Jaafari, A., Zenner, E. K., Kamari, A. N., & Bui, D. T. (2020). Vulnerability of coastal communities to climate change: Thirty-year trend analysis and prospective prediction for the coastal regions of the Persian Gulf and Gulf of Oman. *Science of the Total Environment, 741*, 1-12. https://doi.org/10.1016/j.scitotenv.2020.140305

Martin-Howard, S., & Farmbry, K. (2020). Framing a needed discourse on health disparities and social inequities: Drawing lessons from a pandemic. *Public Administration Review, 80*(5), 839-844. https://doi.org/10.1111/puar.13265

Maul, A. (2018). Judgment sampling. In B. B. Frey (Ed.) *The SAGE Encyclopedia of Educational Research, Measurement, and Evaluation.* Sage Publications. https://dx.doi.org/10.4135/9781506326139.n367

McEntire, D. A. (1999). Issues in disaster relief: progress, perpetual problems and prospective solutions. *Disaster Prevention and Management: An International Journal, 8*(5), 351-361. https://doi.org/10.1108/09653569910298279

Meier, K. J., Juenke, E. G., Wrinkle, R. D., & Polinard, A. J. (2005). Structural choices and representational biases: The post-election color of representation. *American Journal of Political Science, 49*(4), 758-768. https://doi.org/10.1111/j.1540-5907.2005.00153.x

Messenger, H. From McDonald's to Goldman Sachs, here are the companies mandating vaccines for all or some employees. NBC News. https://www.nbcnews.com/business/business-news/here-are-companies-mandating-vaccines-all-or-some-employees-n1275808

Minta, M. D., & Valeria, S. C. (2013). Diversity in political institutions and Congressional responsiveness to minority issues. *Political Research Quarterly, 66*(1). 127-140.

Moynihan, D., Herd, P., & Harvey, H. (2014). Administrative burden: Learning, psychological, and compliance costs in citizen-state interactions. *Journal of Public Administration Research and Theory, 25*, 43-69. https://doi.org/10.1093/jopart/muu009

Moynihan, D. P., Herd, P., & Ribgy, E. (2016). Policymaking by other means: Do states use administrative barriers to limit access to Medicaid?. *Administration & Society*, *48*(4), 497-524.

Myers, C. A., Slack, T., & Singelmann, J. (2008). Social vulnerability and migration in the wake of disaster: the case of Hurricanes Katrina and Rita. *Population and Environment*, *29*(6), 271-291. https://doi.org/10.1007/s11111-008-0072-y

National Academy of Public Administration (NAPA). (2021). Grand challenges in public administration. Accessed September 1, 2021, from https://napawash.org/grand-challenges/the-12-grand-challenges

National Association of County and City Officials (NACCHO). (2019). National Profile of Local Health Departments. https://www.naccho.org/resources/lhd-research/national-profile-of-local-health-departments

National Conference of State Legislatures. (2020). State legislator demographics. https://www.ncsl.org/about-state-legislatures/state-legislator-demographics

National Conference of State Legislatures. (2021). State partisanship composition. https://www.ncsl.org/research/about-state-legislatures/partisan-composition.aspx#

National Governors Association (2021). COVID-19 vaccine incentives. https://www.nga.org/publications/covid-19-vaccine-incentives/

National Research Council of the National Academies. (2006). *Facing hazards and disasters: Understanding human dimensions*. National Academies Press.

Neelon, B., Mutiso, F., Mueller, N. T., Pearce, J. L., & Benjamin-Neelon, S. E. (2021). Spatial and temporal trends in social vulnerability and COVID-19 incidence and death rates in the United States. *Plos one*, *16*(3), 1-17. https://doi.org/10.1371/journal.pone.0248702

New York Times. (2022). Coronavirus in the US: Latest map and case count. https://www.nytimes.com/interactive/2021/us/covid-cases.html?name=styln-coronavirus&region=TOP_BANNER&block=storyline_menu_recirc&action=click&pgtype=Interactive&variant=1_Show&is_new=false

Nisar, M. A. (2018). Children of a lesser god: Administrative burden and social equity in citizen–state interactions. *Journal of Public Administration Research and Theory*, *28*(1), 104-119. https://doi.org/10.1093/jopart/mux025

Norman-Major, K. (2011). Balancing the four E's; Or can we achieve equity for social equity in public administration? *Journal of Public Affairs Education*, *17*(2), 233-252. https://doi.org/10.1080/15236803.2011.12001640

Nukpezah, J. A. (2020). Social vulnerability determinants of individual social capital for emergency preparedness. *International Journal of Emergency Management, 16*(1), 41-59. https://doi.org/10.1504/IJEM.2020.110107

Osborne, J. W., Costello, A. B., & Kellow, J. T. (2008). Best Practices in Exploratory Factor Analysis. Sage. https://dx.doi.org/10.4135/9781412995627.d8

Osman, S. M. I., & Sabit, A. (2022). Predictors of COVID-19 vaccination rate in USA: A machine learning approach. *Machine Learning with Applications, 10*, 1-13. https://doi.org/10.1016/j.mlwa.2022.100408

Painter, E. M., Ussery, E. N., Patel, A., Hughes, M. M., Zell, E. R., Moulia, D. L., ... & Messonnier, N. E. (2021). Demographic characteristics of persons vaccinated during the first month of the COVID-19 vaccination program—United States, December 14, 2020–January 14, 2021. *Morbidity and Mortality Weekly Report*, *70*(5), 174. https://doi.org/10.15585%2Fmmwr.mm7005e1

Persad, G., Emanuel, E. J., Sangenito, S., Glickman, A., Phillips, S., & Largent, E. A. (2021). Public perspectives on COVID-19 vaccine prioritization. *JAMA*, *4*(4), 1-12.

Phillips, N. (2021). The coronavirus is here to stay-here's what that means. *Nature, 590*, 382-384. https://doi.org/10.1111/psj.12040

Pierce, J. J., Siddiki, S., Jones, M. D., Schumacher, K., Pattison, A., & Peterson, H. (2014). Social construction and policy design: A review of past applications. *Policy Studies Journal, 42*(1), 1-29.

Plein, C. (2019). Resilience, adaptation, and Inertia: Lessons from disaster recovery in a time of climate change. *Social Science Quarterly*, *100*(7), 2530-2541. https://doi.org/10.1111/ssqu.12658

Preuhs, R. R. (2006). The conditional effects of minority descriptive representation: Black legislators and policy influence in the American states. *The Journal of Politics, 68*(3), 585-599. https://doi.org/10.1111/j.1468-2508.2006.00447.x

Pynes, J. E., & Rissler, G. E. (2017). Social equity in the Trump era: What can local public administrators do to improve social equity for their residents and community in the face of federal cuts?. *State and Local Government Review*, *49*(1), 48-59. https://doi.org/10.1177/0160323X17720267

Riccucci, N. M. (2009). The pursuit of social equity in the federal government: A road less traveled? *Public Administration Review*, *69*(3), 373-382. https://doi.org/10.1111/j.1540-6210.2009.01984.x

Rifai, M. A., Jain, V., Khan, S. U., Nasir, K., Zhu, D., Vasudeva, R., ... & Virani, S. S. (2021). Social vulnerability and COVID-19: An analysis of CDC data. *Progress in Cardiovascular Diseases*, *73,* 1-3. https://doi.org/10.1016%2Fj.pcad.2021.09.006

Rivera, J. D. (2016). *Acquiring federal disaster assistance: Investigating equitable resource distribution within FEMA's home assistance program* (Doctoral dissertation, Rutgers University-Camden Graduate School).

Rivera, F.I., & Kapucu, N. (2015) Resilience. In: F. I. Rivera & N. Kapucu (Eds.). *Disaster Vulnerability, Hazards and Resilience* (pp. 69-81). Springer. https://doi.org/10.1007/978-3-319-16453-3_6

Rogers, K., LaFraniere, S., and Weiland, N. (2021). Biden says the U.S. will soon have enough vaccine for all Americans, but logistical hurdles remain. *New York Times*. https://www.nytimes.com/live/2021/02/11/world/covid-19-coronavirus

Ruel, E. (2019). 100 Questions and Answers About Survey Research. https://dx.doi.org/10.4135/9781506348803.n100

Rufat, S., Tate, E., Emrich, C. T., & Antolini, F. (2019). How valid are social vulnerability models?. *Annals of the American Association of Geographers*, *109*(4), 1131-1153. https://doi.org/10.1080/24694452.2018.1535887

Rufat, S., Tate, E., Emrich, C. T., & Antolini, F. (2020). Answer to the CDC: Validation must precede promotion. *Annals of the American Association of Geographers*, *111*(4), em-vii. https://doi.org/10.1080/24694452.2020.1857221

Ruscio, J., & Roche, B. (2012). Determining the number of factors to retain in an exploratory factor analysis using comparison data of known factorial structure. *Psychological Assessment, 24*(2), 282.

Russell, C. J., & Dean, M. A. (2000). To log or not to log: Bootstrap as an alternative to the parametric estimation of moderation effects in the presence of skewed dependent variables. *Organizational Research Methods, 3*(2), 166-185.

Sadiq, A. A., Kapucu, N., & Hu, Q. (2020). Crisis leadership during COVID-19: the role of governors in the United States. *International Journal of Public Leadership, 17*(1), 65-80

Sadri, A. M., Ukkusuri, S. V., Lee, S., Clawson, R., Aldrich, D., Nelson, M. S., ... & Kelly, D. (2018). The role of social capital, personal networks, and emergency responders in post-disaster recovery and resilience: a study of rural communities in Indiana. *Natural Hazards, 90*(3), 1377-1406. https://doi.org/10.1007/s11069-017-3103-0

Salamon, L.M. (2002). The tools of government. 1st ed. New York: Oxford University Press.

Salemi, J. L., Salinas-Miranda, A. A., Wilson, R. E., & Salihu, H. M. (2015). Transformative use of an improved all-payer hospital discharge data infrastructure for community-based participatory research: A sustainability pathway. *Health Services Research, 50,* 1322-1338. https://doi.org/10.1111/1475-6773.12309

Salkind, N. J. (2007). Encyclopedia of Measurement and Statistics. Sage. https://dx.doi.org/10.4135/9781412952644.n293

Schneider, A., & Ingram, H. (1993). Social construction of target populations: Implications for politics and policy. *American Political Science Review, 87*(2), 334-347. https://doi.org/10.2307/2939044

Schneider, A., & Sidney, M. (2009). What is next for policy design and social construction theory? *Policy Studies Journal, 37*(1), 103-119. https://doi.org/10.1111/j.1541-0072.2008.00298.x

Schoon, I., & Cheng, H. (2011). Determinants of political trust: A lifetime learning model. *Developmental Psychology, 47*(3), 619. https://psycnet.apa.org/doi/10.1037/a0021817

Sharp, E. B. (1994). The dynamics of issue expansion: Cases from disability rights and fetal research controversy. *The Journal of Politics, 56*(4), 919-939.

Sheridon, K., & Colombini, S. (2021). After a slow start, Florida's Hispanic COVID-19 vaccination rates surpass non-Hispanics. *NPR*. https://wusfnews.wusf.usf.edu/health-news-florida/2021-09-17/after-a-slow-start-floridas-hispanic-covid-19-vaccination-rates-surpass-non-hispanics

Simon, R. M. (2016). The conflict paradigm in sociology and the study of social inequality: Paradox and possibility. *Theory in Action, 9*(1), 1-31.

Small, T. A. (2012). e-Government in the age of social media: An analysis of the Canadian government's use of Twitter. *Policy & Internet, 4*(3-4), 91-111. https://doi.org/10.1002/poi3.12

Song, J., South, E., Solomon, S., & Wiebe, D. (2021). Injustices in pandemic vulnerability: A spatial-statistical analysis of the CDC Social Vulnerability Index and COVID-19 outcomes in the US. *MedRxiv,* 1-19. https://doi.org/10.1101/2021.05.27.21257889

Springer, C. G. (2012). Resilience in emergency management research. *Public Administration Review, 72*(4), 548-549.

Subbaraman, N. (2020). Who gets a COVID vaccine first? Access plans are taking shape. *Nature, 585*(7826), 492-493.

Stone, D. (2002). *Policy Paradox: The art of political decision making* (Vol. 13). New York: Norton.

Svara, J. H., & Brunet, J. R. (2005). Social equity is a pillar of public administration. *Journal of Public Affairs Education*, *11*(3), 253-258. https://doi.org/10.1080/15236803.2005.12001398

Tellman, B., Schank, C., Schwarz, B., Howe, P. D., & de Sherbinin, A. (2020). Using disaster outcomes to validate components of social vulnerability to floods: Flood deaths and property damage across the USA. *Sustainability*, *12*(15), 1-28. https://doi.org/10.3390/su12156006

Tenforde, M. W., Self, W. H., Gaglani, M., Ginde, A. A., Douin, D. J., Talbot, H. K., ... & Network, I. V. Y. (2022). Effectiveness of mRNA vaccination in preventing COVID-19– associated invasive mechanical ventilation and death—United States, March 2021– January 2022. *Morbidity and Mortality Weekly Report, 71*(12), 459.

Thakore, N., Khazanchi, R., Orav, E. J., & Ganguli, I. (2021, December). Association of Social Vulnerability, COVID-19 vaccine site density, and vaccination rates in the United States. *Healthcare, 9*(4), 1-5. https://doi.org/10.1016/j.hjdsi.2021.100583

The White House. (2021). Press briefing by White House COVID-19 Response Team and public health officials. https://www.whitehouse.gov/briefing-room/press-briefings/2021/11/17/press-briefing-by-white-house-covid-19-response-team-and-public-health-officials-68/

Tracy, S. J. (2010). Qualitative quality: Eight "big-tent" criteria for excellent qualitative research. *Qualitative Inquiry, 16*(10), 837-851.

Tram, K. H., Saeed, S., Bradley, C., Fox, B., Eshun-Wilson, I., Mody, A., & Geng, E. (2021). Deliberation, dissent, and distrust: Understanding distinct drivers of coronavirus disease 2019 Vaccine Hesitancy in the United States. Clinical Infectious Diseases: An Official Publication of the Infectious Diseases Society of America.

Turner, J. H. (1975). Marx and Simmel revisited: Reassessing the foundations of conflict theory. *Social Forces*, *53*(4), 618-627. https://doi.org/10.1093/sf/53.4.618

United Against Poverty. (2022). About Us. https://uporlando.org/about-us/

U.S. Census. (2021). *Around Four-Fifths of All U.S. Metro Areas Grew Between 2010 and 2020*. https://www.census.gov/library/stories/2021/08/more-than-half-of-united-states-counties-were-smaller-in-2020-than-in-2010.html

United States Department of Health and Human Services (2022a). How to address COVID-19 vaccine misconceptions. https://wecandothis.hhs.gov/outreach-tools/addressing-covid-19-vaccine-misconceptions

Van Zandt, S., Peacock, W. G., Henry, D. W., Grover, H., Highfield, W. E., & Brody, S. D. (2012). Mapping social vulnerability to enhance housing and neighborhood resilience. *Housing Policy Debate*, *22*(1), 29-55. https://doi.org/10.1080/10511482.2011.624528

Wang, S., & Mastracci, S. (2014). Gauging social justice: A survey of indices for public management. *Public Administration Quarterly*, 488-520. https://www.jstor.org/stable/24372062

Wang, H., Xu, R., Qu, S., Schwartz, M., Adams, A., & Chen, X. (2021). Health inequities in COVID-19 vaccination among the elderly: Case of Connecticut. *Journal of Infection and Public Health, 14*(10), 1563-1565. https://doi.org/10.1016/j.jiph.2021.07.013

Warner, M. E., & Zhang, X. (2021). Social safety nets and COVID-19 stay home orders across US states: a comparative policy analysis. *Journal of Comparative Policy Analysis: Research and Practice, 23*(2), 176-190. https://doi.org/10.1080/13876988.2021.1874243

Waugh Jr, W. L. (1994). Regionalizing emergency management: Counties as state and local government. *Public Administration Review, 54*, 253-258.

Whiteman, A., Wang, A., McCain, K., Gunnels, B., Toblin, R., Lee, J. T., ... & Barbour, K. E. (2021). Demographic and social factors associated with COVID-19 vaccination initiation among adults aged≥ 65 years—United States, December 14, 2020–April 10, 2021. *Morbidity and Mortality Weekly Report*, *70*(19), 725. https://doi.org/10.15585%2Fmmwr.mm7019e4

Wilson, J. Q. (1980). *The Politics of Regulation*. Basic Books.

Wilson, J. Q. (1989). *Bureaucracy*. Basic Books.

Wong, C. A., Dowler, S., Moore, A. F., Sosne, E. F., Young, H., Tenenbaum, J. D., ... & Kinsley, K. H. (2021). COVID-19 vaccine administration, by race and ethnicity—North Carolina, December 14, 2020–April 6, 2021. *Morbidity and Mortality Weekly Report, 70*(28), 991.

Woolridge, B. & Gooden, S. (2009). The epic of social equity: Evolution, essence, and emergence. *Administrative Theory and Praxis, 31*, 222-234. https://www.jstor.org/stable/25610986

Wright, J. E., & Merritt, C. C. (2020). Social equity and COVID-19: The case of African Americans. *Public Administration Review, 80*(5), 820-826. https://doi.org/10.1111/puar.13251

Yamano, Takashi. 2009. Heteroskedasticity and Robust Estimators. http://www3.grips.ac.jp/~yamanota/Lecture_Note_9_Heteroskedasticity

Yin, R. K. (2016). *Qualitative Research from Start to Finish.* Guilford Press.

Zavattaro, S. M., Entress, R., Tyler, J., & Sadiq, A. A. (2021). When deaths are dehumanized: Deathcare during COVID-19 as a public value failure. *Administration & Society, 53*(9), 1443-1462.

Zylla, E., Bernard, S., & Lukanen, E. (2021). *Ensuring equity: State strategies for monitoring COVID-19 vaccination rates by race and other priority populations*. State Health and Value Strategies. https://www.shvs.org/ensuring-equity-state-strategies-for-monitoring-covid-19-vaccination-rates-by-race-and-other-priority-populations/