The Tale of Two Counties: A Case Study Analysis of Sociological and Systemic Health Barriers in Powhatan and Galax County, Virginia

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Rebecca A. Rogers

The College of William & Mary
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The Tale of Two Counties:
A Case Study Analysis of Sociological and Systemic Health Barriers in Powhatan and Galax County, Virginia

A thesis submitted in partial fulfillment of the requirement for the degree of Bachelor of Science in Kinesiology from William & Mary

by

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Williamsburg, VA
May 11, 2022
The year of 2020 will famously be known by most as the year “the world stopped working.” Unfortunately, the world had not been functioning sufficiently prior to the COVID-19 pandemic. Utilizing 2019 as a pre-pandemic baseline, the not so evident discrepancies in healthcare systems were illuminated during the pandemic, not only between countries but also between states, cities, and even counties. My research, being inductive, aims to dissect the pathways that allow health inequities to exist alongside providing realistic solutions that could be implemented through health policy. To accomplish my research goal, I conducted a case study that compares the most and least vulnerable county in Virginia alongside utilizing GIS methodology to aid in visually showing the discrepancies in health across the state. With utilization of the Social Vulnerability Index, which will be discussed in more detail later in this paper, I was able to narrow the predominant social determinants that impact health which can be seen broadly in the categories of socio-economic class, racial minority status, household composition, and accessibility to transportation. In addition, I plan to assert why health inequities matter and how they are results of structural neglects in our societal system.

There are numerous responses that could be adequate in diminishing the effects of health inequities, like eliminating poverty or improving current healthcare systems; however, the third and most overlooked step is the initiative to reduce and eventually eradicate health disparities (Marmot, 2005). Health disparities are the result of varying incongruities in social determinants of health, which are societal structures that disproportionately advantage some while also disadvantaging others. The predominant social determinants that impact health can be seen broadly in the categories of socio-economic class, racial minority status, household composition, and accessibility to transportation. Inherently, if the determinants of health are ultimately results of social processes, the remedies themselves should also be rooted in social change (Marmot,
Social change is predominantly reliant on the changes of health policy; however, health policy does not always equate to health equity. These remedies should not only focus on alleviating determinants but also having a broader aim to restructure the conditions that enable these determinants (Marmot, 2005). While the research is plentiful in showing the impact social determinants have on health (Marmot, 2005), there is a seemingly lack of research in how social infrastructure enables social determinants and ultimately establishes health inequity.

Social structure holds a strong influence over the potential societies can reach through the economic, political, legal, religious, and cultural arrangements that affect how different social groups interact (Farmer & Rylko-Bauer, 2016). Policies, norms, and laws that overly privilege some social groups while excessively harming others can induce a discriminatory social arrangement, also known as structural violence (Buyum et al., 2020: 1). When social determinants are strongly disproportioned between groups within a society, structural violence occurs, and over time can become more prevalent and established as an accepted societal norm. These social arrangements are deemed violent due to the avoidable injuries, morbidity prevalence, and mortality rates that result from the discrepancy in social support; in addition, they enable violence by the marginalization of varying groups of people that constrain their agency and sustaining inequalities (Farmer & Rylko-Bauer, 2016).

Today, we can see the exacerbated effects of structural violence amid the COVID-19 pandemic with the disproportional allotment of aid and in varying demographic susceptibility to the virus. However, the economic and social damage done is not random; the mortality rates of COVID-19 can be attributed to social inequities just as much as it can be attributed to virology (Samra et al., 2020). Elevated social vulnerability can stem from housing insecurity, poverty, racism in healthcare, and other integrated social arrangements (Samra et al., 2020). Multiple
public health entities have created various indices to evaluate social variables that inherently create structural violence and health inequities. The most recent index to evaluate social vulnerability was updated by the Center for Disease Control and Prevention (CDC) in 2020 with new information from the 2020 Census.

The Social Vulnerability Index (SVI) is utilized to measure community vulnerability to aid public health officials and community responders in providing aid before, during, and after a disaster like hurricanes or pandemics (CDC, 2020). The SVI provides a vulnerability score on a scale between 1 and 0 where 1 is the most vulnerable and 0 is the least. The CDC utilized fifteen social factors that were then broken into four main types of variables which include: household composition & disability, transportation, minority status, and socioeconomic status (CDC, 2020). Within the four variables, the sum of each are calculated and averaged to establish individual variable scores and an overall social vulnerability index for a particular county.

Understanding the SVI is important to understanding how social determinants of health go unaddressed and reproduces structural violence, despite their nominal intention to mitigate disaster impact. The literature review will focus on the four subareas of the SVI and evaluate their impact on health and COVID-19: household composition & disability, transportation, minority status, and socioeconomic status. First, I will address the impact of housing composition and disability on community health through age demographics, disability demographics, and single parent households.

In terms of epidemiological tracing, household composition and predisposed comorbidities seem deceptively obvious when thinking of the various routes of virus transmission and predisposed risk. In the CDC’s SVI, one of the four subindices evaluated household composition and disability by examining (1) the health outcomes of single-parent
households, (2) individuals 65 or older, (3) children 17 or younger, and (4) civilians with
disability in all United States counties. Household composition can be assessed through varying
house assortments like multigenerational living situations, single-parent households, and
households with elderly or disabled individuals. It is important to acknowledge the effects
household composition and disability can have on health to appropriately create health protecting
strategies that accommodates all living conditions.

A significant indicator of household composition in the SVI is the number of single-
parent households in each county. Studies have continuously shown that children who live with
continuously married or partnered parents have better health due to better levels of key
psychological and developmental outcomes like physical health, psychological well-being, and
emotional fulfillment (Lut et al., 2021). The immediate assumption of the health inequities
between households is assumed through financial and time freedom that could be accompanied
with a dual-parent household; nonetheless, broader sociological mechanisms also have the
potential to impact a child’s health outcomes through access to healthcare and varying
developmental processes (Lut et al., 2021). Literature as far back to 2005 concludes that children
with continuously married parents develop better cognitive and emotional outcomes compared
with children who live in single-parent households; this can be plausibly explained through
impacts of the parental relationship breakdown (Lut et al., 2021). In addition, single parents are
more likely to work occupations with lower income and lack job security which must be
balanced with the responsibilities of childcare, which in terms of affordability is very limited.
Lower earnings can affect the quality and availability of healthcare. Single parent homes can also
be linked to adverse child health outcomes due to parental stress, lack of social support in their
communities, and the social stigma surrounding single parent homes. In addition to assessing the
importance of household composition in terms of parental arrangement, evaluating the percentage of elderly and children in each home indicate other critical health measurements.

Health among the elderly population has typically been a strong indicator of the health of the general population; conversely, as health began to be seen as a multidimensional variable the question does longer life longevity correlate to a healthier life is met by the latter question being, are they longer healthy or unhealthy years (Crimmins, 2004). Observing the health trends of the elderly population aids healthcare officials in developing geriatric health care programs that encompass many different aspects ranging from improving health literacy in the elderly to ensuring periodic health assessments (Shrivastava et al., 2013).

On the opposite end of the age spectrum, assessing the general health of children under the age of 17 has become an increasingly relevant research topic (Ravens-Sieberer et al., 2006). Assessing the quality of health in children requires a multidimensional approach assessing children’s physical, emotional, mental, and social well-being. This assessment has increasingly gained importance as it helps public health officials learn where to appropriate allocate health services like pediatric therapy or better in school health measures (Ravens-Sieberer et al., 2006). With rising United States disparities in environmental exposures and income, it is important as a society to acknowledge that helping all children to achieve optimal functions physically, mentally, and socially is in the best interest of the general population (Beck et al., 2017).

Another key aspect to population health is assessing the trends in disability. The SVI weighs the number of disabled in a population to accommodate for other areas of vulnerability. The percentage of the population living in extreme disability have large expenditures for the use of long-term care facilities (Crimmins, 2004). Discussions of disability trends are complicated due to the arrayed extremity of different disabilities (Crimmins, 2004).
The most common way to define disability is the inability to be self-sufficient and perform activities of daily living (ADLs) like bathing, eating, dressing, and toileting (Crimmins, 2004).

In terms of the COVID-19 pandemic, assessing household composition and population disability levels are important indicators of vulnerable residents. However, each population possesses a different vulnerability to COVID-19. For single parents, COVID-19 exposed challenges in terms of childcare and education. Many single parents rely on the stability of routines to have the ability to work and provide for their children, however, during the pandemic many single parents struggled to balance jobs, educational responsibilities, and childcare (Blagg et al., 2020). Children of single parents were vulnerable to suffering increased household stress, falling behind on schoolwork, and lack of parental attention (Blagg et al., 2020). For the elderly, psychological and mental health took a great toll during the height of COVID-19, which resulted in elderly individuals above 60 being more at risk for developing mental illness than any other age group (Lee, Jeong, & Yim, 2020). With strong social distancing, social restraint, and quarantine measures, the elderly became a chief concern in the realm of mental health (Lee, Jeong, & Yim, 2020). Acknowledging the impact COVID-19 had on the elderly is important in facilitating a deeper understanding of the elderly’s mental health and creating guidelines to aid with coping (Lee, Jeong, & Yim, 2020).

The disabled population poses different challenges due to the variety of disabilities and how each navigates healthcare. Those who live with visual disabilities have faced problems in managing the psychosocial aspects of being blind in addition to navigating the physical environment (Nyman, Gosney, Victor, 2009). Many of the new behavioral adoptions in light of the pandemic posed an immense challenge to the blind community in conjunction with minimizing inclusive service approaches and lack of accessibility to COVID-19 information.
Those who are mobility impaired faced barriers in obtaining physical exercise; SUPER-HEALTH was a designed intervention for those with a mobility impairment to access at home exercises that are inclusive with their disability (Wilroy et al., 2021). Lastly, the cognitively impaired individuals fought to be seen in health policy by self-advocating for better clinical experiences and treatment. In light of COVID, the disabled population alongside their peers advocated for training of medical staff on the inequities those with disabilities face alongside proposing a more holistic and specialized approach to provide support for those with learning disabilities (Courtenay & Cooper, 2021).

The second pillar of the SVI incorporates housing type and transportation’s impact on health. Specifically in housing types, analyzing the impact multi-unit structures, mobile homes, group quarters, and crowding gives insight to how structural conditions can hinder health. In terms of transportation, assessing the accessibility of transportation is important in understanding the effects no vehicle can have on an individual’s wellbeing in addition to the utilization of public transportation.

The growing disparities in health have led to an increasing awareness that health is linked to socially determined factors that originate at the individual level and extend all the way to the structural (Gibsen et al., 2011). In an attempt to tackle health disparities, interventions are aimed towards ‘upstream determinants’ that help create and maintain health inequalities (Gibsen et al., 2011). Housing types and neighborhood conditions are considered an upstream determinant due to the factors of area characteristics, internal housing conditions, and housing tenure; all three housing factors have their effects on health through specific mechanisms to each factor (Gibsen et al., 2011).
Neighborhood and housing conditions are compounding in terms of their negative effects on health outcomes. Area characteristics of housing include deprived neighborhoods where residents experience a higher level of crime and social disorder, which makes those living in deprived areas more predisposed to stress and dangerous living conditions (Gibsen et al., 2011). In addition, compared to affluent areas, access to amenities, jobs, and healthcare are worse in deprived neighborhoods (Gibsen et al., 2011).

In conjunction with housing composition in the SVI, access to transportation is pivotal in connecting residences to health services. Similar to food deserts, where certain residences are unable to buy affordable or quality food, there are areas that can be considered ‘health deserts’ where lack of access to transportation can hinder their ability to receive healthcare. These transportation barriers lead to missed appointments, belated care, and delayed medication prescriptions (Syed et al. 2013). The consequences to transportation barriers turn into poorer management of chronic illnesses thus leading to worse health outcomes (Syed et al. 2013). Lower socioeconomic status citizens are found to have higher rates of transportation unavailability, in a multitude of separate studies 10-51% of patients reported that lack of access to transportation hinders their healthcare access (Syed et al. 2013). This means that in the worst case of transportation vulnerability, 51% of patients are unable to obtain healthcare. Unfortunately, COVID-19 only worsens transportation access.

Varying internal housing conditions can result in a multitude of negative health outcomes. In terms of air regulation and ventilation systems, poorer neighborhoods are susceptible to having houses that are cold and damp which can exacerbate or cause respiratory health conditions (Gibsen et al., 2011). Housing safety also differs between affluent and deprived neighborhoods. Lead paint and carbon monoxide poisoning in addition to lack of fire alarms, fire
extinguishers, and sprinklers are seen more frequently in impoverished areas due to lack of housing regulations and inspections; the absence of proper safety and emergency equipment exacerbates the risk of injury and negative health outcomes (Gibsen et al., 2011). Psychosocial impacts of housing types can be seen through housing tenure, owning opposed to renting one’s home can establish greater feelings of security or prestige. Conversely, renting a home may be seen as socially inferior in some social contexts in addition to the burden of possible debt that leads to stress which is known to have adverse health outcomes when prolonged (Gibsen et al., 2011).

COVID-19 has magnified health disparities in a multitude of different ways including housing composition and transportation. In transportation, limited testing sites and “drive-thru” testing that required a vehicle prevented individuals who either lacked or didn’t have access to a mode of transportation from accessing COVID-19 testing (Kim & Kwan, 2020). Social distancing, which has contributed to decreased contraction rates, has become nearly impossible for those in the lower SES that are more frequently essential workers (Kim & Kwan, 2020). Those who typically rely on public transportation experience a significantly heightened risk of exposure during the pandemic (Kim & Kwan, 2020). Other groups who are shown to have elevated risk during COVID-19 are the result of housing type instead of transportation.

The third pillar of the SVI focuses on how minority and English as a Second Language (ESL) status affects health outcomes through housing conditions, health care accessibility, and cultural barriers. As seen, marginalized groups are much more likely to contract and develop severe COVID-19 cases. Three major groups that have been disproportionately affected by COVID-19 include ethnic minorities, the elderly, and lower socioeconomic individuals (Ali et al., 2020). Ethnic minorities are three times less likely to be able to self-isolate due to multi-
generational housing conditions that create dense living conditions and exposure to older, susceptible individuals (Ali et al., 2020). In most health statistical research and interventions, like the SVI, race has been used as a surrogate to highlight social and economic disadvantage (McGrath, Matthews & Brady, 2006). It is important to acknowledge that no demographic or race is genetically healthier than the other, rather that certain demographics and races are privileged with societal advantages while others are not. Residential nursing homes have made up almost half of COVID-19 mortalities due to high density of chronically ill and impaired individuals in addition to residents living in close quarters with one another (Barnett & Grabowski, 2020). Compounding the risk in nursing homes, caregivers moving between multiple rooms prevents the spread of infection and absence of paid sick leave leads to employees continuing to work even when experiencing symptoms. (Barnett & Grabowski, 2020). Low socioeconomic neighborhoods often reside closer to major sources of air pollution including power plants, industrial facilities, and highways (Chen et al., 2021). Higher exposure to air pollution has been shown to increase vulnerability to the virus due to air pollution’s ability to compromise cardiovascular and respiratory symptoms (Chen et al., 2021).

Minority and ESL citizens in the United States are no strangers to inequities whether they be social or in health. Ranging from diagnostic techniques to accessibility to healthcare, those who are found in the minority demographic or speak English as their second language have faced numerous barriers when it comes to receiving equitable healthcare.

The effects of minority and ESL status on health can be seen at the micro, meso, and macro level. At the most individualized level of health, minorities face inequities in their sociocultural environment, due to limited diversity in sociodemographics, and in the healthcare system, via different levels of insurance coverage and limited health literacy (Alvidrez et al.,
Through the community and interpersonal levels, non-white demographics struggle with the availability of health services, open patient-clinician relationships, and making medical decisions (Alvidrez et al., 2019). Extending to a general population level, barriers in receiving quality care and having beneficial healthcare policies inhibit the ability to maintain quality health (Alvidrez et al., 2019). At all three of the levels, consistent social networks enable these disparities not only to be present but seen throughout the country. An effort to alleviate these inequities are cross-cultural medicine clinics that tailor to the specific needs and beliefs of distinct cultural groups (Shaw et al., 2009). For many ESL patients, translators are the go-to remedy when it comes to communicating between the provider and patient. Translators are critical in increasing health care access to ESL patients however, translators provide a juxtaposing barrier by inadvertently creating a limited number of patient-provider interactions (Shaw et al., 2009). Culture specific medical clinics can eliminate the lack of provider-patient interactions and relationships.

Cultural and language differences contribute to the low levels of health literacy in the minority and ESL population (Shaw et al., 2009). These differences affect communication and compliance which are two major factors when it comes to a patient’s ability to understand and act on a provider’s directions (Shaw et al., 2009). Too often, minorities and ESL status patients have limited access to health material and limited capability to process that information; providers also struggle identifying how cultural differences contribute to misunderstandings around disease management, disease severity, and treatment guidelines (Shaw et al., 2009). Poor health literacy is only one part of the multi-layered systemic issue that contributes to minority and ESL patient barriers. Providers often are poorly educated on varying symptom presentations when it comes to non-white demographics.
In the era of COVID-19, health inequities continue to not only be prevalent, but grossly enhanced. As noted by doctors at the start of the pandemic, those with comorbidities have a higher risk of infection (Shah et al., 2020). African American populations are more likely to develop hypertension which is not due to innate physiological differences but more so is the result of social influences (Opi & Seedat, 2005). Social influences have been shown to have a drastic impact on minority morbidity and mortality rates of COVID-19. Ranging from densely populated neighborhoods to lower socioeconomic status, these factors can lead to increased exposure from closer contact between individuals, less equitable health care access, and lower rate of COVID-19 testing (Shah et al., 2020). Additionally, minorities are more likely to work in occupations included in the essential employee workforce, such as transportation and food services, which do not provide adequate healthcare coverage or any healthcare coverage at all (Shah et al., 2020).

Finally, the most complex pillar of the SVI is socioeconomic status (SES). This portion of the literature review will focus on dissecting socioeconomic status and how poverty, unemployment, income, and education are pivotal determinants in one’s health and success. SES has consistently been the most researched determinant of health being that it is the root of causes to causes. For example, the pathway to good health can start at low income which compiles the results of poor diets, lack of educational support, and environmentally unsafe housing conditions. Despite recognition of the evident association through years of fundamental research, the reasons for this health gradient remain obscure (Cutler & Lleras-Muney & Vogl, 2008). In the Social Vulnerability Index (SVI), SES was broken down into four subset categories being the effects of poverty, unemployment, income, and high school education on health. Typically, SES has been studied as a broad effect poverty has on health; however, SES when viewed as a multifaceted
variable can illuminate the complexities of the health gradient (Cutler et al., 2008). Often, researchers examine one of the main subsets of SES; however, the idea that SES and health are associated through these indicators suggests that underlying social stratification is the compelling force (Cutler et al., 2008).

When SES is evaluated through a poverty focused lens, researchers compare the health of individuals in poverty to those in above the poverty level (Cutler et al., 2008). The evident effects of poverty on health can be seen through the impact of unsanitary living conditions, poor nutrition, and little access to healthcare (Cutler et al., 2008). While acknowledging the effects poverty has on health, strictly limiting the effects of SES on health to poverty does not account for the additional health gradient among those above the poverty threshold. Not only do those in poverty have poorer health than those above the poverty line, those above the poverty line also have an array of poor health outcomes compared to those at the top 1% having the best health of them all (Cutler et al., 2008).

In another layer of the gradient between socioeconomic status and health, unemployed individuals also find themselves at the lower end of the health spectrum. While the immediate assumption that accompanies this correlation is that those with deteriorating health led to their unemployment or that concurrent conditions impede them from work; however, the least understood pathway sheds light on how unemployment itself leads to a deterioration of health (Schmitz et al., 2011). Historically, studies tracing the relationship between health and unemployment follow biomedical, sociological, or physiological models (Janlert & Hammarstrom, 2009). From these models, new combinations of the approaches resulted in more complex models that relate unemployment and health through stress, economic deprivation, and latent functions (Janlert & Hammarstrom, 2009). The most renowned theory in this field would
be the models of latent functions; this theory utilizes both the sociological and psychological elements which connects employment as a contributory factor to several latent functions that when lacking, ill health may result (Janlert & Hammarstrom, 2009). Examples of work contributory latent functions include daily structure, social interaction, sense of contributive status, and the opportunity to strive towards a collective goal (Janlert & Hammarstrom, 2009). In terms of economic deprivation, the same cause and effect relationship can be seen with unemployment like poverty: unemployed individuals have less money which then results in the worsening of prerequisites of good health like adequate food, housing, and clothing (Janlert & Hammarstrom, 2009). In terms of biological effects of unemployment, the stress model outlines the relationship between psychosocial stimuli, like employment termination, and health by elucidating the connection between an elevated stress response and unemployment (Janlert & Hammarstrom, 2009). Prolonged activation of the body’s stress mechanisms can result in elevated levels of cortisol which can negatively affect the body’s metabolism, blood sugar levels, inflammation, and memory formulation (Scott, 2021).

A typical bridge to unemployment revolves around an individual’s quality and quantity of education. Education not only impacts the health of individuals but also health behaviors that people can adopt (Cutler & Lleras-Muney, 2006). Individuals who are better educated are less likely to partake in health risk behaviors like smoking, drinking, and drugs (Cutler & Lleras-Muney, 2006). More incongruities in education can be seen in neighborhood environmental factors, whereas lower SES students who reside in poorer environments are shown to have an elevated dropout rate (Jury et al., 2017). Largely, education protects against disease and poor health outcomes by establishing positive lifestyle behaviors, problem solving abilities, and values; however, those with access to higher education are able to obtain preventative health
services, membership in peer clubs that promote the continuation of positive behavior, and overall, a better sense of self-efficacy (Jury et al., 2017).

The strongest link between health and income can be shown alone through the existence of a health gradient between all social classes (Marmot, 2015). Substantial inequalities are tied to income-like opportunities for social participation, life satisfaction, and societal agency; in addition, these inequalities imply that income is causally linked to health but through sociological conditions opposed to materialistic (Marmot, 2015). With income being associated with low position in social hierarchy, it may be more that income’s ability to define social positions and how these social positions affect health outcomes opposed to the income itself. Those lower on the income hierarchy may find themselves in economic segregation which leads to a concentration of people with high social needs in areas with low tax bases resulting in worse public goods and services such as schools, transportation, healthcare, and housing (Marmot, 2015). Lack of public services and goods inadvertently establish designated neighborhoods where residents are more likely to, given their disadvantaged societal standing, have lower income and poorer health.

After assessing the multiple heads of SES, the correlation of all aspects to health can be seen through the COVID-19 pandemic. Assessing the social infrastructure of the United States alongside the components of education, poverty, unemployment, and income, those with lower SES are inherently more at risk not only contracting COVID-19 but also developing severe cases (Karmakar et al., 2021). In a retrospective cohort study, social and health disparities place low SES individuals at higher risk of infection through inequalities found in living conditions, occupational opportunities, prevalence of comorbidities, and financial stability (Little et al., 2021).
In choosing which methods for my research, I felt that a case study would be most effective in understanding how varying SVIs in two different counties can impact health outcomes of residents. Using an inductive research approach, the SVI provides data constructed around social determinants of health which aids in developing ideas and theories for future health policy. Being that a case study utilizes a combination of different data methodologies, I decided to implement GIS methodology, with consultation from the William and Mary Center of Geospatial Analysis, to assist in providing a qualitative component that can effectively portray the correlation between the SVI and COVID-19 rates alongside tables of Census Data to add quantitative data. In selecting my two cases for the Case Study, I chose the county indicated with the lowest social vulnerability index was Powhatan County with a score of 0.01 in addition to the county with the highest index being Galax County with a score of 0.98 (Figure 1).

While acknowledging the extreme benefits in utilizing the case study as my primary mode of methodology, it is important to also admit the limitations in my data collection strategies. In terms of the SVI, limitations to the index can be seen through lack of specificity when it comes to community specific variables, only “snapshot” pictures of communities’ post census data, and the relevancy dates of underlying data sets (CDC, 2021). Census Data, while very representative of certain areas in demographics, fails to collect a 100% response rate which skews the data. For GIS methodology, only certain census data and information was accessible in the living atlas database which led me to pursue the 2018 SVI map opposed to the most recent 2020 SVI. This can lead to the information not being fully representative, but it is shown that the studied trends have been consistent enough over the years to not take the full validity from the data.
Data Analysis and Results

First, taking a look at the overall SVI in Virginia (Figure 1), it is evident that there is a large health gradient between the counties. The map indicates the relative vulnerability, with the SVI data, in the counties of Virginia through four colors, blue being highest vulnerability and yellow being the lowest. With Powhatan being the pinpoint located in the center of Virginia and Galax being the pinpoint furthest west, it is noticeable that Powhatan is in relatively low vulnerability while Galax is at the highest level. In addition, Graph 1 represents the quantitative values of their overall vulnerability with 1 being the most vulnerable and 0 being the least. It can also be seen in Graph 1 that in the SVI’s subcomponents, Galax is continually more vulnerable than Powhatan.

Figure 1- Map of CDC 2018 Social Vulnerability Index.
Graph 1: Overall Vulnerability Index and Subset Indices

<table>
<thead>
<tr>
<th>Score Category</th>
<th>Galax County</th>
<th>Powhatan County</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Vulnerability Index (SVI) Score</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Socioeconomic Vulnerability Score</td>
<td>0.947</td>
<td>0.0606</td>
</tr>
<tr>
<td>Household Composition &amp; Disability Score</td>
<td>1</td>
<td>0.0455</td>
</tr>
<tr>
<td>Minority Status &amp; Language Score</td>
<td>0.7652</td>
<td>0.2045</td>
</tr>
<tr>
<td>Housing Type &amp; Transportation Score</td>
<td>0.995</td>
<td>0.053</td>
</tr>
</tbody>
</table>

In the face of a pandemic, counties similar to Galax were less resilient in terms of socioeconomic funds, struggle with unemployment rates, median income levels, and lack of high school graduates. Looking at Figure 2, Galax’s score indicates high socioeconomic vulnerability which again juxtaposes Powhatan’s low socioeconomic vulnerability. The highest vulnerability in Galax County is the low high school graduation rate in addition to the number of citizens below the poverty level, while for Powhatan County, the lowest vulnerability score was in terms of unemployment in addition to their citizens below the poverty line (Graph 2).

The high levels of poverty and unemployment (Graph 2) in Galax are concerning in terms of overall health impact due to the heightened likelihood of contradicting diseases and nonexistence of medical funds. The importance of a high school education can result in a make or break of career pathways that provide healthcare benefits, days off, and compensated leave.
These advantages provide mobility in the SES ladder which allows the ability to move up and access better health conditions and adopt better health behaviors. Areas of improvement in the aiding counties with poorer socioeconomic status include creating relief programs that provide doctor’s visits, job fairs, food banks and tutoring to target pathways that allow lower socioeconomic status to play such a pivotal role in health.

**Figure 2- Map of CDC 2018 Social Vulnerability Index; Socioeconomic Sublayer**

![Map of CDC 2018 Social Vulnerability Index; Socioeconomic Sublayer](image)

**Graph 2: Socioeconomic Vulnerability and Subset Indices**

<table>
<thead>
<tr>
<th>Score Category</th>
<th>Galax County</th>
<th>Powhatan County</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socioeconomic Vulnerability Score</td>
<td>0.947</td>
<td>0.0606</td>
</tr>
<tr>
<td>Below Poverty Score</td>
<td>0.947</td>
<td>0.053</td>
</tr>
<tr>
<td>Unemployment Score</td>
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<td>0.0227</td>
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<tr>
<td>Income Score</td>
<td>0.8712</td>
<td>0.2121</td>
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</table>
Housing composition is an important layer to health in terms of creating homes that are beneficial to the individual living in them. The SVI highlighted the importance of age distribution, disability, and single-parent households due to the ability these factors have in showing the needs of the county. Knowing the distribution of ages helps policy makers identify needs that appropriately match the individuals that reside in said county. Lower socioeconomic countries like Galax, tend to show a higher number of elderly individuals in comparison to those under the age of 18 (Graph 3); with the information that there are higher rates of elderly, health policy makers can note attention to nursing home policies and establishments whereas if there were more children then policy would be more focused on the school systems. Recognizing the disabled community is vital in attempting to increase overall health mainly due to the large medical expenses and variation of disabilities. In Galax, where the disabled population is the largest source of vulnerability(Graph 3), attention needs to be focused on updates to long term healthcare facilities to make them more equitable and affordable in comparison to housing conditions outside of the facility. Other housing conditions like single-parent households need attention to mental health services and school accommodations that provide meals, better bus systems, and school daycare services to aid single-parents juggling difficult work hours with safe and free services that assist them with childcare.

In terms of comparing both Powhatan and Galax’s score of relative household composition and disability vulnerability, Galax scored a perfect 1 which indicated the highest level of vulnerability whereas Powhatans vulnerability remained low (Graph 3). Looking at the map, we can see that the trends present in Figure 1 can also be seen in both Figure 2 and Figure
3. The data suggests that there are consistent systemic and social differences in higher vulnerable counties, like Galax.

According to the 2019 Census, Powhatan County had 21.09%, 6,397 individuals, under the age of eighteen whereas Galax County had 20.86%, being 1,402 individuals, of the population under eighteen (USCB, 2019). In terms of those living with disabilities, Powhatan County only had 6.7% of its population listed as disabled which is lower than Galax County’s 20.5% of individuals who are listed as disabled (USCB, 2019)

**Figure 3-** Map of CDC 2018 Social Vulnerability Index; Household Composition and Disabilities Sublayer

<table>
<thead>
<tr>
<th>Score Category</th>
<th>Galax County</th>
<th>Powhatan County</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household Composition &amp; Disability</td>
<td>1</td>
<td>0.0455</td>
</tr>
<tr>
<td>Aged 65 or Older</td>
<td>0.8409</td>
<td>0.4015</td>
</tr>
</tbody>
</table>
In terms of racial demographic dispersion, Galax and Powhatan are both predominantly white areas with 84% of Powhatan and 74% of Galax being white (USCB, 2019). In addition to the predominant population, Powhatan’s second largest demographic at 8% are African Americans. For Galax, the rest of the population stands at 16% being Latino or Hispanic and 5% being African American (USCB, 2019).

Evaluating racial demographics of a population provides the ability to identify and compile all cultures, religions, opinions, and tendencies that vary across ethnicities. Knowing this enables the ability for policy makers to pinpoint needs and improvements that are desired amongst the groups. Looking at Galax, there is more diversity in the county in comparison to Powhatan which can create imbalanced social structures that hinder health benefits (Figure 4, Graph 4). The biggest factors contributing to the disparities in health amongst minority groups are due to different levels of insurance, lack of health literacy, and the inability to communicate effectively. Healthcare policy should be targeted in decreasing the discrepancy in health rates between different racial groups by providing healthcare practices that accommodate the different cultures, languages, and religions of the minority groups.
In comparing Galax and Powhatan, there is a stark difference in the number of housing units available in addition to cost associated with mortgages and rent. Galax County has a total amount of 3,175 housing units in addition to 2,663 households (USBC, 2019). The mean monthly rent for housing units in Galax County is $574 and for those paying housing mortgages on average are charged $967 a month (USBC, 2019). In Powhatan County, there are 11,274
housing units in addition to 10,265 households; these households' mortgages and monthly rent are on average $1,621 a month while housing units run at $980 monthly (USBC, 2019).

The type of house and availability of transportation has become a progressively more important social determinant since the wake of COVID-19. With a disease that has a heightened propensity of spreading, creating preventative measures to ensure safety in close quarters and transportation can greatly reduce levels of morbidity in poorer socioeconomic areas that are more prone to have intergenerational homes and reliance on public transportation. Galax County scored above average in vulnerability rates of over-crowding and no vehicles whereas Powhatan County scored higher in the amount of group living quarters (Graph 5). While Powhatan may have more group living arrangements, the county scored 0.1 in terms of crowding which might indicate larger living quarters due to Powhatan’s greater median income average. Lowering the amount of crowding, group living quarters, and individuals without a car is an important step in eliminating super-spreader areas and creating better access to needs. Creating generational homes that are affordable and larger can both aid in decreasing virus transmission and respecting the cultural lifestyles that families choose to adopt. Instead of labeling generational family homes as living “wrong” or “outdated,” health officials should create protective and preventative measures that accommodate the beliefs of their patients and community members. In creating accessible transportation, recognizing the barriers of cost and citizens with disabilities are pivotal in building the most equitable solution for the community. With Galax being a more rural community, having multiple bus stops in neighborhoods and routes could be a common fix, however I would suggest a more sustainable option that includes community bikes, scooters, and cars that can be shared, sanitized, and charged throughout the county. With this, citizens that lack transportation and are less inclined to take public transportation, have an easily accessible and
safe means of traveling. Improving a community’s transportation system will result in better health outcomes with the better availability of healthcare.

**Figure 5- Map of CDC 2018 Social Vulnerability Index; Housing and Transportation Sublayer**

**Graph 5: Housing and Transportation scores and Subset Indices**

<table>
<thead>
<tr>
<th>Score Category</th>
<th>Galax County</th>
<th>Powhatan County</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing Type &amp; Transportation Score</td>
<td>0.995</td>
<td>0.053</td>
</tr>
<tr>
<td>Multi-Unit Structures</td>
<td>0.6591</td>
<td>0.0152</td>
</tr>
<tr>
<td>Mobile Homes</td>
<td>0.5</td>
<td>0.3182</td>
</tr>
<tr>
<td>Crowding</td>
<td>0.6591</td>
<td>0.0985</td>
</tr>
<tr>
<td>No Vehicle</td>
<td>0.9545</td>
<td>0.0</td>
</tr>
<tr>
<td>Group Quarters</td>
<td>0.7879</td>
<td>0.8712</td>
</tr>
</tbody>
</table>
Looking at the relative COVID-19 rates in Galax and Powhatan, it is evident that Galax County was impacted more by the virus than Powhatan County in all relative aspects including total cases, hospitalizations, and deaths (Graph 6). Interestingly enough, as of January 21, 2022, Galax was able to control their cases, while Powhatan was struggling with an epidemic level (Figure 6). However, while Powhatan was still trying to grasp COVID, the county still managed to have a lower contraction and mortality rate than Galax, an apparently controlled county (Figure 6). It is important to make note that due to the time this analysis was conducted, data is limited and may have changed since initial analysis. After breaking down the SVI, the data illuminates Galax’s susceptibility in all four pillars of the SVI and its effect on the county’s heightened morbidity and mortality rates. As touched upon, SES, household types and compositions, racial demographics, and transportation accessibility are all social inequities that advantages some communities while also hurting others. The SVI was created in 2011 to identify and plan for socially vulnerable populations in the event of a large-scale hazard. Now in 2022, 3 years after the start of the pandemic and 11 years after the creation of the SVI, health policy makers and disease oriented federal agencies still fail to utilize their own tool and information when creating response arrangements and monetary allocations. Galax, and millions of other counties like Galax, are still struggling with COVID-19 and its effects today; instead of prioritizing the potential future of medicine and its remedies, more attention should be allocated to the present by applying preventative measures and providing more vulnerable areas with equitable aid.
**Figure 6- Map of Virginia Counties and Correlating Covid-19 Trends January 1, 2022**

**Graph 6: Relative COVID-19 Cases, Hospitalizations, and Deaths**

<table>
<thead>
<tr>
<th>COVID-19 Data as of 12/20/21</th>
<th>Galax County</th>
<th>Powhatan County</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Cases (rates per 100,000)</td>
<td>26,639</td>
<td>10,840</td>
</tr>
<tr>
<td>Hospitalization Rate (rates per 100,000)</td>
<td>2,164</td>
<td>281</td>
</tr>
<tr>
<td>Total Deaths (rates per 100,000)</td>
<td>1,012</td>
<td>106.2</td>
</tr>
</tbody>
</table>

**Discussion**

After collecting the data, it is evident that there are systemic and structural differences between Galax and Powhatan that continue to hinder Galax’s and advantage Powhatan’s overall health. The complex layers of SES, racial demographic proportions, housing conditions, and transportation means all play intricate roles in contributing to a nonfunctional and unfair societal
model. The SVI illuminates areas of Virginia that are more in need of outside resources to effectively combat large scale hazards like pandemics. Galax County in 2018 was indicated the least resilient when it came to capability to combat equitably in comparison to other areas of the state. This difference is not due to actions taken in Galax County but more so a result of unfair resource allotment and lack of health disparity relief.

I chose the SVI as one of my measuring tools because it is utilized to measure community vulnerability to aid public health officials and community responders. In addition it should be the perfect resource in identifying where to provide aid before, during, and after any large scale disaster, like a pandemic. Knowing socially vulnerable communities, public health officials and emergency responders can more effectively support community-based efforts to prepare and mitigate impending disaster events (Flanagan et al., 2011). With the SVI, responders can be more effective in making efficient efforts in providing special assistance to those without transportation, the elderly, and residents where English is their second language (Flanagan et al., 2011). In terms of government aid, the SVI helps identify neighborhoods that may require additional human services to support post-disaster or establish mitigating efforts to prevent costs associated with drastic post-response support (Flanagan et al., 2011).

While it is seen that the SVI can be useful in creating equitable disaster programs, unfortunate policy makers have yet to utilize the index when establishing financial relief and aid to communities. Intended to be used as a tool to help identify the areas of most need, those areas still were disproportionately affected by COVID-19 and were allotted no extra aid or resources based on their circumstances. With the SVI being updated in 2020, it could’ve been the perfect tool in illuminating which counties were more predisposed to vulnerability and need more monetary aid. Unfortunately, it seems that policy makers and government officials failed to
acknowledge the SVI or any public health theories ignoring social determinants of health when allocating COVID-19 relief which adds to the already prevalent structural violence. In 2021, President Biden signed the Coronavirus Aid, Relief, and Economic Security (CARES) Act which provides funding to multiple different programs to combat the coinciding damage done with the pandemic. The CARES Act established a $150 billion dollar fund via the Coronavirus Relief Fund (CRF) to disperse among each state which is then to be distributed within the state’s government discretion. The state government of Virginia, specifically, decided to allocate the 3.1-billion-dollar funds from the CRF based on county population size. While in some logistical standards this allocation makes sense, larger counties in Virginia have a higher net worth which inherently leads to better established social determinants within communities like superior healthcare access, education, job security, and access to transportation. Galax County, the lowest scoring SVI of 2018, was one of the counties allocated the least amount of money in Virginia with 19% of the population in poverty and the median income at $33,575 (United States Census Bureau (USCB), 2019). In communities who were neglected of the appropriate aid, it was seen that large community organizations, like churches and health clinics, had to step up and be heavily depended on. I strongly urge that health organizations and policy-makers utilize the SVI when constructing equitable aid solutions or discerning counties’ needs.

Every industry should have the desired goal of equity. Ranging from economic to social policy, if equity is truly the end goal, policy makers must establish steps that are required to protect its position and its importance (Gilson, 1989). Inherently, the core function of health policy is to enable optimal health and address systemic barriers that foster inequity; if there are still injustices in health and health policy is not doing its job (McCallum, 2022). Acknowledging the counter arguments, rearrangements in policy can be quite the expense; however, structural
adjustment policies that are favored by the International Monetary Fund (IMF) and World Bank also receive cost recovery which allocates drug fees and reimbursements towards replenishing drug supplies for them to remain affordable (Gilson, 1989). When trying to conceptualize healthcare and establish remedies, recognizing the importance of involving the IMF and World Bank is also recognizing the wider picture of international economic policy making (Gilson, 1989).

A broad concern that branches over policies concerning healthcare financing and primary insurance is that illness is caused by an individual’s actions or lack of action (Gilson, 1989). By establishing a sense of health autonomy, citizens are required to seek and pay for their own health services opposed to the state (Gilson, 1989). Policies that empower this exclude the crucial role that poverty, work, housing, and transportation play in the grand scheme of general health and obtaining services. International entities like the IMF and World Bank hope to establish equity in health by implementing equal access to government care yet ignore other barriers that follow accessing the care like payment, work availability, and ability to communicate with ease.

To construct feasible health policies that establish equity, it is more beneficial to construct policies around a consensus opposed to targeting specific attacks on equity (Gilson, 1989). To generalize equity in terms of the United States, there are differences in the circumstances between citizens in terms of wealth, education, work, and location which are the result of systemic allocations of amenities (ie. wealth, education, work, and location) that undermine an individual’s ability to participate fully in society (Gilson, 1989). The generalized goal: reduce inequities through unequal but equitable distribution of the benefits and burdens of society (Gilson, 1989).
The hardest part when revising and implementing policy comes from multifaceted layers and pathways in which these policies will be executed. Three essential indicators and questions that can be utilized when assessing the effectiveness of the policies are: is there equal utilization for equal need, is there equal participation and is payment determined in relation to income level (Gilson, 1989). These indicators also address the three planning issues that hurt equity establishment: need for community participation, improving geographic access to healthcare that match the geographical health needs, and the total rearrangement of financing mechanisms in healthcare (Gilson, 1989).

Based on the data, policymakers should begin to redirect their focus from the overall state’s needs to the individual counties and their needs. As seen throughout the maps, there are plenty of counties in Virginia that are vulnerable in different areas so when attempting to create equitable policy it would make the most sense at allocating it per county. Comparing Galax and Powhatan’s internal health infrastructure, the Powhatan Department of Health has more amenities. Powhatan Department of Health can afford to open a free clinic, available all week, that offers basic check ups, women wellness visits, dental appointments, and behavioral needs; whereas, Galax only offers one free clinic only open on Wednesdays offering basic health vaccinations and check ups. Surprisingly, the Galax free health clinic fails to offer COVID-19 vaccinations which based on the data we can infer was due to high rates of poverty and low unemployment. These barriers prevent citizens everyday from accessing basic necessities like vaccinations and health check-ups. Especially with Galax’s clinic only being open on Wednesday and the residents being highly reliant on public transportation, it is not unreasonable or unrealistic to assume, in conjunction with the data, that the hassle of accessing transportation can hinder obtaining healthcare.
Understanding both the benefits and setbacks to implementing equitable variations of health policy illuminates the need for policy maker and community collaboration. In addition, utilization of the SVI can identify the differences in need based on each counties’ internal resource availability which assures that less wealthy communities receive proportionally more financial support (Gilson, 1989). Considering the heightened focus of health inequities due to the COVID-19 pandemic, increased focus should also be directed towards establishing paid leave to lower-income jobs, better housing facilities for intergenerational families, language diverse clinics, and more accessible transportation in rural counties.

The goal of this case study was to provide inductive clarification of issues like structural violence and social determinants of health through the comparison of Powhatan and Galax county. Gathering data from public health dashboards and working with the Center of Geospatial Analysis, it was very clear that systemic injustices are still prevalent today as they were years and years before. How does this change? As noted in the beginning of my paper, if the determinants of health are ultimately results of social processes, the remedies themselves should also be rooted in social change (Marmot, 2005). These remedies should not only focus on alleviating determinants but also have a larger aim to restructure the conditions that enable them to be prevalent.

Based on the findings in my research, I strongly believe that more research should be dedicated to efforts of reconstructing health policy at the county level that equitably alleviates the impacts of determinants like socioeconomic status, transportation accessibility, minority status, and housing compositions. In addition, health policy needs to encourage community participation, improve geographic access to healthcare that match the area’s health needs, and more appropriate healthcare financing. A country’s overall health can only be as strong as their
weakest county. Health policy is imperative in beginning the process of reframing our societal model towards one that is more equitable and is invested in all citizens' health. My hope is that this paper did its job of not only showing a few trees, but a whole forest when it comes to the various barriers in health. While the United States maintains the slogan “Freedom for All,” it is time we notice the difference that for some this country was built for in mind while others were neglected or ignored. It is long overdue to begin the processes needed to make this country feel made for everyone.

References


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