

## ABSTRACT

People in the Pandemic: COVID-19's Effects on Socioeconomic Status and Health

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Since the beginning of the COVID-19 pandemic, media outlets have been cluttered with information and opinion pieces regarding the coronavirus. Within this sea of information, it is imperative to acknowledge the effects that COVID-19 has had on socioeconomic status and the social determinants of health. Even as conversations regarding social distancing, lockdowns, and mask mandates fade away, many individuals and families will continue to battle the hardships created during the COVID-19 pandemic. This thesis will bring attention to how COVID-19 has affected socioeconomic status by viewing changes in financial stability, food insecurity, and access to healthcare during the early months of the pandemic. These patterns and hardships should be considered when evaluating support policies and planning for public health challenges in the future.

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People in the Pandemic: COVID-19's Effects on Socioeconomic Status and Health

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## CHAPTER ONE

### Introduction

For the past two years it has been almost impossible to make it through a day without a thought or mention of the COVID-19 pandemic. The ramifications and influences of the coronavirus have been felt all around the globe and across a multitude of disciplines. The pandemic and its long-lasting effects are a prominent moment in science and history and will continue to influence public policy decisions and disaster response initiatives for decades to come. From country-wide lockdowns to the race to complete an effective vaccine, COVID-19 presents a multitude of areas for research and study.

This thesis aims to examine one such area of study by demonstrating the close relationship between COVID-19 and socioeconomic status (SES). The ways in which the coronavirus has influenced the social determinants of health closely associated with SES will have long term impacts on overall health for individuals across the country. It is imperative for public health policy makers and healthcare providers to understand this relationship in order to support the public through the pandemic effectively. If returning to normal is the ultimate goal of pandemic response plans, then understanding how COVID-19 has disrupted the lives of individuals at the socioeconomic level is of the utmost importance.

This work will begin with a brief retelling of the history of the COVID-19 pandemic including its onset, spread, and treatment. Next, a general overview will be

given of the relationship between COVID-19 and socioeconomic status. To better understand how a researcher can study the intricacies of COVID-19 and the social determinants of health, an example of a survey instrument will be subsequently offered. To present a succinct and understandable argument, three aspects of socioeconomic status and their relationship to COVID-19 will be examined. These three components are financial stability as demonstrated by income and employment, food insecurity, and access to healthcare. COVID-19 and the resulting policies associated with the pandemic have created challenges and disruptions in each of three categories that will be explored in depth. To conclude the work, potential policies, and interventions to aid in offsetting the disturbances to socioeconomic status caused by COVID-19 will be presented.

The goal of this thesis is to present findings and discussions regarding the socioeconomic effects of COVID-19 and how it has established and worsened health inequalities. COVID-19 and pandemic-related policies share a close relationship with socioeconomic status and have caused health inequalities through introducing disturbances and challenges to social determinants of health such as financial stability, food security, and access to healthcare.

## CHAPTER TWO

### History and Overview of COVID-19

#### COVID-19 in Context

Often described as an unprecedented event, COVID-19 entered the epidemiologic scene in late 2019, earned the title of pandemic in early 2020, and has captured the world's attention ever since. COVID-19 is the term given to the disease caused by infection from the SARS-CoV-2 virus. An effective evaluation of the relationship between the COVID-19 pandemic and socioeconomic status requires an understanding of the context and characteristics of the SARS-CoV-2 virus and the disease syndrome it causes.

There are clear distinctions that define COVID-19 as a pandemic rather than endemic or epidemic disease. An endemic refers to the baseline level of occurrence for a disease that is normally present in a population. When the number of cases of a certain disease rises above this expected level the disease becomes an epidemic. Epidemics are diseases occurring at a rate higher than expected in a population. The term “outbreak” shares the same definition as epidemic, in that an outbreak reflects a larger than normal volume of cases, but “outbreak” is typically reserved for a limited geographic area. When an epidemic crosses borders and begins affecting a large number of people in different countries and continents it becomes a pandemic. In simple terms, an epidemic is a large rise in the number of cases of a disease and a pandemic is a global epidemic seen across countries and continents<sup>1</sup>. COVID-19 originated in Wuhan, China and was classified by

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<sup>1</sup> Centers for Disease Control and Prevention (2012, May 18).

local authorities as an epidemic present in the Wuhan population; Following COVID-19's spread to other countries beyond China, it was declared a pandemic by the World Health Organization on March 11th 2020<sup>2</sup>.

Epidemics, and by extension pandemics, require two main things to occur: a disease-causing agent and the opportunity or ability for that agent to spread at an increased rate than previously encountered. Factors that affect the presence of the agent involve increases in the amount or virulence of the agent and instances of the agent spreading to new settings. Circumstances that enhance an agent's ability to spread can include the usage of enhanced modes of transmission, changes in susceptibility, and increases in a population's exposure to the agent<sup>3</sup>.

COVID-19 is far from the first pandemic in history or even in recent memory. Over time, mankind has experienced a variety of pathogens and diseases that have spread across regions and reached pandemic status. The Spanish Flu, an outbreak of a novel strain of influenza called H1N1, occurred in 1918 and is often cited as one of the most devastating pandemics in recent history. The pandemic was named the Spanish Flu since the Spanish media was largely uninvolved in World War I, and therefore dedicated time to reporting on the virus and became the main source of information on details regarding the pandemic. The virus may have originated in China and spread through members of the Chinese Labor Corps assisting the allied war effort in various locations across Europe. The pandemic quickly spread and is estimated to have caused 50-100 million deaths in just 10 months. It is also widely believed that over half of the world's population was infected with the virus at some point in time. Similarly, to COVID-19, the

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<sup>2</sup> World Health Organization (2020, April 27).

<sup>3</sup> Centers for Disease Control and Prevention (2012, May 18).

virus was transmitted through droplets from the nose and throat and treatments and vaccines were not readily available. Interventions to stop the spread of the Spanish Flu paint a picture similar to the current COVID-19 pandemic as they were focused on non-pharmaceutical efforts such as quarantine procedures, school closures, restriction on public gatherings, and the usage of face coverings<sup>4</sup>.

Other coronavirus pandemics have also occurred in history. The Severe Acute Respiratory Syndrome (SARS) outbreak in the early 2000s was caused by the SARS-CoV-1 virus which shares 79.6% of genomic sequence with SARS-CoV-2. SARS accounted for 8000 cases and 800 deaths across 24 countries<sup>5</sup>. The Middle Eastern Respiratory Syndrome (MERS) pandemic of 2012 was caused by another coronavirus and ended with 1000 infections and 400 deaths<sup>6</sup>. Both the SARS and MERS outbreaks defined the importance of early surveillance and communication between countries during pandemics and prompted research of antiviral drugs and vaccines that would lay the foundation for the upcoming COVID-19 pandemic<sup>7</sup>.

In comparison to the previous pandemics, COVID-19 occurred at an opportune time where globalization was high and the virus was able to easily spread to countries across the globe. COVID-19 is more transmissible than other coronavirus strains due to having a higher reproduction number, referred to as R naught ( $R_0$ ). The  $R_0$  value of a disease represents the average number of people to which an infected individual spreads a disease; this metric gives an idea of the communicability of a pathogen. COVID-19 has

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<sup>4</sup> Adil, A. et al. (2020).

<sup>5</sup> Lango, M. (2020).

<sup>6</sup> Lango, M. (2020).

<sup>7</sup> Schroder, I. (2020).

an estimated  $R_0$  of 5.7 in comparison to the  $R_0$  values of 3 and 1.3 for SARS-CoV-1 and MERS-CoV, respectively<sup>8</sup>.

Conversely, COVID-19 has a lower case fatality ratio than these similar viruses. In the beginning of the pandemic, the case fatality ratio for COVID-19 was recorded as 7% across the globe in April of 2020. The case fatality ratios of SARS and MERS were recorded as 11% and 34% respectively<sup>9</sup>. More recently, the United States has reported an adjusted, more accurate case fatality ratio of 1.2% with most other countries also reporting ratios below 2.5%<sup>10</sup>. Overall, COVID-19 entered the epidemiological world at a time where spread was opportune and proved itself to be an easily transmittable virus.

#### Clinical History and Implications of COVID-19

The first recorded mentions of the illness that would become known as COVID-19 originated in early December 2019 from the observations of Dr. Li Wenliang, a physician in Wuhan, China. Dr. Wenliang treated a group of patients presenting signs of severe acute respiratory syndrome (SARS)<sup>11</sup>. These findings were reported to the World Health Organization on December 31st, at the same time that local authorities in Wuhan declared an epidemiological alert<sup>12</sup>. On January 12th 2020, the World Health Organization had sequenced and published the genome of the virus responsible for the outbreak in Wuhan<sup>13</sup>. The causative agent was revealed to be a novel coronavirus closely resembling the SARS-CoV-1 virus and would eventually be named SARS-CoV-2. By the time its genome was sequenced and published, the virus had begun to spread around the

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<sup>8</sup> Schroder, I. (2020).

<sup>9</sup> Schroder, I. (2020).

<sup>10</sup> John Hopkins University of Medicine. (2022).

<sup>11</sup> Lango, M. (2020).

<sup>12</sup> Chan, Y., Chen, C., & Wu, Y. (2020).

<sup>13</sup> Lango, M. (2020).

globe; the first documented case in the United States was reported on January 21st 2020<sup>14</sup>. By February 6th 2020, approximately 28,276 cases and 565 deaths were identified across 25 different countries, leading the World Health Organization to officially name the outbreak the Coronavirus Disease 2019<sup>15</sup>. This name gave rise to the popular use of COVID-19 to represent the virus and the disease it causes. By March 10th 2020 there were 48,000 cases and 3000 deaths around the globe; the World Health Organization officially declared COVID-19 as a pandemic on March 11th 2020<sup>16</sup>.

The SARS-CoV-2 virus belongs to the *Coronaviridae* family. Coronaviruses normally pose little threat to humans but genetic events and processes such as recombination, natural selection, and genetic drift allow for mutation and changes that give viruses mechanisms to infect human hosts and spread from host to host<sup>17</sup>. The name “coronavirus” is derived from the appearance of the virion, specifically the presence of spike shaped projections on its surface that conveys the appearance of a crown on electron microscopic images.

SARS-CoV-2 is a zoonotic virus, meaning it began in animals and at one point gained the ability to transfer to humans. COVID-19 in particular is believed to have originated in bats based on the fact that it shares 96.2% of its genome with a bat coronavirus (Bat-CoV)<sup>18</sup>. There are many theories regarding how the virus transitioned from animals to humans. One such theory claims the virus jumped from bats to an intermediate host, the pangolin. Pangolins are enjoyed in China as a delicacy and their

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<sup>14</sup> Chan, Y., Chen, C., & Wu, Y. (2020).

<sup>15</sup> Chan, Y., Chen, C., & Wu, Y. (2020).

<sup>16</sup> Adil, A. et al. (2020).

<sup>17</sup> Lango, M. (2020).

<sup>18</sup> Kuo, R., Liu, Y., & Shih, S. (2020).

scales are crushed into powders for medicinal purposes. This theory holds that the original outbreak of COVID-19 in Wuhan, China originated at the Huanan Seafood and Wildlife Market which sold pangolin meat and products. Another theory suggests that the virus escaped accidentally or was intentionally released from a research facility named the Wuhan Virology Institute. This coronavirus research facility has been studying coronaviruses in bats for over a decade and is located only a 40-minute drive from the Huanan market where the first COVID-19 infections were recorded. Researchers from the Wuhan lab were among the first to be treated for COVID-19 in November 2019 just before infections spread to other residents of the city<sup>19</sup>. Debate and research will most likely continue surrounding whether the COVID-19 pandemic originated naturally or from a laboratory setting.

The SARS-CoV-2 life cycle can be described in six steps: 1) attachment and entry into host cell, 2) uncoating, 3) replication of guide ribonucleic acid, 4) translocation of guide ribonucleic acid into endoplasmic reticulum and Golgi apparatus, 6) assembly of virions, and 7) release of virions from host cell<sup>20</sup>. The spike proteins previously mentioned serve as anchors for attachment to host cells. SARS-CoV-2 targets the human angiotensin-converting enzyme 2 (ACE2) as the target for entry; ACE2 is expressed on the epithelial cells of the lungs, intestines, kidneys, and blood vessels<sup>21</sup>. Once inside the host cell the virus recruits the machinery of the host cell to produce viral proteins. Eventually mature virions are released and go on to infect other host cells.

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<sup>19</sup> British Broadcasting Corporation. (2021).

<sup>20</sup> Pitlik, S. (2020).

<sup>21</sup> Schroder, I. (2020).

COVID-19 spreads through aerosol transmission. Droplets are transferred from the respiratory system of an infected individual through sneezing, coughing, and talking. Smaller droplets are inhaled from the air while larger droplets can be directly deposited onto mucous membranes<sup>22</sup>. The risk of transmission is higher the closer the proximity and the longer the exposure to an infected individual. This speaks to the importance placed on group settings and contacts such as hospitals, group homes, schools, and work environments throughout the pandemic.

Once an individual is infected with SARS-CoV-2 there is a mean incubation period of 5.2 days. The first symptoms to appear are usually nonspecific and can include fever, dry cough, and fatigue. The virus affects a variety of bodily systems which results in various symptoms. For example, viral infection of the respiratory system leads to the presence of a cough, shortness of breath, sore throat, and chest pain while infection of the gastrointestinal system causes diarrhea, nausea, and vomiting. The most common symptoms have been identified as fever, cough, and shortness of breath which appeared in 83-98%, 76-82%, and 31-55% of Wuhan patients respectively<sup>23</sup>. Depending on the patient's overall health and the presence of comorbidities<sup>24</sup>, disease progression can lead to severe acute respiratory distress syndrome with the need for mechanical ventilation; this requirement was seen in about 39% of patients treated in Wuhan, China<sup>25</sup>.

The ability to test patients for COVID-19 in a timely manner was crucial to determining the severity of the outbreak, tracking the transmittance of disease from one

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<sup>22</sup> Pitlik, S. (2020).

<sup>23</sup> Chan, Y., Chen, C., & Wu, Y. (2020).

<sup>24</sup> Comorbidities refers to diseases and conditions present in a patient at the same time. This term was often used throughout the pandemic to describe conditions occurring alongside COVID-19 that eventually lead to a patients worsening condition or death.

<sup>25</sup> Chan, Y., Chen, C., & Wu, Y. (2020).

individual to another, and controlling the spread of COVID-19. Reverse Transcriptase Polymerase Chain Reaction (RT-PCR) testing is the main method of diagnosis for COVID-19. Effective testing procedures to identify infection with the SARS-CoV-2 virus were essential since the symptoms for the SARS-CoV-2 virus are similar to many other viruses and range in severity from patient to patient. The RT-PCR test functions by amplifying RNA using the polymerase chain reaction until it reaches levels that are high enough to be detected. This process can be automated to create a level of efficiency where test results are available in a few hours, and hundreds of thousands of tests can be processed each day<sup>26</sup>. Unfortunately, shortages in the number of testing kits have been characteristic of the COVID-19 pandemic since the beginning and have severely disrupted the testing process and extended the time to receive results to a few days. Countries across the globe face shortages in swabs, test reagents, and other materials associated with testing kits, further impeding the ability to test for SARS-CoV-2.

Besides RT-PCR, other tests were available throughout the pandemic, including human antibody and viral antigen tests. The human antibody test identifies antibodies formed by the patient against the SARS-CoV-2 virus. The presence of these antibodies suggests a previous exposure to SARS-CoV-2 with subsequent immune response to the pathogen. By using peptides that mimic the molecules present on the surface of SARS-CoV-2 the test interacts with previously formed antibodies and therefore provides evidence of previous exposure. Conversely, the viral antigen test detects molecules on the surface of the virus itself rather than antibodies formed by the host. This test identifies an active infection with SARS-CoV-2 while the human antibody test provides evidence of

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<sup>26</sup> Schroder, I. (2020).

previous exposure<sup>27</sup>. While these tests were limited in their importance in determining the spread of COVID-19 from infected individuals to others, they were important to gain an overarching view of the spread of disease and extent of an outbreak<sup>28</sup>.

Treatment options for COVID-19 remain limited. Methods of symptomatic treatment that focus on alleviating symptoms of the disease have seen more success and attention than specific treatments that would clear the underlying infection with the SARS-CoV-2 virus. Remdesivir is an antiviral drug originally developed for the Ebola and SARS outbreaks of the past and has been seen to decrease the viral load present in nasopharyngeal and oropharyngeal samples from infected patients by inhibiting the replication of the guide ribonucleic acid<sup>29</sup>. Chloroquine, hydroxychloroquine, and azithromycin function *in vitro* to inhibit the uncoating process of an invading SARS-CoV-2 virus which limits the ability of the virus to attach to host cells and usurp host DNA replication machinery<sup>30</sup>. These results were harder to reproduce *in vivo* and showed a more ambiguous effectiveness when used in the public to treat COVID-19.

Most efforts to limit the spread and severity of COVID-19 have focused primarily on the development of effective vaccines and encouraging positive health behaviors. Positive health behaviors can include individual practices such as hand washing, wearing a face covering, and social distancing. These behaviors were also influenced by large-scale social efforts involving limiting travel and the temporary closing of schools, entertainment facilities, and other locations of congregation.

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<sup>27</sup> Centers for Disease Control and Prevention. (2022, April 4).

<sup>28</sup> Schroder, I. (2020).

<sup>29</sup> Chan, Y., Chen, C., & Wu, Y. (2020).

<sup>30</sup> Pitlik, S. (2020).

The development of an effective and safe vaccine for the SARS-CoV-2 virus has been one of several aspects of the COVID-19 pandemic that has been characterized by urgency and mistrust. Vaccines can be described as manufactured versions of disease-causing pathogens that initiate immune responses in the body to give the immune system a chance to learn how to defend against a pathogen in the event of future infections. Normally vaccines are developed through a series of three phases involving extensive laboratory and clinical testing. Phase one involves 10-100 subjects and focuses on evaluating the safety of the vaccine and its immunogenicity, which is its ability to invoke an immune response and cause the development of antibodies effective against a pathogen. Phase two relies on more than 100 volunteers and introduces the concept of dose adjustment alongside evaluating safety and immunogenicity. Phase three involves more than 10,000 volunteers and examines how well the vaccine prevents infection following exposure. If all three phases are successfully completed, the vaccine undergoes the final stages of approval and is pushed into mass production.

In the past, the phases of testing, approval, and production of vaccines could take up to 10 years<sup>31</sup>. It was not uncommon for outbreaks of certain diseases to run their course before the creation or distribution of an effective vaccine. For example, both the SARS and Zika Virus epidemics ended before their respective vaccine development had been completed, resulting in financial losses for the manufacturers involved. In contrast, vaccines for COVID-19 became available early in the year 2021, a little over a full year after the first documented cases of COVID-19<sup>32</sup>. Moderna's mRNA-based SARS-Cov-2 vaccine candidate entered a phase one trial on March 16th 2020, less than 10 weeks after

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<sup>31</sup> Pitlik, S. (2020).

<sup>32</sup> Lim, W. (2021).

the first genetic sequence of the SARS-CoV-2 virus was released by the World Health Organization on January 12th 2020<sup>33</sup>. This is in part due to a change in the way vaccines were manufactured. In the past vaccines followed a mainly linear process with steps separated by pauses for data analysis and quality assurance. The urgency of this pandemic required a parallel model where phases of development were completed simultaneously<sup>34</sup>.

While beneficial for ensuring the health of the public, a quick vaccine development process can cause concerns in the general population. During the COVID-19 pandemic many individuals displayed a hesitancy to receive the approved vaccines for a variety of reasons including concerns about vaccine efficacy, side effects, rushed vaccine development, and more. Many media outlets reported the development process for vaccines as a “race” which established an attitude of fear that vaccine candidates were rushed and were not following proper safety procedures. In reality, phase 3 involved 30,000-60,000 human volunteers and was equivalent to other large vaccine trials in the past<sup>35</sup>. Furthermore, the research utilized to create the vaccine was founded upon decades of research initiated by the SARS and MERS outbreaks. These plans were merely adapted using new mRNA and adenovirus technology to meet the specific demands of the SARS-CoV-2 virus.

Since the beginning, the COVID-19 pandemic has been characterized by robust research, prompt vaccine development, and intense debate over its origins and significance. After being classified as a pandemic in early 2020, COVID-19 would go on

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<sup>33</sup> Halton, J. et al. (2020).

<sup>34</sup> Halton, J. et al. (2020).

<sup>35</sup> Batista, C. et al. (2021).

to raise significant questions regarding epidemiology and public health response measures. As more details of the disease and its causative agent were uncovered, similarities between past pandemics were drawn and concerns rose. Theories as to how the SARS-CoV-2 virus entered the epidemiological scene ranged from natural progressions from animals to laboratory outbreaks that may or may not have been accompanied with malicious motives. As the virus spread from person to person and continent to continent, the need for a strong defense became clear. The development of COVID-19 vaccines was emphasized, and final doses were completed at record rates under this urgency. Throughout this period wrought with uncertainty, COVID-19 touched the lives of most individuals around the globe. COVID-19 not only permanently altered the world of medicine and public health, but also caused widespread effects on socioeconomic status and health inequalities. The following chapters will demonstrate the importance of exploring the relationship between COVID-19 and socioeconomic status and provide an in-depth look into three specific areas of socioeconomic status affected by the pandemic.

## CHAPTER THREE

### The Relationship Between COVID-19 and Socioeconomic Status

Much of the research and discussion regarding COVID-19 revolves around the historical and clinical details of the virus, but the social and economic effects of the pandemic are just as relevant. Many think of COVID-19 in terms of how the virus has affected the health of the country through concerns about mortality, virulence, and vaccinations. Merely thinking of health in terms of disease and its absence misses a large part of the picture of the burden of communicable diseases. The World Health Organization defines health as a “state of complete physical, mental, and social well-being, not merely the absence of disease and infirmity”<sup>36</sup>. Even when herd immunity is reached and concerns of the spread of COVID-19 fades from the public consciousness, COVID-19’s lasting effects on health as the World Health Organization defines it will still be felt. COVID-19 affects socioeconomic status through impacting conditions such as food production, employment, income, mental health, education, housing, access to healthcare and more.

#### Defining SES and Its Impact on Health

Socioeconomic status (SES) is a composite term meant to encapsulate conditions and resources including income, social status, education, work status, occupation, and more. Socioeconomic status is often thought of in association to health because it represents the social determinants of disease or lifestyle conditions that can affect an individual's likelihood of getting sick as well as their ability to return to a non-diseased

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<sup>36</sup> World Health Organization. (2005, Sept. 15).

state. A distinct health gradient refers to the way in which higher SES individuals generally report better health than those of a lower SES status.

Socioeconomic status has impacts on health through determining an individual's access to resources, lifestyle and exposure lists, and experiences in healthcare. Members of a higher SES generally have better access to preventative care, healthy diets, better incomes, and less stressful environments. Meanwhile, those belonging to a lower social class have a greater risk of being exposed to factors that negatively impact health including poor sanitation, unclean housing, stress, and poor diets. These problems compound to cause higher incidence of infectious and chronic diseases in individuals of a lower socioeconomic status.

The effect that a lower socioeconomic status can have on health and a patient's experience in healthcare is shown in Lutfey and Freese's article "Socioeconomic Status and Health in the Routine Clinic Visit for Diabetes"<sup>37</sup>. Two endocrinology clinics and their patients were compared, with one clinic serving patients of a higher SES status and the other serving patients of a lower SES status. This study found that the different facets of SES such as finances, occupation, and access to insurance influenced how effective treatments for diabetes were. For example, individuals from the high SES clinic were better able to accommodate managing glucose levels in their occupations while lower SES patients faced barriers such as working night shifts and missing afternoon insulin injections. Higher SES patients also had higher incomes and access to insurance plans that enabled them to purchase needed equipment and conveniently fill prescriptions. The patterns that socioeconomic status revealed in diabetic patients not only show how

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<sup>37</sup> Fresse, J., & Lutfey, K., (2005).

important SES is to patients seeking treatment for disease but could also reflect similar situations for individuals afflicted with COVID-19 and mirror patterns of treatment and vaccine availability.

#### Examining COVID-19 in the Context of Socioeconomic Status

Socioeconomic status has impacts on health in the ways in which it reflects the resources available to individuals and exposure to certain diseases. Therefore, COVID-19 and its potential impacts on socioeconomic conditions warrants further study and concern. There are two clear pathways through which COVID-19 maintains a relationship with socioeconomic status. First, by creating situations in areas such as financial stability, food security, and healthcare that negatively affect socioeconomic conditions. Second, COVID-19 has illuminated how individuals at different socioeconomic levels have varying abilities to follow COVID-19 procedures meant to stop the spread of the disease.

The COVID-19 pandemic has presented challenges in areas such as food security and living conditions that negatively impact socioeconomic conditions. This is clearly shown through the study “Change in Health-Related Socioeconomic Risk Factors and Mental Health During the Early Phase of the COVID-19 Pandemic: A National Survey of U.S. Women”<sup>38</sup>. The survey included responses from 3,200 women in the U.S. and aimed to track patterns of health-related socioeconomic risks including food security, housing instability, interpersonal violence, ability to pay utilities, and access to transportation. The survey serendipitously began before the pandemic and was continued during the early pandemic phase to give a clear picture of how the pandemic affected the health-

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<sup>38</sup> Boyd, K. et al. (2021).

related socioeconomic risks being studied. Before the pandemic 40% of women met the qualifications of having at least one health related socioeconomic risk. This number increased to 49% of participants during the early phase of the pandemic, with 29% of this measure including women who did not meet the qualifications for a health-related socioeconomic risk before the pandemic. Among these 29% of women experiencing incident impacts on their socioeconomic status following the pandemic, 78% had become food insecure, 24% were experiencing interpersonal violence, 21% acquired difficulty with finding transportation, and 11% developed housing instability. These findings show how COVID-19 has increased health related socioeconomic vulnerability among the women surveyed and presents a sense of urgency in considering the socioeconomic effects of COVID-19 on communities.

Second, individuals at different socioeconomic levels have varying ability to follow COVID-19 procedures meant to stop the spread of the disease. A study done in Bogota, Columbia entitled “Changes in Mobility and Socioeconomic Conditions During the COVID-19 Outbreak”<sup>39</sup> looked at changes in public transportation following mobility restrictions put in place by the local government. They found that there was a general decrease in transit usage following the start of the pandemic but neighborhoods with a lower socioeconomic status showed less of a reduction in mobility. These findings were concluded to reflect the necessity of travel for lower SES individuals to access resources such as healthcare, food, and other services that were not available nearby. Higher SES individuals were able to lower their mobility due to an increased ability to work from home, greater and easier access to resources, and possession of savings. These findings

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<sup>39</sup> Campi, M., Dueñas, M., & Olmos, L., (2021).

reflect how individuals at different socioeconomic levels have varying abilities to respond to certain COVID-19 prevention procedures including lockdown policies and mobility restrictions. COVID-19 and SES should be viewed in close relation since the resources and lifestyle determined by SES have a direct impact on how well populations can adhere to guidelines meant to stop the spread of the coronavirus.

The impacts of COVID-19 on socioeconomic status deserve the attention of researchers and the general population as they will have lasting effects on the health of communities. Thinking of diseases exclusively in the clinical sense leads to a decreased understanding of the full burden of disease including physical, mental, and social wellbeing. Past research into the association between socioeconomic status and health has shown that SES and its components such as diet, living environment, working conditions, and access to healthcare, have profound impacts on health inequalities. Furthermore, since COVID-19 impacts areas of socioeconomic health it has the potential to cause incident and worsening health inequalities. Multiple studies have shown how COVID-19 has caused negative changes in socioeconomic conditions and unveiled differences in the ability to respond to preventative measures. These effects and the importance of researching COVID-19 and socioeconomic status will be further explored through the examination of a possible survey instrument and in-depth explorations of the pandemic's relationship with financial stability, food security, and access to healthcare.

## CHAPTER FOUR

### Survey and Distribution

#### Conception of the Survey

To better understand the relationship between COVID-19 and socioeconomic status, a survey instrument was created as part of this thesis for use in McLennan County. The survey was developed with the intent of being distributed through local organizations serving disadvantaged populations in McLennan County and intended to serve as a supplemental piece of evidence demonstrating the relationship between the COVID-19 pandemic and socioeconomic status. The survey instrument, distribution plan, and data collection rubric were reviewed and exempted by the Baylor University Institutional Review Board process.

In order to provide examples of how the pandemic and resulting policies have affected socioeconomic status, the survey focuses on three main indicators of SES: income and employment, food insecurity, and access to healthcare. Across 20 questions, respondents were able to provide information about how their situations changed and fluctuated from January 2020 (pre-pandemic) to January 2021 (during pandemic). To maintain respondent anonymity, the survey collected no identifying data such as name, gender, age, race/ethnicity, address, etc<sup>40</sup>.

The income and employment section contained seven questions. To measure employment and job loss, respondents were asked to provide the nature of their employment from a list of categories including business, education, finance, hospitality,

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<sup>40</sup> Refer to the Appendix for a full-length copy of the survey.

technology, and more. Respondents were able to indicate if they experienced any type of reduction in work from being laid off, furloughed, or seeing a loss of hours, as well as the main reason the reduction of work occurred. They were then asked to indicate their total annual income for 2019 and 2020 as well as monthly incomes from January 2020 and March 2020. These measures were meant to give an idea of how COVID-19 has introduced disruptions in employment and income levels and how those decreases affect overall socioeconomic status.

The survey also assessed measures for food insecurity by asking respondents to indicate where their families obtained the majority of their food, whether or not they could afford the kinds of food they wanted, and if they were utilizing any assistance programs such as the Supplemental Nutrition Assistance Program (SNAP) or free school meals. The survey also included measures where respondents could indicate how much money they allocated for food on a weekly basis and whether or not these budgets changed with the onset of the pandemic.

Lastly the instrument sought to examine how COVID-19 had affected a respondent's relationship with healthcare. The survey included questions about insurance coverage, whether or not a respondent had been tested for COVID-19, and where they were able to receive a COVID-19 test. In addition to measuring the three indicators of socioeconomic status including income, food insecurity, and access to healthcare, the survey instrument intended to evaluate how influential local charity organizations were in supporting disadvantaged populations through the pandemic.

## Distribution & Challenges

Distribution was planned to utilize McLennan County's various charitable organizations as mediators between researchers and participants. It was thought that using organizations trusted by the community would increase response rate as respondents would feel comfortable. Organizations that received a request to distribute the survey included over 100 local churches and religious organizations and over 80 charitable organizations serving residents of McLennan County in a variety of ways. Notable agreements to distribute the survey were confirmed with Compassion Waco, Shepherd's Heart Food Pantries, CASA of McLennan County, and Mission Waco.

Unfortunately, the survey did not receive enough responses to be included as a truly viable research component of this thesis. Distribution was negatively affected by a very low response rate from the cooperating organizations, despite repeated personal visits, emails, phone calls, and messages. There could be a multitude of reasons why the survey experienced a low distribution rate. In their efforts to distribute the survey, participating organizations may have focused on staff rather than the disadvantaged populations relying on the organizations. This would produce results not representative of lower socioeconomic populations. These decisions in distribution could be related to organizations wanting to avoid any sort of association between completing the survey and receiving needed services or resources. Additionally, those who were reached by the survey could have experienced emotional distress in completing the survey due to the deeply emotional and disturbing nature of socioeconomic issues and their impacts on individual's personal lives.

Regardless of the failure of distribution of and response to this survey, the instrument itself should be used in future studies by other researchers with different access points and resources in the community. The inclusion of the survey furthers the point that it is important to evaluate COVID-19 and its effects on socioeconomic status regardless of how difficult the research can be to complete. Despite the lack of locally collected data to underpin the ties between COVID-19 and SES determinants, the literature abounds with sufficient studies and evidence to make a logical argument for local application of generalized data.

## CHAPTER FIVE

### Income and Employment

Income and employment are strong indicators of socioeconomic status as they reflect the economic resources to which an individual has access. Income and employment also influence other determinants of health including housing, food security, education, and working conditions. The COVID-19 pandemic brought extensive and sudden change to the economy resulting in fluctuations in income, employment, and the need to utilize emergency savings. These economic challenges have arisen through reductions in the ability to work, uneven distribution in the feasibility of remote employment, limitations imposed by childcare, and disruptions in education and career paths. In general, COVID-19 and its related policies have negatively altered the financial stability of already-marginalized individuals in a variety of ways leading to an overall increase in socioeconomic inequalities.

In the context of a pandemic, income and employment function as indicators of socioeconomic status and overall health. The ability for an individual to maintain health can be thought of as a balance between protective and risk factors. Positive health factors that protect against illness and promote good health such as economic security, clean housing, food security, a healthy diet, and others are associated with income. Having an adequate and resilient income means being able to afford basic necessities and a lifestyle that begets good health<sup>41</sup>. Furthermore, financial wellbeing, defined as the ability to meet current and future financial obligations, both imparts greater access to health-related

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<sup>41</sup> Dahlgren, G., & Whitehead, M. (2007).

resources and allows a financial buffer to utilize in the case of medical contingencies such as infection by the coronavirus or subsequent hospitalization<sup>42</sup>. On the other hand, risk factors such as unsanitary living conditions, exposure to harmful pollutants, unhealthy diets, and poor working conditions can all negatively impact health and are somewhat determined by income and employment. Possessing a low income means not having access to resources to help maintain health and likely experiencing poor working and living conditions<sup>43</sup>. Therefore, poverty can be considered a cause of poor health. Conversely, poverty can also be considered a result of poor health as illness may induce financial instability through reductions in the capacity to work or increased medical costs. COVID-19 infection and isolation procedures have the capacity to negatively affect an individual's ability to maintain employment further, compounding the relationship between health and employment-based income. COVID-19 has had devastating effects on income, employment, and the utilization of assets resulting in economic hardships and financial instability that influences socioeconomic status and health inequalities. In this way, COVID-19 has become a “poverty trap” where vulnerable households face financial uncertainties and are at risk of falling further into poverty<sup>44</sup>. This trend can be seen in three key areas: income, employment, and liquid assets.

#### Loss of Income

Overall, COVID-19 has resulted in a loss of income for many individuals and has disproportionately affected the income of those belonging to a lower socioeconomic status. The overall disruption to economic activities can be partially attributed to work

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<sup>42</sup> Bressan, A. et al. (2021).

<sup>43</sup> Dahlgreen, G., & Whitehead, M. (2007).

<sup>44</sup> Annerstedt, K. et al. (2020).

shortages associated with stay-at-home mandates. These mandates resulted in transitions to remote work and the temporary closing of certain industries such as hospitality and food service. This reduction in employment results in a reduced income and further financial uncertainties for those affected. For example, individuals who are younger, have achieved less education, identify as a minority, or who belong to a lower socioeconomic class were more likely to experience reductions in income. Data from a Household Pulse Survey completed in the U.S. from August to November 2020 found that 38.39% of U.S. households experienced a loss of income due to COVID-19 with 64.4% of that reported loss coming from households with an income less than \$75,000. Additionally, households whose primary earner did not have a college degree or higher educational achievement accounted for 52.53% of lost income. Respectively, African American and Hispanic individuals were 1.28 times and 1.38 times more likely to experience loss of income during the early pandemic<sup>45</sup>. These trends show an alarming overall reduction in households' financial capabilities but also showcase the way in which COVID-19 has disproportionately affected those belonging to a lower socioeconomic status.

#### Increases in Unemployment

A key contributor to reduced income is unemployment. Since the 1990s the World Health Organization has identified unemployment as one of the top ten most important contributors to the total burden of disease<sup>46</sup>. Unemployment causes increased poverty from loss of earnings, social exclusion, and transitions to unhealthy behaviors such as smoking and drinking. During April 2020, employment rates in the U.S.

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<sup>45</sup> Anyamele, O., Fiakofi, K., & McFarland, S. (2021).

<sup>46</sup> Dahlgreen, G., & Whitehead, M. (2007).

decreased by 14% which marked the largest one month decline ever recorded<sup>47</sup>, even when compared to the Great Recession which saw a drop of 10% in October 2009<sup>48</sup>. A survey of 13,200 U.S. adults taken in August 2020 found that 42% of respondents had experienced unemployment or significant pay cuts in their household due to the pandemic<sup>49</sup>. Anecdotal evidence also may suggest that stimulus payments and other government initiatives may have further increased unemployment by providing a larger and more reliable form of income than some individuals received from former employment commitments.

The experience of job loss was not equal across industries or socioeconomic status. Due to differences in COVID-19 exposure risks and the feasibility of transitioning specific types of employment to remote options, some industries experienced an increase in job loss. For example, many workers in service-based industries such as hospitality and restaurants that require frequent face to face interactions saw reductions in employment opportunities following COVID-19 social distancing and lockdown procedures<sup>50</sup>.

In addition to differences in employment across different industries, these unequal distributions were also evident in different social groups. Greater losses in employment occurred among women, minorities, individuals with low educational achievement, and those with lower income. Individuals between the ages of 16 and 24 experienced a 37.5% decrease in employment. Those who did not complete high school saw a 29.1% reduction in employment while those who had achieved a high school diploma but no higher

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<sup>47</sup> Han, J., Meyer, B., & Sullivan, J. (2020).

<sup>48</sup> Despard, M., & Roll, S. (2020).

<sup>49</sup> Despard, M., & Roll, S. (2020).

<sup>50</sup> Despard, M., & Roll, S. (2020).

education experienced a 27.2% decrease. 34.6% of individuals with an income below \$40,000 saw employment reductions as well<sup>51</sup>. Additionally, in a survey of U.S. employees, 40% of non-remote employees with household incomes below \$30,000 lost their jobs while only 5% of non-remote employees with a household income above \$100,000<sup>52</sup>. These differences will be explored further in subsequent chapters by exploring differences in the risk of COVID-19 exposure, increasing family responsibilities, and the feasibility of transitioning to work from home.

The decreases in unemployment and income experienced by many during the pandemic can be attributed to a variety of causes that have reduced individuals' ability to work. These reductions in the possibility to maintain employment can be seen through the dangers of increased risks of COVID-19 exposure and limitations on childcare which force individuals to choose between employment and health and family responsibilities.

Some positions, particularly those belonging to employees of a low socioeconomic standing carry an increased risk of exposure to the coronavirus. Low-income individuals are more likely to be employed in positions that rely on face-to-face interactions including those in the service and hospitality, child and elder care, and janitorial industries, all of which carry an increased risk of being exposed to COVID-19<sup>53</sup>. This presents a problem where low SES employees may be forced to choose between health risks and economic stability.

Even if an individual decides to undergo the increased risk of exposure and maintain employment, other responsibilities such as childcare may limit a parent's ability

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<sup>51</sup> Cho, S., & Winters, J. (2020).

<sup>52</sup> Angelucci, M. et al. (2020).

<sup>53</sup> Hinman, J. et al. (2021).

to resist stepping down from a position or taking reduced hours. With the arrival of the pandemic, 99% of the world's 2.36 billion children suddenly found themselves living under lockdown orders or mobility restrictions. The resulting closure of schools and childcare centers limited resources for provision of child care, presenting an increased burden on parents to juggle employment and continuous child care<sup>54</sup>. If parents cannot find adequate childcare to meet the needs of their families, they will have to sacrifice employment in order to attend to the needs of their children, effectively worsening their financial situations.

In addition to reducing the ability of some individuals to work based on increased risk of exposure and family responsibilities, the COVID-19 pandemic forced many industries to consider transitioning to remote working solutions to maintain productivity while protecting the health of their employees. Unfortunately, not all types of employment are able to effectively transition to remote work leading to inequalities in who was able to work from home.

The feasibility of work from home solutions can be examined through looking at the requirements of certain positions. Aspects of employment to consider when evaluating remote solutions include the involvement of technology, physical activity, equipment, face-to-face interactions, external customers, and physical proximity between employees. With these considerations in mind, those in industries including finance, insurance, communications, business, and public administration were able to maintain employment through remote solutions. On the other hand, food services, retail, and trade positions were commonly found to lack remote working options<sup>55</sup>. As the latter group of

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<sup>54</sup> Gromada, A., Rees, G., & Richardson, D. (2020).

<sup>55</sup> Bonacini, L., Gallo, G., & Scicchitano, S. (2020).

positions are more likely to be held by those of a lower socioeconomic status, the ability to work from home and resulting reductions in employment are demonstrably associated with socioeconomic status.

These differences among availability or remote working options across industries are reflected in socioeconomic status. While 37% of jobs in the U.S. can be performed entirely from home, these jobs account for 46% of all U.S. wages<sup>56</sup>. Those serving in positions that could not be translated to remote solutions typically have a lower socioeconomic standing, representing a clear inequality in who is able to utilize remote solutions to protect themselves from COVID-19 exposure and unemployment<sup>57</sup>. Individuals that are able to work from home during the pandemic enjoy a greater level of job security than those whose occupations cannot be transitioned to remote formats. Those employed in industries that are unable to make the necessary adjustments to abide by COVID-19 social distancing and lockdown procedures face unemployment and subsequent income loss.

#### Utilization of Liquid Assets

Financial hardships caused by COVID-19 through loss of income and employment forced many to utilize savings and other liquid assets to handle everyday expenditures, further increasing their vulnerability. “Liquid assets” refers to financial resources held in checking and savings accounts, cash, and prepaid debit cards that can be utilized when income becomes inadequate to cover regular expenses or unexpected rises in expenses<sup>58</sup>. These resources enable households to compensate for financial distress

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<sup>56</sup> Dingel, J., & Neiman, B. (2020).

<sup>57</sup> Dingel, J., & Neiman, B. (2020).

<sup>58</sup> Despard, M., & Roll, S. (2020).

especially during times of reduced employment. Low-income households experienced a larger proportionate income reduction but had fewer financial assets to sustain their normal expenditures. In the United Kingdom 78% of low-income couples were unable to maintain their normal expenses for more than five weeks after losing income<sup>59</sup>. In a similar survey in the U.S. 50% of households were found to lack emergency savings equivalent to three or more months' worth of ordinary expenses<sup>60</sup>. By depleting these resources, COVID-19 not only eroded financial stability but also reduced vulnerable households' ability to recover amidst growing economic concerns caused by the pandemic.

#### Education and Long-Term Career Disruptions

Most of the effects of COVID-19 on income and employment examined here represent short-term concerns revolving around business closures, limitations in the ability to work, and disparities among work from home possibilities, but COVID-19 has also had long term impacts on career paths by disrupting education. Traditionally, education is thought of as a route out of poverty by providing enhanced career aspects and income levels that lead to improved standards of living and access to resources<sup>61</sup>. School closures related to COVID-19 pandemic policies disrupted education's influence on the lives of students of all ages and introduced considerable changes to institutions' abilities to function.

The ease and effectiveness of transitions to remote learning were not equal across schools and typically depended on technical infrastructure, competency of online

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<sup>59</sup> Piyapromdee, S., & Spittal, P. (2020).

<sup>60</sup> Despard, M., & Roll, S. (2020).

<sup>61</sup> Dahlgreen, G., & Whitehead, M. (2007).

pedagogies, and the type of study. Technical infrastructure refers to the ability of students to access online learning materials in consistent and reliable ways. Difficulties arose in students who had limited access to the internet or computers due to living conditions or parent's utilizing resources to work from home. Additionally, different teachers and professors had different levels of competency when it came to transitioning their curriculum to online learning, leading to differences in educational quality across students. Lastly, some disciplines faced unique challenges regarding access to specific spaces and equipment. Scientific study lost the ability to conduct experiments or engage in hands-on learning without access to laboratories. Music and art majors lacked the spaces and instruments necessary for performances and practice. Without the necessary tools, these academic disciplines were often unable to deliver adequate lessons or assessments for students<sup>62</sup>.

COVID-19 functioned to increase the burdens of education on teachers, parents, and students. Teachers were expected to transition their curricula effectively to online platforms often without receiving any prior training in online instruction or resources<sup>63</sup>. With students learning from home through remote methods, parents were expected to step up as drivers of learning in the home. Parents' ability to support their children's education varied depending on the time available to devote to teaching, cognitive skills, and levels of knowledge of the parent, and access to educational resources resulting in varying levels of support for students learning from home<sup>64</sup>. Students themselves experienced social isolation, increased stress, and lack of concentration due to

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<sup>62</sup> Jensen, T., Land, H., & Marinoni, G. (2020).

<sup>63</sup> Atchoarena, D., Elfert, M., & Stanistreet, P. (2021).

<sup>64</sup> Burgess, S. & Sievertsen, H. (2020).

disturbances caused by home life and family affairs<sup>65</sup>. Overall, the quality of education decreased during the pandemic.

These challenges and reductions in educational quality hold significant impacts on future career prospects and student achievement. A particular area of interest is medical education and training. Transitions to online learning affected the ability of students to attend lectures, work in small groups, and gather in learning studios. Furthermore, clerkship environments, where students complete clinical rounds in a variety of specialties, were disrupted. On March 17th, 2020, the Association of American Medical Colleges provided guidelines suggesting that medical students pause clinical rotations and switch to virtual cases and simulations<sup>66</sup>. These changes in the administration of medical education raised concerns regarding the reduction of access to mentor relationships, lack of hands-on training, potential for academic dishonesty in assessments, and more<sup>67</sup>. When considering the role of medical education in raising the physicians of the future, these disruptions may have widespread effects on the future of healthcare and its ability to respond to public health crises similar to that caused by COVID-19.

In the end, COVID-19 causes disruptions in financial security by creating scenarios where individuals are at risk of losing their income and employment. Reductions in employment and drops in income caused households to dip into savings (if present) and other emergency resources further pushing them into vulnerability. The ability to maintain employment and preserve income was disturbed by enhanced risk of exposure to COVID-19, limitations on achieving adequate childcare, and unequal

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<sup>65</sup> Gaur, U. et al. (2020).

<sup>66</sup> Rose, S. (2020).

<sup>67</sup> Gaur, U. et al. (2020).

opportunities to transition to remote work. Furthermore, long term career goals and training were interrupted by cessation or modulation of education. COVID-19 has illuminated inequities in financial stability by exposing differences in job security and the complexities of maintaining the ability to work and learn in a pandemic environment. Moreover, these disruptions in income will have effects on individuals' abilities to acquire other forms of resources such as the food to make up an adequate and nutritious diet.

## CHAPTER SIX

### Food Insecurity

Access to adequate amounts of food is a key aspect of socioeconomic status as it reflects what resources an individual has at their disposal and what additional resources they are able to acquire. Food insecurity represents a lack of resources that can be attributed to inequalities in the availability and accessibility of nutritious, quality food. The COVID-19 pandemic has affected food security in numerous ways including influencing what food is available on grocery store shelves, the purchasing power of households, and the productivity of food supply chains to name a few. COVID-19 has significant impacts on food insecurity that should be considered for their long-term effects on socioeconomic status and health.

Food security is commonly defined as having access to adequate levels of nutritious food and sourcing that food in socially acceptable ways without resorting to scavenging, stealing, or other coping strategies. Food insecurity is therefore having a limited availability of nutritious foods or a lack of socially acceptable ways to source adequate levels of food<sup>68</sup>. The defining characteristics of someone experiencing food insecurity are reduced food intake and disruptions in normal eating patterns such as skipping meals or switching to less nutritious and cheaper alternatives<sup>69</sup>.

Hunger and malnutrition are both terms that are commonly used in discussions revolving around food insecurity. Hunger is a physiological condition caused by inadequate food intake that results in discomfort, illness, weakness, or pain. Hunger can

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<sup>68</sup> Bickel, G. et al. (2000).

<sup>69</sup> United States Department of Agriculture. (2021, Sept. 8).

be defined as a consequence of food insecurity but is by definition less severe in nature and can be caused by actions such as dieting or simply forgetting to eat due to a busy work schedule<sup>70</sup>. Perhaps a better marker to understand food security is malnutrition. Unlike hunger, which can be caused by just going a few hours without food, malnutrition is a more severe condition with physiological consequences. Malnutrition occurs in individuals consuming inadequate or otherwise disturbed levels of nutrients through deficiencies, excesses, or imbalances of vitamins and minerals. These conditions can limit the amount of energy at the body's disposal for daily activities such as producing essential enzymes, hormones, and other substances<sup>71</sup>. Through causing conditions such as malnutrition, food insecurity serves as a social inequality that affects the mental and physical abilities of those experiencing it.

Food insecurity reflects a household's socioeconomic status because it directly relates to what resources are available and what kinds and amounts of food a household can afford. Food insecurity can also be a consequence of one's socioeconomic status due to residing in disadvantaged neighborhoods called food deserts. A food desert refers to an area where there is limited access to nutritious, affordable food. As grocery stores have become more centralized in higher income neighborhoods and Small Business Administration loans favor fast food chains instead of small independent food vendors, low-income neighborhoods are often left isolated from food vendors and experience limited, unhealthy options. One study in Washington D.C. found that of the 520 businesses that identify as food-retailers only 12% offer an adequate variety of fresh food

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<sup>70</sup> United States Department of Agriculture. (2021, Sept. 8).

<sup>71</sup> World Health Organization. (2021, June 9).

that would support a healthy diet<sup>72</sup>. “Food-retailers” may be misleading as the 520 businesses included vendors such as fast-food restaurants and gas stations that provide cheap, ready-made meals instead of the ingredients to create nutritious meals as sold by more traditional vendors such as grocery stores. The 88% of food retailers not offering enough fresh options to support a healthy diet likely include these quick and convenient sources that prioritize cheap alternatives rather than the materials and ingredients necessary to prepare a nutritious meal. Not only has COVID-19 affected purchasing power by disrupting income, the pandemic has also created situations reminiscent of food deserts through supply chain disruptions and changes in consumer behavior.

Food insecurity is usually described across a range of levels of security. High food security refers to a household with no instances of food access problems or limitations. Marginal food security is used to define households that express anxiety over food supply but do not make changes in diet or food intake. Low food security is indicative of households that report reduced quality, variety, or nutritional value of food alongside a reduced intake. Finally, very low food security is reserved for households that display disrupted eating patterns and reduced intake<sup>73</sup>.

Food insecurity is typically measured through surveys and interviews allowing respondents to indicate different behaviors and emotions regarding the food they can access. Survey questions typically focus on anxiety over food budgets being insufficient, food quality, adjustments to normal diets to include cheaper foods, sensations of hunger, and experiences of not being able to locate desired food items. Food insecurity typically follows a pattern of stages. Stage one is when households experience anxiety over food

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<sup>72</sup> O’Hara, S., & Toussaint, E. (2021).

<sup>73</sup> United States Department of Agriculture. (2021, Sept. 8).

shortages and begin to adjust budgets and usage. Stage two is characterized by adults having a reduced intake in food but children continuing to eat adequately. Stage three occurs when children begin to suffer reduced food intake and the adults experience more dramatic hunger<sup>74</sup>.

### The Effects of COVID-19 on Food Security

Interestingly, the 2019 food insecurity rate was the lowest it had been in more than 20 years. Feeding America hypothesizes this phenomenon to be due to the low unemployment and poverty rates at the time. The entrance of the COVID-19 virus marked the first economic recession in the U.S. since the Great Recession of 2007. By March 28th, 2020 the number of claims for unemployment rose to nearly 7 million, representing a record high. The unemployment rate rose to 14.7% by April 2020<sup>75</sup>. These statistics show how COVID-19 has disrupted income and resources which lead to increases in food insecurity. These changes are especially alarming when considering the fact that low-income households typically spend about 70% of their income on food and are therefore susceptible to income shocks or disruptions<sup>76</sup>.

In general, COVID-19 and the impacts of the pandemic increased food insecurity. The pandemic resulted in incident and worsening food insecurity through a combination of pre-existing inequalities and risk factors as well as increasing unemployment, disruption in food production and distribution, and changing consumer purchasing behavior. A COVID-19 impact survey of U.S. households found that 34.5% of households with a child under 18 years old and 34.4% of households with a child under

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<sup>74</sup> Bickel, G. et al. (2000).

<sup>75</sup> Feeding America. (2021, March).

<sup>76</sup> Laborde, D. et al. (2020).

12 years old displayed characteristics of food insecurity by the end of April 2020. When compared with results from 2018 that showed 14.7% of households with a child under 18 years old and 15.1% of households with a child under 12 as being food insecure, it is clear to see the dramatic increase due to the pandemic<sup>77</sup>. A similar study completed in Vermont during March 29th-April 12th 2020, found a 32.3% increase in household food insecurity from before the pandemic with 35.5% of those households being newly classified as food insecure<sup>78</sup>. Furthermore, 59.1% of these households reported having very low food security as classified by disrupted eating patterns and reduced food intake.

#### COVID-19 and the Four Pillars of the Food System

To take a closer look at how the coronavirus and resulting pandemic produced these increases in food insecurity, it is helpful to break down food security into the four pillars of the food system: availability, accessibility, utilization, and stability<sup>79</sup>. All four of these pillars were negatively affected by COVID-19 in some way. Food availability refers to the presence of sufficient amounts of quality food. Accessibility means a household's ability to purchase and acquire available food. Utilization refers to having the correct diet and nutrition to maintain health. Stability encompasses the idea of resilient food security that will not be disrupted by sudden shocks such as a pandemic.

COVID-19 mainly affected availability through inspiring panic buying and stockpiling behaviors that emptied store shelves and made certain products harder to obtain. Panic buying or stockpiling behavior refers to the phenomenon where consumers purchase an increased amount of certain products due to an anticipated interruption in

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<sup>77</sup> Dimitropoulos, G., Katzman, D., & Paslakis, G. (2020).

<sup>78</sup> Belarmino, E. et al (2020).

<sup>79</sup> Belarmino, E. et al (2020).

supply or distribution caused by a crisis<sup>80</sup>. Disruptions in consumption during COVID-19 were unique from other disasters in that the perceived urgency felt by consumers was not sparked by destruction of food-related assets due to extreme weather or natural disaster, but rather were inspired by public health interventions such as border closures, social distancing, and lockdowns<sup>81</sup>. For example, after the announcement of a four-week lockdown in New Zealand, the frequency of food related transactions decreased and the average amount spent per transaction increased by 12.7%. This indicates customers buying larger amounts of items to last through mobility restrictions<sup>82</sup>.

The perceived need to buy larger quantities of food to ensure access to certain resources presents a problem, especially in the context of food insecurity. Stockpiling behavior worsens food insecurity for families that cannot afford to buy in bulk and often rely on shelf-stable foods that are in dramatically increased demand<sup>83</sup>. Households in the Vermont survey reported having to visit multiple food vendors due to not finding the kind or amount of food they needed<sup>84</sup>. As COVID-19 media coverage showcased images of empty shelves, roughly  $\frac{1}{3}$  of consumers in the US felt the need to stockpile essential items<sup>85</sup>. COVID-19 increased food insecurity by inspiring panic buying of important resources resulting in empty shelves and increased difficulty in finding high demand food products.

The consequences of the pandemic affected accessibility in a number of ways including reducing the purchasing power of households and introducing disruptions into

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<sup>80</sup> Prentice, C., Quach, S., & Thaichon, P. (2020).

<sup>81</sup> Dyason, D. et al. (2020).

<sup>82</sup> Dyason, D. et al. (2020).

<sup>83</sup> Fang, D. et al. (2021).

<sup>84</sup> Belarmino, E. et al (2020).

<sup>85</sup> Prentice, C., Quach, S., & Thaichon, P. (2020).

the agricultural supply chain and distribution. First, the pandemic resulted in changes in income through increased unemployment and instances of furlough and reduced hours which affected food insecurity by decreasing available funds for food purchase. The Urban Institute's Coronavirus Survey found that during the early pandemic (May 2020), 25.3% of those experiencing food insecurity had also experienced a loss of work or work-related income through being laid off, furloughed, or being given reduced hours<sup>86</sup>. The aforementioned Vermont survey reported that respondents who indicated some form of reduction in employment were three times more likely to experience food insecurity<sup>87</sup>. Additionally, a survey of low-income Americans found that of the unemployed respondents, 77% were identified as being food insecure while only 45.4% of employed respondents reported experiencing food insecurity<sup>88</sup>.

Additionally, COVID-19 had impacts on the agricultural industry and food supply networks that affected what kinds of food were available to consumers. The disruptions manifested in two main ways, limited labor and transition from supplying the hospitality sector to the residential market. Agricultural labor was disrupted by mobility restrictions and COVID-19 transmission. Non-staple food items such as fruits and vegetables require human labor for planting, weeding, and harvesting. Mobility restrictions and border closures limited the ability of seasonal workers to complete their work leaving food unharvested. Disruptions in labor forces continued to impact the agricultural industry through meat packing and other processing plants closing due to the risk of COVID-19 transmission. During the summer of 2020 it was estimated that over 30,000 meat

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<sup>86</sup> Gupta, P., Karpman, M., & Waxman, E. (2020).

<sup>87</sup> Belarmino, E. et al (2020).

<sup>88</sup> Fang, D. et al. (2021).

processing workers had contracted COVID-19<sup>89</sup>. The increased rate of infection led to multiple processing plants having to reduce operations or temporarily close due to limited workforce<sup>90</sup>. These reductions in labor caused a decrease in the stock of processed food including meat and dairy products which was reflected in grocery shelf stock and in what consumers were able to afford. Waning rates of meat processing due to labor shortages meant less meat was making it grocery store shelves and restocking was occurring less frequently. This visual lack of supply when coupled with panic buying behaviors led to an increased demand for meat products. Meat prices saw a considerable increase in response to these market trends. In early March 2020, meat prices had increased by 30% in the United States and by April beef production had declined by one third<sup>91</sup>.

Moreover, the food supply chains experienced a swift change in demand based on closures in the hospitality sector and had to transition into producing retailer-friendly food items. Farmers scrambled to switch from large volume commercial products to smaller packaging that was more refrigerator friendly. Milk was especially vulnerable as raw unpasteurized milk cannot be stored like other goods, allowing no buffer while packaging changed from large volume bags for coffee shops and restaurants to smaller containers meant for grocery stores. This resulted in about 2.5% of all milk produced in the U.S. being dumped in April 2020<sup>92</sup>. Changes in demand due to closures across the hospitality industry also affected poultry and eggs. An example of this can be seen in the fate of breaker eggs<sup>93</sup>. Since the normal consumer has little interest in large bags of liquid

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<sup>89</sup> Laborde, D. et al. (2020).

<sup>90</sup> Bannon, N. et al. (2021).

<sup>91</sup> Bannon, N. et al. (2021).

<sup>92</sup> Bannon, N. et al. (2021).

<sup>93</sup> Breaker eggs are eggs intentionally removed from their shells and liquidized in order to be sold in large scale bags for baking and culinary purposes. These products are sold to

eggs, these products had little retail value following the closure of food-service-based businesses. With nowhere to go, these eggs were widely destroyed.

COVID-19 effected utilization by changing the kinds of foods that households were able to afford leading to a reduced ability to obtain a nutritional state of wellbeing. As households experienced a loss in purchasing power and a decline in available food items due to panic buying and supply issues, they were forced to rely on cheaper, less nutritious options<sup>94</sup>. These forced transitions can be especially devastating for households with self-reported food allergy or dietary conditions such as celiac disease; these households were more likely to be food insecure than those without dietary restrictions<sup>95</sup>. Forced adjustments in food buying habits can also compound the effects of COVID-19 by introducing immune deficiencies due to malnutrition that can lead to increases in incidence and severity of COVID-19 infection<sup>96</sup>. Malnutrition associated with food insecurity is also shown to have physical and cognitive implications including impaired growth and development, low educational achievement, cognitive deficits, and chronic health problems<sup>97</sup>.

COVID-19 has affected the stability of the food system by disrupting previously established food assistance programs and limiting their capacity to help offset food insecurity in their communities. It can be expected that the disturbances in availability, accessibility, and utilization mentioned above would both worsen food insecurity in families already experiencing the phenomenon and push families previously on the

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hospitality services such as restaurants and bakeries and not intended for grocery store shelves.

<sup>94</sup> Laborde, D. et al. (2020).

<sup>95</sup> Abramsohn, E. et al. (2021).

<sup>96</sup> Oliveira, A., & Pereira, M. (2020).

<sup>97</sup> Dimitropoulos, G., Katzman, D., & Paslakis, G. (2020).

margin to being labeled as food insecure. These consequences were further impacted by the limited availability of food assistance programs that would have normally helped support families through such increases in instability. Feeding America, which represents a collection of over 200 food banks and 60,000 food pantries across the United States, reported that 98% of food banks experienced an increase in demand for assistance with the average increase in any given food bank being 63%. These food banks also reported a 59% decrease in inventory, 95% increase in operating expenses, and a sharp decline in volunteer support<sup>98</sup>. School Lunch programs, which are a staple of food security for many families, also faced severe disruptions during the early pandemic. Disruption of school feeding programs in Nigeria led to a 9% increase in food insecurity<sup>99</sup>. These statistics illustrate the importance of food assistance programs as providers in their communities but also of the challenges they faced during the pandemic. Reduced support from food pantries and school lunch programs likely resulted in more severe levels of food insecurity for those already experiencing the inequality and increased incidence of new families falling below the margin of being food secure.

Food insecurity is closely related to socioeconomic status by representing inequalities in access to a crucial resource. COVID-19 has negatively impacted food insecurity in many ways, thereby leaving long-lasting implications for socioeconomic inequalities. COVID-19 affected each pillar of the food system by inspiring panic buying, reducing purchasing power, disturbing agricultural supply chains, and reducing the capacity of food assistance programs. It is clear to see how COVID-19 and pandemic-

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<sup>98</sup> Rampersad, G. [NIHCMFoundation]. (2020, May 14).

<sup>99</sup> Abay, K., Amare, M., & Andam, K. (2021).

related restrictions have introduced challenges for agricultural networks, consumers, and support organizations leading to downstream impacts in socioeconomic status.

## CHAPTER SEVEN

### Access to Healthcare

Alongside changes in financial stability and food security, COVID-19 also increased the demand on the healthcare system and disproportionately affected the ability and willingness of patients from a lower socioeconomic status to seek medical care. As can be seen in previous chapters, an individual's socioeconomic status affects the resources they have access to and the living and working conditions they are exposed to. Disturbances in income, food security, housing, employment, and more can cause adverse health effects through increased exposure to pathogens, toxins, and stress as well as determining an individual's ability to access and afford adequate medical care. By introducing further limitations to the availability of medical services, COVID-19 created additional barriers to healthcare for those belonging to a lower socioeconomic status.

As COVID-19 cases rose in the first months of the pandemic all eyes turned to the healthcare system for answers and reassurance. Changes to the distribution and types of healthcare services available impacted patients in two main ways. First, decisions on service distribution plans and resource limitations affected the accessibility of healthcare. These changes can be seen in vaccine distribution, the emergence of telehealth services, and the cancellation of elective surgeries and preventative cancer screenings. Second, attitudes surrounding the COVID-19 pandemic and fear of exposure to the virus affected how willing patients were to access what services and resources were available. This phenomenon is evident in two major areas: decreased usage of emergency departments and vaccine hesitancy.

## Effects on Accessibility

One example of decreased healthcare availability lies in the distribution patterns of COVID-19 vaccines. At both a global and individual country level, higher socioeconomic individuals had better access to COVID-19 vaccines. At the global level, higher income countries were able to invest resources into vaccine development and manufacturing to ensure adequate numbers of vaccines for their citizens. Additionally, once vaccines were developed, higher income countries had more funds to purchase the finished product. This clearing out of the medicine cabinet resulted in lower income countries not being able to provide enough vaccines for their populations. One study found that high income countries had purchased more than half of the global vaccines, a number totaling around 4.6 billion doses while only representing 19% of the global population. Lower income countries were left with insufficient dosage levels, just enough to vaccinate around one third of their total populations. Through programs such as Operation: WARP SPEED, the United States alone was able to fund development and production of, as well as secure 600 million doses of the Pfizer vaccine, 500 million doses of the Moderna vaccine, and 810 million doses from other assorted companies including Johnson & Johnson<sup>100</sup>. This unequal distribution presents an intense problem for lower income countries who lag behind economically as they continue to devote resources to medical care and vaccines<sup>101</sup>.

Additionally, early vaccine distribution in the United States favored individuals of higher socioeconomic status<sup>102</sup>. Overwhelmed online registration portals, long lines at

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<sup>100</sup> Kates, J. et al. (2021).

<sup>101</sup> Oehler, R., & Vega, V. (2021).

<sup>102</sup> Bauchner, H., & Jean-Jacques, M. (2021).

physical vaccination distribution locations, and lack of access to transportation were common problems affecting those intending to be vaccinated in the first few months of 2021<sup>103</sup>. These problems and frustrations represent significant barriers keeping populations from receiving the vaccine. These barriers must be dismantled when planning vaccination and other distribution plans to ensure that the individuals at the highest risk have access to the ability to protect themselves and their loved ones.

The emergence of telehealth and other online resources during the pandemic characterized a unique opportunity for physicians to access low income and disadvantaged populations. Telemedicine, or telehealth, refers to remote interactions between physicians and patients done via video chat or phone that provide much-needed clinical services without the need for an in-person visit<sup>104</sup>. Telehealth finds its origins as the primary mode of healthcare for NASA astronauts beginning in 1960 and experienced increases in public usage as video chat programs such as Skype and Zoom were created in the 2000s. During the early months of the pandemic the Centers for Disease Control and Prevention advised clinics, hospitals, and surgical centers to make the effort to suspend nonessential services and functions to limit the spread of the COVID-19 virus and preserve resources such as personal protective equipment<sup>105</sup>. Upon these cancellations, telehealth expanded as a way to keep patients safe while continuing the administration of healthcare. This expansion was made possible in part due to legal interventions created on the behalf of telehealth. The U.S. Department of Health and Human Services suspended enforcement of selected aspects of the Health Insurance

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<sup>103</sup> Oehler, R., & Vega, V. (2021).

<sup>104</sup> Ficke, J. et al. (2020).

<sup>105</sup> Colbert, G., Lerma, E., & Venegas-Vera, V. (2020).

Portability and Accountability Act of 1996, better known as HIPAA, to allow physicians to communicate with patients during the pandemic. Previously forbidden video and audio technology thought to be unsafe and insecure were approved for use. Approved methods of remote communication included Skype, Microsoft Teams, Zoom, Google Suites, and Cisco Webex<sup>106</sup>. Google searches involving terms such as “telemedicine” and “telehealth” saw a marked increase as COVID-19 cases and fatalities rose<sup>107</sup>.

Telemedicine holds a unique position in improving healthcare accessibility for patients of lower socioeconomic standing by providing a mode of healthcare delivery that transcends common concerns regarding lack of transportation, insufficient childcare, or complicated work schedules not accommodating appointment times<sup>108</sup>. By increasing the prevalence and quality of telehealth resources, COVID-19 may have improved access to healthcare for those struggling to attend traditional in person visits.

Lastly, the interruption of elective surgeries and cancer screenings presented disruptions to healthcare services that were already disproportionately affecting lower socioeconomic patients. Alongside the CDC’s request for hospitals to cease unnecessary procedures, the American Society of Clinical Oncology recommended that healthcare providers reduce cancer screenings<sup>109</sup> such as mammograms and colonoscopies to limit the spread of COVID-19<sup>110</sup>. It was estimated that screenings for cancers of the breast, colon, and cervix dropped by 94%, 86%, and 94% respectively during the first few months of the pandemic. These decreases in preventative care are especially problematic

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<sup>106</sup> U.S Department of Health and Human Services. (2021).

<sup>107</sup> Hong, Y. et al. (2020).

<sup>108</sup> Colbert, G., Lerma, E., & Venegas-Vera, V. (2020).

<sup>109</sup> Cancer screenings are tests done to identify precancerous and cancerous abnormalities and function to reduce cancer incidence, morbidity, and mortality.

<sup>110</sup> Chen, Z. et al. (2020).

for those of lower socioeconomic standing who have an increased risk for conditions including cancer especially in the face of increased stress and declining life quality due to complications of the pandemic in income, food security, and other social determinants of health<sup>111</sup>.

In addition to the loss of cancer screenings, elective surgeries were also put on hold, effectively halting necessary medical interventions. The term “elective” is misleading since the surgical procedures identified as elective can include vital preventative measures and essential surgeries for progressive conditions. The term mainly refers to procedures that are neither emergent nor urgent<sup>112</sup>. Reducing elective surgeries was intended to preserve personal protective equipment as well as free up spaces in wards and critical care facilities for the expected increase in patients infected with COVID-19. Before the decision to cancel elective surgeries, there was a global mean of 3.98 patients per ICU bed. This simply means that for every ICU bed available there are a little under 4 patients that need that space. After the cancellations went into effect this number dropped to 2.37 patients per ICU bed. Although improved, there was still a higher number of patients than beds available<sup>113</sup>. This increased availability of space was made possible due to mass cancellations estimated to total 28,404,603 canceled procedures over a 12-week period beginning in March of 2020<sup>114</sup>. These limitations on procedures presented periods of time where patients were cut off from necessary medical interventions and experienced delays in treatment plans. Plans to

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<sup>111</sup> Cancino, R. et al. (2020).

<sup>112</sup> Bibee, K. et al. (2020).

<sup>113</sup> Brooke, B. et al. (2020).

<sup>114</sup> COVIDSurg Collaborative. (2020).

restart elective procedures had to compensate for the backup of patients needing certain surgeries as instances of disease and injury continued regardless of the pandemic.

Overall, COVID-19 and its resulting distribution plans effectively limited access to healthcare for many patients and presented new or worsening challenges for those of a lower socioeconomic standing. As well as reducing availability, nuances of the pandemic also affected patients' willingness to seek out healthcare by inspiring vaccine hesitancy and a fear of being infected by the virus while in a hospital.

#### Effects on Willingness

One example of the population's unwillingness to receive medical care for COVID-19 was vaccine hesitancy. Vaccine hesitancy can be defined as reluctance to be administered the COVID-19 vaccine ranging from those who were cautious to anti-vaxxers. Although caution in receiving a vaccine can come from a variety of reasons, it is relevant to the overall attitude of a population toward COVID-19 treatment interventions<sup>115</sup>. A poll conducted in the United States during May of 2020 found that 50% of U.S. citizens intended to be vaccinated once vaccines became available, 30% were unsure, and 20% did not plan to be vaccinated. There are a multitude of reasons why an individual would be hesitant to receive a vaccine. A survey completed across the United States found that people of color, females, respondents over age 65, those with pre-existing medical conditions, parents, and those who had lost their job during the pandemic were all more likely to report vaccine hesitancy<sup>116</sup>. Factors that were often seen more commonly in populations of lower socioeconomic status such as inequities in education, employment, income, and housing were likely to influence an individual to be

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<sup>115</sup> Coomes, E., Gunaratne, K., & Haghbayan, H. (2020).

<sup>116</sup> Allen, W. et al. (2021).

cautious about being administered the vaccine, showing a clear relationship between socioeconomic status and willingness to receive COVID-19 related care.

Social media played a key role in spreading misinformation and encouraging vaccine hesitancy among populations. Social media allows content to be rapidly created and posted without any sort of fact checking. Twitter reported that during the height of the pandemic a tweet containing some sort of information related to COVID-19 was posted every 45 milliseconds<sup>117</sup>. It is far more likely for false information to gain momentum on social media platforms as the curation of “for you pages” presents opportunities for like-minded individuals to find one another and push particular ideologies. YouTube reported that 27.5% of the videos that appeared when searching the term “COVID-19” contained false information and had collectively been viewed over 60 million times<sup>118</sup>. Many social media platforms have attempted to employ filters and pop-ups to flag posts containing misinformation. These tags were often ascribed without any proper knowledge of epidemiology or biology resulting in some content being misidentified as false and instances of actual misinformation slipping through the cracks. These unregulated and powerful platforms have the ability to increase vaccine hesitancy by spreading COVID-19 misinformation and conspiracy theories. This content has been proven to reach those with cognitive impairment, lower reading literacies, and less experience in digital spaces to influence their opinions regarding important topics. Public health organizations and healthcare providers should utilize social media accounts to combat misinformation and directly reach out to members of the public showing concerns about the vaccine.

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<sup>117</sup> Coomes, E., Gunaratne, K., & Haghbayan, H. (2020).

<sup>118</sup> Coomes, E., Gunaratne, K., & Haghbayan, H. (2020).

The media also played a role in how willing patients were to visit hospitals for concerns unrelated to COVID-19. As COVID-19 cases rose in the early months of the pandemic, news outlets were flooded with images of packed waiting rooms and hospitals teeming with coughing COVID-19 patients. Soon after, emergency rooms across the United States saw sharp declines in patients presenting with certain medical conditions. When compared to a baseline of 56,443 emergency department visits in 2019, the 38,966 visits in the early months of the pandemic represents a 30.9% reduction in utilization of emergency rooms across the United States<sup>119</sup>. Additionally, there were increases in deaths outside the hospital related to conditions that would normally draw patients to seek care at local emergency clinics. For example, in California, there was a 45% increase in cardiac related deaths reported by emergency medical services in the field<sup>120</sup>. These statistics show a clear reluctance for patients to visit the hospital which can be attributed to a number of COVID-19 related reasons. The American College of Emergency Physicians conducted a survey in April 2020 and found that 80% of patients were afraid of contracting COVID-19 from an emergency room, 73% were worried about placing unnecessary burdens on healthcare practitioners by seeking treatment, and 60% expressed unwillingness to visit hospitals based on not being able to have visitors<sup>121</sup>. Hospitals were seen as infectious reservoirs teeming with COVID-19 patients causing many potential patients to steer clear of the help they may have desperately needed. This trend is particularly concerning for patients of low economic status that often lack primary care physicians and other healthcare resources and use the emergency department as a safety

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<sup>119</sup> Baugh, J. et al. (2021).

<sup>120</sup> Hawkins, J. et al. (2020).

<sup>121</sup> Baugh, J. et al. (2021).

net<sup>122</sup>. Perceived unsafe conditions in emergency rooms effectively left some patients with nowhere to go for COVID-19 related or other medical concerns.

In conclusion, COVID-19 presented challenges and disruptions to the availability of healthcare services and the willingness of patients to seek out medical resources. Vaccine distribution was controlled by high income countries and favored administration to individuals of high socioeconomic status with the resources necessary to attend vaccination appointments. Telehealth emerged as a beacon of hope for disadvantaged patients and served as a point of access for medical services. Cancellations of elective surgeries and cancer screenings further distanced disadvantaged patients from medical procedures and increased complications regarding increased pandemic stress and chronic conditions. Vaccine hesitancy was more likely to be seen in low socioeconomic populations and was heavily influenced by misinformation spread on social media. Lastly, hospital avoidance was a common phenomenon where patients refused to utilize available emergency services due to fear of being exposed to COVID-19. These patterns had disproportionate effects on those belonging to lower socioeconomic classes and compounded preexisting healthcare inequalities adding to the total burden of COVID-19 on disadvantaged populations.

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<sup>122</sup> Adjemian, J. et al. (2020).

## CHAPTER EIGHT

### Conclusion

Throughout this work, the relationship between the COVID-19 pandemic and socioeconomic status has been explored through three main social determinants of health: financial stability, food security, and access to healthcare. Loss of income and employment due to COVID-19 was further expanded upon by viewing the ability of households to recover using savings, concerns over the risk of COVID-19 exposure during work, limitations in childcare, the disproportionate capacity for working from home across occupations, and disruptions in education and career attainment. The complex supply chains and purchasing behavior involved in food security showed how COVID-19 has had widespread effects on the amount of food available to families, the capabilities of agriculture labor and processing facilities, and the demand placed on charitable food distribution programs. The pandemic's relationship to healthcare distribution and attitudes was explored through examining vaccine distribution patterns, telehealth resources, disruptions in certain medical services, hesitancy and mistrust present in the public, and the usage of emergency medical services. Throughout these aspects of health, COVID-19 has presented challenges for lower socioeconomic populations and affected their ability to recover from the pandemic as well as overcome worsening health inequalities.

It is important to consider these relationships between COVID-19 and socioeconomic status as well as the patterns of disruptions the pandemic caused in each of the aspects that have been highlighted here. Future research into social determinants of

health should be prepared to consider the policies created to manage public health crises and how those policies have affected the populations they are meant to protect. Measures such as the survey used as an example in this thesis can be used on larger scales to gain insights into how families have been affected by COVID-19. These patterns can then be used to inform support endeavors to help households recover from the current pandemic; the insights gathered can also help develop future policies that will avoid recreating the identified disruptions in subsequent global health events.

As was discussed, many families struggled to adapt to losses in income and employment since they did not have access to adequate liquid assets or reserve funds to take care of daily expenditures. Helping households establish a buffer capacity for pandemics and other crises would be beneficial in supporting families through economic hardships. Governments can consider offering tax incentives for households that choose to place part of their income or tax returns into emergency savings accounts.

Food security saw major difficulties in distribution as commercial avenues in the hospitality sector ceased operations, leaving farmers with a surplus of large-scale items. At the same time, school meal programs were suspended, and food pantries faced overwhelming demands making it hard to provide meals to communities that needed them. Programs meant to reallocate large scale commercial supplies to local food pantries, schools, and distribution centers can help create a bridge between the excess materials of the agricultural industries and disadvantaged populations struggling under the weight of food insecurity.

Healthcare experienced differing patterns in the distribution of services and resources as well as mounting misinformation influencing the attitudes of patients toward

seeking out care. To battle misinformation and the tendency for patients to align with those that share their ideologies, public health and medical organizations should adapt informational material for social media platforms with the goal of providing up-to-date and reliable data and encouragement. Partnering with local support organizations and leaders to foster trust and community engagement will go a long way in building better relationships between cautious patients and providers. Furthermore, distribution plans should focus on providing vaccines and other medical resources to disadvantaged populations that need them most. Programs such as COVAX led by the World Health Organization which sought to purchase vaccines and donate them to low-income populations are invaluable in ensuring timely and effective distributions of materials that can end the pandemic.

Overall, COVID-19 has had several long-term effects on socioeconomic status specifically by creating disturbances to financial stability, food security, and access to healthcare that will be present in the lives of disadvantaged individuals long after the pandemic fades away. Understanding these patterns and their relationships to socioeconomic status is imperative to helping individuals and families recover from the devastating effects of the pandemic. It is the hope of this thesis that research into these relationships will provide better informed policies that lead to a future of healing and support for those who have been most affected by this astounding and complex global health crisis.

## APPENDIX

## Effects of COVID-19 on McLennan County Survey

### Introduction

The purpose of this study is to collect information on how the COVID-19 pandemic has affected the residents of McLennan County in order to better understand how to help the community through this time. This survey is completely anonymous. You will not be asked to provide any sort of contact information or identifying characteristics such as your name, gender, age, address, etc. This survey will take about 2-5 minutes to complete. Fill in the circle next to your chosen answer. Thank you for your participation. If you have any questions about the research being completed, you are welcome to reach out to [wacocovid19pandemic@gmail.com](mailto:wacocovid19pandemic@gmail.com)

### Income and Employment

1. Which of the following best describes the nature of your employment?
  - Agriculture, Food, and Natural Resources
  - Architecture or Construction
  - Arts and Communications
  - Business Management and Administration
  - Education
  - Finance
  - Government and Public Administration
  - Health Science
  - Hospitality and Tourism (Restaurant, Hotel, etc.)
  - Information Technology
  - Law, Public Safety, Corrections, or Security
  - Manufacturing
  - Marketing, Sales, and Service
  - Personal Service (Housekeeping, Janitorial)
  - Science, Technology, Engineering, and Mathematics
  - Transportations or Distributions
  - Unemployed
  - Retired

2. What was the total annual Income of your household for 2019 as of January 2020?

- Less than \$15,000
- \$15,000- \$20,000
- \$20,000-\$30,000
- \$30,000-\$40,000
- \$40,000-\$60,000
- \$60,000-\$80,000
- \$80,000-\$100,000
- \$100,000-\$150,000
- \$150,000-\$200,000
- \$200,000 or more

3. What was the total monthly income of your household in January 2020?

- No monthly income
- Less than \$100
- \$100-\$500
- \$500-\$1000
- \$1000-\$1500
- \$1500-\$2000
- \$200-\$2500
- \$2500-\$3000
- \$3000-\$3500
- \$3500-\$4000
- \$4000-\$4500
- \$4500-\$5000
- \$5000+

4. What was the total annual Income of your household for 2020 as of January 2021?

- Less than \$15,000
- \$15,000- \$20,000
- \$20,000-\$30,000
- \$30,000-\$40,000
- \$40,000-\$60,000
- \$60,000-\$80,000
- \$80,000-\$100,000
- \$100,000-150,000
- \$150,000-\$200,000
- \$200,000 or more

5. What was the total monthly income of your household in March 2020?
- No monthly income
  - Less than \$100
  - \$100-\$500
  - \$500-\$1000
  - \$1000-\$1500
  - \$1500-\$2000
  - \$2000-\$2500
  - \$2500-\$3000
  - \$3000-\$3500
  - \$3500-\$4000
  - \$4000-\$4500
  - \$4500-\$5000
  - \$5000+
6. Have you or anyone in your household lost a job, been laid off, or quit a job between January 2020 and January 2021?
- Yes
  - No
7. What were the main reasons you or someone in your household lost their job?  
(Select all that apply)
- Not applicable, you did not experience a loss or reduction in employment.
  - You were not able to work due to being in quarantine and lost your job as a result.
  - You were caring for children who could not return to school or daycare.
  - You were concerned about being infected with COVID-19.
  - You were laid off due to cutbacks or a reduction in business caused by COVID-19.
  - Your employer temporarily closed due to COVID-19
  - Your employer permanently closed due to COVID-19.
  - The reduction or loss in employment was unrelated to COVID-19.
  - You were sick with COVID-19
  - You were caring for a family member who was sick with COVID-19.

## Food Security

1. In January 2020, where did your family acquire a majority of the food found in your household?
  - Convenience Stores or Gas Stations
  - Department Store (Walmart, Target, etc.)
  - Farmer's Market
  - Food Pantry or similar Charity
  - Grocery Store (HEB, etc.)
  - Local Meat Market
  - Member Grocery Store (Sam's Club)
  
2. In January 2021, where did your family acquire a majority of the food found in your household?
  - Convenience Stores or Gas Stations
  - Department Store (Walmart, Target, etc.)
  - Farmer's Market
  - Food Pantry or similar Charity
  - Grocery Store (HEB, etc.)
  - Local Meat Market
  - Member Grocery Store (Sam's Club)
  
3. Has there been a time during the year 2020 where you could not afford the amount or type of food your family would normally have?
  - Yes
  - No
  
4. In January 2020, did you utilize food stamps to provide food for yourself or your family? If so please indicate which programs you participated in.
  - Yes
    - Supplemental Nutrition Assistance Program (SNAP)
    - Nutrition Program for Women, Infants, and Children (WIC)
    - Free School Meals for Children
    - Free Food Programs for Seniors
    - Disaster Supplemental Nutrition Assistance Program (D-SNAP)
    - Electronic Benefit Transfer System (EBT) or Lone Star Card
  - No

5. In January 2021, did you utilize food stamps to provide food for yourself or your family? If so, please indicate which programs you participated in.
- Yes
    - Supplemental Nutrition Assistance Program (SNAP)
    - Nutrition Program for Women, Infants, and Children (WIC)
    - Free School Meals for Children
    - Free Food Programs for Seniors
    - Disaster Supplemental Nutrition Assistance Program (D-SNAP)
    - Electronic Benefit Transfer System (EBT) or Lone Star Card
  - No
6. In January 2020, what did your family spend on food during an average week (excluding food purchased with food stamps)?
- Less than \$50
  - \$50-\$100
  - \$100-\$150
  - \$150-\$200
  - \$200-\$250
  - \$250-\$300
  - \$300-\$350
  - More than \$350
7. In January 2021, what did your family spend on food during an average week (excluding food purchased with food stamps)?
- Less than \$50
  - \$50-\$100
  - \$100-\$150
  - \$160-\$200
  - \$200-\$250
  - \$250-\$300
  - \$300-\$350
  - More than \$350

### **Access to Care / Testing**

1. What type of health insurance are you currently covered by?
  - Insurance through an employer or union.
  - Insurance purchased from an insurance company.
  - Medicare
  - Medicaid
  - Military health care / TRICARE
  - Veterans Affairs
  - No health insurance
  
2. How many times have you been tested for COVID-19?
  - Never
  - Once
  - More than Once
  
3. Where were you tested for COVID-19?
  - McLennan Community College (McLennan County Department of Public Health)
  - Pharmacy (CVS, Walgreens, etc.)
  - Baylor University (student or staff testing)
  - Hospitals or Urgent Care (Premier, Baylor Scott & White etc.)
  - Waco Family Health (Previously known as Family Health Center)
  - Veterans Affairs Hospital
  - On site at your job
  - Other: \_\_\_\_\_

**Community Support**

1. In January 2020, were you receiving support, either financial or services, from any of the following organizations?

- Caritas of Waco
- Mission Waco
- The Salvation Army
- The Shepherd's Heart Food Pantry
- Faith Based Organization or Church
- Family Health Center
- Other: \_\_\_\_\_

2. In January 2021, were you receiving support, either financial or services, from any of the following organizations?

- Caritas of Waco
- Mission Waco
- The Salvation Army
- The Shepherd's Heart Food Pantry
- Faith Based Organization or Church
- Family Health Center
- Other: \_\_\_\_\_

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