

College of Saint Benedict and Saint John's University

DigitalCommons@CSB/SJU

---

CSBSJU Distinguished Thesis

Undergraduate Research

---

3-24-2022

## Rethinking Public Health Risk Mitigation Strategies: Recognizing the Biosocial Nature of COVID-19

Grace Savard

College of Saint Benedict/Saint John's University, GSAVARD001@CSBSJU.EDU

Follow this and additional works at: [https://digitalcommons.csbsju.edu/ur\\_thesis](https://digitalcommons.csbsju.edu/ur_thesis)



Part of the [Biology Commons](#), [Medicine and Health Commons](#), and the [Social and Cultural Anthropology Commons](#)

---

### Recommended Citation

Savard, Grace, "Rethinking Public Health Risk Mitigation Strategies: Recognizing the Biosocial Nature of COVID-19" (2022). *CSBSJU Distinguished Thesis*. 23.

[https://digitalcommons.csbsju.edu/ur\\_thesis/23](https://digitalcommons.csbsju.edu/ur_thesis/23)

This Thesis is brought to you for free and open access by DigitalCommons@CSB/SJU. It has been accepted for inclusion in CSBSJU Distinguished Thesis by an authorized administrator of DigitalCommons@CSB/SJU. For more information, please contact [digitalcommons@csbsju.edu](mailto:digitalcommons@csbsju.edu).

**Rethinking Public Health Risk Mitigation Strategies:  
Recognizing the Biosocial Nature of COVID-19**

Grace M. Savard  
College of Saint Benedict and Saint John's University  
Distinguished Thesis  
March 24, 2022

Approved By:

Ellen Block

*Thesis Advisor*  
*Professor of Sociology*

Manuel Campos

*Thesis Advisor*  
*Professor of Biology*

Jeffrey Anderson

*Faculty Reader*  
*Chair, Department of Peace Studies*

Ashley Fink

*Faculty Reader*  
*Professor of Biology*

Jennifer Schaefer

*Chair, Department of Biology*

Jeffrey Kamakahi

*Chair, Department of Sociology*

## Table of Contents

<b>Acknowledgements</b> .....	<b>5</b>
<b>Abstract</b> .....	<b>6</b>
<b>Introduction</b> .....	<b>7</b>
<b>Background</b> .....	<b>9</b>
Emergence of COVID-19.....	9
Limited Information about SARS-CoV-2 Begins to Surface .....	10
Stopping the Spread - Isolation, Contact Tracing, PPE, and Containment.....	14
Reorganization, Delayed & Deferred Care, and Death & Dying.....	15
The Double Pandemic.....	16
A Biosocial Approach.....	17
<b>Methods</b> .....	<b>18</b>
Recruitment .....	18
Interviews.....	19
Participant Observation .....	20
Analysis and Presentation of Data .....	20
<b>Emerging Themes</b> .....	<b>21</b>
<b>Reorganization of the Clinical Workspace</b> .....	<b>21</b>
Use of Personal Protective Equipment.....	21
Clustering of Care .....	23
Staffing Cuts.....	26
Communication Challenges with Families.....	27
Rethinking Workplace Organization.....	29
<b>Delayed and Deferred Care</b> .....	<b>30</b>
Patients Avoid Healthcare Settings.....	30
Cancelation of Elective Surgeries and Non-emergent Treatments.....	32
Financial Losses Across Healthcare Systems .....	34
Rethinking Delayed and Deferred Care .....	35
<b>Death and Dying</b> .....	<b>35</b>
COVID-19 Deaths are 'Bad Deaths'.....	36
Challenges of Restrictive Visitor Policies.....	37
Healthcare Providers as Family Substitutes .....	40
Processing Loss and Grief.....	41
Rethinking Policies and Practices around Death and Dying.....	42
<b>Conclusion</b> .....	<b>43</b>

<b>Discussing Risk with Multi-disciplinary Experts at the Table .....</b>	<b>44</b>
<b>Investing in Pandemic Preparedness .....</b>	<b>46</b>
<b>Improving Health Communication .....</b>	<b>48</b>
<b>Moving Forward .....</b>	<b>49</b>
<i><b>Afterword .....</b></i>	<i><b>50</b></i>
<i><b>References .....</b></i>	<i><b>51</b></i>

# Acknowledgements

First, I would like to thank Dr. Ellen Block, my primary thesis advisor, for believing in me for the entirety of this process and mentoring me throughout this research project. I would also like to thank my co-advisor Dr. Mani Campos and readers Dr. Ashley Fink and Dr. Jeffrey Anderson (aka Coach) for their guidance, insight, and support, particularly in relation to bridging the biological and social sciences. Furthermore, this research would not have been possible without support and funding from Undergraduate Research. Finally, I would like to thank my parents, brother, and sister for their never-ending love and encouragement.

# Abstract

The SARS-CoV-2 virus has rippled throughout every aspect of society and influenced how we live, breathe, and interact with one another. The purpose of this thesis is to explore the interdisciplinary biosocial impacts of the SARS-CoV-2 virus and the resulting disease, COVID-19. In order to understand the complexities of caregiving during COVID-19, we conducted 75 semi-structured interviews with 55 healthcare providers across 18 states over a span of two years. This research assesses how COVID-19 risk mitigation strategies were designed with the primary intention to stop the spread of the virus rather than account for the longer-term social and biological consequences. In particular, this thesis discusses three areas in healthcare: workplace reorganization, delayed and deferred care, and death & dying. In these areas, new protocols were implemented that prioritized reducing proximal biomedical risk (largely preventing spread and preparing for surges of COVID-19 patients) over accommodating for long-term biological and social consequences. To address public health crises more comprehensively, we must facilitate conversations across disciplines to create collaborative and innovative public health risk mitigation strategies. Additionally, we must incorporate pandemic preparedness into healthcare systems at all levels. Finally, we must improve our health communication skills to promote greater public understanding and support of risk mitigation strategies. By recognizing the complexities of risk and the interconnectedness of the biological and social consequences of infectious disease, we can better respond to the public health issues of today and tomorrow.

# Introduction

As a certified nursing assistant working in long-term care throughout the spring and summer of 2020, I witnessed firsthand how COVID-19 drastically impacted the way that humans provide care for one another. Though none of the residents I worked with got COVID-19 while I was there, I was constantly thinking about preventing infection and spread in the workplace as well as at home. With restrictions, regulations, and protocols shifting quickly, the weight and stress of the pandemic was felt by caregivers and patients alike. During this time, our response to COVID-19 highlighted how we as a society perceive and approach public health. We tend to respond to crises rather than prevent them, and we often fail to create comprehensive and multi-faceted risk mitigation strategies.

The purpose of this thesis is to explore the interdisciplinary biosocial impacts of the SARS-CoV-2 virus and the resulting disease, COVID-19. The COVID-19 pandemic has sparked widespread fear, imagination, and speculation about infectious disease in general. At the onset, we did not understand how the virus was spreading, and we used rapidly emerging information to determine our actions. We responded in a state of distress, and we did not stop to think about the long-term consequences of the pandemic and our risk mitigation protocols. Through this research process, it became quite clear that we need to invest in more comprehensive public health strategies that account for short and long-term consequences of infectious diseases and pandemics.

This research assesses how COVID-19 risk mitigation strategies were designed with the primary intention to stop the spread of the virus rather than account for the longer-term social and biological consequences. In particular, this thesis discusses three areas in healthcare: workplace reorganization, delayed and deferred care, and death & dying. In these areas, new



protocols were implemented that prioritized reducing proximal biomedical risk (largely preventing spread and preparing for surges of COVID-19 patients) over accommodating for long-term biological and social consequences. This essay will conclude with a discussion about different implications of considering short and long-term risks and provide recommendations for future public health crises that support healthcare providers, patients, and communities.

We evaluated the biosocial nature of infectious disease primarily through qualitative interviews with healthcare providers, and I supplemented this with a literature review, my work as a CNA, and observations in three Minnesota hospitals. Throughout the COVID-19 pandemic, healthcare providers primarily trained in the biological sciences have been uniquely positioned to bear witness to the wide and varied long-term biological and social impacts of infectious disease on their practice, with their patients, and in their communities. In order to understand the complexities of caregiving during COVID-19, we conducted 75 semi-structured interviews with 55 healthcare providers across 18 states over a span of two years. In order to generate reports and recommendations, we read through transcripts, identified emerging themes, and created a code book to sort and categorize data.

While this paper is applicable to several audiences, it is particularly aimed at biomedical practitioners. My hope is that those well-versed in the biological sciences will read this and understand why it is imperative to think both sociologically and biologically when responding to public health crises. It is fundamental that healthcare providers and the general public realize that while we often analyze biological and social factors separately, they are intimately linked. I argue that in order to understand the complexities of caregiving related to COVID-19, we need to recognize the biological and social consequences of infectious disease. Beyond recognition, we need to think about establishing clinical practices and risk mitigation strategies with these

biological and social factors in mind. Furthermore, we need to create strategies that account for a more comprehensive definition of risk: biological and social, proximal and distal. By identifying the relationship that exists between the biological and social factors and learning from our pandemic response to COVID-19, we can more comprehensively address the public health issues associated with COVID-19 and ensure future pandemic preparedness.

## Background

### Emergence of COVID-19

The world has shifted in a myriad of unprecedented ways since the discovery of the SARS-CoV-2 virus and the emergence of the corresponding disease, COVID-19. The first detection of SARS-CoV-2 was in December 2019 in Wuhan, China after a large number of pneumonia cases were found to be linked to a large seafood and animal market. In collaboration with the Centers for Disease Control and Prevention, Chinese health officials announced that the pneumonia outbreak resulted from a novel coronavirus (Xu et al., 2020). At first, it was proposed that this could be an isolated event and that COVID-19 patients in China had been eating infected animals or had gotten infected by directly visiting the market. However, it was soon determined that people were testing positive for COVID-19 who had not been to the market (Parry, 2020). Within a few months, the SARS-CoV-2 virus had spread worldwide, and human-to-human transmission became the focus of conversation. Rather than worrying about how SARS-CoV-2 originated, the scientific community and general public alike were fixated on learning about how the virus spread and how transmission could be stopped.

## Limited Information about SARS-CoV-2 Begins to Surface

A variety of information and findings from studies about SARS-CoV-2 structure, replication, and transmission were published rapidly throughout the beginning stages of the COVID-19 pandemic. The general public seemed to be more invested in public health terminology and concepts than ever before. This obsession with the science of risk spread outside of the scientific community in crazy and unprecedented ways. Everyone was trying to propose solutions and speculate. Public discourse and most news outlets were focused on the most current and updated information about COVID-19. Although it is common for scientific advice to shift as new studies emerge, the constant surfacing of new information led to high levels of uncertainty felt amongst healthcare providers and communities. At the onset of COVID-19 we were learning about the SARS-CoV-2 virus as fast as we possibly could and that meant that findings from earlier studies often differed from the results of later studies. Change is inevitable when we follow the scientific process; conclusions evolve as more data becomes available. However, because of the whirlwind of developing information and widespread fear and uncertainty, healthcare workers expressed a certain frustration and lack of confidence in the science. Dillon, an ER nurse working in Arizona and Illinois, spoke about her frustrations with the changing science and shifting guidance.

We base our profession off [of] science, and we believe the institutions of science, and [the] CDC, and all those organizations. But for them to be giving out unclear and mixed information and it changing in the beginning... Was this an airborne virus? Was it droplet [precautions]? [Do] you need protection? [Now] you don't need eye protection? And then not knowing what to tell your staff and the people looking at you to lead... it was just a lot of responsibility. You're steering the ship and then if you show that you're freaked out or

that you don't know what's going on or you don't know what to do or how to handle a situation, people are going to jump overboard.

Unsure of best practices and protocols, healthcare providers expressed feeling powerless and anxious. While this impacted the providers in action, it also created a sense of distrust and lack of confidence for patients when utilizing healthcare services. People were craving an unrealistic certainty from science in a time filled with unknowns. The fluctuating scientific recommendations - even though change is normal and welcomed in science - made people stressed, frustrated, and upset.

Much of the initial research on SARS-CoV-2 focused on viral structure and mechanisms of spreading. Scientists across the world raced to study and identify the structure of the virus and how it replicates. By April 2020, using genetic data from other coronaviruses and bioinformatics, researchers had discovered that the single-stranded positive-sense RNA genome (+ssRNA) of SARS-CoV-2 was composed of 29,903 nucleotides that codes for several structural and accessory proteins. Perhaps most notably, the RNA sequence codes for a spike glycoprotein, envelope protein, membrane protein, and nucleocapsid protein (Elrashdy, 2020). At this time, these structural findings helped us understand how the SARS-CoV-2 virus was infecting humans and entering cells. This information was later used to develop COVID-19 vaccines.

In early 2020, a few weeks after the first COVID-19 infections were reported, studies suggested that SARS-CoV-2 enters the lung alveolar type II (AT2) pneumocytes by way of the angiotensin-converting enzyme 2 (ACE2) receptor. The two-subunit spike glycoproteins on the surface of the SARS-CoV-2 virions facilitate this process. Subunit 1 attaches to ACE2 in the receptor-binding domain and subunit 2 subsequently facilitates fusion of the virion with the cell membrane (Elrashdy, 2020). The virion then releases its contents. Initially, part of the +ssRNA

genome is translated using host ribosomes in the cytoplasm to make the enzyme RNA dependent RNA polymerase. This process is required to replicate the genome and complete gene transcription and is critical to the remaining steps in the SARS-CoV-2 life cycle. RNA polymerase first copies +ssRNA to make -ssRNA. RNA polymerase then transcribes -ssRNA to make +ssmRNA. At the same time, RNA polymerase facilitates replication of the +ssRNA genome into several copies of +ssRNA genome required for the assembly of progeny virions. Following transcription, the +ssmRNA is translated - synthesizing the required viral proteins. New virions are packaged with +ssRNA and surrounded by the cellular membrane. Finally, virions exit the host cell by budding (A. Fink, personal communication, October, 2020). Discovering how the virus enters cells and replicates allowed us to think about what measures could be put in place to stop the spread and what viral mechanisms we could target with potential vaccines.

In late March 2020, findings from an early study looking at shell analysis indicated a high level of intrinsic disorder in the nucleocapsid and membrane proteins of SARS-CoV-2, therefore suggesting that this virus is resilient and able to survive inside and outside of the body. Furthermore, in comparison of all CoVs, this finding indicated that SARS-Co-V-2 could be categorized as having intermediate respiratory and fecal-oral transmission potentials (Goh et al., 2020). At this point, as more studies have come to light, it is clear that SARS-Co-V-2 is transmitted primarily through respiratory processes and fecal-oral transmission is significantly less prevalent. According to the Center for Disease Control (2022) and World Health Organization (2020), while SARS-Co-V-2 was identified in the feces of some COVID-19 patients, no confirmed reports have surfaced of individuals becoming infected from feces of COVID-19 patients and the risk of fecal-oral transmission has been deemed low. However,

wastewater analysis of viral RNA in feces has become an important tool to assess spread of infection (Randazzo et al., 2020).

Most now agree that SARS-CoV-2 can spread directly via droplets and human-to-human transmission and indirectly via contaminated objects and airborne processes. Transmission of SARS-CoV-2 occurs most commonly when an infected individual coughs, sneezes, talks or sings therefore releasing respiratory droplets. These droplets tend to travel up to six feet and remain airborne for a short amount of time (Lotfi et al., 2020). However, SARS-CoV-2 virion can survive in contagious droplets and be suspended in the air for 3 hours (Van Doremalen et al., 2020). Though much less likely, an individual can also become infected with COVID-19 if they touch a contaminated surface and then touch their eyes, nose, or mouth (Lotfi et al., 2020).

Complexities around transmission increased when it was discovered that asymptomatic infected individuals could spread COVID-19. At first, the rate and likelihood of asymptomatic spread was highly controversial. According to a widely broadcasted press conference from the World Health Organization (WHO) on June 9, 2020, secondary spread from asymptomatic individuals was “rare.” Top WHO officials geared attention towards symptomatic transmission and expressed that many unknowns remained (Joseph, 2020). Many top researchers were frustrated with these comments including those at Harvard’s Global Health Institute - they pointed to credible studies showing that symptomless people can and do transmit SARS-CoV-2 (John, 2020; Wei et al., 2020) and contribute to the spread of COVID-19. These types of discoveries and debates are typical of the scientific process. However, these disagreements were published widely and made visible to the general public, a group often less familiar with the nuances of back-and-forth scientific discussions. This left people feeling like scientific establishments were incompetent and rogue. Ultimately, as more data was published, top health

officials across the world agreed that people not experiencing symptoms can spread the virus, and health organizations expressed the increasingly important need to implement preventative measures to hinder transmission.

## Stopping the Spread - Isolation, Contact Tracing, PPE, and Containment

Public health workers, healthcare providers, researchers, and government officials quickly created plans with one primary intention: to stop (or at least slow) the spread of COVID-19. At a media briefing on March 11, 2020, the WHO director-general, Dr. Tedros Adhanom Ghebreyesus, officially declared COVID-19 a pandemic. Dr. Tedros emphasized that this was a pandemic that could be controlled through preventative and protective measures. The focus of his speech was to highlight four key steps to minimize the impact of COVID-19: 1) prepare 2) detect, protect and treat 3) reduce transmission and 4) innovate and learn. While the speech heavily emphasized the need to limit spread of the virus, Dr. Tedros shared a mere few sentences about the larger societal impacts of the pandemic. He stated, “WHO’s mandate is public health. But we’re working with many partners across all sectors to mitigate the social and economic consequences of this pandemic.” This speech, one of the first major responses to the onset of COVID-19, points to a perceived divide between public health measures and social or economic implications. Furthermore, this speech represents a common prioritization: a triaging of public health over these other disciplines with very little acknowledgement that a) social and economic consequences could be very severe and b) the social and economic consequences could have drastic consequences for public health.

The tendency to create and encourage public health measures that chiefly respond to proximal biomedical risk has continued throughout the past two years. As noted by Kim et al.

(2020), “the rapid development of the COVID-19 pandemic has proven that biosafety policies are a critical part of human society.” The biosafety risk mitigation policies for clinical spaces described by Kim et al. include, but are not limited to, enforcing strict isolation and quarantine requirements, creating PPE guidelines, and minimizing human-to-human interaction whenever possible. These policies were created “to protect susceptible populations by eliminating the transmission risks and avoiding super spread events” (Kim et al., 2020). Little to no consideration seems to be given to the reverberating effects on public health and longer-term societal consequences that come from creating measures exclusively focused on reducing or eradicating transmission.

## Reorganization, Delayed & Deferred Care, and Death & Dying

In healthcare facilities, many restrictions and regulations were put in place due to high numbers of COVID-19 patients filling beds and with the intention of reducing intra-facility transmission. Perhaps most notably was the reorganization of healthcare facilities to cluster care, allow improvisation, and limit spread (Quan, 2020). With the major surge in COVID-19 patients, facilities were forced to adapt quickly and efficiently with limited information. For example, administrators reported closing floors to create COVID-19 units, nurses noted limiting visits in patient rooms to reduce contact, and fewer staff were allowed in rooms to perform certain tasks. Additionally, many patients were unable to receive care for non-emergent illnesses or injuries in a timely manner. While these procedures and treatments are often labeled as “elective,” delaying these procedures can drastically alter the quality of one's life and health and shorten one's lifespan (Byrnes et al., 2021). A study from Harvard in September 2020 found that about 1 in 7 households reported that at least one person in their household was unable to undergo an elective procedure during the pandemic. Furthermore, of the households impacted by delayed care, 54%



of these households reported negative health impacts (NPR, 2020). As health care systems worked through shutdowns and delayed care, healthcare workers and administrators needed to direct their attention towards infection control and planning for surges rather than investing time and energy into non-emergent care, insurance expansion and cost containment (Findling et al., 2020). Finally, rituals and processes surrounding death and dying have shifted rapidly with the onset of the COVID-19 pandemic (Carr et al., 2020). With stringent visitor policies in place worldwide, COVID-19 has made death surrounded by friends and family impossible for many (Wakam et al., 2020). Though these restrictions are in place to slow transmission and protect healthcare providers, for families unable to be physically present with their dying loved ones, the lack of closure has drastically altered grieving and bereavement processes (Carr et al., 2020).

## The Double Pandemic

As argued by psychology and neuroscience professor Julianne Holt-Lunstad (2020), public health strategies were designed to reduce transmission without significant regard for the social consequences of these practices. As Holt-Lunstad notes, “The struggle to balance literal survival with all the things that make surviving worthwhile has never been so clear, with the COVID-19 pandemic forcing many to sacrifice social connections – and therefore quality of life – for life itself.” Moreover, “given that social connection has a strong link to survival, evidence points to the possibility that (via biological mechanisms) we are wired to desire and to be rewarded by connection and, conversely, to feel discomfort when we lack these connections.” Holt-Lunstad deems this concept “the double pandemic” - we are simultaneously facing a global outbreak of infectious disease and experiencing widespread psychological suffering and social disconnect. I assert that the double pandemic model can be used to understand and analyze the biological and social, short and long-term, consequences of risk and risk management related to

the pandemic more comprehensively. We cannot put measures in place that exclusively prioritize short-term biological risk (primarily the risk of transmission and spread) over the longer-term biological and social consequences (ex. impacts of restrictive visitor policies, increase in illness and loss in quality of life due to delayed care, etc.) Establishing a balance between protection and connection is challenging, but feasible.

## A Biosocial Approach

Clearly, we must implement pandemic control measures that consider both the biomedical proximal risk (spread of COVID-19) and the longer-term social and biological consequences to accommodate for this “double pandemic.” Researchers have proposed biosocial approaches in response to past pandemics, and a similar approach could be adopted to combat COVID-19 and future pandemics.

As noted by Kleinman et al. (2008) in an article about avian and pandemic influenza, a biosocial approach integrates biological and social frameworks to create comprehensive preparational and response strategies to pandemics. Biosocial thinking does not simply mean sharing information across disciplines - instead, this process encourages society to acknowledge the interwoven biological and social factors that influence manifestations of disease. Essentially, a biosocial approach calls for interdisciplinary collaboration of specialists working in the biological sciences and the social sciences. While a microbiologist may be credited with first discovering a novel virus, a historian may analyze narratives from past endemics and pandemics. While an epidemiologist measures spreading of the virus, an anthropologist may collect ethnographic samples to evaluate how the virus affects health, healing, and suffering (Kleinman et al., 2008). Rather than working separately, biosocial practices require robust and joint

participation across all these professions to realize thorough, all-inclusive public health measures and solutions.

## Methods

This thesis draws primarily on qualitative data from the project, “COVID-19: Clinical and personal perspectives from healthcare providers in the United States.” I served as a research assistant under medical anthropologist and principal investigator Dr. Ellen Block. I worked alongside Dr. Block and fellow research assistants Mackenzie Carlson, D’Havian Scott, and Mayte Rodriguez-Ortiz. As a research team, we conducted, transcribed, and coded 75 virtual interviews with 55 healthcare providers across the United States to investigate the personal and professional impacts of COVID-19 on caregiving. Additionally, we analyzed ethnographic data, identified emerging trends, and created an infographic for public dissemination with the research team.

We conducted two different rounds of interviews throughout this study. The first round of interviews took place between April and August 2020. The second round of interviews took place between June and August of 2021. The interview guide and questions were tailored to each round based on preliminary conversations with healthcare providers. These conversations allowed us to structure the questions around themes that were most pertinent to the respective stages in the pandemic.

## Recruitment

Recruitment for the study began in April 2020. In order to narrow our scope, we focused on reaching out to those who were either working directly with COVID-19 patients or those who had uniquely witnessed shifts in patient care with the pandemic. Participants were doctors,

physician assistants, nurse practitioners, nurses, healthcare administrators and a few CNAs working in COVID-19 units. We first contacted interviewees by email and conducted interviews via Zoom or by phone depending on interviewee preferences. We utilized purposive sampling and snowball recruitment strategies (Palinkas et al., 2015) and contacted Alumni Affairs at the College of Saint Benedict and St. John's University to expand our interview pool.

## Interviews

We conducted semi-structured qualitative interviews, and used interview guides with open-ended questions, asking follow-up questions if needed. Because we wanted to ensure that we were inquiring about topics and themes that were relevant, interview guides were designed with insight and advice from current healthcare providers. In order to establish a conversational tone, we opened interviews with general prompts for healthcare providers to share about themselves, their jobs, and their work. Next, we moved into questions about the influences of COVID-19 on family dynamics and relationships. Often, we inquired about feelings of risk, risk assessment, and risk mitigation strategies. Then we transitioned into questions about shifts in patient care and work environments. Typically, we closed interviews with questions about the future of healthcare and long-term impacts of the pandemic. In 2021, when conducting second interviews with healthcare providers, we tended to ask less about family and more about work and patient care. During the second round of interviews, healthcare providers shared extensively about the impact of vaccines and their exacerbating frustrations when caring for unvaccinated patients.

## Participant Observation

In addition to collecting data from interviews, I had the opportunity to learn about the impacts of COVID-19 on caregivers and patients through participant observation. In my work as a CNA from March to June of 2020, I experienced how COVID-19 affected the lives of providers, patients, and families professionally and personally. I had the opportunity to enter the retirement center and interact with patients who were isolated from their families and learn about adapting quickly and appropriately in the midst of rapidly shifting protocols. Furthermore, I had the opportunity to shadow three healthcare providers (1 doctor and 2 PAs) working in 3 different Minnesotan hospitals during August 2021. I observed them moving throughout the hospital caring for patients, asked about changes in the organization of the hospital, and witnessed firsthand many of the challenges that providers had shared about in interviews.

## Analysis and Presentation of Data

For data analysis, we utilized Otter.ai to generate transcripts from interviews. Interview transcripts were then manually checked by listening to the audio and reading along with the transcript. Next, we drafted a code book as a group after talking through emerging themes from interviews. Code books were edited throughout the research as subthemes and additional themes emerged. Finally, we utilized MAXQDA to code interviews using group coding strategies to check for interrater reliability.

This research was presented virtually at the The Annual Meeting for Society for Applied Anthropology in March 2021 in a presentation titled “Complexities of caregiving: Healthcare providers’ perspectives on workplace environment, home life, and isolation during COVID-19.” This research was highlighted again in a presentation titled “Promoting ‘good deaths’ in a pandemic: Is it possible?” at the The Annual Meeting for Society for Applied Anthropology in

March 2022 in Salt Lake City, Utah and virtually at the National Conference for Undergraduate Research in April 2022.

## Emerging Themes

Many of our interviews with healthcare providers highlighted the consequences of implementing short-term risk mitigation strategies. The biological sciences and disease pathology of COVID-19 took primacy in decision-making because of risk mitigation. Because the focus was mainly about preventing the spread of COVID-19, healthcare systems and the general public lost sight of the larger consequences of these actions. Providers were forced to shift how they provided care to ensure low risks of transmission whenever possible. A majority of healthcare providers spoke about changing protocols and regulations in the context of three general areas: reorganization of the workspace, delayed and deferred care, and death and dying.

### Reorganization of the Clinical Workspace

Several elements of the clinical workspace were reorganized to prevent and reduce transmission of the SARS-CoV-2 virus. Nearly all healthcare providers mentioned lack of communication and changing protocols as significant stressors during the first stages of the pandemic. Shifting protocols and workplace structures were related to personal protective equipment, clustering of care, staffing cuts, and communication challenges between providers, patients, and families.

### *Use of Personal Protective Equipment*

Undoubtedly, one of the most prominent changes put into effect throughout the pandemic has been the use of personal protective equipment (PPE) to protect healthcare providers from

becoming infected and to protect patients from being infected by providers or other patients. However, several healthcare workers expressed that PPE was very physically uncomfortable and created an ever-present sense of tension and infection in the workplace. Additionally, PPE created significant barriers to care. While healthcare providers wear ample PPE to limit exposure to the virus, the loss of physical touch and inability to see facial expressions can make COVID-19 patients feel lonely, secluded, and abandoned. With masks, goggles, and shields, healthcare providers were unable to communicate and convey trust to patients through facial expressions. Although several healthcare workers taped pictures of themselves to their shields or jackets and tried to establish friendly and hospitable rapport with patients in other ways, the PPE surely impacted communication between providers and patients.

Kate, an ICU nurse in Wisconsin, spoke about how she left a research position to be able to care more intimately for people as a bedside nurse before the pandemic. With restrictions in place and widespread PPE use, COVID-19 made compassionate caregiving more challenging:

I'm covered in a face mask. I have a gown [from] head to toe. I have to wear gloves at all times. You can't even touch them which doesn't give you the same healing presence. You look like an alien coming in to clean up some sort of chemical spill or something when you're actually just caring for another human being. The lack of ability for them to be with their families during probably the hardest fight of their life is one thing, and then to not have physical connection, even with the people who are there because they can't give you that connection, it's got to be incredibly challenging.

Kate went on to add that masks and respirators make it harder to speak in a reassuring way:

I feel like the comfort you could provide somebody, especially with the anxiety of being ventilated and the fear that normally coincides with that, is helped a lot by a calming

presence, like a soft voice, a soft touch, things like that. Speaking through a P100, you basically have to scream for people to hear you.

Rather than deescalating tense situations with a gentle tone, she had to talk forcefully in order to be heard and understood through her respirator. Although PPE was essential to stop the spread of the virus, it had consequences for making effective connections with patients. Additionally, while PPE clearly reduced transmission, specific information about the use of PPE emerged and changed rapidly. For example, healthcare providers expressed that one day they were told to wear N95s and the next they were not. At one point, masks were single-use and suddenly healthcare workers were told that masks could be reused for multiple shifts. Because of the constantly shifting protocols, many healthcare providers felt unsure and lacked complete confidence in PPE.

### *Clustering of Care*

Several healthcare providers spoke about the need to cluster care; clustering care refers to when providers concentrate their cares in fewer visits. Care was clustered to increase efficiency, preserve PPE, and reduce human-to-human contact. Molly, a nurse from Wisconsin, described the need to limit visits because of the extra time it took to don PPE:

Because of the hassle of putting on and taking off all the PPE, I'm focusing a lot harder on clustering my care. So if I've got meds due at nine and ten I'm going in at 9:30 and I've got all my stuff for my bath, I've got all my meds, I've got my blood sugar machine, I've got it all. Because I don't want to leave that room and have to come back. You get my love and attention in a big block but then there's going to be a period of time where I'm going to neglect you.



When providers made fewer visits to rooms, this contributed to greater isolation felt amongst patients. A few healthcare providers, nurses in particular, talked about telling patients that they should only call for help if it was an urgent situation. Although providers wanted to provide quality care for patients as much as possible, donning and doffing requirements and staffing changes significantly impacted the amount of time that providers could spend with patients. Dillon, an ER nurse working in Arizona and Illinois, shared about the experience of reducing time with patients, saying “We’re coming in full head-to-toe PPE with respirators, we’re limiting our interaction in the room, like we’ve literally had to tell them, do not press your call light, unless you are dying because we cannot come in here too often.”

Several of the providers commented on the disconnect, isolation, and dehumanization that occurred as a result of this clustering of care. “From the patient interaction standpoint, it was feeling almost like [patients] were untouchable,” shared Dillon. The fear of being infected was tangible and felt constantly amongst healthcare providers. Particularly in the beginning phases of the pandemic, healthcare workers were uneasy and scared around COVID-19 positive patients, fearing that they themselves would be infected or that they would infect a vulnerable loved one. Chris, an anesthesiologist living in Wisconsin, spoke about his perception of what it might feel like to be a COVID-19 patient isolated within a healthcare facility:

From our perspective, it has to be a very scary and lonely place. You know, if they’re COVID positive, I mean, everyone in the room is, you know, donned in PPE. You can barely breathe on your own now and people are limited in those rooms. So if we were going in to intubate, I mean, those people are very much alone. They’re at their moment of greatest need, and absolutely no one wants to be near them.

Chris went on to say, “So yeah, there wasn't a lot of talking to those patients at all. I mean, it was, you kind of put them where they need to be, interact with them as little as possible. Just trying to limit exposure.” Clearly, the primary goal of most providers was to finish the tasks of care and get out. Although most patients still received a high quality of care, healthcare workers were often unable to spend extra time personalizing care and making patients as comfortable as possible due to infection protocols. The main focus was on providing the necessary care. When talking to these healthcare workers, it seemed as though everyone was constantly conscious of the time spent in each interaction. No one wanted to spend more time than was needed with COVID-19 patients.

Finally, a few healthcare workers noted that the clustering of care and fewer patient-provider interactions resulted in less supervision of patients. This, in addition to the extra time it took to put on and take off PPE, made it more challenging to care for patients who were confused, forgetful, or at risk of falling. Because healthcare workers were not able to check on patients as frequently, healthcare workers often expressed that they had to ‘hope for the best’ that no one became injured or fell while not being supervised. Joe, an RN working on a COVID-19 rule-out floor, where patients go until their COVID status has been determined, spoke about the inner conflict he experienced when he wanted to go in and help a patient but needed to don PPE before entering.

We can't go in to catch them from falling, or anything like that until we get all of our stuff on so it creates these issues... And the nurse in me, as well as a lot of the people I work with is like, ‘No, we gotta go catch this person so they don't fall and crack their head open and not wear our stuff.’ And that's one of the harder things for us to grasp... you need to just let that person fall until you are safe.

Over time, healthcare providers learned to prioritize PPE first so as not to jeopardize their own health and wellbeing, even if that meant taking more time to get to patients in need. Although clustering of care was encouraged to preserve PPE and protect patients and healthcare providers, many of the effects of this concentrated care were physically and psychologically harmful. For example, because providers visited patients less frequently, some patients experienced increased isolation and loneliness. Furthermore, because patient interactions were spaced out, it was more challenging for healthcare providers to notice subtle changes in the cognitive or physical status of patients.

### *Staffing Cuts*

The challenges that accompanied clustered care were further exacerbated by changes to the number of staff and caregivers allowed for certain procedures and cares. Across the board, the number of healthcare workers allowed in patient rooms at a time was decreased. Again, the intention of this policy change was to limit human-to-human interaction. While this makes sense when considering short-term risk of transmission, several healthcare providers expressed that staffing cuts pushed them to their already-exceeded limits. Dillon, an ER nurse working in Arizona and Illinois, talked through the process of a resuscitation in the context of the pandemic with fewer staff:

Originally when we would have a resuscitative effort, it would be all hands on deck.

There'd be like seven people in the room. Now, with COVID you can only have a doctor and two nurses, and then outside the room you have your team leader who's supposed to be recording everything that you're doing. And you have a medication RN who's handing you resuscitation meds through the door slot. So it's two nurses basically trading off doing CPR. I think one of the codes was an hour.

Dillon, like many nurses, acutely felt the staffing shortages in other areas of her work as well. She said that routine screening and intake also became more arduous, as nurses ended up spending hours individually completing tasks that were usually accomplished by teams of people.

Taking care of these patients you are doing the job of five different people. You bring them back. You're the one who's registering them and putting in all their information. Then you are doing the triage nurses job. Why are you here? What are your symptoms? You're doing all the vitals. You're doing your EKG - which normally the tech would help you out with. You're doing all the blood work. So you're staying in these rooms sometimes for like an hour to two hours depending on how sick they are because you're trying to minimize the number [of people.]

Nurses needed to improvise in order to carry out the list of tasks that typically was divided amongst a team. Nurses moved quickly and efficiently. While several factors contributed to feelings of being overwhelmed, stressed, and exhausted, several nurses commented on feeling more burnt out and drained after shifts than ever before. While at first nurses were worried about being furloughed or laid off, nursing shortages quickly became acute. The working conditions for nurses who stayed behind became even more exhausting and untenable.

### *Communication Challenges with Families*

Reorganization of healthcare facilities created a plethora of communication challenges with families. The closure of waiting rooms and implementation of strict visitor policies added a layer of complexity to providing families with updates. Due to the risk of transmission and spread, families were no longer able to wait for their loved ones within the hospital. Instead, many dropped off their sick family members at the door and waited anxiously to hear updates via

the phone from healthcare workers about their loved ones' status. Leo, a third-year resident in Denver, talked about how the closing of waiting rooms impacted communication with family members.

I had one family who came in with their dad. He was very sick. The daughter was with him who was in her 20s or something like that. And I had to have her go wait in the parking lot to tell her how the intubation went, because we had no room where she could physically go and wait. We weren't allowing anybody in the emergency department. And so I essentially had to very quickly tell this young woman, 'I'm so sorry. I have to have you leave the entire hospital and go stand by your car in the parking lot. I will try to come find you out there in a few minutes and let you know how he's doing and make sure you know how the intubation went.' [The procedure went smoothly.] And so [after the procedure], I went out into the parking lot and shouted around to try to find her. She was out there with her mom, and I had to tell them 'I'm really sorry but I can't even have you back in the hospital. I can't have you go to the ICU. I can't have you see him at all. We will just continue to call you for updates.'

While the closure of waiting rooms was enforced to slow the spread of infection within healthcare facilities, it is clear that this caused challenges for providers, families, and patients. Families felt unaware and removed from care decisions, and providers had to work harder to locate family members to provide updates in-person or via the phone.

Additionally, due to the pressures of COVID-19 surges and turbulent work environments, healthcare providers had less time available to call and speak to family members. Quinn, an ER doctor originally from Rhode Island who went to work in New York during the surge, talked about the 'warzone-like' atmosphere in clinical spaces. Healthcare providers were stretched

beyond measure trying to provide necessary care while updating families - this resulted in a chaotic and crazy environment. Unfortunately, in a cruel and striking similarity to war, those who were dying in hospitals of COVID-19 and other illnesses were often alone. Quinn shared:

We were trying to call families, but it was hard to do. I think there just weren't enough people. There wasn't enough manpower to manage the patients and do that...It felt like when there's a mass casualty event...the triage is different.

Despite healthcare providers best efforts, there just were not enough people to get every task done while giving patients and families the attention they deserved. Due to the changing guest protocols in healthcare facilities and disordered work environments, the system of communicating about care with families was completely upended.

### *Rethinking Workplace Organization*

Rethinking workplace organization requires us to learn from our experiences and implement strategies based on this knowledge. In the future, we need to guarantee that we have adequate PPE to use in times of crisis and to accommodate for sudden outbreaks. However, simultaneously, we need to ensure that we are not storing excessive amounts of PPE just to expire on the shelves. Instead of each state, hospital system, or healthcare facility scrambling to gather PPE to meet their own needs, there needs to be a centralized PPE distribution body for quick mobilization. Additionally, healthcare administrators need to be intentional and thoughtful about communicating shifting policies and procedures regarding PPE and best practices and provide clarification when needed. When considering clustering care, we must think about providing care in efficient ways while also keeping patients and providers safe. Although staffing cuts were enforced due to financial losses in healthcare systems, decreasing the number of caregivers present caused those who continued to work to carry more stress and responsibilities.

We need to work to maintain safe caregiver-patient ratios at all times, even in times of crisis. Finally, we cannot understate the importance of keeping families updated with care decisions and the status of their loved ones. Although waiting rooms were closed and strict visitor policies enforced, healthcare systems need to ensure that healthcare teams have the staffing capacity and time to communicate with families.

## Delayed and Deferred Care

We will continue to learn for years to come about the long-term impacts of delayed and deferred care that occurred with the onset of COVID-19. For many, hospitals became places characterized by fear and uncertainty; people avoided going to hospitals at all costs for fear of becoming infected. This led many people to come in for treatment when their symptoms had exacerbated to the point of being unbearable. Additionally, several healthcare facilities canceled and delayed elective surgeries, routine screenings and preventive care, and non-emergent treatments. Finally, quite a few health care providers noted that non-COVID-19 patients would experience long waiting times when coming into urgent care or the emergency room due to surges of COVID-19 patients that were filling beds and utilizing resources and staff.

### *Patients Avoid Healthcare Settings*

Several physicians and nurses who worked in the emergency room talked about the sudden drop in patient volumes with the emergence of COVID-19. Melissa, a hospitalist in Massachusetts, talked about the fluctuating patient populations and the changes in who was - and was not - coming in for care:

I mean, the ER was dead...there was like one patient in the ER, which normally is a bustling place. But then, as you got further into it, that picked back up. And then people

came in, they had all these delayed problems, they were much sicker. And [they] were having major heart attacks or had had a heart attack last week and now...you know...sick people were much sicker.

Melissa was not the only one who expressed this sentiment - several providers were alarmed and wondered where all the people experiencing strokes and heart attacks had so suddenly gone.

Melissa highlighted that the drop in patient volumes was not because people were not experiencing illness or injuries. Rather, people were still experiencing these health emergencies and in need of care, but they were hesitant to seek out care until the absolute last possible moment.

The initial pandemic response of many cities was to lock down and encourage people to stay home. Evelyn, a second-year resident in Denver, talked about how societal shutdowns contributed to a shift in the types of health complaints she observed:

It's all medicine now because there isn't any trauma. There's no bar fights, there's no car accidents the way there used to be, no motorcycle accidents, and so you're just seeing all the complicated medical patients that maybe have been delaying coming in five or six days because they were afraid to come in until they couldn't. And now they have this horrible exacerbation of whatever their chronic illness is.

Because the majority of people were not going out, it seemed to healthcare providers that reckless accidents were few and far between. However, most healthcare providers noticed an upward trend in worsening of chronic illnesses and injuries because people had waited more than they usually would to get medical attention.



Many individuals also delayed their routine screenings and check-ups. William, a geriatric nurse practitioner, highlighted the consequences of delaying these visits and stressed that many of these effects will not surface for some time:

You're not coming in because you're scared of COVID. You're not checking your lipids or your kidney function or [getting] your basic physicals...So now we delayed identifying colon cancer or breast cancer or, you know, some of those screenings. They went another year with high blood pressure, now it's affecting their kidneys, other things like that.

While it is understandable that people were avoiding clinical settings out of fear of infection, delaying preventative care has significant costs. Catching things earlier on typically leads to a better prognosis and less intensive treatment or procedural plan. The consequences of delaying care will continue to surface for years to come. Eventually, studies about COVID-19 and lost disability-adjusted life years (DALYs) due to delayed and deferred care will teach us more about the reverberating effects of delayed preventative, diagnostic, and procedural care.

### *Cancelation of Elective Surgeries and Non-emergent Treatments*

Alternatively, while some patients were too scared to come in to receive care, many patients were forced to delay care after healthcare systems canceled their elective procedures. While cosmetic procedures like removing warts or moles are considered 'elective,' more serious procedures like hip replacements, hernia surgery, mastectomies, and removing kidney stones also fall under this category. Sometimes, elective surgeries are thought of as less important or less necessary because they are non-emergent. However, delaying elective surgeries oftentimes greatly reduces one's mobility or quality of life, sometimes even resulting in shortened lifespans.

Owen, a Navy OR nurse working out of New York, spoke about the prioritization of procedures that caused a large majority of surgical delays:

I know that with surgical patients, a lot of them have had their care delayed. Maybe they had a surgery that they needed and it was very important to them, but from a medical surgical standpoint, it wasn't really pressing and maybe it could wait a little while.

Patients were often left with little to no explanation as to why their particular surgery, procedure, or treatment was canceled. Unfortunately, procedures and treatments that were deemed to be 'solely preventative' or 'not emergent' were a lower priority and often canceled, despite the fact that these services likely significantly impacted the patients' quality of life.

It's important to acknowledge that there were a variety of reasons why these procedures and treatments were delayed. According to healthcare providers, some systems canceled scheduled surgeries because the necessary healthcare workers were furloughed. Additionally, some systems made cancellations in order to have bed space available to prepare for anticipated surges in COVID-19 patients. Several providers felt they needed to cancel treatments for vulnerable patients in order to keep them away from potentially becoming infected. Kristen, an oncology nurse from Massachusetts, talked about the experience of working with cancer patients who were undergoing chemotherapy during a COVID-19 outbreak in her community:

I can tell that a lot of treatment plans were adjusted by the outpatient doctors to try to keep those people out of the hospital as much as possible and just either defer their treatments - which is not a great prognostically to do that (you can casually for a couple of weeks) - or try to do it as an outpatient. There were, unfortunately, some people getting active chemo on the COVID floors or on the floors with COVID positive patients.

Triaging services became incredibly complicated. While on one hand patients needed to receive chemotherapy, bringing them in for chemotherapy could expose these vulnerable patients to the virus. Undoubtedly, this time of delayed and deferred care was fraught with difficult decisions and stressful situations that could have severe consequences. Data emerging about the impacts of delayed and deferred care will help us understand which procedures and treatments can wait and which will significantly impact one's health and quality of life.

### *Financial Losses Across Healthcare Systems*

Another consequence of delaying and deferring care was that healthcare systems incurred significant financial losses. In particular, hospital systems receive payments based on the number of surgeries and procedures that are performed. With the significant drops in patient volumes, healthcare facilities were struggling to stay afloat. Robert, chief health information officer at an urban nonprofit hospital in MN, spoke about the financial challenges many healthcare systems were facing:

How are we going to keep the lights on, you know? Health care, and particularly nonprofit health systems like ours... our margins are very, very small. Normal businesses obviously want as big of a margin as possible, but it's probably 10-20%. We run on like a 2-3% margin. So any change in volumes, and you change, say the number of surgeries we are performing, has dramatic consequences...in April, we lost something like 100 million dollars. And that's just not sustainable for an organization.

Clearly, the delayed care was not just frustrating for patients and their families, but for providers and administrators as well. Several healthcare systems had to furlough or lay off providers in order to accommodate for the massive financial losses. Interestingly, now over two years into the

pandemic, many healthcare systems are facing nursing shortages largely due to burnout and stress.

### *Rethinking Delayed and Deferred Care*

It is imperative that we study the forthcoming impacts of delayed and deferred care. The consequences of delaying healthcare services are not to be taken lightly and can significantly impact lifespan and quality of life of patients. While it is understandable that patients were avoiding healthcare settings for fear of being infected, we must promote the importance of seeking medical assistance and explain that waiting to receive care can significantly influence one's prognosis. We need to assure patients that although risk of infection is present, healthcare systems are doing everything possible to keep patients safe. It is essential that healthcare systems analyze and consider the costs of canceling elective surgeries and non-emergent treatments. Furthermore, healthcare systems need to more comprehensively calculate the risks of bringing in patients for elective and non-emergent care alongside the risks of delaying these services. In addition to affecting patients and their families, delaying care substantially impacts the financial status of healthcare systems. When care is delayed, hospitals make less money, and many providers and administrators receive pay cuts or become furloughed.

## Death and Dying

COVID-19 is rearranging death and dying on an unprecedented scale. Death is not just the act of dying, but also the rituals and mourning that occur before, during, and after the moment of passing. Though talking about death causes anxiety and stress for many, most can agree that a 'good death' is one surrounded by family and friends. During the first year of the COVID-19 pandemic, with stringent visitor policies in place worldwide, COVID-19 made this

reality impossible for many. Though these restrictions have since loosened for non-COVID-19 patients, when creating future public health responses, it is important to consider the repercussions that stringent visitor policies had on patients and families. Unfortunately, due to infection protocols, COVID-19 patients still experience isolation during death. While these restrictions are in place to slow transmission and protect healthcare providers, for families unable to be physically present with their dying loved ones, the lack of closure has drastically altered grieving and bereavement processes. Health care providers have had to fill in as family for many patients, dying patients in particular. Families have been forced to think of new ways to memorialize their loved ones while being attentive to social distancing and gathering restrictions. The impact of COVID-19 deaths will reverberate throughout the fabric of society and result in long-term effects on families and healthcare providers.

### *COVID-19 Deaths are 'Bad Deaths'*

For many, current COVID-19 deaths are considered 'bad deaths.' Those dying from COVID-19 experience breathing challenges and significant physical discomfort. While healthcare providers don several layers of PPE to limit exposure to the virus, the loss of physical touch and facial expression can make COVID-19 patients feel dehumanized. Quinn, an ER doctor who worked in New York, discussed how isolation, loneliness, and the chaotic hospital environment exacerbated suffering for dying patients:

That felt legit, more like a warzone. Kind of, you know, where it's like, family, what family? What are you talking about? Who's talking to the family? We don't have time for that, you know? There was sort of a hierarchy of needs in that situation that precluded going through all of those [steps]. What would be the ideal steps that you would take if

somebody was dying, you know? I had a lady...that just died in the middle of everyone. And I don't think anyone was near her when it happened.

Although no healthcare provider wanted patients to be alone, the staffing shortages, time intensive PPE procedures, and limited contact protocols prevented many providers from taking the time to comfort dying COVID-19 patients. We heard many stories of similar situations from healthcare providers; healthcare environments became chaotic during COVID-19 surges leaving many people to die alone while experiencing significant physical and emotional distress.

### *Challenges of Restrictive Visitor Policies*

Visitor policies were created with one primary intention: to slow the spread of COVID-19. Though visitor policies shifted across hospital systems and patient groups, all patients - especially for the first 6 months to year of the pandemic - were subject to unprecedented amounts of isolation. For COVID-19 patients, visitors were strictly prohibited in most circumstances. In some cases, visitors were allowed to enter the hospital if patients were actively dying, but families often were not able to enter the room. Several providers spoke about witnessing families say their final goodbyes through glass doors or having to pass along messages from patients to family members and vice versa. Most hospital systems allowed non-COVID-19 patients one or two visitors at a time depending on current infection levels, but this varied from hospital to hospital. Some facilities limited the number of visitors per patient per week in order to control who was entering and exiting facilities. Quite a few providers talked about catching family members trying to smuggle in additional visitors. Providers often felt conflicted when encountering these situations. While providers understood the importance of having family present as a source of comfort, they also felt that inward and outward flows of visitors could lead to outbreaks of infection within the hospital and use up limited PPE. When asking providers

during interviews about the particular policies in place at their facility, many responded with hesitancy. Providers often had to use their judgment during challenging situations, like when determining if a patient should be moved to comfort care or hospice (which meant more visitors would be allowed) or perhaps if a patient was unable to make care decisions on their own due to cognitive or physical status.

While visitor restrictions are in place to slow transmission and protect patients and healthcare workers, these limitations have significantly impacted how families share their final goodbyes. Patients are physically separated from families and forced to say their farewells via technology. Dillon, an ER nurse working in Arizona and Illinois, spoke about how family members were distressed because they often couldn't be present to provide the support they had envisioned:

I think it's very isolating, and it's fear-provoking. Because you have these family members that are bringing their sick loved ones in, and you're telling them basically, 'Okay, thanks, but I got it from here...you can't come visit, you can't come back to the ER.' Even if they're gasping for breath.

In the midst of these restrictive visitor policies, Evelyn, a second-year resident living in Denver, talked about trying to give families a little more time when dropping off their loved ones at the hospital. For many, this stressful and often chaotic drop-off is the last time they will see each other for a long time (or possibly forever) due to the restrictive visitor policies in place. As a healthcare provider, Evelyn witnessed patients and families desperate to have more time: "I've had people say, you know, 'Do I have to get admitted? I don't want to get admitted if I can't spend time with my family.' So a big focus I've seen is on family, and just trying to preserve time together."

Additionally, strict visitor policies meant that family members were unable to observe the physical state of their loved ones and were therefore unable to grasp the severity of their illness. Several healthcare providers commented that they felt that care was prolonged and became overly excessive because family members were unable to bear witness to the suffering of their loved ones. George, an internist in Arizona, talked about the challenges of having these conversations with families in the midst of the pandemic:

They are unable to visit, they are unable to understand how sick they really are. So they are unable to make the best decisions in terms of do we want to continue, do you want to initiate a Do Not Resuscitate order, Do Not Intubate order... Families sometimes don't understand how sick their relatives are, so they tend to not want to put those orders in place...Family members will say 'Do everything.' So we initiate everything but the outcome, essentially, is the same. They end up dying anyway.

Several healthcare providers were haunted by this reality that occurred over and over again. They felt as though they were torturing patients and were unable to withdraw care because of the family orders.

Furthermore, visitor policies prevented family members from helping patients make sound care decisions. Additionally, family members, desperate to see their hospitalized loved ones, often held the opinion that their loved one should do anything possible to 'get better' and return home. Again, with visitor policies in place, they were unable to bear witness to the physical state of their loved one. Hugo, an internist from Texas, talked about the difficulties of family communication with visitor policies in effect. He spoke about one experience with an elderly woman who was unsure about how to proceed with care. She was hospitalized and debating whether to undergo a risky surgery.



She was not a COVID patient, but she existed in this COVID world. She really didn't want to go through with it (surgery), but then her family would say you should. It was as though the family couldn't really pick up the vibe. Because they weren't present in the room. I was there. I mean, I spoke Spanish. And there was a time when I was like, 'Okay, we're going to call it off. We're not going to do the surgery, because she doesn't want it.' But then she would change her mind after talking to her family and everything. Well, she ended up dying. After the surgery, she died. It stuck with me because I think they had to visit. I have no proof for this, but I believe if the visitor policy would have allowed somebody to be there with her, I think that she would have made a different decision than to go for the surgery.

These restrictive visitor policies had ripple effects that impacted the reality of care for all patients. Family members serve as care advocates. When families are unable to be with their loved ones in-person, they may advocate for procedures and treatments that do more harm than good.

### *Healthcare Providers as Family Substitutes*

Because strict visitor policies and fear of infection kept families out of the hospitals, many healthcare providers were tasked with serving as a companion for patients. For individuals dying in hospitals due to complications of COVID-19, quite often, healthcare providers were the last point of contact for these patients. If time allowed, healthcare workers tried to bring a sense of comfort through listening and caring for patients at the bedside throughout the dying process. Dillon, an ER nurse in Arizona and Illinois, spoke about how this emotional role has impacted her perceptions of caregiving:

You remember their faces. You remember their names. But I think you don't fully accept that you were somebody's last point of contact in this world and life. Because we weren't allowing visitors for months. And so, these people were either dying alone or you were taking the responsibility of becoming their family, all while still maybe having three more patients to take care of...you can't even fully process the fact that you just held somebody's hand while they left this world.

The burden of providing this type of care in addition to the traditional nursing services contributed to widespread feelings of burnout amongst providers. As Matt, an ER doctor in Minnesota shared, “This virus is causing suffering beyond the physical illness.”

### *Processing Loss and Grief*

Finally, COVID-19 has changed the way that we grieve and process loss. Many individuals are not only grieving loss of life but also the loss of normalcy and old lifestyles. Although pandemic restrictions have ebbed and flowed, coexisting circumstances such as widespread social isolation, financial instability, fears of illness, and constant worry have further intensified the grieving challenges that patients and families are facing. At points in time, limitations on gathering sizes forced families to improvise new ways of memorializing their loved ones through drive-by visitations and virtual funerals. In summer of 2020, Lacey, a bereavement counselor, emphasized that the consequences of COVID-19 on grieving and loss will likely be felt for years to come:

I think that for families, especially the grieving ones, I don't know what's going to happen... to have an entire year as a society of not being able to honor all of our dead loved ones in a way that we want to, or maybe, historically did... I don't know what the larger impact of something like that is where there's not an opportunity for a funeral, or

you couldn't attend it, or it's virtual, or you couldn't go bring the meal that you normally do, or you couldn't surround that person. I don't know what that's going to be like for the support people or the impacted individuals. But I think there's a lot of suffering that's happening. And people are learning a lot about themselves.

As Lacey highlighted, we are learning a lot about ourselves during this time. As we continue to feel the impacts of the consequences of these risk mitigation strategies that focus on short-term risk, let us learn from our experiences to create more comprehensive mitigation strategies for the future.

### *Rethinking Policies and Practices around Death and Dying*

Families and patients of all kinds experienced a plethora of challenges that accompanied death and dying because of the pandemic. In addition to suffering from the physical manifestations of the disease, several patients experienced intense isolation, financial insecurity, and heightened anxiety. Although the strict visitor policies that were put in place helped slow the spread of the virus, family communication and interactions - particularly final goodbyes - were significantly impacted. While visitor policies have since eased and relaxed, it is imperative that we perform a cost/benefit analysis and think carefully before prohibiting visitors from healthcare settings in the future. Many healthcare providers expressed that families and friends bring about healing. Rather than eliminating visitors entirely from healthcare facilities, we should invest in strategies that allow visitors to enter facilities and be present with their sick loved ones while keeping patients and providers safe. For example, if visitors are tested, wearing PPE, and agree to distance whenever possible, the chances of them contributing to the spread of infection are very low. In many cases, allowing visitors with protective measures in place would also ease the

burden on healthcare providers. Workers would be able to focus more on their overall caregiving responsibilities rather than feeling the need to take on the roles of family.

## Conclusion

The last two years have held significant challenges and suffering as well as groundbreaking progress and discoveries in public and global health - particularly in relation to risk mitigation and risk management. Chris, an anesthesiologist from Wisconsin, spoke about the power of reflecting and learning from this surreal experience of living through a pandemic. “What will we think about when we look back on it (COVID-19) 10 years from now? You know, it is a global and life-altering thing. The world is fundamentally changed in ways that I don't think we quite understand yet,” he said. While we are discovering more each day, over the course of the COVID-19 pandemic, we have learned quite a lot about how we as a society respond to public health crises and how we can improve our responses to better meet the needs of providers, patients, and communities in the future. It is fundamental that we utilize what we have learned and implement strategies grounded in this knowledge. Based on this rich body of qualitative data collected at crucial points in the pandemic, I propose three recommendations to ensure that we as a society are better equipped for future public health crises. First, we must involve a group of multidisciplinary experts, including both biological and social scientists, to be a part of the conversation about risk mitigation. Second, we must invest in pandemic preparedness amongst the general public and healthcare systems. Finally, we must commit to studying health communication in order to more effectively communicate risk mitigation strategies.

## Discussing Risk with Multi-disciplinary Experts at the Table

We need to draw from several areas of expertise when considering, establishing, and implementing risk mitigation strategies. When COVID-19 first emerged, we largely relied on scientific knowledge to dictate our policies surrounding risk and transmission. Scientists and researchers determined that the virus spread through close contact with infected individuals shedding viral particles through the air. Because of this, social distancing, masking, and capacity restrictions worldwide were implemented to reduce transmission. In healthcare systems in particular, workspaces were reorganized, non-emergent and elective care was deferred and delayed, and end-of-life care was significantly altered. While measures were enforced in order to prevent spread, these risk mitigation strategies also had consequences.

Over time, COVID-19 did force us as a society to work across areas of expertise to draw on various strengths and insights. Despite the overwhelming challenges related to COVID-19, some healthcare workers did report an unparalleled period of improvisation and innovation that led to thinking creatively and collaboratively. Kieran, chief quality officer for a hospital system in MN, spoke powerfully about the creativity that arose as a result of COVID-19, in this case between doctors and engineers:

Sometimes when you're so desperate and living in such a space of scarcity, it does stimulate a ton of innovation and different ways of thinking about problems. Something I really love [is] that we just came up with very different solutions [to] very complex problems. And that was really invigorating. I'll miss that space or leeway to just [say], 'Okay, go. Let's figure it out.' And we don't have the State or the Feds or the CDC saying you can't do that because they're as desperate as we are.

As Kieran noted, everyone was uncertain about best practices. Because of this, hierarchical leadership allowed for improvisation and trading of ideas between areas of study to occur. Healthcare systems and providers had no other choice but to go through phases of trial and error until they determined best practices. However, the crisis response mindset that allowed for this type of innovation, improvisation, and teamwork is not usually possible in strictly regulated health and administrative settings.

The cross-disciplinary collaboration that Kieran highlighted cannot occur only in times of crisis. We must bring others to the decision-making table when thinking proactively about the influences of infectious disease. For example, we need historians who have studied past pandemics to help us understand the implications of pandemics on all aspects of society. We need economists to share insight on the financial consequences of shutting down businesses and companies for long periods of time. We need anthropologists to understand culturally specific beliefs and practices that might aid in risk mitigation and alleviate suffering. We need sociologists and psychologists to provide knowledge about the impacts of widespread disconnect and stunted human interactions. We need teachers to highlight the ways in which education systems are impacted by risk mitigation strategies. Only when we have all of these experts at the table can we create informed and comprehensive risk mitigation strategies that address the short and long-term biological and social impacts of the pandemic. Thinking forward, we need to allow for joint efforts and periods of innovation in addressing preventive challenges. We cannot only allow for this creativity and collaboration in moments of extreme distress. We need to strike a balance between regulating workspaces and allowing for ingenuity and inventiveness.

## Investing in Pandemic Preparedness

Additionally, as a society, we need to collectively invest in public health preparedness. The reasoning behind this is simple: we can be more thoughtful about our risk mitigation strategies when we are prepared. As a society, we become narrow-minded when we experience distress and lack resources and knowledge about what to do. It is almost certain that we will face another pandemic in our lifetime, and it is essential that we prepare ourselves so that we can respond proactively and preventatively.

First of all, we need to teach the public how to be prepared for future pandemics. Now that we have experienced mitigation strategies put in place for COVID-19 such as masking, social distancing, and hand washing, we need to ensure that people continue to understand the importance of these strategies when facing future public health crises. We need to reinforce these concepts through public health education to ensure that people do not quickly forget their significance. It is imperative that we continue to garner community support for public health, depolarizing and depoliticizing public health whenever possible.

Additionally, we need to equip healthcare providers and healthcare systems to be able to shift in the context of a pandemic. Perhaps this means establishing a cohort of physicians, advanced care providers, and nurses who are briefed to be able to deploy in the case of an infectious disease outbreak or future pandemic. Perhaps this means implementing a national supply chain of PPE so resources can easily be moved around to where they are needed. Above all, we need to balance the spread of infection when caring for all patients now and in the future.

Several healthcare providers noted that COVID-19 presented us with many challenges regarding the ethics of resources. When faced with surges of patients and not enough resources for everyone, providers had to make incredibly difficult decisions regarding care delivery. Chris,

an anesthesiologist from Wisconsin, talked about how conversations about ethics and resources were more frequent and challenging during COVID-19 outbreak. He started by sharing about the process of assigning ventilators to patients when there were not enough ventilators to go around:

You have two patients, both of them could die or one of them could be saved with a ventilator, well who gets it? Or this is a patient who is not going to make it, if we give them a ventilator, they're still not going to make it. How do we have that discussion? Those discussions happened, and physicians were empowered to have that very frank discussion with families and with patients that this may not be survivable. At some point, you need to preserve resources. So we're not going to throw everything we have at trying to save your mom, or your dad, or grandma or grandpa. It's not because we don't think they're worth it, but because there's this feeling that nothing we're going to do is going to change that...With this rampant disease, that was an acceptable conversation to have.

There is no way around the triaging of resources. When resources are limited, some will receive care and some will not. COVID-19 made this reality much more visible to the general public.

Chris goes on to say that he hopes conversations about the ethics of resources will become increasingly common:

We, as a society, we...waste is not the right word. We use resources to fight a losing battle. We think we can cure everything, [that] we can fix everything. And COVID exposed us. We can't fix everything. Death is coming and we can't stop it. I don't want to sound morbid, but I hope that there is a greater realization that [we] can't fix everything, and a more judicious assignment of resources.



Discussions about the role of medicine in the final stages of one's life are necessary and important. Perhaps this gives us an opportunity to rethink our approach to end-of-life care and discern what humans actually want to achieve at the end of life.

## Improving Health Communication

It may be that the most fundamental lesson we have learned over the past two years is that we need to improve health communication across all areas of discourse. Conversations about public health and COVID-19 in particular became the focus of everyone's attention. As previously noted, scientific studies were published rapidly throughout the beginning stages of the pandemic, and the general public (healthcare workers included) tended to extrapolate based on scientific findings. As more information surfaced, recommendations and best practices shifted and changed leaving people frustrated and upset. News outlets not well-versed in the scientific process began to dramatize and criticize scientists and government organizations. COVID-19 became politicized almost instantaneously - people became extremely divided about social distancing, masking, and getting vaccinated.

Improved health communication will help us generate greater understanding of risk and risk mitigation strategies amongst the public. Rather than feeling like these measures are forced upon society in times of crisis, it is essential that people know the reasoning behind these evidence-based strategies. We need to learn to explain public health concepts to the public in ways that are understandable and not fear-provoking, patronizing, or condescending. Furthermore, through creating communication platforms that are culturally aware and tailored to particular populations, we can promote public health messaging and establish trust with hard-to-reach communities.

Information is powerful. The way that information is communicated heavily influences the way people respond. We must learn how to effectively communicate health and science information between all parties - this responsibility does not fall on one particular group of people. Some healthcare providers spoke about how they previously relied on public health departments to facilitate messages about preventing the spread of diseases and promoting community health initiatives. Now, healthcare providers are realizing that they have a unique role to play when it comes to health communication on the macroscale and in everyday patient interactions. Quinn, an ER doctor in Rhode Island, spoke about the need to craft the way that we share information. She highlighted that we have to “take some lessons from propaganda - in a way - because a lot of times that is what you are up against.” It is clear that health communication is a crucial skill, and we must invest time and energy into mastering this in hopes of being better equipped to process and share public health information in the future.

## Moving Forward

The SARS-CoV-2 virus has rippled throughout every aspect of society and influenced how we live, breathe, and interact with one another. As a society, we responded in crisis mode at the onset of COVID-19, and our actions reflected our limited knowledge and investment in public health. We tend to implement risk mitigation strategies that are too narrowly focused on the short-term consequences of certain behaviors and actions. In the context of COVID-19, this was particularly true in the areas of workspace reorganization, delayed and deferred care, and death and dying. Instead, we need to take into account the longer-term biological and social consequences of these risk mitigation strategies. To address public health crises more comprehensively, we must facilitate conversations across disciplines to create collaborative and innovative public health risk mitigation strategies. Additionally, we must incorporate pandemic

preparedness into healthcare systems at all levels. Finally, we must improve our health communication skills to promote greater public understanding and support of risk mitigation strategies. By recognizing the complexities of risk and the interconnectedness of the biological and social consequences of infectious disease, we can better respond to the public health issues of today and tomorrow.

## Afterword

While this thesis is grounded in academic research and qualitative data collection, it also serves as a memoir and space to reflect on the challenges and growth I have witnessed and learned about over the past two years. In my work as a researcher and COVID-19 caregiver, I was uniquely positioned to experience, observe, and listen to stories from healthcare providers and patients navigating the uncertainty of COVID-19. In the future, I plan to use this thesis to inform my personal aspirations and professional career. I desire to work in healthcare as a provider, administrator, or policymaker (or maybe a healthy balance of all three!) Professionally, my ultimate goal is to bridge patient care and public health more explicitly. I assert that we should not have to choose one over the other; patient health and public health are intricately connected. Investing in one of these fields benefits and strengthens the other. Patient care and public health exist in a complementary and reciprocal relationship. I will strive to identify ways in which our healthcare system is failing; I firmly believe that by addressing gaps in current policies, we can invest in healthcare reform with public health at the forefront.

## References

- Block, E. (2020). Exposed intimacies: Clinicians on the frontlines of the COVID-19 pandemic. *Anthropology in Action*, 27(2), 63–67. <https://doi.org/10.3167/aia.2020.270209>
- Block, E., & Vindrola-Padros, C. (2021). Making do: COVID-19 and the improvisation of care in the UK and US. In L. Manderson, N. T. Burke, & A. Wahlberg (Eds.), *Viral loads: Anthropologies of urgency in the time of COVID-19* (pp. 303–323). Essay, UCL Press.
- Byrnes, M. E., Brown, C. S., De Roo, A. C., Corriere, M. A., Romano, M. A., Fukuhara, S., Kim, K. M., & Osborne, N. H. (2021). Elective surgical delays due to COVID-19: The patient lived experience. *Medical Care*, 59(4), 288–294. <https://doi.org/10.1097/MLR.0000000000001503>
- Carr, D., Boerner, K., & Moorman, S. (2020). Bereavement in the time of coronavirus: Unprecedented challenges demand novel interventions. *Journal of Aging & Social Policy*, 32(4-5), 425–431. <https://doi.org/10.1080/08959420.2020.1764320>
- Centers for Disease Control and Prevention. (2022, March 11). *Coronavirus (COVID-19) frequently asked questions*. Retrieved March 20, 2022, from <https://www.cdc.gov/coronavirus/2019-ncov/faq.html#:~:text=The%20virus%20that%20causes%20COVID,feces%20to%20a%20person>
- Collins, A., McLachlan, S. A., & Philip, J. (2018). How should we talk about palliative care, death and dying? A qualitative study exploring perspectives from caregivers of people with advanced cancer. *Palliative Medicine*, 32(4), 861–869. <https://doi.org/10.1177/0269216317746584>
- Elrashdy, F., Redwan, E. M., & Uversky, V. N. (2020, September 11). Why COVID-19

- transmission is more efficient and aggressive than viral transmission in previous coronavirus epidemics? *Biomolecules*, *10*(9). <https://doi.org/10.3390/biom10091312>
- Findling, M. G., Blendon, R. J., & Benson, J. M. (2020). Delayed care with harmful health consequences - Reported experiences from national surveys during coronavirus disease 2019. *Jama Health Forum*, *1*(12), 201463. <https://doi.org/10.1001/jamahealthforum.2020.1463>
- Fraher, E. P., Pittman, P., Frogner, B. K., Spetz, J., Moore, J., Beck, A. J., Armstrong, D., & Buerhaus, P. I. (2020). Ensuring and sustaining a pandemic workforce. *New England Journal of Medicine*, *382*(23), 2181–2183. <https://doi.org/10.1056/nejmp2006376>
- Goh, G. K., Dunker, A. K., Foster, J. A., & Uversky, V. N. (2020, March 31). Shell disorder analysis predicts greater resilience of the SARS-CoV-2 (COVID-19) outside the body and in body fluids. *Microbial Pathogenesis*, *144*, 104177. <https://doi.org/10.1016/j.micpath.2020.104177>
- Holt-Lunstad, J. (2020, June 22). *The double pandemic of social isolation and COVID-19: Cross-sector policy must address both*. HealthAffairs. Retrieved February 25, 2022, from <https://www.healthaffairs.org/doi/10.1377/forefront.20200609.53823>
- John, T. (2020, April 3). *Iceland lab's testing suggests 50% of coronavirus cases have no symptoms*. CNN. Retrieved March 1, 2022, from <https://www.cnn.com/2020/04/01/europe/iceland-testing-coronavirus-intl/index.html>
- Joseph, A. (2020, June 9). *'We don't actually have that answer yet': WHO clarifies comments on asymptomatic spread of COVID-19*. STAT. Retrieved February 18, 2022, from <https://www.statnews.com/2020/06/09/who-comments-asymptomatic-spread-covid-19/>
- Kim, D., Shinde, S. K., Lone, S., Palem, R. R., & Ghodake, G. S. (2021). COVID-19 pandemic:

- Public health risk assessment and risk mitigation strategies. *Journal of Personalized Medicine*, 11(12). <https://doi.org/10.3390/jpm11121243>
- Kleinman, A. M., Bloom, B. R., Saich, A., Mason, K. A., & Aulino, F. (2008). Avian and pandemic influenza: A biosocial approach. *The Journal of Infectious Diseases*, 197 Suppl 1, 1–3. <https://doi.org/10.1086/524992>
- Lotfi, M., Hamblin, M. R., & Rezaei, N. (2020). COVID-19: Transmission, prevention, and potential therapeutic opportunities. *Clinica Chimica Acta*, 508, 254–266. <https://doi.org/10.1016/j.cca.2020.05.044>
- Meier, E. A., Gallegos, J. V., Thomas, L. P., Depp, C. A., Irwin, S. A., & Jeste, D. V. (2016). Defining a good death (successful dying): Literature review and a call for research and public dialogue. *The American Journal of Geriatric Psychiatry: Official Journal of the American Association for Geriatric Psychiatry*, 24(4), 261–271. <https://doi.org/10.1016/j.jagp.2016.01.135>
- NPR, The Robert Wood Johnson Foundation, & Harvard T.H. Chan School of Public Health. (2020, September). *The impact of coronavirus on households across America*. [https://cdn1.sph.harvard.edu/wp-content/uploads/sites/21/2020/09/NPR-RWJF-Harvard-National-Report\\_092220\\_Final1-4.pdf](https://cdn1.sph.harvard.edu/wp-content/uploads/sites/21/2020/09/NPR-RWJF-Harvard-National-Report_092220_Final1-4.pdf)
- Palinkas, L. A., Horwitz, S. M., Green, C. A., Wisdom, J. P., Duan, N., & Hoagwood, K. (2015). Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. *Administration and Policy in Mental Health and Mental Health Services Research*, 42(5), 533–544. <https://doi.org/10.1007/s10488-013-0528-y>
- Parry, J. (2020). China coronavirus: cases surge as official admits human to human transmission. *BMJ (Clinical Research Ed.)*, 368, 236. <https://doi.org/10.1136/bmj.m236>

- Quan, K. (2020, August 14). *Clustering care with COVID-19 patients*. The NursingCE Blog. Retrieved March 1, 2022, from <https://www.nursingce.com/blog/clustering-care-with-covid-19-patients/>
- Randazzo, W., Cuevas-Ferrando, E., Sanjuán, R., Domingo-Calap, P., & Sánchez, G. (2020). Metropolitan wastewater analysis for COVID-19 epidemiological surveillance. *International Journal of Hygiene and Environmental Health*, 230, 113621–113621. <https://doi.org/10.1016/j.ijheh.2020.113621>
- Smith, B. J., & Lim, M. H. (2020). How the COVID-19 pandemic is focusing attention on loneliness and social isolation. *Public Health Research & Practice*, 30(2), e3022008. <https://doi.org/10.17061/phrp3022008>
- Van Doremalen, N., Bushmaker, T., Morris, D. H., Holbrook, M. G., Gamble, A., Williamson, B. N., Tamin, A., Harcourt, J. L., Thornburg, N. J., Gerber, S. I., Lloyd-Smith, J. O., de Wit, E., & Munster, V. J. (2020). Aerosol and surface stability of SARS-CoV-2 as compared with SARS-CoV-1. *The New England Journal of Medicine*, 382(16), 1564–1567. <https://doi.org/10.1056/NEJMc2004973>
- Wallace, C. L., Wladkowski, S. P., Gibson, A., & White, P. (2020). Grief during the COVID-19 pandemic: Considerations for palliative care providers. *Journal of Pain and Symptom Management*, 60(1), 76. <https://doi.org/10.1016/j.jpainsymman.2020.04.012>
- Wakam, G. K., Montgomery, J. R., Biesterveld, B. E., & Brown, C. S. (2020, April 14). Not dying alone - Modern compassionate care in the COVID-19 pandemic. *The New England Journal of Medicine*, 382(24), 88. <https://doi.org/10.1056/NEJMp2007781>
- Wasfi, R., Poirier Stephens, Z., Sones, M., Laberee, K., Pugh, C., Fuller, D., Winters, M., &

- Kestens, Y. (2021). Recruiting participants for population health intervention research: effectiveness and costs of recruitment methods for a cohort study. *Journal of Medical Internet Research*, 23(11), 21142. <https://doi.org/10.2196/21142>
- Wei, W. E., Li, Z., Chiew, C. J., Yong, S. E., Toh, M. P., & Lee, V. J. (2020, April 1). Presymptomatic transmission of SARS-CoV-2 - Singapore, January 23 - March 16, 2020. *Morbidity and Mortality Weekly Report*, 69(14), 411–415. <https://doi.org/10.15585/mmwr.mm6914e1>
- World Health Organization. (2020, February). *Report of the WHO-China joint mission on coronavirus disease 2019 (COVID-19)*. Retrieved March 20, 2022, from [https://www.who.int/publications-detail-redirect/report-of-the-who-china-joint-mission-on-coronavirus-disease-2019-\(covid-19\)](https://www.who.int/publications-detail-redirect/report-of-the-who-china-joint-mission-on-coronavirus-disease-2019-(covid-19))
- World Health Organization. (2020, March 11). *WHO Director-General's opening remarks at the media briefing on COVID-19 - 11 March 2020*. Retrieved February 11, 2022 from <https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020>
- World Health Organization. (2020, June 9). *COVID-19 virtual press conference*. Retrieved February 13, 2022, from [https://www.who.int/docs/default-source/coronaviruse/transcripts/who-audio-emergencies-coronavirus-press-conference-08jun2020.pdf?sfvrsn=f6fd460a\\_0](https://www.who.int/docs/default-source/coronaviruse/transcripts/who-audio-emergencies-coronavirus-press-conference-08jun2020.pdf?sfvrsn=f6fd460a_0)
- Xu, X., Chen, P., Wang, J., Feng, J., Zhou, H., Li, X., Zhong, W., & Hao, P. (2020). Evolution of the novel coronavirus from the ongoing Wuhan outbreak and modeling of its spike protein for risk of human transmission. *Science China. Life Sciences*, 63(3), 457–460. <https://doi.org/10.1007/s11427-020-1637-5>