

Author: Lenertz-Lindemer, Lisa Y.

Title: *How the COVID-19 Pandemic Has Impacted the Perceptions and Motivations of Pre-Health Students in Minnesota and Wisconsin*

The accompanying research report is submitted to the **University of Wisconsin-Stout, Graduate School** in partial completion of the requirements for the

Graduate Degree/ Major: MS Career and Technical Education

Research Advisor: Diane Klemme, Ph.D.

Submission Term/Year: Spring 2022

Number of Pages: 62

Style Manual Used: American Psychological Association, 7th edition

- I have adhered to the Graduate School Research Guide and have proofread my work.
- I understand that this research report must be officially approved by the Graduate School. **Additionally, by signing and submitting this form, I (the author(s) or copyright owner) grant the University of Wisconsin-Stout the non-exclusive right to reproduce, translate, and/or distribute this submission (including abstract) worldwide in print and electronic format and in any medium, including but not limited to audio or video. If my research includes proprietary information, an agreement has been made between myself, the company, and the University to submit a thesis that meets course-specific learning outcomes and CAN be published. There will be no exceptions to this permission.**
- I attest that the research report is my original work (that any copyrightable materials have been used with the permission of the original authors), and as such, it is automatically protected by the laws, rules, and regulations of the U.S. Copyright Office.
- My research advisor has approved the content and quality of this paper.

STUDENT:

NAME:

Lisa Lenertz Lindemer

DATE:

3/20/22

ADVISOR: (Committee Chair if MS Plan A or EdS Thesis or Field Project/Problem):

NAME: Diane Klemme

DATE: April 6, 2020

This section for MS Plan A Thesis or EdS Thesis/Field Project papers only
Committee members (other than your advisor who is listed in the section above)

1. CMTE MEMBER'S NAME:
2. CMTE MEMBER'S NAME:
3. CMTE MEMBER'S NAME:

DATE:
DATE:
DATE:

This section to be completed by the Graduate School

This final research report has been approved by the Graduate School.
Director, Office of Graduate Studies:

DATE:

Lenertz-Lindemer, Lisa Y. How the COVID-19 Pandemic Has Impacted the Perceptions and Motivations of Pre-Health Students in Minnesota and Wisconsin

Abstract

The United States has an aging and unhealthy population, and the world faces a continuous threat of emerging infectious diseases. Given these challenges, it is critical undergraduates continue to pursue careers in health care and we maintain a strong health care workforce. Past pandemics have presented both significant challenges and served as a source of motivation for doctors and nurses. In this phenomenological study, the effect the COVID-19 pandemic has had on the motivations of pre-health undergraduates and their attitudes and concerns about working in health care were examined. Twenty pre-health undergraduates and two undergraduates interested in a career in biomedical research participated in semi-structured interviews. The majority of the pre-health students have been interested in a health care career for many years, and none of them have altered their career plans due to the pandemic. When asked about their motivation level, three of the participants noted that although their career choices have not changed since the start of the pandemic, they are at least somewhat more motivated to become a health care worker, and one student noted being much more motivated. A few students noted some hesitancy about working in health care in the future but that the hesitancy is not strong enough to persuade them to choose a different career path. In conclusion, the COVID-19 pandemic was not a significantly inspiring event nor a deterrent for pre-health students and has provided reassurance for some students that they are pursuing the right career path for them.

Acknowledgments

I would like to thank Josh Bench, Dr. Basu Bhattacharyya, and Janine Mason for their help recruiting students for this study and for their discussions with me about this topic.

Table of Contents

Abstract	1
List of Tables	5
Chapter I: Introduction.....	6
Background	6
Statement of the Problem.....	8
Research Questions	9
Limitations	10
Definition of Terms.....	11
Methodology	12
Chapter II: Literature Review	13
Risks to Health Care Workers.....	13
Motivation to Work in Health Care	15
Motivational Theories.....	16
Alternatives to an Altruistic Explanation.....	19
Safety and Security	20
Summary	21
Chapter III: Methodology	23
Subject Selection and Description	23
Instrumentation	26
Data Collection Procedures.....	27
Data Analysis	28
Limitations	29

Summary29

Chapter IV: Results30

 Demographics30

 Vaccination Status and Infection Control Strategies33

 Research Questions34

 Research Question 1 34

 Research Question 2 38

 Research Question 3 39

 Research Question 4 41

Chapter V: Discussion, Conclusion, and Recommendations.....42

 Discussion42

 Conclusions44

 Recommendations45

References46

Appendix A: Transcript for the Recruitment Video Titled, “Seeking Participants for a Study
 About COVID-19 and Pre-Health Careers”56

Appendix B: The Google form questions the interested participants answered57

Appendix C: Reliance Agreement Between UW-Stout and UW-La Crosse58

Appendix D: Consent Form60

Appendix E: Interview Guide62

List of Tables

Table 1: Demographics of the Participants	31
Table 2: Intended Career Paths of the Participants	32
Table 3: Professions of the Participants' Parents	32
Table 4: Themes About How the Pandemic Positively Impacted Students' Motivations and Perceptions About a Future Career in Health Care	36
Table 5: Themes About How the Pandemic Negatively Impacted Students' Motivations and Perceptions About a Future Career in Health Care	37

Chapter I: Introduction

The COVID-19 pandemic has reminded us that humans are constantly threatened by emerging infectious diseases and that our health care system has vulnerabilities. It is important to understand how we can maintain a robust health care workforce to meet our many challenges. This section describes the problem studied and the purpose of the research.

Background

The COVID-19 pandemic has cost the lives of millions of people worldwide and has strained health care systems, including those in the United States (Cleveland Clinic, 2020). Many health care workers are stressed, and some doctors and nurses have quit their jobs or retired early. Countless health care professionals have become sick from the SARS-CoV-2 virus, have felt anxious about unknowingly infecting patients and their families, and have become disillusioned by the general population's negligence regarding viral spread mitigation efforts (Jacobs, 2021). Nurses have reported being worried about having to take on more patients, and a lack of psychological assistance for nurses has been acknowledged (Ali et al., 2020). Younger nurses reportedly have a heightened risk of developing long-term psychological problems in comparison to older nurses (Shen et al., 2020), which may be attributed to being less experienced dealing with critically ill patients and being more likely to have had children at home learning remotely (Ali et al., 2020; Joyce, 2020). Even prior to the arrival of SARS-CoV-2, physicians had demanding workloads, and the COVID-19 pandemic has further increased the demands on these workers (Schirmers, 2016). Doctors have reported increased burnout during the pandemic even if they were not at a heightened risk of SARS-CoV-2 infection (Amanullah & Ramesh Shankar, 2020). Many health care workers have decided to quit during the COVID-19 pandemic, and burnout is degrading the sense of purpose for many who have stayed in the field. Nurses and

other health care workers have expressed their frustration with having to treat patients who have refused to receive a vaccine against SARS-CoV-2 and not being able to provide more attention to their other patients (Noguchi, 2021; Yong, 2021).

There had been concerns about a nursing shortage for several years and concerns about a shortage of physicians, at least in certain geographical regions (Haddad et al., 2020; Kerns & Willis, 2020). A study published in early 2020 estimated the United States will have a shortage of over 138,000 physicians by 2030. This paper cited an aging population, population growth, and increased access to medical care because of the Affordable Care Act (ACA) as reasons why there is an increased demand for physicians. The authors predict that the shortages will be highest in the West and South (Zhang, 2020). Because this study was written prior to the arrival of SARS-CoV-2, the strain on the health care system from treating patients who are unvaccinated against SARS-CoV-2 and patients experiencing long-term complications from COVID-19 was not considered (Pomeroy, 2021). The Association of American Medical Colleges (AAMC) predicted in mid-2021 that the United States may have a shortage of 37,800 to 124,000 physicians by 2034 (AAMC, n.d.). Although there are disagreements about how many health care providers will be needed in the future, we will need a large, competent health care workforce to meet the challenges of having an aging and unhealthy population and being threatened by future pandemics (Haddad et al., 2020; Kerns & Willis, 2020; Kushner & Sorensen, 2013; Short et al., 2018).

The University of Wisconsin-La Crosse, one of the institutions study participants were recruited from, is similar to almost all other universities in that many of their undergraduates are interested in pursuing a career in health care (B. Bhattacharyya, personal communication, November 18, 2021). Countless undergraduate students are interested in furthering their

education to become a nurse, pharmacist, physical therapist, physician's assistant, medical doctor, or other health care professional. Others are interested in becoming researchers who study human biology and disease. Although studies of college students have shown that a significant number of undergraduates have experienced stress, anxiety, and loneliness in response to the COVID-19 pandemic (Dennon, 2020; Son et al., 2020), studies have not been conducted to determine how the pandemic has influenced the perceptions of college students about health care careers. Little is known about whether students have become apprehensive about entering health care, whether the pandemic has inspired students to pursue a pre-health program, or whether the pandemic has had no impact on student perceptions. The reasons for any changes in student motivations are also not known.

Statement of the Problem

The United States has an aging and unhealthy population (Saklayen, 2018), and the world is continuously threatened by emerging infectious diseases (Jones et al., 2008). Millions of people in this country live a sedentary life and are afflicted with serious health conditions. Approximately one-third of adults in the United States has metabolic syndrome, which is a condition where the person is typically obese and has an increased risk of heart attack, stroke, and type II diabetes (Saklayen, 2018). A strong health care workforce is needed to provide quality health care to a population with many challenges.

We currently have a nursing shortage and potentially a shortage of other health care providers (Haddad et al., 2020; Kerns & Willis, 2020; Kobernick, 2015). Many health care workers have experienced burnout, and some have quit mid-career or retired early in response to the COVID-19 pandemic (Jacobs, 2021). Given our challenges, it is critical that our health care workforce is competent and well-staffed.

The health care profession needs to continue recruiting talented students to health care and retaining our health care providers. Although there are plentiful data about the difficulties that existing health care workers have experienced in response to the COVID-19 pandemic, little is known regarding how the pandemic has influenced the perceptions of college students about careers in health care. College students will be our next generation of health care providers; therefore, students must understand any concerns they may have about pursuing a career in health care and their motivations for choosing their particular career path. Any student concerns that are identified in this study or others should be addressed at a national level to ensure that our talented undergraduates continue to want to serve in health care. The Career and Technical Education (CTE) National Research Agenda framework includes researching areas, such as “program relevance and effectiveness” or “curricula and program planning” to help stakeholders contribute to our body of CTE knowledge and to influence policy (Lambeth et al., 2018, p. 3). Government and business leaders may be able to use the results of this study to develop policies and partnerships that can improve recruitment and retention in health care, and CTE educators may use this information to improve their courses and programs in the health sciences cluster, therapeutic services pathways.

Research Questions

This study will attempt to identify how the COVID-19 pandemic has influenced the perceptions of college students at the University of Wisconsin-La Crosse and Minnesota State College Southeast (i.e., Red Wing and Winona campuses) about pursuing a career medicine, biomedical research, or another health care-related field. The aim is to answer the following questions:

1. Has the COVID-19 pandemic served as a source of discouragement, inspiration, or neither for undergraduate students interested in pursuing a career in health care?
2. What are the reasons for why students want to enter health care, and what are the reasons students become disinterested in health care?
3. What concerns do students have about being a health care professional, and are these concerns related to the COVID-19 pandemic?
4. Has the sickness or death of a loved one from COVID-19, personal disruptions caused by the pandemic, or the community's response to the pandemic influenced students' motivations and perceptions about pursuing a health care career?

Limitations

The limitations of the study are as follows:

1. This study is limited by the small number of students who were interviewed.
2. Most of the students interviewed are from Wisconsin or bordering states. Students from areas more greatly impacted from the COVID-19 pandemic as of December 2021, such as New York City or the state of Florida, were not involved in this study (The New York Times, 2021).
3. Given the small number of students studied and the limited geographic region represented by the study participants, the results may not be transferrable to other institutions of higher education.
4. The students may not answer the questions honestly, particularly about how seriously they implemented mitigation strategies to prevent the spread of SARS-CoV-2.

5. The students may not have a clear understanding of what the questions are asking; thus, meaningful data may not be obtained from the responses to every question from every interviewee.

Definition of Terms

The following terms are defined to provide clarity.

Endemic

An endemic disease is a disease that is constantly present within a geographic region (Centers for Disease Control and Prevention, 2012).

Medical College Admissions Test (MCAT)

The MCAT is the exam that is taken by those interested in attending medical school. The exam is over six hours and includes sections about biology, biochemistry, chemistry, physics, psychology, sociology, human behavior, and critical analysis and reasoning skills (AAMC, n.d.).

Messenger RNA

Messenger RNA is the type of ribonucleic acid (RNA) that is used by cellular machinery to produce the protein encoded in the RNA.

Pandemic

A pandemic is an epidemic found in several regions of the world and typically affects a large number of people at the same time. An epidemic may result when the infectious agent becomes more abundant or virulent, the infectious agent is found in an area where it was not found before, the infectious agent can be more easily transmitted than before, and/or hosts can be more easily exposed (Centers for Disease Control and Prevention, 2012).

Pre-Med Program

Pre-med programs are a series of courses undergraduates take to fulfill the entrance requirements for admission into medical school. It is not a major (Mathur, 2020).

SARS-CoV-2

SARS-CoV-2 is the virus that causes Coronavirus Disease 2019 (COVID-19; World Health Organization, n.d.).

Methodology

Semi-structured interviews of students who indicated an interest in a career in health care were conducted via phone. Detailed notes were taken during the interviews, and researcher notes were recorded immediately after each interview. Themes of the responses were identified.

Chapter II: Literature Review

The purpose of this study is to determine how the COVID-19 pandemic has impacted the motivations and attitudes of pre-health students at the University of Wisconsin-La Crosse and Minnesota State College Southeast. The United States, like most other countries, has significant health care challenges that require a robust health care workforce to meet demands. Many individuals in the United States are unhealthy (Must et al., 1999; Saklayen, 2018), and pandemics will be a never-ending threat to humanity. The health care field must maintain a pipeline of talented health care workers who can diagnose, treat, and care for our population. This requires recruiting new students to the field who will replace those who leave health care for retirement or other reasons. Health care worker shortages is a concern (AAMC, n.d.; Haddad et al., 2020; Kerns & Willis, 2020; Zhang, 2020). In the year 2015, over 20% of practicing physicians were over the age of 65 (Dellinger, 2017), and employment in health care is down 2.3% from February 2020 in comparison to January 2022 (Bureau of Labor Statistics, 2022).

In order to recruit new students to health care, we need to understand what motivates students to pursue a career in health care and what may be done to ensure we retain talented workers in their professions. Health care systems and policy makers must understand the worries and concerns that future health care providers have and work to address identified issues. This literature review examines risks to health care workers, motivational theories, past pandemics, and prior studies about why students and current health care professionals have pursued a career in health care.

Risks to Health Care Workers

The COVID-19 pandemic has challenged our health care workforce in many ways. Some hospitals have become overwhelmed with unusually high number of patients, and doctors and

nurses have been traumatized by seeing COVID patients die, are working longer hours, and have had added stressors, such as having children at home learning remotely (Cleveland Clinic, 2020; Joyce, 2020; Levine, 2021; Shen et al., 2020). Health care workers are at increased risk of infection during an infectious disease outbreak, which has been evident during the COVID-19 pandemic and other significant events, such as the 2013-2015 Ebola outbreak in Sierra Leone (Fang et al., 2016; Nguyen et al., 2020). During the 2013-2015 Ebola outbreak, health care workers were disproportionately infected in comparison to the general population, especially in mid-2014. This increased risk of infection with the Ebola virus is particularly alarming given the high infection fatality rate of that virus (Jacob et al., 2020). In addition to these risks, health care workers are at risk of workplace violence. Unfortunately, this is a worldwide problem. Health care workers have been verbally abused, subjected to physical violence, and sexually harassed (Vento et al., 2020).

Burnout is an occupational hazard experienced by many health care workers, particularly since the beginning of the COVID-19 pandemic (Noguchi, 2021; Young, 2021). According to the 11th Revision of the International Classification of Diseases (ICD-11), “Burn-out is a syndrome conceptualized as resulting from chronic workplace stress that has not been successfully managed” (World Health Organization, 2019, para. 4). It is characterized as “feelings of energy depletion or exhaustion; increased mental distance from one’s job, or feelings of negativism or cynicism related to one’s job; and reduced professional efficacy” (World Health Organization, 2019, para. 5). Many health care workers have reported in surveys that they are considering leaving their profession (Noguchi, 2021). An exodus of health care workers now will exacerbate the shortages in staff that existed before the start of the COVID-19 pandemic.

Motivation to Work in Health Care

Despite the risks and stress that health care workers endure, infectious diseases and other critical health issues can motivate workers to continue in their field or inspire students to start a career in health care. For example, despite health care workers in Sierra Leone reporting after the Ebola outbreak that they felt traumatized when their colleagues had died. In addition, the workers were isolated from their communities due to fears health care workers were spreading the disease, yet they still reported having a sense of duty to serve their country (Raven et al., 2018). A 2013 study of nursing students in 11 Pacific Island nations noted that the students chose to attend nursing school in order to care for and educate their people. One student from Vanuatu was quoted saying, “My island has health staff, but most of the community need help. So I want to be a nurse to change the situation in my remote area” (Usher et al., 2013, p. 450). Some noted they were driven by a calling, and one study participant was quoted, “it is within us what we deliver, it should come from within you. It is not by chance that you end up in nursing, but it should come from within you” (Usher et al., 2013, p. 450).

During World War I and the 1918 flu pandemic there were many people who wanted to become nurses. Nine thousand nurses were sent overseas during the Great War, and thousands of others served on U.S. military bases. There was a “nationwide spirit of volunteerism” (Keeling, 2010, p. 105) during those trying times. Many young women were enrolling in Red Cross courses in order to gain experience. The Director of the Bureau of Red Cross Nursing was quoted telling her colleague, “There are moments when I wonder whether we can stem the tide and control the hysterical desire on the part of thousands, literally thousands, to get into nursing” (Keeling, 2010, p. 107). In Canada during this time, nurses had a third tragedy to tend to, the Halifax explosion (Groft, 2006). The war, the pandemic, and the Halifax explosion increased the

demand for talented nursing students in that country (Groft, 2006; Keeling, 2010; Stewart, 1921). During this time, little was known about the disease that was killing millions of people worldwide, and there were no anti-viral drugs. Good nursing was the best treatment, and this was recognized by those in health care and in the general population (Groft, 2006; Keeling, 2010).

During the COVID-19 pandemic, there has been an increased number of students applying to nursing and medical schools (Burke, 2021; Kowarski, 2020; Marcus, 2020). The number of students who apply to medical school has increased on average 2.5% each year with the exception of 2020 when there were 18% more medical school applicants (Burke, 2021). Some in academia have said this increase in 2020 is due to the “Fauci effect.” Proponents of the “Fauci effect” think that Dr. Anthony Fauci, the Director of the National Institute of Allergy and Infectious Diseases, has inspired young people to pursue a career in medicine (Burke, 2021; Marcus, 2020). Similarly, a 2015 study of medical students in Sudan reported that 78.1% of those surveyed were attending medical school for altruistic reasons. Financial reasons were ranked lower; 56.6% of those surveyed indicated that the “medical profession will place me in a high financial status,” and 50.8% indicated that a “medical career will secure me a good income” (Mutwali et al., 2015, p. 22). These studies indicate that the reasons students pursue careers in health care are highly varied.

Motivational Theories

The study of motivational theories is used to improve workplace environments (Kinsey, 2020) and can be used to better understand why undergraduates choose to pursue a career in health care. There are several motivational theories. Three of the most famous motivational theories are David McClelland’s theory of needs, Victor Vroom’s theory of expectancy, and Abraham Maslow’s hierarchy of needs theory. McClelland’s theory of needs states that there are

three motivators: achievement, affiliation, and power. Vroom's theory of expectancy is that people will be motivated if they think their efforts will be successful and they will be rewarded (Knowledge Hut, n.d.; Your Article Library, n.d.).

Maslow's hierarchy of needs theory states that once basic needs are fulfilled, one can work to fulfill other needs, such as belongingness and love (Knowledge Hut, n.d.). Abraham Maslow had a positive view of humanity and thought people try to achieve their full potential (Perera, 2020). Once one fulfills a set of needs in the hierarchy, the person will no longer be motivated unless he or she starts fulfilling the next higher level of needs in the hierarchy pyramid. The most basic human needs are physiological; we require food, water, and shelter. The next level is safety; humans need to feel both safe and secure by having adequate resources. The third level is social, and the fourth level is esteem (e.g., prestige, feeling of accomplishment). The top level in the hierarchy pyramid is self-actualization, which means fulfillment (Your Article Library, n.d.). Self-actualized people tend to be accepting of their flaws and the flaws of others, tend to be independent and resourceful, can develop meaningful relationships with others, express gratitude, and think they have a mission to accomplish something that is beyond themselves. Maslow did acknowledge that the number of those who achieve self-actualization is low, but that self-actualization is achievable (Perera, 2020).

Studies of future health care workers can help us understand what motivates people to enter their profession. As noted earlier, the study of the Sudanese medical students found that financial security is important to many of those who were surveyed, although less important than being able to help people. Over 40% of those studied noted being motivated to study medicine because "doctors are respected by the whole of society," and 56.6% think being a physician is a "prestigious profession." In this study, only 9.1% of respondents indicated they "enjoy studying

science,” and 19.7% indicated a “desire to make change in the medical field” (Mutwali et al., 2015, p. 22). The results of this study show that all of Maslow’s levels in his hierarchy of needs was important to most of the participants.

A study of undergraduates at Yale (Gold et al., 2014) found that participants had a negative attitude about pursuing a career in primary care because of the perceived lack of money, glamour, and prestige of that field. Semi-structured, open-ended interviews were conducted to help learn why relatively few medical school graduates choose to specialize in primary care. In regard to money, one student responded by saying:

I think it is also just the money. You know, you’re really not going to be making a lot of money if you’re in primary care. You’re not going to be having a nice house with a nice car, even though you might see your job as being just as tough as all of the other ones.

(Gold et al., 2014, p. 281)

Regarding prestige, in this same study, a student stated:

I think it’s a prestige thing. You know, say, “I’m a neurosurgeon. I know all about whatever specific area of the brain” Where primary care, it’s primary, even just that language, it makes it seem like they’re elementary and basic and not as legitimate. Not as difficult or technical as the neurosurgeon. (Gold et al., 2014, p. 281)

Another was quoted, “It could be a status thing. Like ‘Oh, you’re just a primary care doctor’” (Gold et al., 2014, p. 281). These abovementioned statements indicate that prestige and a high salary were important to the studied population. The study did not indicate whether fulfillment, or self-actualization, were important. There was no quantitative data included, and it was not reported whether questions related to the importance of having a meaningful career or achieving one’s full potential were asked (Gold et al., 2014).

Understanding how motivational theories apply to students interested in pursuing careers in health care will help us understand why people enter their given field.

Alternatives to an Altruistic Explanation

There are numerous reports that health care crises, such as the 1918 influenza pandemic, the COVID-19 pandemic, and a lack of quality health care in rural areas, have motivated students to become health care workers (Burke, 2021; Groft, 2006; Keeling, 2010; Kowarski, 2020; Marcus, 2020; Usher et al., 2013). While these reports imply that students may be motivated by altruistic reasons, there are alternative explanations for why some of the students who were the subjects in these publications were entering health care.

During World War I and the influenza pandemic, there was a great need for nurses. The number of nursing students and nursing training schools had been increasing, particularly since the mid-1890s (Department of the Interior, 1920; Stewart, 1921). As new advancements in medicine were made and specialties were created, the demand for more nurses increased (Stewart, 1921). Despite Bureau of Education reports stating that there was “almost universal interest in nursing which the war developed” and that “the newly aroused passion for patriotic work might find a congenial outlet in this permanent form of national service” (Stewart, 1921, p. 6-7), there did not appear to be a striking spike in the number of students during the time of the influenza pandemic. In 1904-1905 there were 19,824 nursing students, in 1909-1910 there were 32,636 students, in 1914-1915 there were 46,141 students, and in 1919-20 there were 54,953 students (Bonner, 1922). In 1926-27 there were 77,768 nursing students (Phillips, 1928). While the number of nursing students increased in the late 1910s, there had been a consistent increase for many years. However, reports indicate that more highly educated and better applicants were interested in nursing in 1917 and 1918 (Stewart, 1921).

As noted earlier, 18% more people applied to medical school in 2020 than the previous year (Burke, 2021). While some have speculated this is attributed to Dr. Anthony Fauci, others have noted that the medical school application process takes many years, and one could not decide to apply to medical school without making significant preparations (Burke, 2021; Marcus, 2020; Murphy, 2020). Medical school applicants must take specific courses, complete the MCAT, gather letters of recommendation, write a compelling personal statement, and demonstrate they are aware of what life as a physician is like. The latter can be accomplished by shadowing or working in a health care setting (Burke, 2021). More students may have applied to medical school in 2020 in comparison to previous years because interviews were virtual, thus applicants did not have travel expenses. Applicants also had more spare time, and there were fewer opportunities, such as shadowing to improve one's application; therefore, some applicants may have decided to try to get accepted during the 2020-2021 academic year instead of waiting (Burke, 2021; Marcus, 2020).

Safety and Security

The reasons students decide to pursue a career in health care are varied and complex. The reasons include helping their community, prestige, and earning a high salary. However, information as to whether the COVID-19 pandemic has changed students' perceptions of their safety and security, which is the second level in Maslow's hierarchy of needs, is unclear. After the end of World War I and the 1918 pandemic, the number of applicants for nursing school decreased. This decreased interest in a professional career was not limited to nursing though; there was also a shortage of "physicians, trained clerical workers, engineers, librarians, clergymen, and notably of teachers" (Stewart, 1921, p. 6). Young people were more at-risk of dying from influenza during the 1918 pandemic than middle-aged people, particularly during the

first two of three waves of infection (Morens & Fauci, 2007). The risks that young nurses endured was the subject of a 1921 government report (Stewart, 1921) about nursing education:

During the influenza epidemic, when hospitals were overcrowded and nurses were working unusually long hours, the sickness rate was exceedingly high. Numbers of pupil nurses died of infection and weakened systems from overwork, and many were compelled to give up their training. This appalling experience, together with the shortage of nurses which followed closely after, and the agitation for shorter hours have all served to call attention to the need of conserving the health of student nurses. (p. 8-9)

A lesson from the 1918 pandemic is that caring for the health and safety of health care providers must be a national priority.

Summary

Three motivational theories were presented in this literature review: David McClelland's theory of needs, Victor Vroom's theory of expectancy, and Abraham Maslow's hierarchy of needs theory. According to Abraham Maslow's hierarchy of needs theory, most people try to attain fulfillment, or self-actualization. Before being able to achieve fulfillment, one must satisfy the other needs in the hierarchy: physiological, safety and security, love and belonging, and esteem (Knowledge Hut, n.d.; Your Article Library, n.d.). Currently no one knows whether the COVID-19 pandemic has changed whether students think they will be able to satisfy the needs that are important to them if they pursue a career in health care. The tough conditions nurses endured during the 1918 pandemic may have resulted in a decline in interest in health care (Stewart, 1921), and the current pandemic has presented many challenges to the health care workforce including increased burnout, risk of infection, and a lost sense of purpose (Noguchi,

2021). Research is needed to understand how the latest pandemic may have changed student perceptions and motivations for wanting to become a health care worker.

Chapter III: Methodology

The purpose of this study was to develop an in-depth understanding for how the COVID-19 pandemic may or may not have influenced the career trajectories, motivations, and perceptions of pre-health students. This study sought to determine how students' perceptions of the severity of COVID-19, the impact the pandemic had on their personal and academic lives, and their community's response to the pandemic may or may not have impacted them. This information will be useful in addressing future shortages of health care workers and identifying the needs of the next generation of physicians, nurses, and other health care professionals.

This chapter describes the student populations at the University of Wisconsin-La Crosse and Minnesota State College Southeast, the impact of COVID-19 in the counties these institutions are located in and some of the counties the participants are from, the research design of this phenomenological study, and how the rights of the participants were protected

Subject Selection and Description

University of Wisconsin-La Crosse students enrolled in a pre-health seminar and a biochemistry course were notified about the study via an announcement posted in the learning management system of their respective course. Nursing students at Minnesota State College Southeast were notified about the study via email. Students interested in the study were asked to fill out a Google form to be considered. Those who filled out the form were contacted via text message or email to set up a 30-60 min interview.

The University of Wisconsin-La Crosse is located in La Crosse, WI, which is 135 miles southeast of St. Paul, MN and 145 miles northwest of Madison, WI. The university offers undergraduate majors in biochemistry, biology, clinical laboratory science, exercise and sports

medicine, microbiology, nuclear medicine technology, public health and community health education, and radiologic science (University of Wisconsin-La Crosse, 2021).

The majority of the students at the University of Wisconsin-La Crosse are undergraduates. Ninety-three percent of them are full-time and 7% of them are part-time. There are more than females than males, and the majority (80%) are in-state residents. There were 2,054 bachelors' degrees awarded in the 2019-2020 academic year. Almost 250 students earned a degree in biology, 26 earned a degree in microbiology, 13 earned a degree in biochemistry, and 189 students earned a degree in the category health professions and related programs. This latter category includes but is not limited to athletic training, clinical laboratory science, and nuclear medical technology. The university admits 75% of applicants seeking a bachelor's degree, and 46% of admitted students enroll. Eighty-six percent of full-time students who began in fall 2019 returned in fall 2020, and only 50% of part-time students enrolled during fall 2019 returned the following year. The racial/ethnic makeup of the undergraduate population is the following: 89% white, 2% Asian, 1% Black, 4% Hispanic, and 3% two or more races (National Center for Education Statistics, n.d.-a).

The main Minnesota State College Southeast campus is located in Winona, MN, which is 109 miles southeast of St. Paul, MN and 31 miles northwest of La Crosse, WI. The college has a campus in Red Wing, which is approximately 50 miles southeast of St. Paul and 62 miles northwest of Winona. Minnesota State College Southeast is a two-year community and technical college that offers programs in nursing and other health care-related fields (National Center for Education Statistics, n.d.-b).

Thirty-eight percent of the students at Minnesota State College Southeast are full-time while 62% are part-time. Fifty-four percent of the students are female, and 46% are male. The

college has an open admission policy. Fifty-six percent of full-time students who began their studies in fall 2019 returned in fall 2020, while 27% of part-time students who began at the same time returned the following year. During the 2019-2020 academic year, there were eight associate degrees awarded in biomedical technology, seven awarded in clinical medical laboratory technician, 14 awarded in radiologic technology, and five awarded in medical administrative. The racial makeup of the student population is the following: 83% white, 2% Asian, 3% Black, 5% Hispanic, 3% two or more races, and 3% race/ethnicity is unknown (National Center for Education Statistics, n.d.-b).

La Crosse, WI is located in La Crosse County. As of February 4, 2022, one out of every 766 people in La Crosse County had died of SARS-CoV-2 infection. Winona, WI is located in Winona County where one out of every 753 people had died of COVID-19 as of February 4, 2022. As of the same date, one out of every 464 people in Wisconsin, one out of every 482 people in Minnesota, and one out of every 399 people in Goodhue County, which is where Red Wing is located, had died. At least one participant was from each of the following Wisconsin counties: Waukesha, Marathon, Vernon, Polk, and Milwaukee. As of February 4, 2022, one in 430 in Waukesha County, one in 301 in Marathon County, one in 371 in Vernon County, one in 381 in Polk County, and one in 475 in Milwaukee County had died. In this same time period, one in 370 in the United States had died of COVID-19. More than 5.7 million people in the world had died of COVID-19 by early February 2022 (The New York Times, 2022).

The recruitment material posted in the learning management system of the courses at the University of Wisconsin-La Crosse included a one-minute video that described the purpose of the research and information about how to sign up (see Appendix A). All who were interested in participating in the study filled out a Google form (see Appendix B). After setting up an

interview time, each participant was sent the consent form. Students attending the University of Wisconsin-La Crosse were notified that he or she could view the reliance agreement between the University of Wisconsin-Stout and the University of Wisconsin-La Crosse if they would like (see Appendix C). Each participant was instructed to return a signed copy of the consent form to the researcher (see Appendix D). Snowball sampling was used to identify participants who were not enrolled in the pre-health seminar or the biochemistry course. Fourteen of the interviews were conducted in mid-December 2021, which is when the Omicron variant of SARS-CoV-2 was beginning to overtake the Delta variant as the dominant strain in the United States and news outlets reported that hospital systems may be overrun with infected patients (Kimball et al., 2021). Five of the interviews took place in early to mid-January, and three of them took place in the first week of February.

Instrumentation

Semi-structured interviews provide an opportunity for the researcher to focus an interview yet have the flexibility to gain an in-depth understanding of a person's views about a particular event or issue. These interviews allow the researcher to ask all participants the same base questions to ensure similar topics are covered and the opportunity to follow up with spontaneous questions (Robert Wood Johnson Foundation, n.d.). The base questions and the potential follow up questions were reviewed by two colleagues who were not involved in the study.

Abraham Maslow's hierarchy of needs theory has been previously used to understand the motivations for undergraduates pursuing a career in nursing (Zysberg & Berry, 2005). The questions asked in a survey conducted by Zysberg and Berry were used to develop the foundational questions used in this study (Zysberg & Berry, 2005).

The interviews were conducted by the researcher, who has previously taught hundreds of pre-health students in the Midwest in the following undergraduate courses: introductory biology, genetics, biochemistry, first-year seminar, special topics seminars. The researcher has previously interviewed over 100 pre-health students before writing their letter of recommendation and is thus familiar with many of the reasons undergraduates want to pursue a career in health care.

Data Collection Procedures

Before the prospective participants were contacted, a proposal was submitted to the University of Wisconsin-Stout Institutional Research Board (IRB) for approval. The application sent to the University of Wisconsin-Stout IRB, the acceptance letter from the University of Wisconsin-Stout for the project, and the consent form were sent to both the University of Wisconsin-La Crosse and Minnesota State College Southeast. The IRB at the University of Wisconsin-La Crosse reviewed these materials, along with a reliance agreement (see Appendix C). The Institutional Effectiveness Team at Minnesota State College Southeast reviewed the materials and approved the project via email correspondence (J. Mason, personal communication, January 29, 2022). The Institutional Effectiveness Team provides guidance on survey development and data requests, generates and facilitates major college surveys, and fields external IRB-sanctioned requests (J. Mason, personal communication, February 22, 2022). Correspondence with the study participants noted that the project had received IRB approval and that their respective institutions have honored the IRB approval from the University of Wisconsin-Stout.

Individual interviews took place in December 2021 through the first week of February 2022. Interviewing all the participants within a two-month timeframe helped establish dependability by ensuring the data were stable. The health implications for fully vaccinated

people in the United States did not significantly change during these two months despite the arrive of a new SARS-CoV-2 variant (Garcia-Beltran et al., 2022; Ginsberg, 2021). Interview responses of one participant would not vary drastically from another participant due to any changes in risk of disease for those who received two doses of the Moderna or Pfizer messenger RNA (mRNA) vaccines and a booster shot (Garcia-Beltran et al., 2022). However, there were changes to public health policies in certain regions during this time, and the risk of infection for unvaccinated people increased (Berg, 2022; City of Chicago, 2022). The participants were interviewed via phone but were provided the option of being interviewed via a video conferencing app if he or she did not want to provide a phone number to the researcher. An interview guide was prepared in advance (see Appendix E). Thorough notes were taken during the interviews to help establish validity. The participants were asked to pause throughout the interviews to ensure the data were accurately recorded, and any misunderstandings or ambiguity were clarified with the participant right away. Participants were transferred \$20 via the cash app Venmo or were sent an eGift card to a store of their choice.

Data Analysis

At the conclusion of each interview, the researcher recorded her comments right away. Themes were analyzed after the first few interviews, and notes about the themes were continually updated. The most common themes are discussed in the next section. Negative cases were also analyzed to enhance validity and are also reported in the next section.

Factors that could be used to identify a participant, such as their hometown, intended career path, and year in school, were removed from the data sections containing direct quotes and themes of interviewee responses. The participant's gender, intended career path, and year in

school were reported in the demographics section, but these data were not reported together. For example, a participant's home county and intended career path could not be determined.

Limitations

The majority of the study participants were all from the upper Midwest; thus, the perceptions that the COVID-19 pandemic has had on students in other areas of the country was not investigated. This study was advertised to pre-health students currently enrolled in science courses. Recruitment efforts did not prioritize finding participants who may have changed their major to a non-science field because of the pandemic. In addition, convenience sampling was used to enroll participants in the study. Students who were available and interested in the study were able to participate.

Summary

Undergraduate students at the University of Wisconsin-La Crosse and at Minnesota State College Southeast participated in semi-structured interviews to determine how the COVID-19 may or may not have impacted their motivation to pursue a career in health care and their perceptions of what a career in health care would now be like. Questions related to Maslow's hierarchy of needs theory were incorporated into the interviews. Themes in the responses were analyzed and reported in the next section.

Chapter IV: Results

The participants shared similar themes to many of the interview questions. All of the pre-health students stated their interest in health care began prior to entering college, the vast majority of them think SARS-CoV-2 is serious and have taken precautions to protect themselves and others from becoming infected, and their career interests have not changed because of the COVID-19 pandemic. A few of the pre-health participants indicated the pandemic has reinforced their decision to pursue a career in health care and stated they recognize the high demand for health care workers.

Because the study was advertised to students who were previously pre-health, one former pre-nursing student enrolled in this study. This student is currently interested in biomedical research. The pandemic did not dissuade this student from a career in nursing but has motivated her to learn more about infectious diseases with the goal of becoming a microbiologist.

Demographics

Each participant was asked about their year in school and where they are from (see Table 1).

Table 1*Demographics of the Participants*

	Response	Frequency	%
Gender			
	Female	20	90.9
	Male	2	9.1
School attending			
	University of Wisconsin-La Crosse	20	90.9
	Minnesota State College Southeast	2	9.1
Year in school			
	First	14	63.6
	Second	2	9.1
	Third	3	13.6
	Fourth	3	13.6
Home state			
	Wisconsin	18	81.8
	Minnesota	2	9.1
	Illinois	1	4.5
	West coast	1	4.5
Size of hometown			
	Large city (pop. $\geq 100,000$)	2	9.1
	Medium-sized city ($20,000 \leq \text{pop.} \leq 100,000$)	4	18.2
	Medium-sized city/suburb of Milwaukee ($20,000 \leq \text{pop.} \leq 100,000$)	1	4.5
	Small city ($2,000 \leq \text{pop.} \leq 20,000$)	5	22.7
	Small city/suburb of Milwaukee ($2,000 \leq \text{pop.} \leq 20,000$)	2	9.1
	Small town (pop. $\leq 2,000$)	8	36.4

The students were also asked about their intended career path (see Table 2).

Table 2*Intended Career Paths of the Participants*

Intended career path	Frequency	Percentage
Physician	7	31.8
Physician's assistant (PA)	7	31.8
Nurse	2	9.1
Athletic trainer/physical therapist	3	13.6
Optometrist	1	4.5
Biomedical researcher	2	9.1

Each participant was asked whether a parent is a health care worker (see Table 3).

Responses to the question "Is anyone in your family in health care?" are provided in Table 3.

Table 3*Professions of the Participants' Parents*

Response	Frequency	%
At least one parent works in health care		
Yes	10	45.5
No	12	54.5
Number of parents who work in health care		
One	9	90
Two	1	10
Job titles of their parents		
Dentist	1	9.1
Dietician	1	9.1
Emergency medical technician	1	9.1
Nurse	7	63.6
Occupational therapist	1	9.1

Note. This table shows the professions of the students' parents. The parents of the student who has two parents in health care are both nurses. None of the participants indicated that a step-parent or other former guardian was in health care.

Vaccination Status and Infection Control Strategies

Each participant was asked about how strict they, their immediate family members, and their communities have been about following COVID-19 guidelines, such as wearing masks, getting vaccinated, and practicing physical distancing. Of the 22 participants, two have not been vaccinated. Both of these students stated they will get vaccinated once they start a job in health care. Both became ill from SARS-CoV-2 infection but did not become seriously sick. As of February 4, 2022, 68% of the U.S. population age 5 and over were fully vaccinated, and over 25% of eligible people received a booster (The New York Times, 2022). In the studied group, 90.9% of them were vaccinated at the time they were interviewed. The percentage of participants who had received a booster was not determined.

Every participant indicated they and at least some of their immediate family members used mitigation strategies prior to the arrival of vaccines to help prevent the spread of SARS-CoV-2. Two of the participants stated that they and their families were careful because either their parent or sibling is immunocompromised. One of these students said her father who works with the general public lived outside the household to protect her immunocompromised mother. Others said their families were careful to protect their grandparents or the residents in assisted living facilities that one of the family members worked with. One interviewee said that only one member of the household would go grocery shopping at a time, and another said she did not visit with people indoors until she was vaccinated. Several students said the majority of their peers at the University of Wisconsin-La Crosse followed COVID-19 protocols but that people in their hometowns do not think SARS-CoV-2 is a serious virus. One student stated that “COVID does not exist” where she is from, and another said that “the misinformation has been frustrating.”

Several of the study participants were asked when they and their family members received the vaccine. Of those asked, nine said that they and their family members were vaccinated as soon it was possible. Six of those interviewed said that at least one of their parents or a step-parent has not been vaccinated, which has created tension within the household. Two of the vaccinated participants reported being hesitant about receiving a vaccine. One of these participants noted she received a vaccine once finding out it was mandated by the Army; the other hesitant student stated she received the vaccine after becoming ill from the virus and witnessing two people close to her seek emergency treatment for COVID-19.

Research Questions

The purpose of this study was to assess undergraduate students' motivations for pursuing a career in health care and to determine whether the COVID-19 pandemic has changed their attitudes and motivation level. The participants were interviewed to determine why they became interested in health care, how the pandemic affected their daily lives, and whether their viewpoints about health care careers have changed since the arrival of SARS-CoV-2.

Research Question 1

Research Question 1 asked, "Has the COVID-19 pandemic served as a source of discouragement, inspiration, or neither for undergraduate students interested in pursuing a career in health care?" All of the 20 interviewed pre-health students indicated that the pandemic has neither deterred nor significantly inspired them to pursue a career in health care. All 20 of these pre-health students said they have known since childhood or high school that they would like to be a health care worker. Their interest in health care developed prior to the onset of this pandemic. Fifteen of these students stated that the pandemic has caused little or no change in their motivation. Three noted they are somewhat more motivated about working in health care,

one student indicated being “much more motivated,” and one student noted being “hesitant” about working in health care. Themes of responses to the question “Did the pandemic change how motivated you are to pursue a career in health care?” were identified. Themes for how the pandemic positively impacted students’ attitudes and motivations about working in health care are provided in Table 4, and negative themes are provided in Table 5.

Table 4*Themes About How the Pandemic Positively Impacted Students' Motivations and Perceptions**About a Future Career in Health Care*

Theme	Direct quote or paraphrased response
Greater demand and appreciation for health care providers	<ul style="list-style-type: none"> • I'm glad attention has been given to health care workers • "I trust health care more because you see health care work" • "Health care workers are definitely needed" • The pandemic has been motivating and I like the praise the medical field has received • I am more motivated because there is an increased need for doctors • Although you cannot help everyone, there will be plenty of people who want the help • "Now is the time to get into nursing"
Society has learned from this pandemic	<ul style="list-style-type: none"> • I am glad people are learning more about science and more about viruses • "We'll be more careful in the next pandemic"
Will work where needed	<ul style="list-style-type: none"> • "We need people who are willing to help others" • I am much more motivated and will work where needed
No change in motivation	<ul style="list-style-type: none"> • "I have always wanted to work in health care" • I have wanted to work in health care since I was five years old • I have wanted to work in health care since I was in high school • I have been interested in health care since watching my mom work at a hospital • "No matter what, this is what my path is"
The pandemic has provided affirmation	<ul style="list-style-type: none"> • The pandemic has been a "good final push, but the idea in the back of my mind that I wanted to do something in health care was always there" • "Health care is inspiring" • I would be proud to be part of the solution • Seeing COVID patients in my CNA job is motivating • Nursing is "super hero work"
Not worried about the unknown	<ul style="list-style-type: none"> • There may or may not be another pandemic in my lifetime, and there is no point in worrying about it

Table 5*Themes About How the Pandemic Negatively Impacted Students' Motivations and Perceptions**About a Future Career in Health Care*

Theme	Direct quote or paraphrased response
Worries about working in health care in the future	<ul style="list-style-type: none"> • “COVID will always be around” • I would not want to be working in health care right now • I would worry about spreading the disease to my family • We will have future pandemics
Frustration with the general public's ignorance	<ul style="list-style-type: none"> • I do not want to work around people who do not take care of themselves • This pandemic may never go away because not enough people will get vaccinated • “The failures of the education system are very concerning”
My parent has experienced trauma working in health care during this pandemic	<ul style="list-style-type: none"> • My mom watched people die alone • My mom helped residents FaceTime their families • My mom's favorite residents died • My dad is angry with the unvaccinated • My parent is overwhelmed • Despite being overworked, my mom has never said I shouldn't pursue a career in health care • My mom's coworkers' mental health is suffering • I am “scared to see how worn out she is”

One student who works as an emergency medical technician (EMT) stated the pandemic initially caused her doubt about applying to medical school. This interviewee noted she started doubting herself early in the pandemic because as an EMT she only had “seen the negative” and that people's ignorance about SARS-CoV-2 has been frustrating. However, this student stated that she has been able to convince some of her patients to take a SARS-CoV-2 vaccine and noted that there will always be people who want and appreciate the help provided by those in health care.

As mentioned previously, one student noted being “hesitant” about pursuing a career in health care. This was the only student interviewed who has two parents that work in health care. Both parents are nurses. This student’s father “has a lot of negative emotions” about the state of the pandemic and is angry with people who have not been vaccinated and have not used mitigation strategies to prevent the spread of the virus. The student’s father contracted COVID-19 before the vaccines were available and still has issues related to the disease despite being healthy and fit. The student’s mother witnessed the death of many people from COVID-19, including her favorite residents at the assisted living facility.

Research Question 2

Research Question 2 asked, “What are the reasons for why students want to enter health care, and what are the reasons students become disinterested in health care?” Every student interviewed who wants to work in health care indicated that their primary reason for pursuing health care is to help people. Three of the interviewees noted that job security was a secondary reason, and one pre-PA student stated a healthy work-life balance and flexibility as being a secondary reason to become a PA. As noted earlier, each of the pre-health students indicated that they became interested in health care in either childhood or as a high school student. Many of these students discussed how they were exposed to health care workers in their early years. One discussed how she became inspired as a middle school student after being able to assist someone during a life-threatening emergency. Others discussed how they watched health care workers help their siblings, a grandparent, or themselves overcome serious injuries or diseases. One of the interviewees interested in becoming a physician and two of the students interested in athletic training/physical therapy indicated that they were exposed to health care workers after suffering sports injuries.

Many of those interviewed have at least one parent who works in health care (see Table 3). Despite the negative experiences of their parents endured since the start of the pandemic, none of the interviewees have decided not to pursue a career in health care. None of the students said that their parent has discouraged them from becoming a health care worker.

Two of the 22 interviewed are interested in research. One previously wanted to become a nurse but now wants to be a microbiologist. This student has worked as a nursing assistant and has become disinterested in working with patients. The pandemic is not the reason for this student's change in interests. One other student expressed an interest in working in biomedical research and stated that she thinks it is interesting that a family friend is working on a COVID-19 vaccine.

Research Question 3

Research Question 3 asked, "What concerns do students have about being a health care professional, and are these concerns related to the COVID-19 pandemic?" Most of those interviewed did not discuss any concerns about being a health care worker but a few noted they were concerned about the medical school or physician's assistant school admissions process. Some of these students mentioned concerns about not being able to obtain enough patient contact hours due to the pandemic. One of these students is concerned that her grades suffered at the beginning of the pandemic due to the isolation of having classes online and not feeling connected to her campus community. Others discussed the frustration of having to take their high school classes at home. The researcher and a few of the participants discussed the potential need for admissions committees to adjust the amount of required patient contact hours needed for applicants who were undergraduates during the most tumultuous times of the pandemic when certain health services were not being provided (Becker, 2021).

A pre-medicine student discussed how she has thought about what it would be like to be a health care worker right now and being at risk of spreading SARS-CoV-2 to a family member. The students were asked about their fears of future pandemics and working in health care. All participants who were asked this question acknowledged that another pandemic is possible during their lifetimes. Only two of the participants expressed concern about working in health care in a future pandemic. As noted in Table 4, some participants stated that we have learned from this pandemic and should be better prepared for the next one. In addition, several participants acknowledged that they will not be working in health care for many years and think this pandemic should be over at that time.

Two of the pre-health students discussed their disinterest in working in a rural health care setting. Although both of these students are from small towns, they both want to work in an urban or suburban environment. Both interviewees mentioned that they think those in rural areas do not take their health as seriously as those in larger cities. Smoking and being unvaccinated were two lifestyle choices mentioned by these study participants. Both students said they want to work on a variety of health cases and that they think a rural setting will not offer as much diversity in case types.

Two students discussed being against vaccine mandates, and one of these students discussed being alarmed by health care workers being fired for not getting vaccinated. Future mandates and the “dynamics of power” are a concern for her about working with health care. This student did note that while she disagrees with health care systems requiring vaccines, she will be “working for people and helping them.” Thus, despite disagreements with those drafting and enforcing mandates, she will remember that she is working for the patient, not the health care system.

Research Question 4

Research Question 4 asked, “Has the sickness or death of a loved one from COVID-19, personal disruptions caused by the pandemic, or the community’s response to the pandemic influenced students’ motivations and perceptions about pursuing a health care career?” Two of the interviewees said that her parent became seriously ill, and none said that a close family member or friend died from COVID-19. A few participants said they knew people who died from COVID-19, including family members they were not close with, their parents’ friends, patients they had worked with, and neighbors. One participant’s friend’s father passed away because he was unvaccinated. Others said that they have friends whose teachers or grandparents died. Three of the interviewees most closely connected to health care expressed the most reservation or concern about working in health care. As noted earlier, one of these students currently works as an EMT and has transported many COVID-19 patients; one student’s parents are both nurses, and one of her parents became seriously ill before being eligible for a vaccine. Another student has a parent who works as a nurse and has been overwhelmed and exhausted since the pandemic began. This has not deterred the students from wanting to enter health care. As discussed above, three participants are somewhat more motivated, and one participant is now much more motivated to work in health care.

Chapter V: Discussion, Conclusion, and Recommendations

Twenty students at the University of Wisconsin-La Crosse and two students from Minnesota State College Southeast participated in a semi-structured interview about how the COVID-19 pandemic may have influenced their career decisions. Twenty of those interviewed intend to enter health care, and two are interested in becoming a scientist. The pandemic largely did not affect the pre-health students' motivations about entering health care, nor has it caused much concern in these students about working in health care in the future. The pre-health students with the most reservations are some of the most closely connected to health care. The two students interested in research have been inspired to become a scientist because of the pandemic.

Discussion

There are several explanations for why the pandemic has not affected the motivational levels of the majority of those interviewed for this study. The health of the participants and the health of their families were largely unaffected by the virus. None of the participants had a close friend or family member die of the virus with the exception that a parent of a close friend of one of the participants died. Everyone who was interviewed employed mitigation strategies to prevent COVID-19 infection, and all but two interviewees have been vaccinated against SARS-CoV-2. The majority of those interviewed noted they and their family members have taken the pandemic seriously. Many noted that they and their family were vaccinated as soon as they were eligible and that they have been boosted or plan to get boosted soon.

The pandemic has not been a significant source of inspiration. A few study participants explained they were inspired to work in health care after witnessing a loved one interact with health care professionals, but these events occurred prior to the COVID-19 pandemic. All but

one study participant was not close with anyone who needed to be treated for COVID-19. All 20 of the interviewed pre-health students became interested in health care before the start of the pandemic.

The lack of concern about working during a pandemic and these results showing COVID-19 has not been a significant deterrent for pre-health students is likely attributed to the fact that the participants in this study will not be working in health care for at least a few years and after we have learned how to live with endemic SARS-CoV-2. The pre-medicine and pre-PA students will not be working for several years. While all of the participants acknowledged when asked that there could be another pandemic, only three of them were concerned about working during an outbreak. Two indicated they are worried about working in an overwhelmed environment, and one is worried about future vaccine mandates. Themes of the responses to questions about their concerns regarding future pandemics were largely positive and included the following:

1. We have learned from this pandemic and will be better prepared for the next one.
2. It is not necessary to worry about the unknown.
3. Health care workers are respected more now.

The findings are encouraging that these students have not been deterred from working in health care. The interviewed students are largely motivated by altruistic reasons and want to help those in the most need. If these data reflect the attitudes of the broader pre-health undergraduate population, there will be replacements for the health care workers who have quit or retired early. More research is needed though to determine whether enough undergraduates are interested in health care to replace the health care workers we have lost during this pandemic and to prevent the shortages that were predicted prior to the arrival of SARS-CoV-2 (Haddad et al., 2020; Kerns & Willis, 2020; Kushner & Sorensen, 2013; Short et al., 2018; Yong, 2021; Zhang, 2020).

While the results of this study are encouraging, there are several caveats that suggest the results are less positive. Three of the study participants most closely connected to the health care field have the most reservations or concerns about working in health care. As noted previously, the researcher has taught hundreds of pre-health students. Many of her pre-medicine students have parents who are doctors. The possibility exists that the college-age children of doctors are now less interested in pursuing a similar career path as their parents because of what their parents have endured for the last two years. If those most closely connected to health care have been deterred, we may not have enough people to replace the health care workers we have lost.

Interestingly, two of the 20 pre-health students said that they do not want to work in a rural setting because they think people in rural areas do not take care of themselves as much as those in suburban or urban areas. These data are discouraging if this trend persists in a larger sample size. Rural areas struggled to recruit physicians prior to the pandemic (Jaret, 2020), and the results from this study indicate this problem may be exacerbated.

Those interviewed who have been the most motivated by the pandemic are now interested in becoming scientists. These two students have become more interested in human health and are fascinated by how the body works. While this is a seemingly positive result, biomedical research is a crowded field, and the need for more scientists is debatable given the limited number of jobs available for graduates, particularly those with a Ph.D. (Das, 2019; Malloy et al., 2021).

Conclusions

The findings are encouraging that the pandemic has not deterred the study participants from wanting to become a health care worker. Despite the difficult conditions that our health care workers have endured these past two years, young people are determined to help where

needed. However, more research is needed to better understand this issue. Additional studies are needed to determine whether students whose parents work in health care have been discouraged and whether fewer students are now interested in rural medicine.

Recommendations

To better understand what undergraduates think about pursuing a career in health care, future studies should include students from diverse geographical regions. The group of participants in this study and their immediate family members largely took COVID-19 seriously and did not know many people who became seriously sick or died from the virus. Researchers in any future studies should interview or survey students from families that were more affected by the virus. Enrolling a larger number of participants and recruiting from different areas of the country will increase the probability of enrolling students who have been impacted more than the students in this study. In addition, recruiting students from states and counties with particularly low vaccination rates or areas most affected at the start of the pandemic before vaccines were available, such as New York City, may provide additional insight (The New York Times, 2022). Also, increasing gender diversity in the students may provide information about how the pandemic affected different genders. Finally, it is recommended that non-pre-health students are interviewed or surveyed to determine whether the pandemic has served as a source of inspiration for those wanting to conduct research. If more students are now interested in research, it will be important to address whether there are enough jobs for an increased number of science graduates.

References

- Ali, H., Cole, A., Ahmed, A., Hamasha, S., & Panos, G. (2020). Major stressors and coping strategies of frontline nursing staff during the outbreak of coronavirus disease 2020 (Covid-19) in Alabama. *Journal of Multidisciplinary Healthcare, 13*, 2057–2068. <https://doi.org/10.2147/JMDH.S285933>
- Amanullah, S., & Ramesh Shankar, R. (2020). The impact of COVID-19 on physician burnout globally: A review. *Healthcare, 8*(4), 421. <https://doi.org/10.3390/healthcare8040421>
- Association of American Medical Colleges. (2021, June 11). *AAMC report reinforces mounting physician shortage*. Retrieved February 26, 2021, from <https://www.aamc.org/news-insights/press-releases/aamc-report-reinforces-mounting-physician-shortage>
- Association of American Medical Colleges. (n.d.). *Taking the MCAT Exam*. Retrieved February 2, 2021, from <https://students-residents.aamc.org/applying-medical-school/taking-mcat-exam/>
- Becker, A. (2021, September 20). *It's time to stop describing lifesaving health care as "elective"*. Vox. <https://www.vox.com/22678393/elective-surgery-nonessential-trans-gender-affirming-hysterectomy>
- Berg, S. (2022, January 14). *What doctors wish patients knew about the COVID-19 Omicron variant*. Retrieved January 15, 2022, from <https://www.ama-assn.org/print/pdf/node/79826>
- Bonner, H. R. (1922). *Statistics of nurse training schools 1919-1920*. Statistical Division of the Bureau of Education. (Report No. 51). Government Printing Office. <https://files.eric.ed.gov/fulltext/ED541588.pdf>

Bureau of Labor Statistics (2022). *The employment situation-February 2022* [press release].

<https://www.bls.gov/news.release/pdf/empisit.pdf>

Burke, L. (2021, January 11). A 'Fauci effect'? Inside Higher Ed.

<https://www.insidehighered.com/admissions/article/2021/01/11/health-professions-schools-see-surge-applications>

Centers for Disease Control and Prevention (2012, May 18). *Principles of epidemiology in public health practice*. <https://www.cdc.gov/csels/dsepd/ss1978>

City of Chicago (2022). *Chicago vaccine requirement*. Retrieved January 15, 2022, from

<https://www.chicago.gov>

Cleveland Clinic. (2020, December 7). *How the pandemic is straining the healthcare system – and what you can do to help*. Retrieved March 14, 2021, from

<https://health.clevelandclinic.org/how-the-pandemic-is-straining-the-healthcare-system-and-what-you-can-do-to-help/>

Das, M. (2019, June 18). *Oh, the Places You Will Go With a PhD in Biology!* American Society for Cell Biology. <https://www.ascb.org/publications-columns/diversity-matters/oh-the-places-you-will-go-with-a-phd-in-biology/>

Dellinger, E. P., Pellegrini, C. A., & Gallagher, T. H. (2017). The aging physician and the medical profession. *JAMA Surgery*, *152*(10), 967-971.

<https://doi.org/10.1001/jamasurg.2017.2342>

Dennon, A. (2020, November 3). *Update on the College Student Mental Health Crisis*. Best

Colleges. <https://www.bestcolleges.com/blog/mental-health-in-college-students-during-covid-19-mental-health-crisis/>

Department of the Interior, Bureau of Education. (1920). *Nurse Training Schools 1917-18*.

(Report No. 73). Government Printing Office.

<https://files.eric.ed.gov/fulltext/ED541382.pdf>

Fang, L.-Q., Yang, Y., Jiang, J.-F., Yao, H.-W., Kargbo, D., Li, X.-L., Jiang, B.-G., Kargbo, B., Tong, Y.-G., Wang, Y.-W., Liu, K., Kamara, A., Dfae, F., Kanu, A., Jiang, R.-R., Sun, Y., Sun, R.-X., Chen, W.-J., Ma, M.-J., ... Cao, W.-C. (2016). Transmission dynamics of Ebola virus disease and intervention effectiveness in Sierra Leone. *Proceedings of the National Academy of Sciences*, *113*(16), 4488-4493.

<https://doi.org/10.1073/pnas.1518587113>

Garcia-Beltran, W. F., St Denis, K.J., Hoelzemer, A., Lam, E. C., Nitido, A.D, Sheehan, M.L., Berrios, C., Ofoman, O., Chang, C.C., Hauser, B.M., Feldman, J., Roederer, A.L., Gregory, D.J., Poznansky, M.C., Schmidt, A.G., John Iafrate, A., Naranbhai, V., & Balazs, A. B. (2021). mRNA-based COVID-19 vaccine boosters induce neutralizing immunity against SARS-CoV-2 Omicron variant. *Cell*, *185*(3), 457-466.

<https://doi.org/10.1016/j.cell.2021.12.033>

Ginsberg, L. (2021, December 21). *Why Covid vaccine booster shots are so important: Omicron will 'rip right through the population,' says expert*. CNBC.

<https://www.cnbc.com/2021/12/21/omicron-expert-why-covid-vaccine-booster-shots-are-so-important.html?&qsearchterm=omicron%20will%20rip%20right%20through%20the%20population>

- Gold, J. A., Barg, F. K., & Margo, K. (2014). Undergraduate students' perspectives on primary care. *Journal of Primary Care & Community Health, 5*(4), 279-283.
<https://doi.org/10.1177/2150131914534072>
- Groft, J. N. (2006). "Everything depends on good nursing." *The Canadian Nurse, 102*(3), 18-22.
<https://www.canadian-nurse.com/HigherLogic/System/DownloadDocumentFile.ashx?DocumentFileKey=b939bead-9f03-1ba4-79aa-8d88d6614d44&forceDialog=0>
- Haddad, L., Annamaraju, P., & Toney-Butler, T. J. (2020). Nursing Shortage. *StatPearls* [internet]. <https://www.ncbi.nlm.nih.gov/books/NBK493175/>
- Jacob, S. T., Crozier, I., Fischer, W. A., Hewlett, A., Kraft, C. S., de la Vega, M.-A., Soka, M. J., Wahl, V., Griffiths, A., Bollinger, L., & Kuhn, J. H. (2020). Ebola virus disease. *Nature Reviews Disease Primers, 6*(13). <https://doi.org/10.1038/s41572-020-0147-3>
- Jacobs, A. (2021, February 4). *A parallel pandemic hits health care workers: Trauma and exhaustion*. New York Times. <https://www.ncbi.nlm.nih.gov/search/research-news/12629/>
- Jaret, P. (2020, February 3). *Attracting the next generation of physicians to rural medicine*. Association of American Medical Colleges. <https://www.aamc.org/news-insights/attracting-next-generation-physicians-rural-medicine>
- Jones, K. E., Patel, N. G., Levy, M. A., Storeygard, A., Balk, D., Gittleman, J. L., & Daszak, P. (2008). Global trends in emerging infectious diseases. *Nature, 451*, 990–993.
<https://doi.org/10.1038/nature06536>
- Joyce, A. (2020, August 11). *The stress of the unknown is taking a massive toll on parents*. The Washington Post. <https://www.washingtonpost.com/lifestyle/on-parenting/the-stress-of->

the-unknown-is-taking-a-massive-toll-on-parents/2020/08/06/c5ec39be-d359-11ea-9038-af089b63ac21_story.html

Keeling, A. W. (2010). “Alert to the necessities of the emergency”: U.S. nursing during the 1918 influenza pandemic. *Public Health Reports*, 125(3_suppl), 105-112.

<https://doi.org/10.1177/00333549101250S313>

Kerns, C., & Willis, D. (2020, March 16). *The problem with U.S. health care isn't a shortage of doctors*. Harvard Business Review. <https://hbr.org/2020/03/the-problem-with-u-s-health-care-isnt-a-shortage-of-doctors>

Kimball, S., Rattner, N., & Constantino, A. K. (2021, December 15). ‘We’re heartbroken. We’re overwhelmed’ – U.S. hospitals grapple with delta outbreak as omicron takes root.

CNBC. <https://www.cnn.com/2021/12/15>

Kinsey, A. (2020, July 8). *How to apply motivational theories in the workplace*. Houston Chronicle. <https://smallbusiness.chron.com/apply-motivational-theories-workplace-10962.html>

Knowledge Hut. (n.d.). *Motivational Theories*. Retrieved March 5, 2021, from

<https://www.knowledgehut.com/tutorials/project-management/motivation-theories>

Koernick, C. (2015). *Surviving the leadership shortage: A succession plan for nursing leadership*. [Master’s thesis, University of Wisconsin-Stout].

<https://library.uwstout.edu/home>

Kowarski, I. (2020, June 18). *How Coronavirus affects nursing school admissions*. US News & World Report. <https://www.usnews.com/education/best-graduate-schools/top-nursing-schools/articles/how-coronavirus-is-affecting-nursing-school-admissions>

- Kushner, R. F., & Sorensen, K. W. (2013). Lifestyle medicine: The future of chronic disease management. *Current Opinion in Endocrinology, Diabetes and Obesity*, 20(5), 389-395.
<https://doi.org/10.1097/01.med.0000433056.76699.5d>
- Lambeth, J. M., Joerger, R. M., & Elliot, J. (2018). Merits of creating a revised CTE National Research Agenda for 2020. *Journal of Research in Technical Careers*, 2(1), 1-7.
- Levine, D. (2021, November 15). *U.S. faces crisis of burned-out health care workers*. U.S. News & World Report. <https://www.usnews.com/news/health-news/articles/2021-11-15/us-faces-crisis-of-burned-out-health-care-workers>
- Malloy, J., Young, L., & Berdahl, L. (2021). *Ph.D. oversupply: The system is the problem*. Inside Higher Ed. <https://www.insidehighered.com/advice/2021/06/22/how-phd-job-crisis-built-system-and-what-can-be-done-about-it-opinion>
- Marcus, J. (2020, December 1). *The ‘Fauci effect’: Inspired by front-line health care workers, record numbers apply to medical schools*. The Hechinger Report.
<https://hechingerreport.org/inspired-by-front-line-health-care-workers-record-numbers-apply-to-medical-schools/>
- Mathur, S. (2020, February 23). Is pre-med a major? Best majors for pre-meds [Blog post]. College Vine. <https://blog.collegevine.com/is-pre-med-a-major>
- Morens, D. M., & Fauci, A. S. (2007). The 1918 influenza pandemic: Insights for the 21st century. *The Journal of Infectious Diseases*, 195(7), 1018-1028.
<https://doi.org/10.1086/511989>
- Murphy, B. (2020, December 18). *Applications to medical school up big. Is it the “Fauci effect”?* American Medical Association. <https://www.ama-assn.org/residents-students/preparing-medical-school/applications-medical-school-big-it-fauci-effect>

- Must, A., Spadano, J., Coakley, E. H., Field, A. E., Colditz, G., & Dietz, W. H. (1999). The disease burden associated with overweight and obesity. *JAMA*, 282(16), 1523-1529. <https://doi.org/10.1001/jama.282.16.1523>
- Mutwali, I. M., Omer, A. I. A., & Abdalhalim, S. M. (2015). Why a medical career? What makes Sudanese students to join a medical college and pursue a medical career? *World Journal of Education*, 5(2), 19-25. <https://doi.org/10.5430/wje.v5n2p19>
- National Center for Education Statistics (n.d.-a). *The University of Wisconsin-La Crosse*. <https://nces.ed.gov/collegenavigator/?q=university+of+Wisconsin&s=all&id=240329>
- National Center for Education Statistics (n.d.-b). *Minnesota State College Southeast*. <https://nces.ed.gov/collegenavigator/?q=Minnesota+stat&s=all&id=175263>
- Nguyen, L. H., Drew, D. A., Graham, M. S., Joshi, A. D., Guo, C.-G., Ma, W., Mehta, R. S., Warner, E. T., Sikavi, D. R., Lo, C.-H., Kwon, S., Song, M., Mucci, L. A., Stampfer, M. J., Willett, W. C., Eliassen, A. H., Hart, J. E., Chavarro, J. E., Rich-Edwards, J. W., ... Chan, A. T. (2020). Risk of COVID-19 among front-line health-care workers and the general community: a prospective cohort study. *The Lancet Public Health*, 5(9), e475-e483. [https://doi.org/10.1016/S2468-2667\(20\)30164-X](https://doi.org/10.1016/S2468-2667(20)30164-X)
- Noguchi, Y. (2021, October 2). *Health workers know what good care is Pandemic burnout is getting in the way*. NPR. <https://www.wkyufm.org/2021-10-02/health-workers-know-what-good-care-is-pandemic-burnout-is-getting-in-the-way>
- Perera, A. (2020, September 4). *Self-Actualization*. Simply Psychology. <https://www.simplypsychology.org/self-actualization.html>

- Phillips, F. M. (1928). *Statistics of nurse training schools 1926-27*. Statistical Division of the Bureau of Education. (Report No. 2). Government Printing Office.
<https://eric.ed.gov/?id=ED540140>
- Pomeroy, C. (2021, July 6). *A tsunami of disability is coming as a result of 'long COVID'*. Scientific American. <https://www.scientificamerican.com/article/a-tsunami-of-disability-is-coming-as-a-result-of-lsquo-long-covid-rsquo/>
- Raven, J., Wurie, H., & Witter, S. (2018). Health workers' experiences of coping with the Ebola epidemic in Sierra Leone's health system: a qualitative study. *BMC Health Services Research, 18*(251). <https://doi.org/10.1186/s12913-018-3072-3>
- Robert Wood Johnson Foundation. (n.d.). *Semi-structured interviews*.
<http://www.qualres.org/HomeSemi-3629.html>
- Saklayen, M. G. (2018). The global epidemic of the metabolic syndrome. *Current Hypertension Reports, 20*(12). <https://doi.org/10.1007/s11906-018-0812-z>
- Schirmers, C. (2016). *Plight of oncologists: Burnout and biotechnology*. [Master's thesis, Boston University] OpenBU. <https://hdl.handle.net/2144/17035>
- Shen, X., Zou, X., Zhong, X., Yan, J., & Li, L. (2020). Psychological stress of ICU nurses in the time of COVID-19. *Critical Care, 24*(200), 1–3. <https://doi.org/10.1186/s13054-020-02926-2>
- Short, K. R., Kedzierska, K., & van de Sandt, C. E. (2018). Back to the future: Lessons learned from the 1918 influenza Pandemic. *Frontiers in Cellular and Infection Microbiology, 8*, 343. <https://doi.org/10.3389/fcimb.2018.00343>

- Son, C., Hegde, S., Smith, A., Wang, X., & Sasangohar, F. (2020). Effects of COVID-19 on college students' mental health in the United States: Interview survey study. *Journal of Medical Internet Research*, 22(9), Article e21279. <https://doi.org/10.2196/21279>
- Stewart, I. M. (1921). *Developments in Nursing Education Since 1918*. Statistical Division of the Bureau of Education. (Report No. 20). Government Printing Office.
<https://files.eric.ed.gov/fulltext/ED541506.pdf>
- The New York Times (2020, November 24). *Track Coronavirus cases in places important to you*. Retrieved November 24, 2021 from <https://www.nytimes.com/interactive/2021/us/covid-cases-deaths-tracker.html?searchResultPosition=1>
- The New York Times (2022, February 4). *Track Coronavirus cases in places important to you*. Retrieved February 4, 2022 from <https://www.nytimes.com/interactive/2021/us/covid-cases-deaths-tracker.html?searchResultPosition=1>
- University of Wisconsin-La Crosse. (2021). *Academic Programs*. Retrieved December 23, 2021, from <https://www.uwlax.edu/academics/>
- Usher, K., West, C., MacManus, M., Waqa, S., Stewart, L., Henry, R., Lindsay, D., Conaglen, J., Hall, J., McAuliffe, M. M., & Redman-MacLaren, M. (2013). Motivations to nurse: An exploration of what motivates students in Pacific Island countries to enter nursing. *International Journal of Nursing Practice*, 19(5), 447–454.
<https://doi.org/10.1111/ijn.12095>
- Vento, S., Cainelli, F., & Vallone, A. (2020). Violence against healthcare workers: A worldwide phenomenon with serious consequences. *Frontiers in Public Health*, 8, Article 570459.
<https://doi.org/10.3389/fpubh.2020.570459>

- World Health Organization. (2019, May 28). *Burn-out an “occupational phenomenon”*: *International classification of diseases*. <https://www.who.int/news/item/28-05-2019-burn-out-an-occupational-phenomenon-international-classification-of-diseases>
- World Health Organization. (n.d.). *Naming the coronavirus disease (COVID-19) and the virus that causes it*. Retrieved February 11, 2021, from [https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/naming-the-coronavirus-disease-\(covid-2019\)-and-the-virus-that-causes-it](https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/naming-the-coronavirus-disease-(covid-2019)-and-the-virus-that-causes-it)
- Yong, E. (2021, November 16). *Why health-care workers are quitting in droves*. The Atlantic. <https://www.theatlantic.com/health/archive/2021/11/the-mass-exodus-of-americas-health-care-workers/620713/>
- Your Article Library. (n.d.). *Motivational Theories: Top 8 Theories of Motivation - Explained!* Retrieved March 5, 2021, from <https://www.yourarticlelibrary.com/motivation/motivation-theories-top-8-theories-of-motivation-explained/35377>
- Zhang, X., Lin, D., Pforsich, H, & Lin, V. W. (2020) Physician workforce in the United States of America: forecasting nationwide shortages. *Human Resources for Health, 18*(8). <https://doi.org/10.1186/s12960-020-0448-3>
- Zysberg, L., & Berry, D. M. (2005). Gender and students’ vocational choices in entering the field of nursing. *Nursing Outlook, 53*(4), 193-198. <https://doi.org/10.1016/j.outlook.2005.05.001>

Appendix A

Transcript for the Recruitment Video Titled, “Seeking Participants for a Study About COVID-19 and Pre-Health Careers”

Hello everyone. My name is Lisa and I’m a grad student at UW-Stout. I’m studying how the pandemic has influenced the career decisions of undergraduates. Specifically, I want to know whether the pandemic has served as a motivating factor, has been a deterrent, or has no impact on those of you who are interested in a career in health care. For this study, I’m looking for people to complete a 30 to 60-minute interview with me where I’ll ask you questions about how the pandemic has influenced your daily life, what your career choices were before the pandemic, whether those have changed since, and any other information that may assist with understanding this important topic. There is compensation for this study. If you’re interested, first fill out the Google form, then wait for me to contact you about setting up the interview. I’ll make sure to set up an interview time that works best for you. Then you’ll complete the short interview, and then as compensation, I’ll send you either \$20 or a \$20 gift card. If you have any questions about the study, my contact information is here. Feel free to call or text my cell phone if you prefer to communicate that way. Thanks so much for your time, and have a great day. Bye.

Note that the researcher’s UW-Stout email address and personal phone number were provided in the video.

Appendix B

The Google form questions the interested participants answered

1. What is your name?
2. What college do you attend?
3. What is your intended career?
 - Nurse
 - Physician
 - Physician's Assistant
 - Pharmacist
 - Medical Technician
 - Other

4. When are you most likely available for the interview?

	8:00 am – 12:00 pm	12:00 pm – 5:00 pm	5:00 pm – 9:00 pm
Monday			
Tuesday			
Wednesday			
Thursday			
Friday			
Saturday			
Sunday			

5. What is the best way to contact you? Please provide your phone number and/or your email address.

Appendix C

Reliance Agreement Between UW-Stout and UW-La Crosse

Institutional Review Board Reliance Agreement

Name of Institution Providing IRB Review (Reviewing Institution / Designated IRB)

Institution Name: University of Wisconsin-Stout
 Federalwide Assurance (FWA): FWA00000103
 IORG: 0000688
 IRB Registration Number: 00001043

Name of Institution Relying on the Designated IRB (Deferring Institution)

Institution Name: University of Wisconsin-La Crosse
 Federalwide Assurance (FWA): 00002685
 IORG: 0000924
 IRB Registration Number: 00001294

Project Information

Project Title: How the COVID Pandemic Has Impact the Perceptions and Motivations of Pre-Health Students

(250 character maximum – must match title submitted to the Designated IRB):

Project Period

Start Date: 10/28/2021 End Date: 6/23/2026

Deferring Principal Investigator: Lisa Lenertz-Lindemer

Designated Principal Investigator: Basudeb Bhattacharyya

Sponsor or Funding Agency: N/A

Current IRB protocol status: Approved Pending review To be submitted

If approved: IRB protocol ID #:

Agreement

The Officials signing below agree that University of Wisconsin-La Crosse, the Deferring Institution, may rely on the Designated IRB for review and continuing oversight of its human subjects research described above.

- I. Responsibilities of the Designated IRB and Reviewing Institution
 - a. The review performed by the Designated IRB will meet the human subject protection requirements of the Deferring Institution's OHRP-approved FWA.
 - b. The Designated IRB or Reviewing Institution shall review any applicable grant to ensure the protocol is congruent with the grant.
 - c. The Designated IRB will follow written procedures for reporting its findings and actions to appropriate officials at the Deferring Institution. Relevant minutes of IRB meetings will be made available to the Deferring Institution upon request.
 - d. The Reviewing Institution shall report any Designated IRB findings of serious or continuing noncompliance and unanticipated problems posing risks to subjects or others to OHRP, FDA, and sponsors when required by law or the Reviewing Institution's policy. The Designated IRB shall share its findings with the Deferring Institution prior to a report if those findings involve conduct by the Deferring Institution's employees or agents.

- e. Neither party to this Agreement is required to accept a deferral or make a deferral, except as described in this Agreement.
- II. Responsibilities of the Deferring Institution
- a. The Deferring Institution remains responsible for ensuring compliance with the Designated IRB's determinations and with the Terms of its OHRP-approved FWA.
 - b. If the Deferring Institution has agreed on its OHRP-approved FWA to apply 45 CFR 46 (the "Common Rule") or any of its Subparts to non-federally funded or supported research, the Deferring Institution shall communicate this to the Reviewing Institution prior to review by the Designated IRB of the research.
 - c. The Deferring Institution will notify the Reviewing Institution of any instances of potential noncompliance or any unanticipated problems which may pose risks to subjects or others of which it becomes aware for any protocols covered by this Agreement.

This document must be kept on files by both parties and provided to OHRP upon request.

This Agreement may be terminated at any time upon written notice to the other party's Institutional Official. Upon termination, each institution must assume or arrange for oversight of the activities of its own employees or agents. The Designated IRB's oversight shall continue until the transfer of the protocol, which shall occur without undue delay.

Signatures

Signature of Signatory Official (Reviewing Institution):



Date: 11/2/2021

Print Full Name: Glendalí Rodríguez

Institutional Title: Interim Provost and Vice Chancellor

Signature of Signatory Official (Deferring Institution – UWL IRB Coordinator):



Date: 11/19/2021

Print Full Name: Christine Hippert

Institutional Title: IRB Coordinator

Appendix D

Consent Form

UW-Stout Implied Consent Statement for Research Involving Human Subjects

Consent to Participate In UW-Stout Approved Research

Project Title: How the COVID-19 Pandemic Has Impacted the Perceptions and Motivations of Pre-Health Students at the University of Wisconsin-Stout

Description: We are interested in determining if and how the COVID-19 pandemic changed the aspirations of undergraduate students interested in a career in health care and whether the pandemic introduced any concerns about working in health care. Participants of this study will complete a 30-60 minute phone or video semi-structured interview. Please feel free to contact the researcher with any questions or concerns.

Risks: You will be asked questions about how the pandemic affected your personal and professional lives. Some of these questions may be upsetting. There is also a small chance that the responses to your interview may be seen by someone who does not have access to it. Risks will be minimized by ensuring the interview notes are stored in a secure location and personal identifiers, such as age and gender and not stored with the interview notes.

Benefits: You may benefit by contributing to our understanding for how the COVID-19 pandemic affected the motivations and attitudes of undergraduate students. This information may be used to improve recruitment and retention in health care professions, particularly during significant events, such as a pandemic.

Confidentiality: The data from the interviews will be reported in a way where the hometown, gender, race, major, etc. of the participant cannot be used to identify he or she. In addition, the interview notes will be shredded upon publication of the study.

Future Use: The data collected for this study will not be used in future research.

Time Commitment: The interviews will likely last between 30 and 60 minutes. The researcher may follow up via email after the interview.

Right to Withdraw: Your participation in this study is entirely voluntary. You may choose not to participate without any adverse consequences to you. You have the right to stop the survey at any time. However, should you choose to participate and later wish to withdraw from the study, there is no way to identify your anonymous document after it has been turned into the investigator. If you are participating in an anonymous online survey, once you submit your response, the data cannot be linked to you and cannot be withdrawn.

IRB Approval: This study has been reviewed and approved by The University of Wisconsin-Stout's Institutional Review Board (IRB). The IRB has determined that this study meets the ethical obligations required by federal law and University policies. If you have questions or concerns regarding this study, please contact the Investigator or Advisor. If you have any questions, concerns, or reports regarding your rights as a research subject, please contact the IRB Administrator.

Investigator: Lisa Lenertz
[REDACTED] | lenertz-lindeml4958@my.uwstout.edu

Advisor: Diane Klemme
715-232-2546 | klemmed@uwstout.edu

IRB Administrator: Seth Langreck
Office of Research and Sponsored Programs
101 Vocational Rehabilitation Bldg.
UW-Stout
Menomonie, WI 54751
715-232-2691 | Langrecks@uwstout.edu

Statement of Consent: I agree to participate in the project entitled “How the COVID-19 Pandemic Has Impacted the Perceptions and Motivations of Pre-Health Students at the University of Wisconsin-Stout.”

Signature

Date

Appendix E

Interview Guide

Guiding Questions

- 1) What is your intended career path? What factors motivated you to pursue that path (e.g., helping others, prestige, job stability)?
- 2) Is anyone in your family in health care?
- 3) Where were you living during the pandemic (e.g., on campus, city, state)?
- 4) How did the pandemic affect your family and their professional lives?
- 5) How seriously do you, your family, and your community think COVID-19 is?
- 6) Did anyone you know become seriously ill or die from the virus?
- 7) Did the pandemic change how motivated you are to pursue a career in health care?
How concerned are you about future pandemics or other significant health events?