The Impact of COVID-19 on Canadian Acute Care Nursing Professionals:

An Integrative Review

A Thesis Submitted to the

College of Graduate and Postdoctoral Studies

In Partial Fulfillment of the Requirements

For the Degree of Master of Nursing

In the College of Nursing

University of Saskatchewan

Saskatoon

By

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Abstract

**Background:** The COVID-19 pandemic has put widespread pressures on the Canadian healthcare system. As infections soared and the healthcare system attempted to grapple with increased patient loads and acuity, nurses were impacted and, among other issues, began leaving the profession. Shortfalls of acute care staff have caused bed closures, service disruptions, and decreased access to timely patient care. In order to stem the tide of nurses exiting the profession, the system needs to change. Understanding the complexity of pandemic impacts on nurses is integral to making changes that will be most impactful as COVID-19 continues and as new pandemics occur.

**Purpose:** To integrate the current evidence of COVID-19 impacts on Canadian acute care nurses.

**Method:** This is an integrative review using Whittemore and Knafl’s framework. The databases searched were CINAHL, MEDLINE, Web of Science, and NIH. The search terms used were Canada/Canadian/Canadians, the name of each province, nurse/nurses/nursing, and COVID-19/SARS-CoV-2/coronavirus/cov-19. Search criteria were supported by a health sciences librarian. Twenty articles were found to meet inclusion criteria and contribute to an understanding of the impacts of the COVID-19 pandemic on acute care nurses specifically.

**Results:** The current evidence has been synthesized into a conceptual framework which indicates the COVID-19 pandemic impacted acute care nurses in Canada through four main mechanisms: a) changes which sometimes occurred rapidly and frequently; b) access to needed resources; c) connections between nurses as well as others; and d) aspects of the infectious agent itself. The outcomes of the pandemic on nurses included positive effects, physical effects, emotional responses, leaving/attrition, and mental health disorders. As well, four significant mediating factors were identified as coping, making connections, learning and experience, and finding meaning.
Application to Nursing: Nurses have been impacted by the COVID-19 pandemic in ways that are far-reaching and possibly long-term. Understanding how these impacts occur, can help in the formation of policies and procedures that can mitigate the effects and support nurses even during pandemic events.
Acknowledgements

I would like to express my deepest gratitude to my thesis supervisor, Dr. Kelly Penz, PhD RN. Your patient guidance and constant encouragement made it possible for me to finish this project. You are inspiring to me as a nurse and as an educator. Thank you for sharing your time with me.

I would also like to thank my committee member Dr. Helen Vandenberg, PhD RN. Your unique perspective helped me improve this project by showing me how to look beyond my first impressions and dig a little deeper.

Thank you as well to Dr. Shelley Peacock, PhD RN for being my chairperson and Kevin Read, MLIS MAS for helping develop the search parameters.

Lastly, I could not have undertaken this journey without the help and patience of my family. Thank you to my kids and my husband who gave me the space and the quiet I needed to get this finished. We have had a few rough years through COVID and our fire, but we made it through. I love you!
Dedication

I would like to dedicate this thesis to the nurses who worked through the COVID-19 pandemic. You sacrificed yourselves for the betterment of people who were often deniers of the suffering around them. It has not gone unnoticed, and I hope this research serves as a tiny acknowledgement for all that you have been through.
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List of Abbreviations

CAEP – Canadian Association of Emergency Physicians
CCRN or CCN – Critical Care Registered Nurse
DASS-21 - Depression, Anxiety, and Stress Scale, 21 item version
GAD-7 - Generalized Anxiety Disorder, 7 item
GHQ – General Health Questionnaire
GHQ-12 – General Health Questionnaire, 12 item version
HCW – Health Care Worker
ICU – Intensive Care Unit
IES-R – Impact of Events Scale, revised version
MERS – Middle East Respiratory Syndrome
MMAT – Mixed Methods Appraisal Tool
NP – Nurse Practitioner
PHQ-9 - Patient Health Questionnaire, 9 item
PPE – Personal Protective Equipment
PROQoL – Professional Quality of Life measure
PSS-10- Perceived Stress Scale, 10 item
RN – Registered Nurse
SARS – Severe Acute Respiratory Syndrome
Chapter 1. Introduction and Overview

1.1 Statement of the Problem

Epidemics and pandemics of infectious diseases are not new phenomenon. Epidemics have occurred throughout human history. The first recorded pandemic of an unidentified infectious disease was in Greece in 425 BCE, and others have followed, sometimes centuries apart, such as the Syphilis plague of 1494 or the Yellow fever pandemic of 1793 (Morens et al., 2020). In the last 100 years, pandemics have become more commonplace as the human population has expanded and travel has increased, giving us Ebola, Human Immunodeficiency Virus, Severe Acute Respiratory Syndrome (SARS), H1N1 flu, and Zika to contend with (Morens et al., 2020). It had been long predicted that a new global flu pandemic would eventually arise, and as such, it was not a surprise when a new virus began circulating in late 2019.

Since the first reports of a new viral pneumonia in Wuhan, China, on December 31, 2019, the Sars-CoV-2 virus causing COVID-19 continues to spread worldwide at an alarming rate. At the time of writing, cases are in the hundreds of millions, and waves of infection are still occurring (John Hopkins University, 2022). This highly infectious disease causes a number of effects ranging from mild, cold-like symptoms, to organ failure, and death. Though research on COVID-19 infection is still in its early stages of publication, the public has witnessed the effects on the health of the public as well as healthcare systems. News articles abound describing overflowing hospitals, crying healthcare workers, and refrigeration trucks acting as morgues giving some perspective to the extent of COVID-19's damaging effects (Cherelus, 2020; Moon & Mossburg, December 31, 2020; Pelley, October 9, 2020). Governments asked healthcare workers to contribute to efforts to stem the tide of infections.

In response to the pandemic, Registered Nurses, Nurse Practitioners, and Licensed or Registered Practical Nurses (nurses) were on the frontline of COVID-19 care as cases have been
reported in almost every country of the world (John Hopkins University, 2022). Nurses provided not only direct patient care but also immunizations, contact tracing, and various types of COVID-19 testing services. As the largest cohort of healthcare providers, nurses were integral to the continued functioning of healthcare systems during the COVID-19 pandemic.

Nurses, as integral providers of healthcare services, are not in endless supply. Nursing shortages were prevalent worldwide before the pandemic and are predicted to worsen post-pandemic (Drennan & Ross, 2019; International Council of Nurses, 2021b). According to the International Council of Nurses (ICN) (2021b), there has been an increased attrition rate from nursing in 2020. The ICN estimates that up to 13 million nurses, globally, will be needed to fill positions moving forward. Attrition rates include expected retirements as the Baby Boomer generation continues to age out of the system and the "mass traumatization" of the workforce by the effects of the COVID-19 pandemic, which the ICN has termed "the COVID Effect" (2021a). Given that shortages are occurring and predicted to worsen, healthcare systems need to act quickly to support nursing professionals to remain in the workforce.

In Canada, the Canadian Nurses Association (n.d.) predicted a shortage of 60,000 registered nurses by 2022 before the pandemic had even begun. Like the rest of the world, Canada will have to deal with the aftermath of the pandemic by finding ways to support the healthcare system. Canada's system is publicly-funded and provincial governments ultimately have the responsibility to address nursing shortages. These decisions will have huge impacts on patient care as shortages of nurses are linked to increased patient mortality, increased falls, failure to rescue, increased length of stay, and additional readmissions (Blume et al., 2021; Needleman et al., 2020; Stalpers et al., 2015). Shortages must be addressed to ensure optimal care levels for patients.
Nursing shortages are not the only effect of COVID-19 to be examined. There are a number of other systemic issues in nursing that the pandemic has exacerbated. Increasing nursing workloads and patient acuity have led nurses to have concerns about patient care and safety pre-pandemic (Adams & Sawchuk, 2020; Brunoro, 2007; Registered Nurses' Association of Ontario, 2004b). COVID-19 caused an influx of patients into the system including high acuity challenges requiring specialized care such as intensive care. As well in Canada, political motivations to manage healthcare expenditures has resulted in an underfunded health system with fewer full-time nursing positions and nurse manager positions, little to no surge capacity, and few resources to manage infectious disease outbreaks and deploy staff appropriately (Canadian Nurses Association, 2022; Pringle, 2009; Registered Nurses' Association of Ontario, 2004b). Underfunding of the healthcare system has led to a "doing more with less" attitude that has left nurses with fewer educational opportunities, reduced opportunity to rely on their own professional judgment, and a system that has replaced many Registered Nurse jobs with that of licensed nurses or un-regulated healthcare workers (Adams & Sawchuk, 2020; Brunoro, 2007; Pringle, 2009). Although pandemics have the potential to increase the reach and influence of the nursing profession, structural issues and the sheer scope of the COVID-19 pandemic's effects on the healthcare system, challenge the nursing profession.

1.2 Purpose of the Study and Specific Aims

The literature on the effects of COVID-19 on the nursing workforce is abundant; however, in the fast-paced world of healthcare, there is a need for reviews of the scholarly evidence to help succinctly describe the evidence and make it usable to those on the frontlines (Hopia et al., 2016a, 2016b). The purpose of this research is to integrate the findings of quantitative, qualitative, and mixed methods research on the experiences of acute care nursing professionals working during the COVID-19 pandemic in Canada with the intent of informing
policy related to the retention of nursing professionals in their work during pandemics. A second objective of this research is to provide a baseline of information to inform future research as the COVID-19 pandemic and its effects continue over the coming years, and other pandemics are predicted to occur. Therefore, the research question is "what is the impact of COVID-19 on the experiences of acute care nurses working in Canada?"

1.3 Significance of the Research

COVID-19 is unlike any pandemic or epidemic since the Spanish Flu of 1918. It has incurred more cases and deaths than SARS, Middle East Respiratory Syndrome (MERS), and Ebola outbreaks (Chan-Yeung & Xu, 2003; Nassar et al., 2018; Singh et al., 2017). The unique experiences of nursing professionals on the frontlines of pandemics must be taken into account in the future planning of healthcare systems. Though COVID-19 has provided the impetus for many studies in nursing; to glean any useful information from the large corpus of evidence, summaries and analyses are required. An integrative review of the current state of nursing during the COVID-19 pandemic in Canada can provide a condensed version of research and analysis that could yield new information and point the way for future research and policy.
Chapter 2. Literature Review

Although the COVID-19 pandemic has presented new challenges for healthcare systems, many precursor health events provide a foundation for our knowledge of nurses' experiences during such times. An examination of the Spanish Flu, SARS, MERS, Ebola and H1N1 flu can provide a background regarding the reality of nursing during times of infectious disease outbreaks, thereby giving insight into the current pandemic. A cursory review of the literature has provided many important areas to examine such as: workload, personal protective equipment (PPE), stress and distress, isolation and stigmatization, systems issues and staff shortages, mitigating factors, and positive outcomes. A discussion of each of these issues has supported the research question and the development of subject headings and search terms.

2.1 Nursing Roles during Historically Significant Health Events

The significance of the role of nurses during past large-scale health events such as pandemics and epidemics cannot be understated. During the Spanish Flu (1918), nursing staff worked tirelessly to provide care for patients with a disease that, at the time, had no proven medical treatment or cure (Kolawole, 2010). The crisis highlighted that nursing was essential to the public's welfare (D'Antonio, 2019a), with the recognition that "now everything depends on good nursing care" (Deming, 2021, p. 1309). Nurses took on roles across the field of healthcare, such as screening for cases, educating the public, monitoring disease progression, and providing nursing interventions in the homes of sick patients and in hospitals (Kolawole, 2010). Through the expansion of nursing roles and the dire need for more nurses during this time "the status of nursing became elevated and their [nurses’] roles . . . were more visible" (Robinson, 2021, p. 351).

Other major health events have changed the roles of nurses. It has been suggested that during the H1N1 pandemic of 2009, nurses had increased roles compared to physicians and other
healthcare assistants as they were the central point of patient contact from admission through to discharge (Wong et al., 2012). During the 2003 Severe Acute Respiratory Syndrome (SARS) pandemic, nursing roles changed to include screening, identification, and containment of infectious diseases (Registered Nurses' Association of Ontario, 2004a). Moreover, during the 2014 Ebola outbreak in Africa, nurses worked both in the hospitals to provide treatments, as well as, in the communities to help educate the public and encourage them to seek treatment when they were afraid of hospital environments (Jones et al., 2017). Nursing roles consistently change and expand during serious outbreak of infectious disease.

The increased nursing workload due to pandemic or epidemic disease events has been reported in many studies to cause significant strain as nurses attempted to reconcile sometimes-competing interests. For example, emergency room nurses found that new roles in infection control, disease surveillance, and managing other aspects of outbreaks made their work more difficult (Lam et al., 2019a). During times of outbreak, Corley et al. (2010) found that experienced nurses were required to treat higher acuity patients leaving roles such as team leads and charge nurses vacant. Younger and less-experienced nurses were required to take on these roles even though they may not have been prepared or supported in them. There is a consensus among scholars that nurses are at the forefront of infectious disease outbreaks and are often expected to expand their roles in order to protect the public (D'Antonio, 2019b; Hessels et al., 2019; Klopper et al., 2020; McGillis Hall & Kashin, 2016; J. Rankin, 2006; Wong et al., 2012). Though some positive effects such as increased public awareness of the importance of nursing have been found (Kolawole, 2010), expanded roles have also added to the already growing workload placed on nurses.

Although the expansion of roles must necessarily occur in all domains of care such as public health and long-term care, it is within the hospital system that patients first seek care. For
example, emergency rooms are the first point of contact for patients with infectious disease and, therefore nurses in these areas are at increased risk of illness and death (Lam et al., 2019b). From there, patients often move either to critical care areas or in-patient hospital units making nurses in these areas also more at risk of pandemic illness (J. Rankin, 2006). As well, the number of patients in long-term care does not increase dramatically during outbreaks due to their limited ability to expand bed capacity, and nurses often have more supervisory roles, unlike acute care settings. For these reasons, acute care poses potentially different experiences for nurses and needs to be examined independently of other care settings.

2.2 Experiences of Nurses During Previous Infectious Disease Outbreaks

2.2.1 Workload

There is literature devoted to examining and measuring nurses' workload, but little has been done specifically during times of infectious disease outbreaks. Workload is connected to the retention of nurses (Holland et al., 2019; Marufu et al., 2021; Moloney et al., 2018; Shiao et al., 2007) and pandemics increase acuity which increase nursing care requirements. History demonstrates that during the Spanish Flu, H1N1, SARS, MERS, and Ebola outbreaks, patients presented with multiple health issues ranging from minor illnesses to death (Deming, 2021; Huaping & Liehr, 2009). Patients were often cared for in their homes during the Spanish Flu, leaving hospitals for only those requiring the highest levels of care (Bradshaw, 2005). This increased acuity could be said to increase workload.

The sheer volume of patients also increases workload as pandemics like the Spanish Flu can quickly overwhelm healthcare systems and all but the most acute patients are quickly discharged to the community (Schoch-Spana, 2001). During the Ebola virus outbreaks in Africa in 2014, the government health system was overwhelmed with patients, and the international community had to step in to provide support, including increases to the supply of nurses through
the International Federation of Red Cross and Red Crescent Societies deployment of staff (Paillard-Borg et al., 2020). The SARS outbreak had more limited spread; however, still managed to overwhelm systems, particularly emergency departments where isolation rooms were in short supply and in ICUs where general hospital staff were sent to operate newly opened beds (Holroyd & McNaught, 2008; Registered Nurses' Association of Ontario, 2004a). Therefore, pandemics have an immense potential to increase workloads for nurses, which in turn, can influence retention.

2.2.2 Need for Personal Protective Equipment (PPE)

Another critical factor in nurses' experiences during disease outbreaks is the amount of PPE required. Extra time is required to don and doff equipment such as masks, gowns, gloves. As well, the physical aspects of wearing PPE has been shown to increase workload by creating exhaustion, dizziness, dehydration, difficulty breathing, skin issues, sleep disorders, and trouble completing tasks through the many layers (Huaping & Liehr, 2009; Im et al., 2018; Registered Nurses' Association of Ontario, 2004a). In one study in Hong Kong, it was observed that some nurses even succumbed to their PPE and collapsed (Holroyd & McNaught, 2008). As well, increased monitoring of PPE compliance means that additional staff time is required just for this activity (Corley et al., 2010). The effects of PPE increase workload by increasing the time it takes to complete tasks and increasing the physical stamina required to look after infected patients. Even visitors who required education on proper PPE use may increase the workload of nursing staff (Corley et al., 2010). The results of burdening nurses, who are arguably already overworked before an outbreak, with even more to bear increases workload.

2.2.3 Stress and Distress

The increase in nurses' stress during times of infectious disease outbreaks was commonly reported in the literature. During the SARS outbreak in Hong Kong, 68% of participants,
including nurses, reported significant or severe job-related stress (Tam et al., 2004). Maunder and Maunder (2004) found that being a nurse and looking after probable and suspected SARS cases during the SARS outbreak were significantly associated with the severity of stress. Stress did not come from just the workplace, but also from home life and the community giving context to outbreaks as not strictly isolated to the hospital environment (Chan et al., 2005). As well, in areas where nurses' co-workers were getting sick, there was an increased stress response and emotional burden on nurses caring for them as well as worry about others becoming infected (Bournes & Ferguson-Paré, 2005; Chung et al., 2005; Khalid et al., 2016; Lee et al., 2005). Nurses who got sick themselves suffered both physically and mentally with the fear that accompanies contracting a deadly disease (Registered Nurses' Association of Ontario, 2004a). The experience of stress is not new to nursing but appears to be more severe during infectious disease outbreaks.

Psychological distress has also been researched in relation to nurses and working during pandemics. Goulia et al. (2010) found that 6.8% of their participants (i.e., medical staff, nursing staff, allied personnel and auxiliary staff) had severe psychological distress, with the highest rates in nurses. The authors also found that psychological distress was negatively correlated with work satisfaction (Goulia et al., 2010). These results had already been established by Nickell et al. (2004), who found that 45.1% of nurses in their study had probable emotional distress during the SARS outbreak. Psychological distress, then, is another layer to the complex experience of nursing during pandemic outbreaks.

These experiences of the stress of working during a pandemic may become pathological in some cases. Psychological morbidity, stress reaction syndrome, and posttraumatic stress (PTS) have all been found to be higher in healthcare workers who experienced working in a pandemic (Bai et al., 2004; Chen et al., 2005; Tam et al., 2004; Wu et al., 2009). Stress has also been shown to take the form of Post-Traumatic Stress Disorder (PTSD), which indicates long-term effects on
nurses who experience it. Chan and Huak (2004) found that 20% of the doctors and nurses developed PTSD during the SARS outbreak in Singapore. Other studies also indicated PTSD that was acquired through working as a nurse during SARS as well as MERS due to the trauma and stress they experienced (Holroyd & McNaught, 2008; Jung et al., 2020). These findings indicated that the nurses in pandemics may experience increased stress even to the point of developing long-term psychological conditions.

2.2.4 Isolation and Stigmatization

Stigmatization of healthcare workers is also a concern in the context of pandemic outbreaks. Ebola presented one of the most extreme examples, as the public panicked and saw hospitals and those who worked in them as the source of the infections in Africa (Hewlett & Hewlett, 2005). In some cases, healthcare workers were barred from their communities, shunned by their families, and were even called "the Ebola people" (Hewlett & Hewlett, 2005). Violent examples of stigmatization occurred such as workers' clothes being burned, kids throwing stones at them, being physically attacked, and destruction of their property (Hewlett & Hewlett, 2005; McGillis Hall & Kashin, 2016). The extreme fear in Africa may have related to the public's lack of understanding of basic infection control and transmission processes (Hewlett & Hewlett, 2005), but even outbreaks in other countries caused stigma and isolation for nurses. Nurses returning to other countries after assisting in the epidemic also experienced adverse reactions and stigma, particularly through the effects of the media that provoked a fearful view of the nurses (Paillard-Borg et al., 2020).

During an H1N1 influenza outbreak in 2009, nurses reported that people close to them avoided them due to their work in the hospital (Goulia et al., 2010). During MERS outbreaks, nurses found that other staff would avoid them, and due to community stigmatization they had to start living in the hospital dorms, and even their children were discriminated against (Im et al.,...
2018; Kim, 2018). These findings were similar to that of nurses working in hospitals during SARS. Not only were communities, family members, and friends found to have ostracized nurses, but even co-workers sometimes avoided them or treated them differently (Bai et al., 2004; Holroyd & McNaught, 2008; Nickell et al., 2004; Williams, 2007).

The isolation of nurses has been found to directly affect their mental health by increasing their stress (Park et al., 2018). Nurses also reported feelings of betrayal, shame, fear, a lack of support, sadness, and feeling like "vermin" and "lepers" (Im et al., 2018, p. 75; Kang et al., 2018; J. Rankin, 2006, p. 134; Williams, 2007). The removal of social supports and even just moral support as nurses found others pulling away from contact with them was experienced as an issue that needed to be addressed (Williams, 2007). Maunder and Maunder (2004) also found that more subtle types of isolation during outbreaks such as reduced personal contact through PPE and findings that indicated workers self-isolated and more often chose avoidance coping behaviors contributing to their overall isolation. These experiences were amplified during periods of quarantine, which many nurses endured in their homes or within facilities during outbreaks due to their exposures at work (McMahon et al., 2016; Williams, 2007).

Quarantines of staff members have been found to have significant adverse effects on health care workers. Bai et al. (2004) found that being quarantined led to a high risk of acute stress disorder and decreased willingness to work. Quarantine has also been linked to increased alcohol use, emotional exhaustion, anger, stress, and avoidance coping behaviors in nurses (Marjanovic et al., 2007; Maunder & Maunder, 2004; Wu et al., 2008). Individuals quarantined during the SARS outbreak also spoke of feelings of rejection, blame, as well as fear (Cava et al., 2005). Henssler et al. (2020) found through meta-analysis that individuals experiencing quarantine or isolation have an increased risk of depression, anxiety, stress disorders, and anger. These findings suggest that the quarantine of nurses needs to be considered when examining the
harmful effects of outbreaks, with the possibility of increased isolation leading to various psychosocial consequences.

2.2.5 Other Negative Impacts

Research on nurses during pandemics and epidemics has shown other types of negative impacts. First of all, nurses may experience anxiety related to their experiences, although Chen et al. (2006) found that anxiety may decrease after the experience of caring for infected patients. Worrying about an outbreak situation such as the H1N1 pandemic prompted both stress and psychological distress (Chong et al., 2004; Gouliia et al., 2010; Lee et al., 2005). Other concerns found in the literature include fatigue, health hypervigilance, and panic attacks (Corley et al., 2010; Lancee et al., 2008; Maunder & Maunder, 2004). Depression was also found in nurses who had worked during the SARS outbreak, along with other psychiatric disorders (Chong et al., 2004; Lancee et al., 2008). The mental and emotional toll experienced during these events has been well documented, with the physical impacts such as insomnia, exhaustion, and poor self-rated health recorded in the literature, but not examined in detail (Bai et al., 2004; Registered Nurses' Association of Ontario, 2004a; Tam et al., 2004). The numerous physical and emotional impacts of pandemics on nurses provide insight into their experiences.

2.2.6 Health System Preparedness and Staffing Shortages

Even with all the previous knowledge and guidance coming from past outbreaks of infectious disease, a common thread apparent in the research is a lack of preparedness on the part of governments and healthcare systems. Understandably, the world was not prepared for the Spanish Flu. Many healthcare workers had been deployed to help with the war effort, public health nursing was in its infancy, and treatments and vaccines were scarce (Schoch-Spana, 2001). In the United States, "the healthcare system was quickly overwhelmed" with hospitals overflowing and families being asked to provide all but the most challenging care (Bradshaw,
2005). Without proper PPE or any way to medically eliminate the disease, the Spanish Flu killed millions (Schoch-Spana, 2001). The Spanish Flu pandemic showed the weaknesses of healthcare systems when faced with a novel infection.

Fast forward to 2003 and the SARS pandemic. This time in a much more sophisticated and technologically advanced healthcare system, another respiratory illness began to cross the globe. However, when it hit, health systems were similarly unprepared for the surge. At that time, Toronto, Canada, was one of the cities to find cases in its hospitals. Ontario nurses caring for SARS patients reported that the healthcare system was ill-prepared for a significant outbreak as funding cuts and restructuring had created an "under-resourced" and "destabilized" system where hospitals were quickly overrun with patients requiring isolation rooms and emergency beds, thereby causing movement of patients, along with the virus, to other facilities (Registered Nurses' Association of Ontario, 2004a). Other healthcare services were also compromised as additional resources were taken from some areas to meet the growing demand of the pandemic in acute care settings (Registered Nurses' Association of Ontario, 2004a). Across the world, nurses in Hong Kong expressed similar issues. The nurses cited a lack of planning, inadequate supplies, and a lack of hospital capacity as serious issues during the outbreak (Chung et al., 2005; Holroyd & McNaught, 2008). This lack of attention to the structure of healthcare systems left them wanting when faced with dangerous outbreaks.

In Africa, Ebola became an outbreak that highlighted the faults in the healthcare system there. Essential equipment such as PPE, thermometers, disinfectants, and medications were scarce (Bell et al., 2017; Hewlett & Hewlett, 2005). Even things taken for granted in wealthier countries, such as running water and electricity, were often unavailable to nurses working during Ebola epidemics (Bell et al., 2017; Hewlett & Hewlett, 2005). As human and other health resources were pulled into the Ebola treatment centers, healthcare in other areas was adversely
affected (Jones et al., 2017). Outbreaks such as this highlight the need for investments in healthcare infrastructure.

One of the key resources during a pandemic is its healthcare workforce, of which nurses make up the majority. Multiple staffing issues affected the ability of healthcare systems to keep pace during outbreaks. During the First World War, many nurses had been deployed to work in army hospitals, just as the Spanish Flu was taking hold (Cipriano, 2018; Deming, 2021; Schoch-Spana, 2001). As well, during the SARS outbreak in Canada, it was well-documented that a shortage of full-time staff, nurses working in multiple areas and then being cohorted to only one site, recruitment and retention lagging behind attrition, as well as population growth all contributed to a severe nursing shortage during the pandemic (Registered Nurses' Association of Ontario, 2004a). Nursing shortages have been reported worldwide for many years, and continue to contribute to difficulties in addressing healthcare needs during infectious disease outbreaks.

Shortages can also be exacerbated during a pandemic through the infectious disease itself. Healthcare workers are not impervious to new viruses and get sick at the same or higher rates than the community leaving them possibly unable to work for a time (Schoch-Spana, 2001). Nurses are particularly vulnerable to infection due to the time they spend in direct patient care (Goulia et al., 2010; J. Rankin, 2006). SARS was a potent example of this as its spread occurred more specifically in the hospital environment, and nurses were the largest group to become infected (Bai et al., 2004; Registered Nurses' Association of Ontario, 2004a; Tam et al., 2004; Tolomiczenko et al., 2005). Staff who become sick or have close contacts and have to quarantine, only increases the staffing shortages. Some healthcare workers even died from their infections acquired at work, causing additional shortages as well as fueling fear of infection in other healthcare workers that affected their ability to show up for work (Bai et al., 2004; Registered Nurses’ Association of Ontario, 2004a; Williams, 2007). When nurses cannot attend work, there
are few alternatives but to ask those who are left to take on more, thereby increasing their workload and logically increasing their stress levels and fatigue.

Ebola is another deadly infectious disease outbreak that disproportionately affected healthcare workers. An analysis done on the data from Sierra Leone, Africa, showed that healthcare workers had a 103-fold higher incidence of Ebola than the general population (Kilmarx et al., 2014). Though this data may be incomplete, it shows how high the risks are for professionals with direct patient contact and the difficulties this might pose to sustaining the working population (Kilmarx et al., 2014). These same patterns were observed in other outbreaks, such as MERS in South Korea in 2015, where 21% of reported infections were in healthcare workers, with 40% of those being nurses (Jung et al., 2020). Although the majority of cases during these outbreaks spread directly through the healthcare system, even with community spread, the number of healthcare workers who become sick or require quarantine would significantly affect the ability of systems to provide safe staffing levels.

Beyond the actual infection, the fear of contracting an infectious disease and passing such infections on to family members are two significant reasons healthcare workers consider not reporting for work during outbreaks (Corley et al., 2010; Kim & Choi, 2016; Martin, 2011; Martin et al., 2013b). Healthcare workers calculated the risk to themselves and their families based on various factors. One factor was the lack of concise and usable information regarding the spread, containment, appropriate PPE and infection control measures, and organizational plans which led to increased fear and anxiety (Bell et al., 2017; Chan & Huak, 2004; Chung et al., 2005; Holroyd & McNaught, 2008; Huaping & Liehr, 2009; Jones et al., 2017; Kim, 2018; J. Rankin, 2006). As well, the information that was available to nurses during outbreaks was often contradictory and changed so often as to be confusing instead of supportive, leading to increased fear that PPE would not protect them (Chung et al., 2005; J. Rankin, 2006; Registered Nurses'
Association of Ontario, 2004a). In these situations, nurses had to decide whether it was worth risking their lives just to go to work.

Even when information was available, it was noted that nurses did not always trust the information that they were provided, mainly when they believed it related more to organizational issues rather than to the science of the disease. For example, with the use of PPE, guidelines were often changed based on the masks or equipment available, or policies changed seemingly without explanation or without proper training leaving nurses to question their level of protection against the disease (Abolfotouh et al., 2017; Beardwood & Kainer, 2015; Corley et al., 2010; Kang et al., 2018; Kim, 2018). An example highlighting the rationality of this fear was found by the Registered Nurses’ Association of Ontario (2004a) where a nurse stated,

"I was initially told that I wouldn't have to work in the unit if the mask didn't fit…none of them fit properly – so I was sent home. The next day I was called [to return to work] and told that they weren't going to be doing any more mask fit testing." (p. 21)

PPE is essential in the perceived, and actual, safety of the nurse and their loved ones and therefore figures heavily in risk assessment.

The risks of infection to themselves or taking these risks home to family members affected the decisions of healthcare workers to continue working during outbreaks. Multiple authors have found a link between the perceived threat of the infection and health care professionals’ willingness to work. Kim and Choi (2016) found that nurses were less likely to work with Ebola patients when they perceived their risk of infection as being high. Corley et al. (2010) found that during the H1N1 pandemic, some nurses were reluctant to provide care to patients or even outright refused to. In a study on nurses' willingness to work during a pandemic, Martin (2011) supported these findings by showing a significant correlation between the perceived risks of infection to self and family and nurses’ willingness to work. Other researchers
found that nurses’ intention to leave their jobs was also increased by the outbreak of infections and the risks they foresaw (Abolfotouh et al., 2017; Chong et al., 2004; Jung et al., 2020; Williams, 2007). In particular, the likelihood that nurses would report to work decreased the closer the infection was to them personally, either geographically or within a facility, as the threat was therefore increased (Abolfotouh et al., 2017; Fiksenbaum et al., 2006; Martin, 2011). With staff already in short supply during outbreaks due to system issues, sickness, and quarantine, the perceived risks to themselves and their families may also have contributed to further attrition of nurses.

The attrition of nurses during times of infectious disease outbreaks was problematic for systems already working at capacity. Attention to the factors that negatively affect nurses’ willingness to work during pandemics may mitigate some of these issues. As well, as nurses leave because they are ill or decide they cannot do the job because the risk is too high, other nurses have to fill the gaps by picking up shifts or working overtime. Overworking the nurses who are left logically increases their risk of the negative effects discussed so far such as stress, distress, and depression.

2.2.7 Mitigating Factors

2.2.7.1 Organizational Supports. Though the picture seems grim for nurses during infectious disease outbreaks, the research also showed that many factors might have contributed to mitigating the negative impacts. The most-reported mitigating factor was the level and type of support from a variety of sources. One source was the healthcare system, including the government and hospitals, termed organizational support including informational as well as emotional support (Marjanovic et al., 2007). Marjanovic et al. (2007) found that when nurses felt that organizational support was high, they experienced less anger and emotional exhaustion. A study of Canadian hospital workers in Toronto found that organizational support was protective
against various psychiatric disorders during SARS (Lancee et al., 2008). Other authors reported that government acknowledgment and educational supports were viewed as beneficial to nurses during the SARS pandemic (Huaping & Liehr, 2009; Lee et al., 2005). As well, directed support in the form of specific interventions within health organizations for their staff, such as providing psychiatric/psychological supports, was perceived as helpful and important during a pandemic (Goulia et al., 2010; Lee et al., 2005). Even more directly, nurses who perceived that their supervisors were supportive, felt that this helped to buffer against the stresses of the work environment (Jung et al., 2020; Tam et al., 2004; Williams, 2007). The perception that a nurse's family was supportive was also highlighted as important, effectively leading to decreased anxiety, a sense of reassurance, and a greater willingness to work during an outbreak (Chen et al., 2006; Khalid et al., 2016; Lee et al., 2005; Wu et al). These findings suggest that organizational and personal supports are important in mitigating the negative effects of serious infectious disease outbreaks.

**2.2.7.2 Peer Support and Relationships.** Collegial/peer support and collaborative team relationships were also important in mitigating some of the negative effects of working during an outbreak. Nurses found that their relationships with their colleagues were often strengthened through what they saw as difficult times (Im et al., 2018; Williams, 2007). The ability for nurses to discuss issues and receive support from their colleagues in formal and informal groups was also mentioned in the literature as an important outlet, sometimes even more important than family support (Lee et al., 2005; Williams, 2007). As social relationships outside of the outbreak were strained by periods of isolation and the stigmatization of working as a nurse, collegial relationships and internal organizational supports seemed to become even more critical. They provided a means through which nurses found ways to continue working in the often stressful conditions.
2.2.7.3 Meaning and Purpose. The personal meaning and purpose that nurses develop while working their way through infectious disease outbreaks, may also help them cope with stress. Some nurses found that working together towards a common goal made their work more rewarding (Im et al., 2018). As well, many nurses reported feeling that their work had real value and outbreaks had only solidified their commitment to the profession and made them more determined to continue in their work (Chung et al., 2005; Williams, 2007). Finding their work meaningful increased their sense of duty to continue working in the profession when many others left.

2.2.7.4 Sense of Duty. A sense of duty is common in the literature as a reason for becoming a nurse and remaining one during difficult times. The duty to care is encompassed in many professional codes of ethics (Pfrimmer, 2009), but the perception of that duty varies among nurses. First, there is the professional/ethical duty that means a nurse believes they have a professional responsibility to provide care, sometimes even in the face of personal dangers such as during outbreaks (Pfrimmer, 2009). Jones et al. (2017) found that during an Ebola outbreak in Africa, there was a clear motivation to continue working in the face of a deadly disease, particularly from those who viewed themselves as leaders. A belief in this type of obligation was correlated to the willingness to care for infected patients (Hewlett & Hewlett, 2005; Kim & Choi, 2016) and to continue working in the field of nursing (Abolfotouh et al., 2017; Goulia et al., 2010; Khalid et al., 2016; Kim, 2018; Williams, 2007; Wong et al., 2012). Researchers also mentioned religious duty and the perception that the danger was "part of gods plan" was a motivator for continued work during pandemics (Jones et al., 2017, p. 24). That nurses felt they had an obligation that overshadowed whatever stress and fear they were experiencing helps make sense of why so many nurses stay in their positions even when conditions deteriorate. However,
the duty to care is not absolute, and some weighed their safety and the safety of their families as too great and left.

**2.2.7.5 Access to Adequate Personal Protective Equipment.** Nurses were more likely to fulfill their duty when provided with the necessary resources. The provision of PPE was deeply important to nurses assuming because the perceived risk to themselves and their families was decreased when they felt protected from the illness (Khalid et al., 2016; Kim, 2018; Lee et al., 2005; Martin et al., 2013b; Wong et al., 2012). It also connects to the reciprocal nature of the duty to care, in which organizations have a duty to look after their employees which includes provision of PPE (Pfrimmer, 2009; Simonds & Sokol, 2009). Nurses' fears were increased when they perceived a lack of appropriate PPE (Corley et al., 2010; Kim, 2018). Providing appropriate PPE is also linked to nurses’ intent to work during a pandemic (Martin et al., 2013a). Together, these findings show that appropriate PPE influences nurses' experience of working during an infectious disease outbreak.

**2.2.7.6 Access to Accurate and Timely Training and Information.** Information was also a significant predictor of nurse willingness to work during pandemics. In this vein, training was significant both before and during an outbreak. Ma et al. (2011) found that an H1N1 training program increased healthcare workers' willingness to look after infected patients. In a systematic review of the literature, Brooks et al. (2018) found that specialized training and past experience were protective against the stress and anxiety experienced during outbreaks. Research on a SARS prevention program in Taiwan found that nurses had lower anxiety and depression, indicating that information can be crucial to the mental health of nurses (Chen et al., 2006). Beyond specific programming, clear guidelines for infection control, knowledge of the disease, and knowledge sharing contributed to decreased tension and increased willingness to work (Chen et al., 2009; Khalid et al., 2016; Lee et al., 2005; Williams, 2007). These findings show that information
during pandemics is a vital resource that can be leveraged to increase nurses’ willingness to work and mitigate some of the stressors associated with infectious disease outbreaks.

2.2.8 Positive Outcomes

Although negative outcomes are more commonly found in the literature on past pandemics and epidemics, some positive outcomes have also been found. Nurses have sometimes benefitted from their willingness to work by being acknowledged and rewarded publicly. Some nurses recognized that they had pride in their achievements and in their courage as they faced the danger posed by the infectious disease (Im et al., 2018; Kim, 2018; Registered Nurses' Association of Ontario, 2004a). Some nurses found that they had new skills and newfound confidence in their abilities because of the outbreaks they had worked through (Huaping & Liehr, 2009; Registered Nurses' Association of Ontario, 2004a). Some nurses were also found to have made positive changes in their lives outside of work, including re-prioritizing how they spent their time, valuing family time more, and feeling more altruistic after their experiences (Tam et al., 2004). It was also found that some nurses had further committed to their work and to helping make changes in the system (Registered Nurses' Association of Ontario, 2004a; Wong et al., 2012). These positive changes seem to support that over the long-term nurses' experience during pandemics may help them weather future ones by increasing their skills base and confidence.

2.3 Application to COVID-19 Pandemic

This review of the literature has shown the complexity of how infectious disease events may impact nurses on the frontlines of pandemic responses. The change in workload, effects of PPE, stress, and distress, isolation and stigmatization, and other negative impacts put nurses at risk for adverse outcomes. Health systems have proven to be unprepared for the considerable challenges of infectious disease outbreaks in the past. While there have been some positive outcomes, more negatives can be found in the literature. An examination of the mitigating factors
may help policymakers and organizational leaders in the future to support nurses in their essential work.

The COVID-19 pandemic poses a threat to the health and safety of people in almost every country in the world. Though not as deadly as the Spanish Flu of 1918, the virus continues to mutate and cause wave upon wave of infections, causing healthcare systems to buckle under the weight of large numbers of seriously ill patients. The impact of such a prolonged and widespread pandemic on nurses has yet to be fully tabulated, but previous research has pointed to some of the potential impacts and outcomes. Examining the impact of COVID-19 on Canadian nurses is key to providing support and for future planning.
Chapter 3. Methodology

3.1 Integrative Review Method

An integrative review is used to gather all research in a particular area and then synthesize this data into themes and relationships among themes to provide new insights into the topic (Cronin & George, 2020). This type of review allows for synthesizing both experimental and non-experimental data, as well as data collected through qualitative studies. This type of review was chosen so that all research methodologies could be included in the analysis. Whittemore and Knafl (2005) have provided a framework that can be used as the basis of an integrative review. Although there are other methodologies, Whittemore and Knafl's (2005) approach consists of distinct steps and guidelines for this type of review, providing a map and solid foundation for a novice researcher. Each of the five steps in this review framework will be described below, and include: (a) problem identification, (b) literature search, (c) data evaluation, (d) data analysis, and (e) presentation. This framework provided the structure for this review of Canadian acute care nursing professionals and their experiences during the COVID-19 pandemic with the intent of informing policy related to the retention of nursing professionals in their work during pandemics. A second objective of this research is to provide a baseline of information to inform future research as the COVID-19 pandemic and its effects continue over the coming years, and other pandemics are predicted to occur.

3.1.1 Problem Identification

Problem identification is the first stage of the integrative review process. Whittemore and Knafl (2005) describe this step as integral to all future steps of the review by providing a clear purpose and distinction of the variables involved, allowing for better integration of multiple data types. For professional nurses to get the help and support they require there needs to be an understanding of what encompasses being a nurse during a pandemic. The first variable then is
the COVID-19 pandemic as the core antecedent of nurses' experiences. The second variable is 'nurses' as a professional group. This variable is difficult to identify in the research literature as nurses are often sampled together with other health providers into categories such as "healthcare workers." In order to make sure that the results of the review apply to the field of nursing, research had to delineate nurses as subjects/participants and present results that pertained specifically to nurses. The variable of Canadian was chosen as providing a specific geographical focus for the results of the review. Healthcare systems in Canada function under principles of the Canada Health Act such as public funding and public administration which are not comparable to private systems such as those in the United States (Health Canada, 2014). Canada also has a large geographic area with a relatively small population that presents unique health system issues compared to many countries such as the UK or China, making it important to examine on its own. The final variable is the pandemic's impact on the experiences of nurses.

3.1.2 Literature Search

The second step of Whittemore and Knafl's (2005) review process is the literature search. The literature search is an important step in order to make sure the review includes "a complete and balanced representation of findings relevant to a topic . . . to guard against bias arising from gaps in the included data" (Cronin & George, 2020). Whittemore and Knafl (2005) identify that in order to have a comprehensive search, at least two strategies should be used. As well, the choices made during the search need to be documented (Whittemore & Knafl, 2005). For the purposes of identifying the experiences of Canadian acute care nurses, the following criteria were used to create a comprehensive literature search.

3.1.2.1 Eligibility Criteria. The following items made up the inclusion criteria:

1. English language.
2. Full text available.
3. Nursing specific – must be distinguished within the research as a separate group or as individual participants with at least some results specific to nurses.

4. Acute inpatient care specific – "encompasses a range of clinical healthcare functions, including emergency medicine, trauma care, pre-hospital emergency care, acute care surgery, critical care, urgent care, and short-term inpatient stabilization" (Hirshon et al., 2013).

5. COVID-19 pandemic specific, including all published data up to the end of 2022.

6. Original, single study, peer-reviewed research.

7. Participants identified as working within the Canadian healthcare system.

3.1.2.2 Exclusion Criteria. Research relating to managers or students was excluded as not representing the average nurses' experiences. Research related to advanced practice nurses was also excluded as the scope of practice included more supervisory and managerial roles. Due to the large amount of available peer-reviewed literature, a grey literature search was not included. The decision to leave out grey literature is in keeping with Mahood et al. (2014) and Benzies et al. (2006), who found that grey literature searches were not always necessary for reviews and could add a significant workload for a team of researchers.

3.1.2.3 Search String. The search string was developed with the help of my thesis supervisor Dr. Kelly Penz, committee members, and the University of Saskatchewan Health Sciences Librarian, Kevin Read, as well as the findings of the literature review. Terms were used in their free form or under their major and minor headings with their field tag MH as applied through CINAHL. Terms that were more than one word long were enclosed in quotations so they would be searched together. Each concept to delineate Canadian, COVID-19, and nurses was searched separately using the Boolean operator "OR." The three concepts were then searched together with the Boolean operator "AND."

3.1.2.4 Search Outcome. The Preferred Reporting Items for Systematic and Meta-Analyses (PRISMA) diagram was used to show the flow of the search strategy and the numbers of articles found and those included/excluded in order to provide sufficient documentation as Whittemore and Knafl (2005) suggest. The search was undertaken at two time points, first in October 2022 and again in April 2023 to make sure that all data from the first two years of the pandemic were included. CINAHL, MEDLINE, and Web of Science were chosen as containing relevant nursing research and being recommended by the Health Sciences Librarian at the University of Saskatchewan. I also searched the National Institute of Health (NIH) COVID-19 database as it attempts to catalog all COVID-19 specific research. I also citation searched for references to ensure that search results were comprehensive.

During the first search in October 2022 (see Figure 1), CINAHL, MEDLINE, Web of Science, and NIH databases returned a total of 1,848 results. After duplicates were removed, 1,437 articles were screened by their title and abstract leaving 98 reports that were sought for retrieval. Two reports were not available from the University of Saskatchewan library. This left 96 reports which were assessed for the inclusion and exclusion criteria. Of these, two were not in the English language, 24 were not nurse specific, 27 were not acute care, five were not an original, single study, five were not COVID-19 pandemic related, one was manager or student focussed, and 16 included participants who were not working in Canada. This left 16 reports for
inclusion in the review. I also hand searched reference lists which gave 19 reports all of which were retrieved. Of these, one report met the inclusion criteria, with the remaining being excluded due to 16 involving participants not working in Canada, one was focussed on manager/students, and one was not related to COVID-19.

**Figure 3.1**

*Prisma Diagram October 2022*

![Prisma Diagram October 2022](image)

Adapted from Page et al. (2021)

During the second search in April 2023 (see Figure 2), the search of the same databases returned a total of 3,160 articles. After duplicates were removed, 874 articles were screened by their title and abstract leaving 22 articles that were sought for retrieval. One report was not available leaving 21 articles to be assessed for eligibility. Of these, 10 were not specific to nursing, five were not acute care, one was not original research, and two were not COVID-19
specific. This left three articles to be included in the review from this search and a final total of N = 20 articles for the review.

**Figure 3.2**

*PRISMA Diagram April 2023*

3.1.3 Data Quality Evaluation

The third stage of the review process is the evaluation of the quality of included literature (Whittemore & Knafl, 2005). The Mixed Methods Appraisal Tool (MMAT) version 2018 (see Figure 3) was used as it provides criteria for evaluating multiple methodologies, including qualitative, quantitative, and mixed methods research (Hong, Fàbregues, et al., 2018). It has also been found to be an efficient method that allows reviews to assess studies systematically and has been used in other integrative reviews as the data analysis tool (Kydonaki et al., 2021). Though the MMAT is not designed for summative scores, points were assigned for the purposes of...
comparison, one point for each of the five criteria that each article met within the category. The results of the MMAT appraisal were recorded in the summary tables (Appendix) and reported in the findings. The purpose of the appraisal was not to exclude articles from this study but to inform the analysis by providing descriptions of the quality of included articles. MMAT scores were not used to weigh how much or how little the data from the article was used in the analysis due to practical difficulties in applying such a system. The appraisals were used in analysis to describe known weaknesses or gaps in the research found such as a lack of reporting on methodologies. This is discussed further in Chapter 4: Results.

3.1.4 Data Analysis

The fourth step of the review process, according to Whittemore and Knafl (2005), is the data analysis stage. The end goal of this step is "a thorough and unbiased interpretation of primary sources, along with an innovative interpretation of primary sources, along with an innovative synthesis of the evidence" (Whittemore & Knafl, 2005, p. 550). This stage can be divided into

**Figure 3.3**

Mixed Methods Appraisal Tool (MMAT) Version 2018

Hong et al., 2018
four steps: data reduction, data display, data comparison, and conclusion drawing and verification (Whittemore & Knafl, 2005). As well, Whittemore and Knafl (2005) suggested the use of constant comparison in order to compare data at each phase of the research in an iterative manner so this was done throughout the process.

3.1.4.1 Data Reduction. Full-text articles for the citations to be included were obtained and entered into Endnote. All the included articles were then imported into NVivo 12 to allow for the organization of materials and for coding. When importing, NVivo saves all bibliographic information for future reference. Files were also made a "case" in the program and assigned the attributes of year of data collection, year of publication, setting, location, and research type. Including files as cases allowed for data grouping via attributes to allow for further analysis. Data reduction was accomplished by categorizing the primary data into subgroups. The following subgroups were chosen: qualitative, quantitative, mixed methods, and 'other design.' Once each article was placed into a subgroup and its attributes were assigned, first-order (participant's quotes) and second-order (researcher input) data were extracted using NVivo 12 software (Butler et al., 2016). The data were coded into nodes in NVivo 12 as they emerged.

3.1.4.2 Data Display. Data was then displayed using a variety of methods in order to allow visualization of emerging relationships (Whittemore & Knafl, 2005). Word clouds, node charts, matrixes and charts were used to examine the data. Also, the codebook was saved at multiple time points so that nodes could be viewed alongside the articles.

3.1.4.3 Data Comparison. The fourth step in the data analysis stage is data comparison. The original coding structure had 80 nodes. These nodes were placed into chart form and examined individually alongside their sources. As duplications and categories were created, the nodes were collapsed into one another. New categories were created to encompass smaller categories. At the same time, an initial conceptual framework was created and modified
iteratively as the nodes were modified and combined. After multiple sessions of analysis, a final codebook was created, and each article was recoded into the conceptual framework categories to allow for final analysis of the fit of the data to the framework.

3.1.4.4 Conclusion Drawing and Verification. Conclusion drawing and verification is the final step of data analysis according to Whittemore and Knafl (2005). At this point, previous findings are collected into generalizations which represent the data collected (Whittemore & Knafl, 2005). The conceptual framework was examined for its fit to the data and modified as needed. The end result of this step is presented in Chapter 4: Results.

3.1.5 Presentation

The final step of the integrative review, according to Whittemore and Knafl (2005) is the presentation of the findings. The principle behind the careful presentation of findings is that integrative reviews are meant to be useful for the future direction of research and perhaps policy or practice methods (Torraco, 2016). In the case of this particular research, the intention is to inform policy for the support of nurses during pandemics and epidemics. To this end, the conclusions of this review will be presented in concept map form with linkages between concepts delineated in a format that is easily understood. These findings will then be published to the University of Saskatchewan repository, HARVEST.
Chapter 4. Results

4.1 Description of Studies

Of the 20 articles included in the review, four were mixed methods, six were qualitative, and 10 were quantitative. Thirteen of the articles were based on data collected in 2020 with only five in 2021, and two articles overlapping both of those years. The fact that many more studies were done in the first full year of the pandemic may reflect the novelty of the situation. Thirteen of the articles were published in the year 2022, one was published in 2022, and six were published in 2021 showing the difference between data collection and publication. Repeats did occur with two projects having a follow-up study showing changes over time (Maunder et al., 2022; Maunder et al., 2021; Silverberg et al., 2021, 2022). As well, six of the articles were a separate analysis of the same study data (Gamble et al., 2022; Lou et al., 2021a; Lou et al., 2022; Rhéaume & Breau, 2022; Rheaume et al., 2022; Silverberg et al., 2022). It was sometimes difficult to discern when articles were based on the same study. For example, Lou et al. (2021a) and Lou et al. (2022) did not mention that they were related, but through sample size and an email to the author it was confirmed that the sample was the same. As well, in the articles by Silverberg et al. (2022) and Gamble et al. (2022), they separated the two parts of a mixed methods study thereby making integration nearly impossible and confusing the reader as to the purpose of the study.

Analysis of the sample population of professional nurses provided a number of points of comparison. First, the majority of articles involved participants from the province of Ontario with 14 articles having participants working in that province as opposed to the next largest number of seven with participants from Alberta and British Columbia and then six with participants from Quebec. The territories were only included in two studies which listed location. The skewing of the location data reflects the larger populations of Quebec, Alberta, British Columbia, and
Ontario, but may lead to generalizations pertinent to nurses in large hospitals in more urban areas as opposed to smaller and more rural areas. Four of the included articles did not provide location information, but recruitment methods indicate that participants may have come from anywhere in Canada. Beyond just location, nine of the included articles focused on critical care workers from either intensive care units or emergency departments. An additional three looked at COVID-19 specific hospital unit nurses. The other eight articles did not report results about unit types included. Choosing participants from emergency and intensive care was logical at the beginning of the pandemic when patients entered the system through emergency and hospitals tried to isolate them onto specific wards. It will be interesting to see if future research is more inclusive of other units as patient numbers increased beyond the ability of most hospitals to isolate them.

The articles included in this review had from 17 to 5,361 nurse participants. In 2020, the year most included articles collected their data, there were almost 177,000 registered nurses working in hospitals meaning that the applicability of findings to professional nurses across Canada may be limited (Canadian Institute for Health Information, 2021). Many articles did not report their definition of "nurse" and therefore comparisons between the sub-groups, for example RN or LPN, cannot be made. Due to the focus on intensive care and emergency settings, findings would also appear to be more heavily weighted to RNs as opposed to NPs, LPNs, or RPNs, but this cannot be verified from the included articles. Studies that focused on specific groups of professional nurses would provide more insight into how the COVID-19 pandemic impacted them.

The quality of included articles was also variable with MMAT scores ranging from one to five. The four articles reporting on mixed methods studies received scores of 3, 3, 1 and 1 mostly due to a lack of integration between the quantitative and qualitative data created. The five qualitative studies included in this review had scores of 1, 4, 5, 5, and 5. The qualitative study
that received a score of 1, seemed to be more focused on recommendations and changes that they wanted to see than the actual "live experience" of the nurses as they had proposed to do. The other qualitative studies followed their methodologies well and provided ample evidence in the form of both first and second order data. The other nine studies in this review follow quantitative methodologies. Of these studies, two had a score of 1, one had a score of 2, four had a score of 3, and two had a score of 4. Most points were lost due to missing information about the study components such as sample characteristics compared to the target population. Also, all of the quantitative studies use surveys with small sample sizes and a large chance of nonresponse bias that was not addressed.

The types of studies that were chosen by researchers were non-experimental or qualitative in nature; therefore, all of the studies attempted to describe what was happening at the time. Experimental or quasi-experimental designs could be included in the research to provide balance to the field of research. Some of the studies included in this review could have added an aspect of randomization such as the study by El Gindi et al. (2022) in which participants belonged to an intervention program. In that study, HCWs who were not a part of the Text4Hope program could have provided a comparison group. There were no studies on the impact of interventions which may have been of benefit to nurses in having supports put in place. Also, there were no studies specifically examining the differences between groups such as male vs. female, RN vs. LPN, emergency/ICU vs. medicine unit. The stress of the pandemic may have created barriers to completing research such as the increased workloads of nurses leaving little time for extra activities or the fact that in-person research such as interviews could no longer be done in the same way.

We can see from the description of the articles that there are many gaps which can be filled the next time that a pandemic occurs. There is still research yet to be published and
analyzed about the COVID-19 pandemic. As well, there can be plans for what research can be done next time there is a pandemic. To facilitate either of these processes, a conceptual framework can help identify relationships and possible avenues of discovery for future research projects.

4.2 Conceptual Framework

Together, all of the themes identified in this review were placed within a conceptual framework in order to allow for presentation of the current research (Figure 4). The three themes resulting from the data analysis include the impacts, mediators, and outcomes for nurses. From the analysis of the reviewed studies, four subthemes were identified as impacts of the COVID-19 pandemic on Canadian acute care nurses: change, access to resources, the infectious agent, and interrupted relationships. Factors which appear to mitigate (lessen) the impacts of the pandemic on nurses were making connections, coping, learning and experience, and finding meaning. Finally, five subthemes related to outcomes for nurses as a result of the pandemic's impacts were: physical effects, emotional reactions, leaving (jobs or profession), mental disorders, and positive effects. The findings from each theme represents the majority of data synthesized from the 20 articles included in this review.

4.3 Impacts of the COVID-19 Pandemic

The impacts of the COVID-19 pandemic are a reflection of how it changed the context of being a Canadian acute care nurse. The context includes both healthcare, as well as the larger community as COVID-19 affected much more than just hospitals and the work environments for nurses. It created changes in multiple areas and created problems with access to resources. COVID-19 itself was an unknown virus that proved to spread easily and cause extreme illness which came with its own impacts. As well, nurses' relationships with family and friends, patients,
co-workers, employers, the community, and various levels of government were all affected as they worked during the pandemic. Each of these impacts were supported in the 20 articles of this review and are discussed in the following sections.

4.3.1 Change

Change, in this case, can be defined as "to undergo transformation, transition, or substitution" in order to be specific as to the impact COVID-19 had on acute care nurses in Canada (Merriam-Webster, n.d.-a). Change was identified as something that nurses had to constantly adapt to which was challenging at times (Crowe et al., 2021; Peter et al., 2022). As described by one participant, "I guess change is just hard. There's definitely been a lot of change and I guess it just gets hard to be constantly adapting and doing things different" (Crowe et al., 2021, p. 4). This type of change was not limited to the work environment. Changes in living arrangements in an effort to socially distance at home, children being home-schooled, and
changing childcare arrangements created additional burdens, particularly for women (Crowe et al., 2021; Crowe et al., 2022; Fredericks et al., 2022; Gamble et al., 2022). These community level changes occurred in addition to the many changes within acute care nurses' work environments.

Changes to healthcare environments came at a rapid pace as the virus spread. As government and organizations tried to respond to the newest information and the resources that were available, nurses working at the bedside were often unable to keep up to the massive influx of changing policies and procedures (Crowe et al., 2021; Fiest et al., 2022; Gamble et al., 2022; Rheaume et al., 2022). The rapid evolution of policies and procedures resulted in, at times, conflicting or multiple versions and sometimes increased nurses' uncertainty and mistrust of the guidelines meant to protect them and to help their patients (Crowe et al., 2021; Gamble et al., 2022; Rheaume et al., 2022). In particular, changes to PPE requirements seemed to create more mistrust than other types of policies. "One nurse commented that 'one minute surgical mask and [then] it's an N95 . . . don't know who to believe or how to protect yourself, and protect your family'" (Lapum et al., 2021, p. 7). Without clear reasoning being given, nurses felt that PPE was sometimes based more on limited supplies than on best practices leaving them vulnerable to infection (Rheaume et al., 2022). The rapid pace of changing policies and procedures was one issue, but the changes themselves were another.

Changes to visitation policies were found to be the most studied in this review. These changes referred to either severely restricting or prohibiting visitors during the pandemic. Restrictions of this kind were fraught with difficulties as nurses didn't always agree that they were necessary and often felt that patients really suffered without their loved ones there (Crowe et al., 2021; Fiest et al., 2022; Lapum et al., 2021; Peter et al., 2022; Rheaume et al., 2022). End of life care was particularly reported as distressing and even traumatic to nurses without patient's
loved ones present or when family could only visit at the end (Crowe et al., 2021; Lapum et al., 2021; Peter et al., 2022; Rheaume et al., 2022). Crowe et al. (2022) provided the following example:

'When patients passed away in the COVID ICU, families were not allowed in . . . we had to set up a zoom meeting for families to watch their loved one die. This was VERY traumatic. Imagine being a mother having to watch your child die on zoom? Or a child watching your parent die on zoom? . . . A lot of spirits were broken for nurses working in this pandemic.' (p. 5)

Fiest et al. (2022) specifically examined restricted visiting policies in an ICU setting and found a number of issues including increased work of enforing policy, increased emotional work of being the patient's only contact, and increased mistrust of others as they found ways to bypass the restrictions. Lapum et al. (2021) also examined visitation restrictions, though indirectly. Their research found that nurses had additional emotional work due to the restrictions and patients dying alone using the words "upsetting," "depressing," "sad," and "hard" to describe it. These changes to policy represented core changes to the ways in which nurses practiced.

Other practice changes came to the nurses. First of all, nurses clustered care in order to limit their time with infected patients thereby reducing their risk of being infected themselves (Crowe et al., 2021; Lapum et al., 2021; Mohammed & Lelievre, 2021). Also, the PPE that nurses were required to wear meant that they couldn't respond to emergencies quickly and that there was a physical barrier between them and the patients (Lapum et al., 2021; Maunder et al., 2021; Mohammed & Lelievre, 2021; Peter et al., 2022). Peter et al. (2022) identified evidence of PPE as a barrier through the quote "'I feel terrible because the patients can't see my face because I've got a face mask on, a face shield on, a yellow gown, scrubs, gloves, and . . . it sort of removes yourself from the patient, you know?"' (p. 850). The PPE also required extra time and
energy to don and doff (Lapum et al., 2021; Peter et al., 2022). As well, there was evidence that nurses had additional roles to fulfill during the pandemic such as learning new technology to allow for communication with families who could no longer visit or filling in for staff who could not or would not do their own jobs (Gamble et al., 2022; Rheaume et al., 2022).

The biggest practice change during the pandemic was the redeployment of staff to other units. Redeployment was mentioned in five of the 20 articles included in this review and included moving staff from different units and even different workplaces in order to deal with the influx of COVID-19 patients. Mandatory redeployment meant that nurses were forced to work in areas that they had often not been trained for or, on the flip side, were forced to work with nurses who did not have proper training (Gamble et al., 2022; Peter et al., 2022). As well, redeployment meant different hours on top of the necessity for overtime work which made it difficult to balance their other responsibilities (Crowe et al., 2022). Redeployment to new areas also meant that nurses were isolated and found that the change increased their stress: "Isolating and alone. I’ve definitely been having feelings of depression and lots of anxiety . . . I’m being thrown into a different areas, redeployment, and not knowing the people or where stuff is that is stressful to" (Crowe et al., 2021). Redeployment also fueled feelings that decision-makers did not respect nurses and treated them as replaceable commodities (Crowe et al., 2022). So, although redeployment may have seemed necessary to decision-makers in order to make up for short staffing, the effects on nurses were often very negative.

Short staffing also changed the workload for nurses. Being short staffed meant that patient loads were often increased stretching the limits as one nurse made clear: "Overwhelmed with ventilated COVID-19s, not enough staff working in a makeshift unit, plastic duct-taped walls with no end in sight" (Rheaume et al., 2022, p. 322). Staffing shortages, particularly of ICU nurses, and higher nurse to patient ratios were discussed in numerous articles as increasing the
workload and decreasing quality patient care (Crowe et al., 2022; Gamble et al., 2022; Rheaume et al., 2022). Other healthcare workers were sometimes not helpful or left the nurses to take on additional tasks (Gamble et al., 2022). On top of these workload changes, infection control practices also caused additional work.

Qureshi et al. (2022) focused more specifically on quantifying the changes to nursing workload during the pandemic. Through computer model generation, they were able to forecast a number of outcomes based on number of COVID-19 patients a nurse was assigned to. Qureshi et al. (2022) found that the following types of workload were increased: PPE donning and doffing, mental workload, and distance walked. These workload increases resulted in more missed care tasks and decreased direct care time which helps to quantify the effects on patient care resulting from the pandemic as well. The final result of staffing and workload changes was often a situation where nurses felt that the best care could not be given (Crowe et al., 2022; Rheaume et al., 2022) and that "at best, the nurses were 'barely able to keep up,' and at worst, they felt disposable, 'trashed and abused' by various levels of leadership" (Crowe et al., 2022, p. 4).

Only three of the articles indicated a more positive view of the changes. Mohammed and Lelievre (2021) reported that on the medicine unit they were researching, measures had been taken to decrease the burdens placed on the nurses. Lower nurse to patient ratios, better teams, new technologies for communication, and better infection control procedures were reported in that article. Lapum et al. (2021) found that nurses were more cautious and careful with infection control practices which could have a positive impact on keeping nurses safe. Finally, Fiest et al. (2022) reported that some clinicians felt restricted visiting in the ICU had decreased their workload. These positive changes indicate that improvements can be made and change does not always have to be a negative factor when nursing during a pandemic.
4.3.2 Access to Resources

Resources can be defined as "a source of supply or support" and has been used here to indicate both physical and mental (Merriam-Webster, n.d.-b). Fourteen of the 20 articles in this review discussed resources which were needed by nurses during the pandemic and were not appropriately supplied to them. The resources which were most often discussed were staff, psychological supports, job factors, information, and PPE.

As was discussed in the section on change, staffing was a resource that was in short supply during the pandemic. As a human resource, less than adequate staffing was found to have a negative effect on both the nurses themselves and to the quality of patient care (Crowe et al., 2022; Gamble et al., 2022; Rheaume et al., 2022). In particular, specialized nurses were in short supply as one nurse stated "we learned quickly that physical space and equipment weren't the bottleneck. It was experienced ICU nurses" (Gamble et al., 2022). Although none of the articles specifically discussed the reasons for the lack of staffing, since ICU nurses are specialized and have additional training, it is logical that they could not easily be replaced with other nurses leading to shortfalls in ICU staffing levels. As well, nurses may have been infected or required to be quarantined which would have further decreased available staffing. Whatever the reasons, staff was a resource, particularly in ICUs, which was in short supply due to the pandemic.

Another resource that was in short supply was supports, including organizational supports, for the acute care nurses working during the pandemic. In this review, support is used as a verb to indicate assisting or helping someone, the someone being nurses (Merriam-Webster, n.d.-c). Rhéaume and Breau (2022) specifically examined organizational support and found that it was negatively related to burnout, and through the mediation of burnout, was also negatively related to turnover intention. This finding backs up the importance of organizational support for nurses working during the pandemic, though their definition of organizational support is not
given. Furthermore, in three of the articles, the authors included discussion about organizational supports. Gamble et al. (2022) found that nurses felt unsupported by their leadership teams and that supports particular to their needs were not available to them. The findings from Lou et al. (2021a) indicated that counseling was perceived as available to over half of the healthcare professionals they surveyed, but only approximately 10% used it. Together, this indicates that organizations may have felt they were providing resources, but nurses were experiencing barriers to accessing them such as discrepancies between what they needed and what was being provided. Peter et al. (2022) also found that counseling was not always considered supportive by the nurses. Specifically, a nurse in their study stated "it felt like the whole layer of disconnect. Like, I don't want to talk to someone on the phone who can't possibly appreciate what I am going through and what I am living through right now" (Peter et al., 2022, p. 852). The unique situation presented by COVID-19 may have impacted the ability of counsellors to truly connect with nurses and provide appropriate care.

Other resources were also affected by the COVID-19 pandemic. Pay compensation and job security as resources were perceived as not fairly distributed and often not available to nurses including rewards/incentives (Crowe et al., 2022; Lou et al., 2021a). In fact, Lou et al. (2021b) reported that 90% of nurses felt appropriate pay was helpful to them as a resource, but only 33% felt it was available. The same research found that access to hospital resources overall were negatively correlated with intentions to quit and psychological distress. Shortages of hospital resources such as equipment, isolation rooms, oxygen, and other medical supplies were reported by Gamble et al. (2022) and Rheaume et al. (2022) which means that they were occurring into the second year of the pandemic, not just initially when requirements were unknown. These shortages also affected PPE.
PPE was by far the most reported with 12/20 included articles including findings on it as a resource. The importance of PPE to nurses working in acute care was directly linked to their personal feelings of safety from being infected with COVID-19 (Binnie et al., 2021; Crowe et al., 2021; Gamble et al., 2022; Lapum et al., 2021; Mohammed & Lelievre, 2021; Rheaume et al., 2022). Lapum et al. (2021) highlighted the level of anxiety that was associated with PPE:

'Like how is this normal? How do we have to go somewhere and just pray that we're not going to die? . . . I have struggled with the idea of leaving nursing. And I never ever would have thought of that before this.' (p. 12)

There was a real risk of infection related to PPE use and availability that nurses are trained to identify. Binnie et al. (2021) found that the anxiety related to PPE availability was positively correlated with General Health Questionnaire (GHQ-12) scores meaning increased risk of mental disorders. Nurses had reason to worry about PPE as the COVID-19 pandemic created a situation where PPE was in short supply.

Availability of PPE was a problem throughout the two years of data collection in the included articles. Binnie et al. (2021) reported that 81.8% of participants had access to PPE which left 18.2% not always having access to PPE for patient care, though what percent of nurses specifically was not discussed. Clearly, having less than 100% availability of PPE during an infectious disease outbreak is not acceptable. Additional problems with PPE due to the shortage occurred as nurses were unsure about changing infection control practices such as the efficacy of re-using PPE or the adequacy of new PPE supplies (Crowe et al., 2021; Gamble et al., 2022; Lapum et al., 2021; Mohammed & Lelievre, 2021; Rheaume et al., 2022). This led to mistrust in organizations as practices did not match what nurses saw at other facilities (Lapum et al., 2021; Mohammed & Lelievre, 2021), what they had been taught as standard infection control
procedures (Lapum et al., 2021), and decisions around PPE were not transparent (Rheaume et al., 2022). The availability of PPE and its role in COVID-19 impacts may have changed over time.

It seemed that the fear of not having enough PPE led to changes in practice which may have prevented more severe shortages. Evidence of this came from Silverberg et al. (2021) who reported a high rate of PPE use and moderate ease of access to PPE in the first half of 2020. In their follow-up study in 2021, they identified similar access to PPE indicating that shortages did not increase. As well, availability seemed to be less of a problem as the pandemic went on into summer 2021 with Lou et al. (2021a) finding that 94% of healthcare providers felt PPE was widely available. Also, nurses adapted to shortages through education and teamwork (Lapum et al., 2021; Mohammed & Lelievre, 2021). Over time, nurses reported increased confidence and skills in PPE (Silverberg et al., 2022).

4.3.3 The Infectious Agent

The infectious agent in this case was the SARS-CoV-2 virus which caused the COVID-19 pandemic. There were a number of attributes of COVID-19 that impacted the nurses working during the pandemic. First of all, the spread of the virus was very extensive. Binnie et al. (2021) collected data in early 2020 and found that across the country, more than 90% of respondents stated their ICUs had COVID-19 patients. The same study found that 72.6% of participants had been exposed to COVID-19 patients. Though these findings did include physicians, respiratory technicians, and allied health professionals along with the nurses, it shows that early in the pandemic, COVID-19 had already spread across the whole country and was increasing patient loads in acute care centers.

The number of patients was not the only reason the spread was of concern. The acuity of COVID-19 also caused addition burdens. Nurses spoke of the deterioration of patients and their
inability to intervene effectively (Crowe et al., 2022; Lapum et al., 2021; Rheaume et al., 2022). One participant's statement especially made this clear, saying "'your training and learning is useless and you're just watching your patients slowly deteriorate and eventually die'" (Lapum et al., 2021, p. 8). Nurses understood that working during the pandemic came with grave risks as evidenced by statements such as "'we [nurses] were all trying to get our wills in order just in case'" and "'the fear . . . either you or someone you love is going to pass away'" (Lapum et al., 2021, p.7). These risks were not just to themselves, but also to their families, colleagues, and communities. Concerns about the spread of the virus, when the consequences could be so dire, were reported in multiple sources (Crowe et al., 2021; Lapum et al., 2021; Mohammed & Lelievre, 2021; Rheaume et al., 2022; Silverberg et al., 2021, 2022). These author's findings indicate that the increased acuity of COVID-19 affected nurses at a professional level and a personal level.

The newness of COVID-19 also affected nurses on multiple levels. Not knowing about the disease led to anxiety and fear with Binnie et al. (2021) finding that their participants had similar levels of anxiety whether or not their ICU had COVID-19 patients. The same research also found that anxiety was actually negatively correlated with the number of shifts worked with a COVID-19 patient indicating that as the newness wore off, the impacts to the nurses changed. Other articles supported this change over time with nurses becoming more confident and comfortable with COVID-19 patient care as the "newness" was replaced by experience (Fredericks et al., 2022). The finding of decreased newness did not indicate less impact on nurses though, just a change.

Other articles indicated almost opposite findings with Silverberg et al. (2022) finding that the fear of infection spreading to themselves and their families was actually higher in 2021 than it was in 2020. In this study, they found that the proportion of participants who had cared for
COVID-19 patients had gone up 30% as well which meant that experience had not provided relief from the fear of infection. The lack of proper PPE as discussed previously may have caused some of these increasing concerns. Another possible explanation is that participants had been exposed to the virus already and were afraid it would happen again though the included articles did not review the number of nurses who had previously tested positive for the virus. Another contributing factor to the increase in fear over time could be the continued exposure of nurses to the virus through modes like aerosolization of particles and improper categorization of patients as non-infectious when they were, in fact, infectious that were reported by Rheaume et al. (2022). This study data were collected in early 2021, but were based on recall so could represent earlier findings. Whatever the reasons, there was mixed reports on whether the impacts of the infectious agent were lessened over time as experience was gained and the "newness" wore off.

**4.3.4 Interrupted Relationships**

The fourth impact that came from analysis of the data extracted from the 20 articles in this review was interrupted relationships. Nurses were subject to changes in both their private spheres as well as in their professional environments. This means that interrupted relationships with others covers a wide-array from family and friends to co-workers, patients, and patient’s family members. This subtheme also looks at the nurses’ relationships with their own communities, organizations, and governments. Interrupted relationships as a subtheme did not mean there were always negative impacts, but that changes occurred in response to the COVID-19 pandemic.

The interrupted relationship between the nurses and their families, friends, and their larger communities can be discussed together as the overall impact was stigma and isolation. Four of the included articles reported nurses living away from their families in order to prevent spreading COVID-19 (Crowe et al., 2021; Fredericks et al., 2022; Lapum et al., 2021; Maunder et al.,
This meant isolating themselves in the strictest sense, but also isolating in other ways such as making sure children did not approach them until they had changed and showered or attending events from afar (Lapum et al., 2021). Redeployments with changes to schedules and forced overtime meant that some nurses could no longer be the caregiver at home, another change in their basic relationships (Crowe et al., 2022).

These sacrifices were often made on behalf of the nurse to protect others, but other changes occurred because of the stigma others assigned to nurses. "People didn't want to visit us. People didn't want to have contact with that, that scariness so we were isolated in our little bubble" (Lapum et al., 2021, p. 9). Nurses reported being stigmatized in their communities (Crowe et al., 2021; Gamble et al., 2022; Mohammed & Lelievre, 2021). This larger isolation was highlighted by one nurse's statement:

'I have noticed an ongoing lack of care for nurses. I hide the fact that I am a nurse as people react poorly in many cases. Even friends have made comments . . . that indicate that they feel I am a cesspool of the COVID-19 virus.' (Gamble et al., 2022, p. 10)

Alongside stigmatization, nurses also experienced a changed relationship with their communities as public opinion was an ongoing factor. In particular, the narrative of nurses as heroes did not always feel supportive to nurses as it seemed to diminish what they did routinely and was sometimes used by companies to portray themselves positively (Peter et al., 2022). As well, when some of the community questioned that the pandemic was real and began to push against continuing restrictions, nurses felt disconnected from their communities (Crowe et al., 2022; Gamble et al., 2022). Feeling disconnected from the people whom the nurses were trying to help was a difficult impact of the pandemic and led to many of the outcomes that will be discussed in another section.
Disconnection also occurred between nurses and other workers in the healthcare system. Nurses reported that some non-nurse workers were adding to nurses' work (Rheaume et al., 2022) as evidenced by the statement: "we emptied the hampers because hospital assistants do not come into 'isolation rooms . . . respiratory techs ask nurses to adjust vents (ventilators) settings because they would not want to 'expose' themselves" (Gamble et al., 2022, p. 10). Other staff also stigmatized the nurses and treated them as contaminated (Mohammed & Lelievre, 2021). Within the nursing profession, the research noted that redeployment changed the relationships between co-workers by introducing new, often unskilled nurses into areas which reduced the trust and support within the team (Crowe et al., 2021; Gamble et al., 2022; Rheaume et al., 2022). A lack of PPE also contributed to disconnection between the nurses themselves as it was seen to pit nurses against one another in a bid for limited resources (Lapum et al., 2021). Social distancing was also required at work which led to isolation from team members (Lapum et al., 2021). Isolation for COVID itself was also a factor with Maunder et al. (2021) reporting that 15.7% of nurses had been isolated for symptoms at their first time interval (September 21 to November 15th, 2020). Disruption of the relationships between co-workers was an unfortunate by product of the pandemic which affected many nurses during the COVID-19 pandemic.

Interrupted relationships with healthcare institutions were spread between organizations and governments but the impacts on nurses often did not discern between those levels. Whether the organization specifically, or the government more generally, the impacts on nurses primarily fell into aspects of trust, preparedness and response, and devaluing of nurses.

Trust in healthcare institutions was specifically examined by the authors in two of the articles, one a follow-up to the other (Silverberg et al., 2021, 2022). Silverberg et al. (2021) found the participants with more years of experience and experience in previous outbreaks scored higher on trust in the system than other nurses. The authors also found that trust was not changed
depending on caring for COVID-19 patients or not. When they repeated their study in 2021, they found that institutional trust had decreased particularly with respect to "act in citizens' best interest" (Silverberg et al., 2022). The change in trust over time shows that it was linked directly to the impacts of the pandemic.

Some researchers touched on reasons for increasing mistrust of healthcare institutions. One reason may have been the perceived lack of transparency when institutions made decisions and created policies (Gamble et al., 2022; Peter et al., 2022; Rheaume et al., 2022). Another reason may have related to the communication of information which was sometimes unclear (Gamble et al., 2022) and constantly changing (Crowe et al., 2021; Gamble et al., 2022; Rheaume et al., 2022). Together the constant changes and lack of transparency meant that nurses were in the dark as to why changes were being made. Even at the level of management, Fiest et al. (2022) found that mistrust was engendered when policies were not applied fairly. Nurses as an integral part of the healthcare system suffered from an increasing lack of trust in their organizations and governments during the COVID-19 pandemic. This lack of trust on the part of nurses extended from communication into other areas such as pandemic preparedness and response.

The preparedness of the healthcare system to handle a pandemic had been tested before with SARS, H1N1, and other infectious diseases. Despite this, nurses reported that the healthcare system including the government had not used previous outbreaks to make plans, rules, guidance that could be used during the COVID-19 pandemic (Gamble et al., 2022). One participant exemplified this perception when they stated that "'they didn't do what they said they were going to do after SARS which was, be ready for something . . . it's like they've learned nothing'" (Lapum et al., 2021, p. 8). There was even mention that between waves of COVID-19, plans had not been prepared and training had not been instituted (Rheaume et al., 2022). The lack of preparation meant that the response was crisis focused and nurses felt that it was often inadequate
Finally, it was reported that nurses wanted those in charge of the healthcare system to make decisions based on expert health opinions as well as the nurses who were working on the frontline (Gamble et al., 2022; Peter et al., 2022). This means that nurses were disconnected from decision-makers in the healthcare system due to the COVID-19 pandemic.

Ultimately, the relationship between the nurses and the healthcare system was changed through the devaluing of nursing and nurses. Nurses described being taken for granted, unacknowledged, and unsupported by multiple levels of healthcare including the government, health authorities, and hospitals (Crowe et al., 2022; Gamble et al., 2022). Nurses felt replaceable, meaning that their specialized knowledge and experience was unrecognized (Crowe et al., 2022). Nurses felt that inadequate pay (Crowe et al., 2022) and lack of job security (Lou et al., 2021a) also spoke to the ways in which they were devalued. As devalued as they felt, nurses worked on the frontline of the COVID-19 pandemic even when decisions were often made without them and did not reflect the realities that they faced (Peter et al., 2022; Rheaume et al., 2022). As one participant described the problem:

'I perhaps feel a bit more disposable than I did at the beginning of this . . . I just feel like they didn't care as much as I wish they would have is the issue. In the end, at the end of the day, the nurses were still the ones showing up for every shift, every night shift, every weekend; when everyone else went home, no one else were in those rooms when those aerosol-generating procedures were happening. Or when there was a COVID positive patient, the APN (Advanced Practice Nurse) would never step in the room, the manager never needed to go in the room.' (Peter et al., 2022, p. 851)
Together, the changes in trust, a lack of preparedness, the inadequacy of responses, and the devaluing of nursing and nurses caused an interruption to the relationship between healthcare institutions and the nurses who worked within them.

The final relationship that was interrupted by COVID-19 was that of the patient and their families with the nurses. In fact, this relationship was discussed in nine of the included articles and mostly centered around the restricted visiting policies that were put in place to stem the spread of COVID-19. In most hospitals, visitors were not allowed or were allowed in limited ways only at the end of life. This change meant that the nurses often became the only ones in the room with patients as they died which was highlighted by one nurse's comment that "'I should not be the last voice they (patients) hear. It should be someone they love'" (Rheaume et al., 2022, p. 323). Nurses attempted to fill this void with additional methods of communication such as FaceTime and Zoom, which helped families connect with patients, but which often were poor substitutes for in-person visits (Crowe et al., 2021; Crowe et al., 2022; Fiest et al., 2022; Lapum et al., 2021; Rheaume et al., 2022). As frontline staff, the nurses saw firsthand the suffering of patients and their families due to visitation restrictions imposed by healthcare organizations and did their best to provide support to both (Crowe et al., 2021; Crowe et al., 2022; Fiest et al., 2022; Gamble et al., 2022). Lapum et al. (2021) in particular reported that nurses made attempts to increase communication and emotional connections as a substitute to visitation.

Even as they tried to provide the best care possible, patients and families sometimes reacted negatively to the nurses as one nurse stated "'I'm tired, patients [sic] and their families take out their frustration at nurses, and we are yelled at, even though we are doing everything we can to protect them'" (Crowe et al., 2022, p. 5). As well, the care they gave was often futile as COVID-19 patients in the ICU (the site of the majority of the research) often died even when all treatment measures were used and continuing care with little chance of survival caused ethical
issues for the nurses (Peter et al., 2022; Rheaume et al., 2022). One nurse stated that the "constant ethical dilemma of keeping someone alive when there is no hope for recovery and keeping patient alive at the cost of the patient's comfort, i.e. constantly inflicting painful procedures" was extremely stressful (Rheaume et al., 2022, p. 325). End of life decisions often were made without input from the nurses (Rheaume et al., 2022) yet nurses were the ones at the bedside providing care. The constancy of patients dying alone impacted nurses in very negative ways, and they reported trying to take on more and more in order to continue to provide care to patients and their families:

'The fact that you're unable to express those emotions puts you in a place where you're carrying this load. . . Your emotions are not as important as helping someone who might need the help and might survive. So the baggage is, not only are you carrying whatever you had, but also trying to bottle it in so that you can move onto the next person, and that keeps building.' (Lapum et al., 2021, p. 10)

These issues can be considered even more of a problem as the COVID-19 pandemic spread into the second and third year where many restrictions were most likely still in place.

Also, PPE requirements would be in place throughout this time. Though nurses are trained to understand infection control procedures and the necessity of PPE, it presented a barrier to the nurse/patient relationship. Mohammed and Lelievre (2021) found that the PPE was even more of an issue because of the visitation restrictions with patients being unable to even see who they were as patients only saw them "'covered head to toe in PPE'" (p. 37). In the Peter et al. (2022) article, nurses mentioned PPE as a barrier to relationships as well as emergency care due to the time it took to put on. "'I feel like a robot and very distant from my patients'" was how one participant described this remoteness between nurses and their patients (Peter et al., 2022, p. 850). Altogether, the pandemic caused many barrier to the nurses' relationships with patients and
their families which changed the experiences of nurses in ways that will be examined in the outcomes section of this research.

4.4 Outcomes of the COVID-19 Pandemic on Nurses

All twenty of the included articles in this review included at least some discussion of ways in which the COVID-19 pandemic changed the experiences of the acute care nurses. Through coding of the included articles, five outcomes were created. These outcomes were positive effects, physical effects, leaving (their job or their profession), mental disorders, and emotional responses. These outcomes are what was embodied in the twenty articles and represent a wide variety of potential results that are often overlapping.

4.4.1 Positive Effects

The positive effects of the COVID-19 pandemic on acute care nurses were few and far between in the included articles. In Gamble et al. (2022), one nurse stated that the COVID-19 pandemic had forced them "to become a stronger and better RN" (p. 5). Lapum et al. (2021) reported deeper connections to patients and the profession of nursing, as well as increased patient monitoring. And finally, nurses in the article by Mohammed and Lelievre (2021) described feelings of greater empathy and connection to their patients and their families, partly due to the restriction of visitors. One nurse described this connection:

'I always felt myself to be very compassionate, but this really put it into perspective. It could have been my family member or myself in the hospital bed. So I think it made me more compassionate and sympathetic towards my patients and their families.'

(Mohammed & Lelievre, 2021, p. 37)

The nurses in the same study also reported feeling grateful for the experience they had working on the COVID-19 unit, though this was over a period of just a few months and then they returned
to working on other units. These were the only reported positive effects of the pandemic on acute care nurses during these first two years.

### 4.4.2 Physical Effects

One of the physical effects on the nurses was the PPE itself causing physical problems. The PPE was uncomfortable to wear especially for prolonged periods of time (Crowe et al., 2021; Gamble et al., 2022; Lapum et al., 2021). Not only did it take a long time to put on and take off which was draining (Crowe et al., 2021; Lapum et al., 2021), but it also prevented them from hydrating properly (Crowe et al., 2021) even when the equipment made them very hot on top of everything else (Lapum et al., 2021). The PPE was not the only physical problem that nurses recounted in the research.

The exhaustion of working during the COVID-19 pandemic was also discussed more generally in some of the research. As one nurse exemplified with her statement "'I have loved being a critical nurse and was grateful to have a job which I enjoyed . . . Now I am exhausted, mentally and physically drained. I don't know how much more I have in me to give'" (Crowe et al., 2022). Other researchers also mentioned exhaustion (Gamble et al., 2022; Lapum et al., 2021) and the sense that though they were tired, no relief was in sight as the pandemic continued on (Lapum et al., 2021). The exhaustion that they felt was logically exacerbated by the difficulties they faced with sleep. Nurses reported worry and nightmares which prevented them from sleeping properly (Lapum et al., 2021). In particular Binnie et al. (2021) found that 54.2% of their participants indicated that they had lost sleep due to worry.

The final example of physical outcomes that were discussed in these articles was the experience of becoming infected with COVID-19. Surprisingly, only one article, (Mohammed & Lelievre, 2021) touched on infection even though rates were most likely high enough that some
nurses would have been infected. Rates of infection and long-term disability and death are therefore outside of this discussion but remain an important piece of research to be examined. Altogether the physical outcomes show that nurses were negatively affected by the COVID-19 pandemic in multiple ways.

4.4.3 Emotional Responses

By far the largest of the reported outcomes fell into the category of emotional responses to the impacts of the COVID-19 pandemic. Eighteen of the twenty articles included in this integrative review reported on the emotional responses of nurses. Due to the large number of references coded to this category, it was further subdivided into "frustration and anger," "trauma," "burnout," "fear," "emotional exhaustion and overwhelm," and "stress, distress, and anxiety."

Whenever possible, the second order and first order data in this section was examined for use of the exact words such as stress or fear, but at times the researcher subjectively categorized data based on the context provided. Cross-over between categories was significant as nurses were apt to experience more than one emotion of course. As well, the category of burnout had significant crossover with emotional exhaustion and stress as these can be considered a part of burnout, but were also discussed as their own topic. What follows is not an exact list of emotional responses, but the creation of a discussion that encompasses as much of the data as possible under logical categories.

4.4.3.1. Frustration and Anger. Articles reported a number of reasons for anger and frustration that nurses felt. One reason was a lack of communication and trust in their organizations and governments as nurses wanted to do what was best, but felt they did not always know what that was (Crowe et al., 2021). The lack of appropriate PPE and its effects on the nurses' safety also cause a lot of anger and frustration as nurses felt let down by organizations and
governments that would not or could not provide the equipment they felt they needed (Gamble et al., 2022; Lapum et al., 2021; Mohammed & Lelievre, 2021). As one nurse explained the effect: "I'm so fed up . . . going into the unit and risking my life and risking the lives of my kids and my husband, the anger that I feel is real and it's exhausting" (Lapum et al., 2021, p. 8). There was also anger from nurses about policies they did not agree with, particularly the visiting restrictions (Lapum et al., 2021) and perceptions that they were treated poorly by the healthcare system and those in charge of their workplaces (Crowe et al., 2022). These issues were primary causes of anger, but others were more secondary in nature.

Secondary anger came from the suppression of emotions at work. As nurses, emotions cannot be expressed at times because patients and families require that space and come first. During the pandemic, nurses' emotions were often suppressed in this way and so some of these would come out at home or at other times. One nurse exemplified this with their statement: "I just felt angry and sad all the time . . . lashing out on people for things that I was bottling up" (Lapum et al., 2021, p. 9). All of the anger and frustration were additional emotional baggage that nurses had to carry during the pandemic.

4.4.3.2. Trauma. Trauma as an outcome is examined here separately from the mental disorder of Post Traumatic Stress Disorder (PTSD). This allows discussion of some of the experiences that nurses felt were traumatic and which subjectively speak to the experience of trauma. The experiences mentioned were particularly related to death and dying such as being present when family could not be at the end of life (Crowe et al., 2021; Lapum et al., 2021; Rheaume et al., 2022). As well, trauma was experienced due to the acuity of COVID-19 patients and the sheer volume of people needing help (Crowe et al., 2022; Gamble et al., 2022). The depth of this trauma was best expressed by a nurse who said:
'In all my years of work, I have never so viscerally understood the depths of despair and feelings of worthlessness can be. I have not contemplated suicide, BUT I now understand how someone can feel that way. This past year has shattered me in ways I never thought possible. I hope, someday I can be myself again.' (Crowe et al., 2022, p. 5)

To give some context to how many nurses may have experienced events as traumatic, Crowe et al. (2022) found that 87.1% of their participants had signs of secondary traumatic stress. Secondary trauma relates to "secondary exposure to people who have experienced extremely or traumatically stressful events" (Stamm, 2010). This experience of trauma may have long term effects on the working population of acute care nurses in Canada.

**4.4.3.3. Burnout.** 100% of the nurses surveyed in the Crowe et al. (2022) article reported moderate to high burnout on the Professional Quality of Life measure (PROQoL). This number provides a stark picture of nursing just over one year into the pandemic. Lou et al. (2022) also found that burnout out had significantly increased compared to pre-pandemic, but used a different scale, the Maslach Burnout Inventory for Medical Personnel. Maunder et al. (2022) also use the Maslach inventory in their longitudinal study and found that burnout peaked for nurses at the spring 2021 time point and was significantly higher at every time point in nurses, in all three subscales, than all other surveyed staff members. Maunder et al. (2021) also found that severe emotional exhaustion in nurses was 54.3%, higher than other healthcare staff who were surveyed. Rhéaume and Breau (2022) using the Oldenburg Burnout Inventory, also found moderately high levels of burnout in nurses. Together, these findings indicated the nurses, in particular, suffered during the pandemic causing many of them to suffer from burnout.

The findings of these four studies were supported with first order data as well. "More than the pandemic, it is the mismanagement by the "leaders" that left us nurses feel[ing] burn[t] out and devalued", these “leaders” being those in leadership and administrative positions in
government and health authorities/hospitals (Crowe et al., 2022, p. 3). Gamble et al. (2022) reported that burnout was "a common issue among nursing staff" and that nurses often had "strong feelings of 'burnout'" (p. 9). Though multiple measurements of burnout exist in the literature, the evidence is clear that the COVID-19 pandemic did indeed cause burnout in nurses, in particular through its effects on emotional exhaustion.

Emotional exhaustion and feelings of being overwhelmed in general, were discussed in seven of the articles included in this review. Emotional exhaustion is included specifically as a sub-scale in the Maslach (Riley et al., 2018) and Oldenburg (Halbesleben & Demerouti, 2005) measures and was also present in the more qualitative descriptions of nurses' experiences during the pandemic. Feeling emotionally drained and/or exhausted were specifically mentioned in Crowe et al. (2021), Crowe et al. (2022), Gamble et al. (2022), and Lapum et al. (2021). Other articles mentioned the concept of "defeat" as the nurses struggled with "no end in sight" (Lapum et al., 2021, p. 10). "It's hard when you are defeated from the battle of trying to support yourself emotionally, and then having to provide that same or similar type of support to the family" (Lapum et al., 2021, p. 10). Exhaustion left nurses with fewer resources to care for themselves and others: "you're taxed, you don't really have a lot, emotionally to give those patients that sometimes probably need it. I try my best. But there are times you're just tired" (Lapum et al., 2021, p. 11)

Nurses also described other types of emotional exhaustion. Rheaume et al. (2022) found powerlessness and guilt stemmed from not being able to do more for patients. Visiting restrictions meant that patients were alone even at the end of their life, leaving nurses alone at the bedside. Nurses reported trying to take on the emotional burdens of patients and their families particularly during critical moments: "It almost feels like a part of my soul, I gave to them. After those traumatic moments happen, you leave a little more empty" (Lapum et al., 2021, p. 10).
These additional burdens contributed to an overall sense of burnout and diminished ability to cope with the long-term stresses incurred during the pandemic.

4.4.3.4. Fear. The fear that nurses felt most often centered around getting sick or spreading the virus to others. Early in the pandemic, the virus was virtually unknown so fears came from watching what had happened in other places such as Italy or the United States and seeing the fast spread of the disease (Crowe et al., 2021; Lapum et al., 2021; Mohammed & Lelievre, 2021). This additional burden of fear of transmission was reported by Crowe et al. (2021), Gamble et al. (2022), Lapum et al. (2021), Mohammed and Lelievre (2021). As well, Silverberg et al. (2022) and Silverberg et al. (2021) found that survey respondents were most concerned about virus transmission and that this fear did decrease in the time between spring 2020 and 2021. As one nurse put it: "My first emotion was fear. I feared for my family. I was afraid working on the frontline would put my family at risk. I really didn't want to come to work" (Crowe et al., 2021, p. 6). The nurses' fears of getting sick and then spreading it to others were not unjustified as became apparent as the pandemic went on.

These fears were increased due to managerial and governmental decisions that were made. Constantly changing policies and procedures contributed to fear by decreasing trust in the information provided to nurses to keep themselves and others safe (Crowe et al., 2021; Lapum et al., 2021). "Every day policies and practices are being changed . . . it was like a fire of uncertainty and the fire of fear, not knowing what we're going to see that day" (Lapum et al., 2021, p. 7). PPE shortages also contributed to the fear of transmission as one nurse explained, "I'm gonna get it tonight. There's not enough masks, there's not enough PPE" (Lapum et al., 2021, p. 7). As infection control practices are common knowledge to professional nurses, fears were legitimate, yet nurses did not control the flow of information or equipment needed to keep them safe.
4.4.3.5. Stress, Distress, and Anxiety. This integrative review found that 14 of the articles reflected stress, distress, and/or anxiety of nurses during the COVID-19 pandemic in Canada. This resulted in over 70 separate references in the literature making this subtheme by far the most supported as emotional responses to the impacts of the pandemic. Stress, distress, and anxiety are difficult to separate due to their overlapping definitions. As well, they are sometimes seen as parts of other concepts such as anxiety overlapping with fear or distress overlapping with trauma. In the end, the subthemes help to provide structure for discussion and so somewhat subjective groupings were made here based on the words found directly in the articles. An interesting point about this section was that instead of mostly qualitative data, a number of quantitative based articles were included here. This may stem from the fact that there are many scales and measures that have been used to quantify stress, distress, and anxiety including the Depression, Anxiety, and Stress Scale (DASS), the Perceived Stress Scale (PSS), and the Modified Moral Distress Scale. The mixed data available allowed for a deeper understanding of the experiences of nurses and also for comparisons with other healthcare workers.

The DASS-21 was used in three of the articles to describe levels of depression (discussed separately in that section), anxiety and stress. From data in 2020, Crowe et al. (2021) found that 41.7% of participants had moderate or greater levels of anxiety and 38% had moderate or greater levels of stress. In 2021, Crowe et al. (2022) reported similar rates of anxiety and stress symptoms. Also in 2020, Lou et al. (2022) used the DASS-21 as well as a shortened version to assess anxiety and stress in nurses. In that study, they reported that nurses experienced anxiety and stress at higher rates during the pandemic than they did before. They also found that nurses experienced anxiety at higher rates than did physicians. El Gindi et al. (2022) described stress using the PSS-10 instead and found that 82.5% of nurses in their study reported moderate to high stress levels during the COVID-19 pandemic. Rheaume et al. (2022) used the Modified Moral
Distress Scale to show that the moral distress felt by nurses during the pandemic were positively related to their levels of burnout and therefore, intention to leave their jobs. These quantitative results were supported by the qualitative data collected as described below.

As was discussed in the section on fear, the risk of infection to the nurses and to the people around them was a significant factor in nurses’ anxiety and stress levels. Binnie et al. (2021) found that nurses were more likely than physicians to report anxiety about being infected and transmitting COVID-19 to others. Four other articles in the review supported the anxiety and stress associated with infection: Crowe et al. (2021), Gamble et al. (2022), Mohammed and Lelievre (2021), and Lapum et al. (2021). Specifically, one nurse stated "I worry about getting sick from COVID or worse – spreading it to a loved one or to a vulnerable person and feeling guilty about this" (Crowe et al., 2021, p. 6). The severity of symptoms and the newness of the virus also contributed to stress and anxiety for the nurses (Lapum et al., 2021; Mohammed & Lelievre, 2021). In fact, some nurses did contract COVID-19, justifying their stress and anxiety.

This risk of infection is highly related to the ability of nurses to access and use the appropriate PPE, therefore, PPE was a source of stress and anxiety. Binnie et al. (2021) studied the relation of anxiety to PPE availability and found that respiratory therapists and RNs had higher levels of anxiety than did allied health professionals or physicians. This is consistent with the data obtained by Crowe et al. (2021) who reported stress and anxiety around the type of PPE and how to don and doff it. When PPE was seen to be in short supply and nurse felt compromised, the stress was also increased as logically, the risk of infection was increased (Lapum et al., 2021). Nurses also experienced other types of stress.

The changes to the nurses' work lives also created stress, distress, and anxiety. The constantly changing information and practices contributed to that stress (Crowe et al., 2021). "I feel like most of my energy is spent on fear and on adapting to changes. I can feel the stress of
my coworkers and it makes me feel stressed and tired too” was one participants experience of the changes (Crowe et al., 2021, p. 6). Nurses reported that the changes added to their anxiety and left them feeling vulnerable (Rheaume et al., 2022). One of these changes was the use of redeployment to solve staffing issues (Crowe et al., 2021; Crowe et al., 2022) and another, was restrictions to visitation (Fiest et al., 2022; Peter et al., 2022; Rheaume et al., 2022). Changes came quickly and often to the nurses' workplaces, but that was not the only source.

Part of the pervasiveness of the effects of COVID-19, was that the stress was not just found in the work place, although that was the majority of reported stress (Binnie et al., 2021). Home life was also found to be a significant source of stress (Binnie et al., 2021). Issues such as changes to childcare and home schooling, social distancing, reduced socialization outside of work, and financial pressures of partners unable to work added to the stress nurses experienced (Crowe et al., 2021; Gamble et al., 2022). The extensive spread of COVID-19 meant that nurses' stress and anxiety spread throughout all parts of their lives.

4.4.4 Leaving

Surprisingly, nurses leaving their positions or profession was only reported in six of the articles in this review. Also, leaving was only reported as an intention or a wish, not in numbers of people who actually left. Also, no investigations were made into nurses who left nursing, which would have added greatly to this discussion. Nonetheless, intention to leave is an outcome for nurses working during the COVID-19 pandemic with Lou et al. (2022) and Rhéaume and Breau (2022) both finding a rate of close to 50%. Crowe et al. (2022) found a slightly lower rate at 44%. If these thoughts of leaving came to fruition, it would cripple the healthcare system in Canada.
The authors of the articles found numerous reasons why nurses intended to leave. Nurses reported little support from their organizations (Gamble et al., 2022). As well, hospital resources including PPE was a factor (Lapum et al., 2021; Lou et al., 2021a) which correlates with Rhéaume and Breau (2022) finding that psychological and physical safety were the primary reasons for leaving. Burnout was also linked to the intention to leave (Lou et al., 2022) and Rhéaume and Breau (2022) found it mediated organizational support and moral distress effects. Nurses often wanted to leave, but felt stuck in their jobs due to monetary and other factors (Crowe et al., 2022). One study participant spoke directly to this struggle "because I have a mortgage and kids to take care of . . . I regret becoming a nurse and am now trapped in a job that is soul sucking in order to continue to provide for my family" (Crowe et al., 2022, p. 5).

4.4.5 Mental Disorders

The final outcome of the COVID-19 pandemic on Canadian nurses is evidence of mental disorders. Though none of the articles took these findings to the level of actually assigning diagnoses to any of the nurses, many predictive measures were used. The ones discussed were the General Health Questionnaire (GHQ-12), the Impact of Events Scale revised edition (IES-R), the Perceived Stress Scale (PSS-10), Personal Health Questionnaire (PHQ-9), General Anxiety Disorder (GAD-7), Depression, Anxiety, and Stress Scale (DASS-21), and the Kessler Psychological Distress Scale (K6). Each of these measures were created previous to the COVID-19 pandemic and represent only a few of the possible mental health outcomes for nurses. Whether these outcomes were short term or long term effects was not discussed, but the findings were spread over the two years of included articles with Maunder et al. (2022) collecting data summer of 2021 indicating continuing psychological distress. As the pandemic spread over a
significant period of time, it is reasonable to think that these outcomes will also continue on until the impacts have been fully removed.

To begin with, the overall rates of mental disorders in acute care nurses was measured in two of the included articles. Binnie et al. (2021) used the GHQ-12 and a cut-off of greater than or equal to 3 points to indicate "clinically relevant psychosocial distress" (p. 3). This study reported that 64.5% of their participants, which included nurses, physicians, respiratory therapists and allied health had significant distress. In particular, Binnie et al. (2021) found that Registered Nurses had the highest GHQ-12 scores in their study. They also found that anxiety relating to PPE and the risk of becoming infected with COVID-19 or transmitting that infection were correlated with increased GHQ-12 scores meaning increased distress. Interestingly, Binnie et al. (2021) did not find that years of experience, COVID-19 exposure, and perceived current availability of PPE were correlated with increased distress. This study was completed in April 2020 and included ICU staff from across Canada. Maunder et al. (2021) and Maunder et al. (2022) also measured distress, but used the K6 to describe prevalence of likely mental disorder. They found rates of possible severe mental illness in nurses of almost 10% in fall 2020, increasing to close to 20% in spring 2021 and then decreasing to somewhere in between these two rates in summer 2021. Nurses in their studies reported the most severe distress as opposed to the other occupations (Maunder et al., 2022). Though these rates are not discussed in context with population rates or previous rates in nurses, discussion indicates that these levels should be concerning. High psychological distress indicates possibly high rates of mental disorder in the acute care nursing population. Other articles discussed more specific measures.

Specific measures for Post-Traumatic Stress Disorder (PTSD) were also used. In their study of ICU nurses at the beginning of the pandemic, Crowe et al. (2021) found that more than 74% of participants were about the cut-off for PTSD. In their second study on these effects,
Crowe et al. (2022) found the exact same with just over 74% of nurses over the cut off. Lapum et al. (2021) provided qualitative evidence of PTSD as well. In their study, one participant talked about nightmares they had: "'blood coming off the bed . . . I couldn't go back to sleep because I would feel overwhelmed'" (p. 9). In the Lapum et al. (2021) study, nurses even used the term post-traumatic stress disorder to describe what they were feeling. Though none of the articles discussed further psychological diagnoses, the high rates of PTSD in screening tests and in the qualitative results indicate a long-term mental disorder stemming directly from the impacts of COVID-19.

Depression was also studied quantitatively. El Gindi et al. (2022) used the PHQ-9 as a screening tool for major depression in their participants. El Gindi et al. (2022) found that nurses had rates of likely Major Depressive Disorder of 31.3% and were twice as likely as physicians to meet the criteria for depression on the PHQ-9 scale. Conversely, Lou et al. (2022) found no difference in depression rates between nurses and physicians using the DASS-21 and rates of 18.8%. Crowe et al. (2021) also used the DASS-21 and found that 57.4% of nurses reported depressive symptoms and Crowe et al. (2022) reported a rate of 69.6%. The disparate findings may be due to a number of factors such as instruments used, sample size, or point in the pandemic. Nonetheless the rates suggest a mental health burden for nurses that may indicate long term negative health consequences.

4.5 Mediating Factors

Mediating factors in this section are those that appear to protect the nurses from the full impacts of the COVID-19 pandemic. As such, these factors appear to be important to the conceptual model as standing between the impacts of COVID-19 and the nurses themselves. The factors that have been discovered are making connections, coping, learning and experience, and
finding meaning. Together these categories encompass findings from ten of the twenty articles in
the review including both quantitative and qualitative data. The following sections will describe
these findings in more detail.

4.5.1 Making Connections

Acute care nurses in Canada during the COVID-19 pandemic reported making
connections as an important mediating factor. The first important connection that nurses made
was with their profession and as nurses in general. As one nurse described how her identity as a
nurse had been reinforced, "we're all in this big giant COVID boat . . . I felt more important than
ever before" (Lapum et al., 2021, p. 12). Lapum et al. (2021) found that this reinforcement of
professional identity was a common subtheme of the mediating factors and added to nurses’
commitment to working during the pandemic. This is consistent with the data created by Peter et
al. (2022) on moral identity as a nurse which included completion of the caring process when
patients got better or responded with gratitude. The nurses found that these effects helped to
sustain them during their work in the pandemic (Peter et al., 2022). Other work-related factors
also helped nurses during the pandemic.

The "strongest and most common source of support recognized by nurses was through
their nursing colleagues" (Peter et al., 2022). That statement was supported by data from Lou et
al. (2021a) who found that 95% of nurses in their study perceived co-worker support as very
useful and also available to them. The support from co-workers was evidenced in different ways.
First, through a feeling of shared experience (Fredericks et al., 2022; Peter et al., 2022). The fact
that other nurses could relate to each other on a meaningful level allowed them to feel validated
(Peter et al., 2022). As well, co-workers were able to provide support in the form of
encouragement (Crowe et al., 2021; Gamble et al., 2022), camaraderie (Fredericks et al., 2022;
Mohammed & Lelievre, 2021; Peter et al., 2022), and by going above and beyond to provide care even in difficult circumstances (Gamble et al., 2022; Peter et al., 2022). The support of co-workers allowed for increased resilience and was described by one study participant as "uplifting" (Fredericks et al., 2022, p. 4). The importance of co-worker relationships during the pandemic was not surprising given the restrictions on other forms of socialization as well as the unique nature of working as a nurse during a pandemic.

Other connections which nurses found helpful during the pandemic were also work related and are grouped here under the term "organizational support." Organizational support can be defined as "the extent to which the organization values their [the nurses'] contributions and cares about their well-being" through things such as “fairness, supervisor support, and organizational rewards and favourable job conditions (Rhoades & Eisenberger, 2002, p. 712). Rhéaume and Breau (2022) found that nurses reported a moderate level of organizational support. This support occurred during the pandemic at multiple levels including the government, organization/hospital, and manager or unit based. At the government level, Gamble et al. (2022) pointed out a few of the positive things nurses had to say about the government response such as providing resources, testing, and getting information. At the level of the hospital, important points of support were provision of PPE, listening to staff concerns, and providing education and updates (Gamble et al., 2022). In the article by Mohammed and Lelievre (2021), the hospital created a rapid intubation team to support nurses providing advanced care. At the level closest to the nurses, the unit, leaders who were present, honest, open, and caring were found to be supportive (Gamble et al., 2022; Peter et al., 2022). So though not many of the articles reported on supports that had been provided by the organization that were positive, there were some examples at each level.
Organizational supports and resources correlate with other outcomes for nurses. For example, "the availability of hospital resources (but not personal or healthcare system resources) significantly predicted reduced psychological distress. Similarly, the availability of hospital resources . . . significantly and negatively predicted intentions to quit" (Lou et al., 2021a, p. 321).

In Rhéaume and Breau (2022), they found that organizational support was negatively correlated with burnout meaning that more support indicated less burnout. In this same study, they found that burnout was then positively related to intentions to leave. This makes the data on organizational support very important in the retention of nurses during and after pandemics.

### 4.5.2 Coping

The ability of nurses to cope with the COVID-19 pandemic impacts was not well documented in the literature for this review. Only 6 of the twenty articles discussed it and a lot of this research was about resilience and the difference in adaptive and maladaptive coping. Some coping strategies used by nurses were listed such as hobbies, spending time outside, prayer, meditation, exercise, socializing, and journaling (Crowe et al., 2021; Lou et al., 2021a; Peter et al., 2022). Positive or active coping methods were shown to be protective against some of the effects of the pandemic. Lou et al. (2022) was the only article which specifically measured coping and outcomes. In that study the researchers found that nurses were more likely to use maladaptive coping strategies than active ones. They also found that maladaptive coping was associated with increased distress and burnout, but active coping did not have these associations.

Finally, Lou et al. study found that "adaptive coping strategies buffered the negative impact of stress on burnout" (2022, e50). As well, Fredericks et al. (2022) examined resilience in nurses and found that moderate levels existed at the time of the study. The same study found that nurses often felt that their resilience was present before the pandemic and that it allowed them to cope
with the COVID-19 work environment. These findings show that coping, particularly adaptive types of coping, can help mediate the effects of the pandemic on nurses.

4.5.3 Learning and Experience

Learning and experience was also not well documented in the articles for this review. Only seven articles mention these concepts and then only as small parts of their findings. Nonetheless, it is important to mention them here so as not to miss a factor that requires further study. The exposure of nurses to COVID-19 patient care resulted in some nurses adapting to the new environment and becoming more confident in their skills and the care they provided (Fredericks et al., 2022; Mohammed & Lelievre, 2021). "I'm able to think more quickly on my feet, adapt to stressful situations, and just work with the resources I have and provide good patient care" (Lapum et al., 2021, p. 8). More specifically, learning new coping skills and strengths (Gamble et al., 2022) and practicing and refining their skills (Mohammed & Lelievre, 2021) were of benefit to the nurses during their work in the pandemic. The effect of experience was supported by Silverberg et al. (2021) who found that it was related to higher confidence in infection control procedures. These types of direct experiences were one type of learning that took place during the pandemic.

Another type of learning that occurred was planned training and education. Mohammed and Lelievre (2021) found that education was a source of comfort and critically important to the nurses in their study. 93% of nurses who had training found it helpful to them, but only 44% thought that it was available according to Lou et al. (2021a). Silverberg et al. (2022) found that by spring 2021, nurses reported "high levels of perceived training, confidence, and use of PPE" (para. 11). The small amount of information available regarding specific educational or training interventions did not allow for any further discussion.
4.5.4 Finding Meaning

The experience of finding meaning is a more subjective topic than some of the others which are more commonsensical like training and coping. Finding meaning as a category of mediating factors includes the data that clearly supported nurses in their efforts to work during the COVID-19 pandemic by discovering reasons to continue on in the face of adversity. Nurses found that they had a sense of pride in their work during the pandemic (Crowe et al., 2021; Mohammed & Lelievre, 2021). Sacrifice and heroism were now a part of some nurses’ identities when it hadn't necessarily been before (Lapum et al., 2021). One nurse showed this through her statement in Peter et al. (2022):

'And all over the radio when you listen to it, it's like, "nurses and doctors, thank you so much. You're the heroes." And I'm like, no one has ever called me that! No one's ever – I feel like any time I say that I'm a nurse, there's always a handful of people who are like, "oh, you're just a nurse?" Or something like that. And now it's like, "oh my gosh, you're the hero!" I'm like, huh there you go.' (p. 853)

There was also a sense of duty to their profession and to their patients that drove them to continue to work (Lapum et al., 2021; Mohammed & Lelievre, 2021). Even the duty just to each other as members of the team brought them to work (Crowe et al., 2021). The act of finding meaning in their work as nurses during the COVID-19 pandemic helped them to continue on even when they were scared or tired.
Chapter 5. Discussion and Conclusion

5.1. Overview

The purpose of this review was to synthesize the literature relating to the impacts of COVID-19 on acute care nurses working in Canada and to present it in a visual format that could be used to inform future research and policy. Specifically, the review was focused on answering the research question What is the impact of COVID-19 on the experiences of acute care nurses working in Canada? The large amount of data and the short timelines in which COVID-19 research was occurring left a gap where synthesis could occur in order to present a more fulsome picture of the topic. The conceptual framework represents a synthesis of twenty articles that included research that took place over the span of the first two years of the pandemic in Canada. Each piece of the framework was created with first and second order data and represents an emerging picture of what nursing during a pandemic in Canada may have looked like. The framework is novel and identifies major themes and subthemes of how the COVID-19 pandemic impacted nurses.

The main findings of this review are based on the impacts of the pandemic themselves. The virus was new, highly communicable, and was able to cause severe disease without clear medical treatments which created an extremely challenging work environment for nurses (Yayla & İlgin, 2021). Nurses were afraid of becoming sick or passing the virus along to others causing them to self-isolate as well as adding to the negative outcomes that they experienced. Research on nurses from other countries reports very similar fears of the virus and of infecting others (Arcadi et al., 2021; Catania et al., 2021; Cordova et al., 2022; Deliktas Demirci et al., 2021; González-Nuevo et al., 2023). The threat posed by the virus and related fears have been associated with burnout (García & Calvo, 2021), decreased resilience (Hu et al., 2020; Jo et al., 2021), PTSD (Leng et al., 2021), psychological distress (Labrague & de los Santos, 2021;
Lorente et al., 2021), and intentions to leave (Labrague & de los Santos, 2021) supporting the theme of the virus itself as one of the important pandemic impacts on nurses.

An associated factor, but one over which there was more control, was the impact of changes during the pandemic. Within healthcare systems, the constant flow of new information along with increasing numbers of high-acuity patients lead to rapid changes within policy and practices. Particularly at the beginning of the pandemic, the dissemination of this information was so hectic and often mismanaged that nurses became overwhelmed trying to keep up and sift through often conflicting information in order to keep safe and provide the best patient care that they could. These findings are supported by the global literature on the topic including Catania et al. (2021) who reported change as a huge impact on the Italian nursing workforce and Bergman et al. (2021) who found change added to the chaos of the pandemic situation in Sweden. These changes were understandable but required management in order to prevent chaos and overwhelming for nurses providing patient care. The final report from the SARS commission in Canada clearly stated that PPE should have been in place and that precaution should override the science when there is no certainty (Campbell, 2006). Neither of these principles were upheld to protect nurses from COVID-19.

Ultimately, many nurses reported disconnects from their work and from the government institutions which oversaw them in this review and across the world (Ball et al., 2023). This disconnect came from a lack of trust as well as feelings of being disrespected and even sacrificed to the healthcare system. This partly related to the lack of PPE and other safety measures (Ball et al., 2023) and highlighted a lack of preparedness in the system to react. It also related to the lack of communication and information that was pertinent and timely for the nurses trying to use it. El Sharif et al. (2022) also found that proper training, information, and supply of PPE was correlated...
with institutional trust as well as the wellbeing of healthcare workers making trust an important aspect of the pandemic.

Increasing workloads was another type of change found in this review that was a direct result of the pandemic caseloads and which impacted nurses. In particular, Qureshi et al. (2022) (part of this review) used computer modelling to show vastly increased workload with similar results found by Hoogendoorn et al. (2021) and Bruyneel et al. (2021) in their examination of nursing data collected during the pandemic. Cordova et al. (2022) found that in the ICU the nurse-patient ratio had increased by one full patient to three. The importance of these changes to workload is supported in the broader literature including Pan et al. (2023) who found that the changes in COVID-19 cases in hospitals were significantly related to rates of burnout in nurses. Other outcomes for nurses as a result of workload changes were physical and mental exhaustion (Leng et al., 2021), moral distress (Lake et al., 2022), and leaving their jobs (Jarden et al., 2023) which align with the outcomes of this review. Nurse illness and attrition only led to increased workload for those left.

PPE has been shown in this review to be very important to nurses working in acute care during a pandemic. PPE is what keeps nurses from being infected and, therefore, represents peace of mind that they are safe and that their families are safe. During the pandemic, particularly early stages, PPE was in short supply and nurses spent time and energy preserving it and worrying about whether there would be enough of it. In addition to the minimal supply, mistrust of the organization was increased when PPE seemed to be based on availability, not on what was actually required for the job. The importance and lack of PPE has also been reported in multiple articles outside of this review (Brophy et al., 2021; Catania et al., 2021). In a study of over 3 000 nurses in New Jersey, USA October of 2020 Cordova et al. (2022) found that 80% of participants in their study lacked PPE and almost 90% had to ration or re-use it. These numbers are especially
shocking since the pandemic had been going on for almost a full year already, but are supported by other research where large proportions of nurses having reported insufficient PPE (Khan et al., 2022; Lake et al., 2022; Oveisi et al., 2021; Stimpfel et al., 2021). In some areas, nurses also perceived that other professions had enough PPE and the nurses did not (Oveisi et al., 2021). The lack of a basic supply of safety equipment available to nurses during the pandemic was alarming, to say the least, and represented huge impacts on the physical and mental health of nurses.

Given the stresses and strains put upon the nurses working in acute care, the almost entirely negative outcomes are not surprising. Stress, distress, anxiety, burnout have been commonly reported in the literature surrounding the COVID-19 pandemic. As well, the trauma experienced by nurses over the course of the pandemic has been well documented and may lead to long term mental health consequences. The rates of psychosocial distress indicative of mental health disorder were 64.5% of healthcare workers (Binnie et al., 2021), up to 20% of nurses on the K6 for severe mental illness (Maunder et al., 2022), and 74% of nurses for PTSD (Crowe et al., 2021) in this review. For depression, the rates were also variable with findings of 18.8% to 69.6% of nurses indicating a high burden of mental illness (Crowe et al., 2022; El Gindi et al., 2022; Lou et al., 2022). Though differences between countries such as measurements used do not allow for direct comparisons, they do support high rates of mental illness including PTSD, anxiety, and depression in healthcare workers, particularly nurses (Damico et al., 2022; Heesakkers et al., 2021; Yunitri et al., 2022). These findings may include mental disorders with long-lasting effects.

The impacts of the pandemic created an environment which had detrimental outcomes on nurses. Physically, nurses were stretched to their limits with higher workloads and additional tasks such as donning and doffing PPE. As well, emotionally, nurses suffered with the effects of anger and frustration, trauma, burnout, fear, stress, distress, and anxiety. And to make a case for
the enormity of these impacts, the nurses who left before these studies took place due to the additional burdens of the pandemic have not been included at all. It is logical to think that if these nurses who had already left their jobs, and maybe even their professions, had been included or studied in some way, the effects would have appeared in an even more negative light.

The overall findings of this review were very negative, but a few positive outcomes for nurses were noted with the mediating factors being more difficult to discover and less supported in the research findings. The discovery that nurses were able to make new and stronger connections with their patients was found in other literature, particularly in the case of restricted visiting with nurses taking on the additional role of families that couldn't be there (Arcadi et al., 2021; Galanis et al., 2021). The act of finding meaning as a mitigating factor has been repeated in which nurses reported a sense of duty to care for patients (Abrams et al., 2023; Arcadi et al., 2021) and felt like heroes on the frontline against COVID-19 (Deliktas Demirci et al., 2021). Increasing the number of studies focused on mediating factors would help to identify better interventions and changes that could be made.

Some of the positive factors may even have been related to the beginning of the pandemic when it was thought that it would be short-lived and that the nurses could do something so stressful and difficult because it was only a moment in time. Some literature outside of Canada supports this idea that over time, the outcomes for nurses such as burnout (Pan et al., 2023) and psychological distress (Sasaki et al., 2021) may increase. The findings on long-term effects could be examined now and moving forward.

**5.2 Need for Future Research**

With regards to the included studies, there is a clear need for more experimental types of research. As a phenomenon, pandemics cannot be replicated in a lab setting, but between group
studies could have occurred such as comparisons between sites, types of nurses, or types of units. Also, no interventional studies were reported such as the difference between nurses given specific types of supports and the effects on mental health scales. The nursing unit in Mohammed and Lelievre (2021) had interventions, but there was no comparison to other units or to before and after so there was no discussion on the efficacy. As well, using sample populations with clearly delineated groups would help with comparisons as some studies were excluded from this review based on not being able to delineate the nurses' experiences in the results. Even in the included research, some findings were limited when only some data was specified as relating to nurses.

The quality of the included research could have been much better if the methods and results were reported in more detail and with consistent formatting so that results could be analyzed more thoroughly. For example, providing simple counts of scores on measurements would allow for better comparison than reporting only comparisons made by the research teams. Mixed methods studies tended to have very poor-quality scores because of a lack of integration in the results of the qualitative and quantitative sections. The mixed methods studies could have been separated into their component parts and been scored far higher quality than they were. As well, many studies did not report on sample size and power or the characteristics of the target population which made it difficult to know how well the data represented the actual situation.

The representation of the actual situation was also skewed towards ICU and emergency types of settings. By the end of the two years covered by this review, I would have expected to see research on regular units and even specialty units like maternity since COVID-19 was sure to be found everywhere at some point. Studies which described the impact of COVID-19 on nurses who worked in these other units would have allowed for more comparisons and for a better representation of acute care nurses overall. Instead, most of these findings are based on ICU nurses which is a small piece of the acute care part of the healthcare system.
As well, being that nurses are primarily women, research examining the gendered impacts of the pandemic is an important topic that was absent in the included studies. Mele et al. (2021) did examine healthcare workers in Canada and found that women in healthcare had increased childcare responsibilities, more anxiety, and fewer leadership and decision-making roles than men. These discoveries reflect some of those found in general such as increased anxiety and stress in women and gender-diverse Canadians (Moyser, 2020). In van Daalen et al. (2020), an examination of global decision-makers involved in the COVID-19 pandemic response showed that 81.2% of task forces were headed by men. Taking gender into account means decreasing gender-based outcomes and data is required to support changes to the response including nurses.

Since there is reason to believe that pandemics will occur again, the research field could be planning for that eventually now. Describing the state of nursing including mental health outcomes could be done at routine points in all healthcare systems. Interventions can be created and examined for their usefulness during the next pandemic. Researchers who created studies for COVID-19 can examine their strengths and limitations and plan for improvements next time. Repeating the studies completed during COVID-19 could provide comparison information on the next one. Institutions could also be performing some of this research as part of ongoing quality control. The inclusion of gender without the confounder of profession as a core concept of research on nurses will also allow for a more equitable examination of pandemic impacts and effects and therefore health systems (Smith et al., 2022). There is no need to wait for the next pandemic to prepare future research.

5.3 Nursing Voice and Historical Trends

As shown in the literature review, knowledge of pandemic nursing is not new to the profession. Infectious disease outbreaks and pandemics have occurred throughout the history of
modern nursing and the similarities to COVID-19 can be seen. To give context to the findings of this review, SARS presents a point of comparison for this part of the discussion as it was new, respiratory, deadly, and had spread in Canada. There has been a number of studies and commissioned reports on SARS and how it spread in Canada as well as the effects on healthcare and even nurses in particular which have largely been ignored during the COVID-19 pandemic (Brophy et al., 2021).

First, there are a number of similarities between what was observed to have happened during the SARS outbreak in Canada and the findings of this review. Amaratunga et al. (2008) found that inadequate staffing, particularly skilled staffing, caused many issues for nurses during the SARS outbreak. In the same report, communication issues, concerns regarding the risk of infection to nurses and their families, and pay inequities were also discovered. The final report of the National Advisory Committee on SARS and Public Health also found that communication was often poor, staffing was difficult with different pay inequities between professions and organizations, and that the psychosocial effects on healthcare workers included fear, anger, and isolation. Advanced training of staff for emergency and ICU settings and providing training on infection control at regular intervals were suggested after SARS, but apparently was not followed in most hospitals as these were also found in the current review. The continued underfunding of the healthcare system was apparent then and remains apparent now particularly in health human resources where nursing shortages continue to be a major issue facing global health systems including Canada. Also, the availability and supply of PPE continues to be a concern since SARS as stockpiles expired before COVID-19 occurred and no new measures were put in place until the crisis occurred. All of these issues were also reported by Registered Nurses’ Association of Ontario (2004b) who undertook a post-SARS review in order to give voice to Ontario nurses.
The psychosocial effects were also studied previously in SARS. Emotional exhaustion and burnout were found to be present in nurses during SARS in Canada (Marjanovic et al., 2007) just as was found in the current review. Stress and anxiety were also reported by a number of articles. Fear was a large part of the experience of SARS as it was new and dangerous (Rankin, 2006). The sense of being let down by a system that was not prepared also remains poignant during COVID-19 when so many reports and organizations had tried to warn of a possible repeat should the lessons of SARS not be learned.

5.4 Pandemic Nursing in the Future

In an ideal world, the preparations for the next pandemic would occur as we closely examine the history of pandemics, particularly COVID-19. The research on the topic will never fully describe all that it is to be a pandemic nurse, but it can give us many useful clues as to how to react in the future if we choose to learn from this experience. Governments, institutions, managers, and nurses can work towards lessening pandemic impacts the next time.

5.4.1 Managing Change

First of all, change can be managed by providing well thought out and standardized information at prescribed times (ex. safety huddles at the start of shift), not Fridays when supports are lacking for implementation (Mohammed & Lelievre, 2021). The information provided should be transparent, timely, and reliable. Having a standardized point of information such as a website or app which is available to on and off duty nurses would be most helpful so that nurses do not need to go looking in various places or be subject to conflicting information (Crowe et al., 2021; Fiest et al., 2022). Committees or other groups to assist in designing and implementing change would be beneficial if it included nurses (Bergman et al., 2021; Fiest et al., 2022; Lake et al., 2022). Planning practices for respiratory illness outbreaks and emergencies
now could alleviate trauma and also decrease the number of changes necessary during a critical event (Leng et al., 2021). These practices could be added to routine training on the units, as well as within educational programs so that responses including communication during a crisis can be improved (Lake et al., 2022). Changes should also be managed in person as much as possible as physical presence reassures staff and enhances communication (Simonovich et al., 2021).

Physical presence also ties in with acknowledgement and logically with nurses feeling that management understands the situation since they can see it with their own eyes (Amaratunga et al., 2008).

5.4.2 Visitation Policy Updates

Managing visitation policies during a pandemic is extremely difficult. This review pointed to the many issues that were found due to the lack of visitation in ICU settings where patients were often the sickest and end of life care was being provided. Without additional information on the other types of acute care units, it is hard to envisage an overall visitation policy that would work. Given enough PPE for everyone and additional staff to assist visitors, a limited visitation policy would seem best with one or two designated for each patient being educated in the donning and doffing of PPE, visiting hours, and with monitoring provided by additional staff members (Fiest et al., 2022). This would alleviate the workload of nurses and provide patient-centered care, relieving some moral distress for nurses.

5.4.3 Provision of PPE

Other types of distress found in the review came from the dubious supply of PPE. It is imperative that nurses be supplied with PPE in adequate amounts during an outbreak (Oveisi et al., 2021). In a large online survey, Ball et al. (2023) found that 60% of nurses reported aspects of PPE such as increased supply as one of the top three things UK government could do to improve
their work environment. Stockpiles and appropriate use guidelines should be created now so PPE can be optimized during the next outbreak as it is an essential resource (Khan et al., 2022; Sharifi et al., 2021). "Hospitals ought to maintain their obligations to provide PPE to healthcare workers, because a failure to adequately protect them is also a failure to protect public health" (Chan, 2021, p. 202). All nurses should be mask fit tested on a regular basis for any and all respirators that could be used during an outbreak so that proper sizes are available and worn (Christopher et al., 2021). Regular re-training with regards to donning and doffing PPE and other basic infection control procedures will increase confidence and lessen stress should it become necessary to use it (Song et al., 2022; Terranova et al., 2022). Also, all staff who may require PPE, not just nurses, need to be educated on these procedures so they can safely continue on with their jobs, just as the nurses do during outbreaks, and provide the support that patients and other team members need.

5.4.4 Providing Supports

The type of support that was named as most beneficial was the team itself in the work environment so encouraging teamwork can possibly lessen pandemic impacts (Mohammed & Lelievre, 2021). Capitalizing on this type of support could be a cost-effective and straightforward intervention. Work teams that stay together over longer periods of time could loosen their social distancing to allow for more interaction at off times such as on breaks and be encouraged to get to know one another. Psychological counselling could be of benefit (Cordova et al., 2022; Fredericks et al., 2022; Sharifi et al., 2021; Yayla & İlgin, 2021) but the reported disconnect between the nurses' experience and the counsellor's was an issue, therefore, peer counselling or additional training for psychologists working in the healthcare environment may help alleviate some of the mental health outcomes for nurses (Sharifi et al., 2021). Fairness in the treatment of staff also helps to create a more collegial atmosphere. If some doctors or nurses are paid more for
the same job, resentments and frustration are bound to occur and affect teamwork. In general, better morale, more team building, and supportive group dynamics are good goals for protective factors before a pandemic even occurs.

5.4.5 Managing Workloads

Also, the workload needs to be managed. (Lorente et al., 2021) Jarden et al. (2023) found that workload was integral to nurses who had resigned from their positions during the pandemic. Reasonable work hours, ability to take breaks, nurse-patient ratios within recommended limits, and flexibility in scheduling can all improve the work environment for nurses (Jarden et al., 2023; Niu et al., 2022; Sharifi et al., 2021). Surprisingly, reducing workload was hardly mentioned in the articles of the review, perhaps because it seemed out of everyone's control. Nonetheless, reducing workload to allow for proper rest, nutrition, and hydration has to be the long-term goal in order to keep nurses healthy and able to continue working during pandemics. Increasing staffing not just during outbreaks will reduce burnout and allow for training times as well as breaks (Oveisi et al., 2021).

5.4.6 Acknowledging Nurses

Simple acknowledgement of the work nurses did and are doing can also make a difference in their experiences and, therefore, the outcomes of the pandemic. The subtheme of acknowledgement and gratitude was found in multiple articles (Jarden et al., 2023; Jo et al., 2021; Leng et al., 2021). In person rounds and one-on-one check-ins are more personalized than mass announcements of thanking healthcare workers. Acknowledgement also includes monetary ways of showing that nurses are important and deserve to be paid according to their level of risk and for their additional hours such as missed breaks and not leaving work on time. Wages are
related to outcomes such as job satisfaction (Niu et al., 2022). This type of acknowledgement would be an easy way to make conditions better for nurses during a pandemic.

5.4.7 Listening to Nurses

Finally, and perhaps most importantly, nursing has to have a voice in the discussions around planning for pandemics. As the proven and trusted frontline against infectious disease, as the touchpoint for patients and families, as experts in healthcare and the systems within which they work, nurses have to be involved in decision-making (Amaratunga et al., 2008; Oveisi et al., 2021). At the very least, those in management positions of nursing units and practice settings should be required to have a nursing practice and leadership background and associated credentialing. Ideally, at each level of institutional and governmental decision-making nurses would be included and be a visible part of the process. For example, chief nursing officers should have been at pandemic updates alongside the medical health officers during the pandemic, to show the importance of nursing knowledge. Though the burden should not be placed at women's feet for this as they are already carrying more of the pandemic costs than men, they need to be included. According to the International Council of Nurses, nursing must be central in pandemic planning and gender inequalities need to be addressed in order to protect the health of global citizens (International Council of Nurses, 2022). Another way to give nurses a voice is by reviewing and integration of research and scholarly evidence from past literature. There are significant amounts of research out there on the effects of the pandemics and how workplaces changed and what went wrong. Now is the time to start using this information. In nursing education, additional training on pandemic events could be provided as foundational knowledge for new nurses. In workplaces, pandemic policies and procedures could be prepared now with the understanding that they may have to be changed, but airborne illnesses are basically treated the
same. At governmental levels, plans for future pandemics could be designed and feedback could come from all parts of healthcare including nurses. It is not that none of this is happening, but nurses need to be included at each of the steps in order for it to be of the most benefit to themselves and their patients.

5.4 Limitations

Despite a well-rounded search strategy including multiple databases as well as reference list searches, it is possible that some relevant research was missed. A further search in other databases may have provided additional articles and therefore more broad data. One particular outcome that was not represented here was becoming infected with COVID-19, which may have appeared in other data sources and would logically be a possible outcome of an infectious disease outbreak. The conceptual framework may need updating if new data is found in the literature.

During the literature review process, the author became sensitized to the concepts related to nurses working during infectious disease outbreaks. This process may have introduced bias into the creation of the framework by introducing possible relationships and themes. In fact, the author attempted to use the literature review as the basis for the original codebook, but the data did not actually fit with the findings of the literature review in many ways and so it was deleted, and inductive coding was chosen instead. Though there is no way to eliminate the previous knowledge of the researcher, using first order data and keeping a research journal were ways in which this risk was mitigated.

Finally, the quality evaluation of articles was not used in the analysis of data as a factor. The MMAT scores were therefore used only for comparison and not to inform the analysis. Perhaps more knowledgeable and experienced reviews would be able to overcome this obstacle. In the end, as statistics were not the focus and because first order data was used as supporting
evidence when possible, it is reasonable to believe that the conceptual framework would not have changed significantly.

5.5 Conclusion

The COVID-19 pandemic has proven to be one of the longest and most widespread pandemics in modern nursing history. Though previous infectious disease outbreak research had warned of the necessity of preparation, it seems that many impacts were not mitigated for nurses. The threat of a new and deadly virus imposed changes to the work and social lives of nurses. Changes to policies, procedures, workloads, nursing practice, as well as the larger societal changes happened quickly and were often not followed with good communication and proper supports. Access to resources like proper staffing and PPE affected the ability of nurses to provide care. Also, nurses suffered changes to their relationships with others such as their families and the organizations they worked for. All of these impacts caused overwhelmingly negative outcomes for nurses.

Now is the time to prepare for the next infectious disease outbreak. Using recommendations backed by research, health systems can make plans and policies that will support nurses during outbreaks and pandemics. Future research areas can focus on high quality, interventional studies which can help mitigate the issues experienced as well as additional studies focused on impacts so that the picture is as complete as possible. The nursing shortage must be dealt with effectively so that staff are available. Nurses are the largest proportion of healthcare professionals and therefore represent an extremely important voice that must be heard in order to protect the health of Canadians, for now and for the next pandemic.
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## Appendix: Summary Table of Included Article

<table>
<thead>
<tr>
<th>Source, Date of data collection, MMAT Score</th>
<th>Aim, Purpose, Research Question</th>
<th>Research Type, Design, Data Collection</th>
<th>Sample, Recruitment, Location</th>
<th>Findings Regarding COVID-19 Impacts</th>
<th>Critical Appraisal and Review Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Binnie et al., 2021 April 6th to April 30th 2020 MMAT = 1</td>
<td>Aimed to examine the relationship between clinically relevant psychosocial distress and pandemic related risk factors.</td>
<td>Quantitative descriptive survey</td>
<td>N = 310 n = 148 RNs</td>
<td>RNs had the highest average GHQ-12 score.</td>
<td>Small sample size of mostly Ontario workers decreases generalizability of results.</td>
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<tr>
<td></td>
<td>Demographics</td>
<td>n = 162 physicians, respiratory therapists, and allied health professionals</td>
<td>GHQ-12 (General Health Questionnaire) Purposive sampling of ICU workers through email listerserves and social media</td>
<td>Age and years of experience were not correlated with GHQ-12 scores.</td>
<td>No definition of stress or description of how the stress scale was created means that results are difficult to interpret.</td>
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<td></td>
<td>Exposures to COVID-19</td>
<td>Rating level of stress in six areas of their life (scale 1-100).</td>
<td>Access to PPE Majority from Ontario, but also BC, Alberta, Manitoba, Quebec, Nova Scotia, and Newfoundland</td>
<td>Work life was the most stressful domain of the six discussed, followed by family health.</td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td>Mental health and work life were most positively correlated with high GHQ-12, but the other domains (except finances), were also positively correlated.</td>
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<td></td>
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<td></td>
<td>No significant correlations between the number of COVID-19 patients in the ICU, number of shifts worked, aerosol generating procedures or whether COVID-19 patients were being looked after outside the regular ICU.</td>
<td></td>
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<tr>
<td>Source, Date of data collection, MMAT Score</td>
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<tr>
<td>Crowe et al., 2021 May 2020 MMAT = 3</td>
<td>Aimed to assess mental health characteristics of CCRNs (Critical Care Registered Nurses) working</td>
<td>Mixed methods, convergent parallel design Survey of IES-R (Impact of Event Scale Revised)</td>
<td>N = 109/240 CCRNs (45% response rate) n = 15 Semi-structured interviews from survey sample</td>
<td>Anxiety related to PPE availability, being infected, and transmitting infection to others were significantly, positively correlated with GHQ-12 score and negatively with years of experience. Significant correlations between GHQ-12 scores and sex, profession, and anxiety about PPE availability, being infected, and transmitting infection to others. Significant positive correlation between GHQ-12 score and anxiety about being infected and a negative correlation with number of shifts with COVID-19 exposure.</td>
<td>Statistics included one participant who did not finish the survey which meant they were included below the cut-off when they should have been included.</td>
</tr>
</tbody>
</table>

For the IES-R scale participant scores, more than half had probable or significant scores, 74% had symptoms above the cut-off. For the DASS-21, 67% reported anxiety, 54% stress, and 57% depression which they say is high compared to other studies.
<table>
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<tbody>
<tr>
<td>Crowe et al., 2022 May to June 2021 MMAT = 3</td>
<td>Aimed to examine the mental health, quality of work life, and intentions to quit of CCNs working during the COVID-19 pandemic.</td>
<td>Integrated mixed methods survey Impact of Event Scale – Revised (IES-R) Depression, Anxiety, Stress Scale (DASS-21)</td>
<td>N = 425 Health care providers n = 414 RN n = 8 NP n = 3 Other n = 147 of the survey participants completed the included open-ended question</td>
<td>74.4% were above the cut-off for PTSD on the IES-R. 69.6% reported depression, 56.9% reported anxiety, and 60.7% reported stress on the DASS-21. The PROQoL indicates that 100% of nurses had moderate or high burnout with 87.1% having secondary traumatic stress. 96.5% reported moderate compassion satisfaction.</td>
<td>Participants included nurse managers, directors, and educators who were not discussed separately though the aim was not to examine this population.</td>
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<td>El Gindi et al., 2022 March 23rd to May 2nd 2020 MMAT = 3</td>
<td>Aimed to examine the impacts of the COVID-19 pandemic on HCWs enrolled in the</td>
<td>Cross-sectional survey Demographic data PSS-10 (Perceived)</td>
<td>N = 1,096 n = 355 nurses n = 63 physicians n = 678 other HCWs</td>
<td>&quot;44% of nurses surveyed were thinking of quitting, 38.1% would like to work for different organization, 49.4% would like to look for a new job in the future, 23.3% already actively searching for a new job and 22.4% indicated they intend to quit&quot; according to the intent to turnover survey. The open-ended question answers fell into three categories stated as: 1. Failed leadership and 2. The traumatic nature of the work environment, that led to 3. A sense of disillusionment, defeat, and an intent to leave.</td>
<td>Possible reasons for provincial differences like rates of infection and hospitalizations was not discussed. Qualitative and quantitative data not integrated resulting in a poor data quality score.</td>
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<td>Convenience sampling via email through the Canadian Association of Critical Care Nursing (CACCN) and social media From all provinces, no territories</td>
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<td>Only participants who had already signed up for Text4Hope (Alberta) though the reason for this sample seemed to be only convenience.</td>
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<td>Fiest et al., 2021 July 17th to October 8th 2020 MMAT = 5</td>
<td>To examine how visitation restrictions during COVID-19 affected patients, families, and clinicians</td>
<td>Qualitative descriptive approach Thematic analysis of interviews</td>
<td>N = 27 n = 17 RNs n = 13 physicians n = 8 family members n = 3 patients n = 3 decision makers</td>
<td>Restricted visiting policies were often changed and were unevenly implemented. Restricted visiting added to the workload and caused interrupted relationships with family/patients. There was sadness, distress, and stress related to perception they were</td>
<td>Reason for recruiting decision makers directly, or how the 3 were chosen, was not discussed and seemed counter to the purpose of the study.</td>
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| Fredericks et al., 2022 August to September 2020 | To identify resilience based strategies and level of resilience in | Concurrent mixed methods 10-item Connor-Davidson | ICU only  
Purposive recruitment of patients/ family and clinicians via email and social media.  
Decision-makers were contacted directly by telephone  
From BC, Alberta, Sask., Manitoba, Ontario, Nova Scotia, and New Brunswick | not always necessary and enforcement was difficult.  
The introduction of new technology was sometimes helpful but required new skills.  
Trust between clinicians and the organization was tested and between clinicians and families.  
Timing and number of changes. Too many emails.  
Policy not implemented fairly or evenly.  
Recommendations were given though they do not specifically apply to this review. | Four study participants were managers.  
Limited reporting of the survey |

N = 60 RNs Convenience sample  
Moderate level of resilience on the Connor-Davidson Resilience Scale, though no scores or cut-offs were given.  
Two themes:
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<tr>
<td>MMAT = 1</td>
<td>nurses working during COVID-19.</td>
<td>Resilience Scale, Semi-structured interviews if they chose to be interviewed.</td>
<td>Interview participants were directly recruited after completing the survey component. Did not say how many interviews were completed (possibly 20) From Ontario</td>
<td>1. Experience of resilience 2. Supporting resilience Nurses were resilient even before COVID-19. Given that COVID-19 was new to all the nurses, years of experience and age did not affect the perception of resilience (which was upheld in the quantitative findings, though never reported on). Nurses felt that as they gained experience with COVID-19 and learned more, they were more able to adjust to their situation. The nurses felt that this type of learning could be applied to future situations. Information from both formal and informal sources was identified as important for nurses to be resilient. Nurses also felt that colleagues supported each other which increased resilience and suggested results as only moderate resilience was mentioned. No integration of qualitative and quantitative data.</td>
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<td>Gamble et al., 2022 April 29&lt;sup&gt;th&lt;/sup&gt; to May 28&lt;sup&gt;th&lt;/sup&gt; 2021 MMAT = 5</td>
<td>As part of a larger study, aimed to identify interventions that could support critical care nurses during pandemics.</td>
<td>Qualitative content analysis Three open ended questions were included and optional at the end of the second survey</td>
<td>N = 109 CCRNs These participants came from the group of 168 CCRNs who responded to the survey of the study by Silverberg et al., 2022 From BC, Alberta, Sask., Manitoba, Ontario, Quebec, New Brunswick, Nova Scotia,</td>
<td>that increasing the connection to others could help. Formal sources of psychological support were seen as a resource that had been missing.</td>
<td>No explanation of why the open-ended questions were not integrated with the quantitative data. Sample size does not match the original study and the data should have been attached to Silverberg et al., 2022, not 2021. Small sample size with 44.9% coming from Ontario may not represent nurses across Canada.</td>
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<td>Lapum et al., 2021 July to October 2020 MMAT = 5</td>
<td>To explore how nurses are emotionally affected working in COVID-19 acute care hospital environments</td>
<td>Qualitative narrative Lieblich et al.’s narrative approach Semi-structured interviews via Zoom</td>
<td>N = 20 RNs both front-line and nurse leaders Toronto and area COVID-19 designated units. Convenience sampling via hospital listservs and social media From Ontario</td>
<td>Three themes were identified: 1. &quot;The emotional experience included fear and apprehension, uncertainty, frustration and anger, helplessness and sadness, and resilience&quot; (p. 7). 2. The agency of emotions included powerful and persistent emotions, containing/releasing emotions, isolation, emotional and physical exhaustion, and emotional labour&quot; (p. 8) 3. Emotions &quot;acted to shape nursing practice and nursing role identity and philosophy&quot; (p. 11). Policies and procedures which did not support safe, ethical practice were the most challenging emotionally such as no visitors and lack of appropriate PPE. Isolation from support systems and the fear of infection/infecting others caused distress.</td>
<td>Nurse leaders are just grouped together with the RNs at the bedside. I left out quotes specific to leaders but used the rest.</td>
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<td>Lou et al., 2021 July 31&lt;sup&gt;st&lt;/sup&gt; to August 15&lt;sup&gt;th&lt;/sup&gt; 2020 MMAT = 1</td>
<td>To examine: (a) the most useful resources for nurses and physicians to cope with stress during the COVID-19 pandemic, (b) resources that are underutilized/lacking in the hospital and healthcare system, and (c) resources available to predict HCPs' psychological distress, burnout, and</td>
<td>Quantitative descriptive survey List of resources DASS-21 Maslach Burnout inventory for medical personnel 2 questions on intention to quit</td>
<td>N=119 (3.4% of total population) n = 64 nurses n = 55 physicians Purposive sampling via email to nurse managers and unit heads From Quebec</td>
<td>A list of resources categorized as personal, hospital, or healthcare system were analyzed in terms of whether physicians and nurses thought they were available and helpful or would be helpful to them and whether they used them or not. Personal resources were widely available and family support, support from friends, and spending time in nature were the most helpful of them. PPE was identified as an available and helpful hospital resource (though the wording of this line is not clear if it only included PPE). Support from colleagues was helpful and included under hospital resources.</td>
<td>It is not clear how personal, hospital, and system resources were defined. For example, clear communication seems like it would have been a hospital resource as how it was distributed came at that level. The support of colleagues is listed as hospital, but it is clearly personal until formalized as a peer counseling service or something like that.</td>
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Nurses struggled but were sometimes able to re-commit to the values of nursing.
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<td>Lou et al., 2022</td>
<td>intentions to quit.</td>
<td>Cross-sectional, descriptive, correlational design</td>
<td>N = 119 (same participants as Lou et al., 2021) Purposive sampling via emails to nurse managers and unit heads to be sent out to the workers</td>
<td>Training was helpful, but not perceived as available. Counselling was perceived as available and helpful but only 10% of nurses and physicians used it as a resource. System resources such as rewards and job protection were not perceived as available. &quot;Job protection, clear communication and disease information, and continued implementation of social distancing&quot; were perceived as the most helpful.</td>
<td>No numbers given for DASS-21 or the Maslach Burnout Inventory.</td>
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July 31st to August 15th 2020
MMAT = 2

To examine whether there are differences in the sources and levels of stress, distress, and approaches to coping between nurses

Pre-COVID depression, DASS Pre-COVID depression,

Of nurses, 18.8%, 17.2%, and 15.6% reported scores indicating severe depression, anxiety, and stress in that order.

Concerns related to physical and mental health and work rated highest as stressors.

Not discussed but this is the same data as the study published in 2021. Pre-COVID reports were based on shortened versions of the scales and recollection of
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<td>and physicians, and whether these differed pre- and post- COVID. Explore coping strategies as moderating the negative impact of stress, burnout, and intentions to quit.</td>
<td>anxiety, stress questions Maslach burnout inventory Three item pre-COVID-19 burnout List of 32 stressors rate 1-5 (not at all to very much a source of stress) Impact of stress on work COPE inventory Two item intention to quit</td>
<td>From Quebec</td>
<td>Nurses reported more stress related to health, work, interpersonal conflict, and stigma than physicians. Nurses reported more anxiety and burnout than physicians and more maladaptive coping than physicians. Age was negatively correlated with scores on the DASS as well as burnout. Maladaptive coping was correlated with distress, burnout, but adaptive coping was not. Adaptive coping buffered the effect of stress on work performance and burnout, but maladaptive coping did not. 50% of nurses intended to quit and this was associated with burnout.</td>
<td>feelings/ emotions. This method of data collection was not supported with previous research, so I excluded reporting this section.</td>
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<td>Maunder et al., 2021 T1 = September 21 to November 15th, 2020 T2 = January 25th to February 15th, 2021 MMAT = 3</td>
<td>“To assess the relationship of occupational roles, care for children and elders at home, sleep quality, and self-efficacy with respect to the occupational challenges of the pandemic, on changes in emotional exhaustion and psychological distress over this time.”</td>
<td>Quantitative descriptive survey Maslach Burnout Inventory (Emotional exhaustion subscale) Kessler K6 One question on sleep quality Self-efficacy scale for COVID-19 prevention and control</td>
<td>N(T1) = 539 n = 134 nurses n = 156 other clinical professionals n = 91 other clinical positions n = 158 non-clinical positions N(T2) = 484 from the original sample Convenience sampling through hospital communication and managers Toronto, Ontario only</td>
<td>Healthcare professionals were more likely to have been isolated for symptoms, tested for the virus, and separated from family. Nurses were more likely to have worked with insufficient PPE, had a breach in PPE, and provided patient care without proper PPE. Nurses experienced more emotional exhaustion than the other groups and a greater increase in this measure over time. Nurses also had higher levels of severe emotional exhaustion. Nurses also experienced higher reported scores of psychological distress which was increasing over time. Participants with lower pandemic self-efficacy and sleep quality had more emotional exhaustion.</td>
<td>The self-efficacy scale they use is one they created for a different study. The original had 24 items, here it says 23 items but does not say why one was dropped. Characteristics of the T2 sample were not discussed or compared to T1. Includes learners, volunteers, retail workers, contractors, but the reason for this was not stated</td>
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<td>Maunder et al., 2022</td>
<td>Purpose is to examine changes over time as well as to compare measures to infection rates.</td>
<td>Randomized to shortened survey or extended version</td>
<td>T3, N= 424 from T1 sample T4, N=409 from T1 sample</td>
<td>Emotional exhaustion did increase over winter and spring and decrease at the summer measurement. Emotional exhaustion scores in nurses were substantially greater than some pre-COVID-19 findings. Burnout was highest among nurses with higher depersonalization and lower personal accomplishment than other groups. Nurses also reported the most severe psychological distress.</td>
<td>Follow up to previous article. Shortened and extended versions were not discussed in first article so unsure if this is a change.</td>
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<td>T1 and T2 as before T3 = April 26th to May 16th 2021 T4 = July 26th to August 15th, 2021 MMAT = 3</td>
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<td>Same measures as first article. Data is from T3 and T4 of original study From Ontario</td>
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<td>Mohammed &amp; Lelièvre, 2021</td>
<td>Aimed to look at the experiences of nurses looking</td>
<td>Qualitative descriptive</td>
<td>N = 43 of 75 &quot;Nurses,&quot; not specifically RNs</td>
<td>Three themes identified: 1. Traumatic experience 2. Living through the experience a. Seriousness of the virus</td>
<td>Had supports in place which may distinguish findings from other areas.</td>
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| 2020 MMAT = 1 after COVID-19 patients. | Hermeneutic phenomenological approach | Purposive sampling (email, in person) directly by investigators as they knew the participants. From Ontario | b. Changes in practice  
c. Concerns for safety  
d. Communication challenges | Nurses had moved back to a regular unit four months before the study so based on recall. |
| Peter et al., 2022/2020 Spring and Summer MMAT = 5 | Aimed to assess how nurses tried to practice ethically and what helped them do so. | Qualitative descriptive  
Vanlaere and Gastman and interpretivist paradigm as framework | N = 24 RNs  
Recruitment through purposive sampling via graduate student listserv and Facebook, university system and then snowball sampling  
From Ontario and Nova Scotia only | Four themes identified:  
1. Challenges providing good care in response to sudden changes in practice.  
2. Tensions in juggling the responsibility to prevent COVID-19 infections with other competing moral responsibilities.  
3. Supports to foster nurses’ capacity to meet their caring responsibilities.  
4. The preservation of nurses’ moral identity through expressions of gratitude and health improvement. | Only RNs who worked with COVID positive or suspected patients.  
Were from a variety of areas, but examples clearly relate to acute care mostly and no long-term care. |
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<td>Qureshi et al., 2022 2020 MMAT = 4</td>
<td>Aimed to create and validate an accurate computer model of nursing care for COVID-19 positive patients.</td>
<td>Patient data collected from GRASP Physical measurements of the in-patient unit Care task walking patterns established by two RNs Care task priorities through interviews and focus groups with 36 RNs</td>
<td>N =12 RNs? One unit chosen for analysis and then the nurses were chosen from that unit From Ontario</td>
<td>Creation and support of moral communities are important to sustaining nurses. Completion of care circles is also important. The authors created a computer model of nursing care that allowed for a quantitative analysis of nursing workload with and without the addition of COVID-19 positive patients. Direct care time increases with the number of COVID-19 patients. Donning and doffing PPE takes a significant amount of time ranging from 2 to 6.1 hours. Mental workload and distance walked also increased with the number of COVID-19 patients. Missed tasks and the average time a task waited in the queue were also increased.</td>
<td>Does not fit with other types of research as it is computer modelling No discussion of how the unit was chosen or how participants were recruited. Unsure where research took place</td>
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<td>Rhéaume and Breau, 2022/ January 11th to March 2nd, 2021</td>
<td>To examine how burnout, intentions to leave, moral distress, and organizational support are connected during the COVID-19 pandemic in ICU nurses</td>
<td>Mixed methods study: Quantitative portion mostly discussed</td>
<td>N = 236 ICU nurses out of 1400 who were invited. Convenience sample recruited through CACCN email as well as social media. From BC, Alberta, Ontario, and New Brunswick</td>
<td>Pre-pandemic workload was already greater than what could be done in 12h, so additional tasks such as donning and doffing PPE causes rushing safety guidelines. 48.9% considered leaving their job mainly for psychological and physical safety reasons. High levels of burnout with subscale of emotional exhaustion higher than that of depersonalization. Moderate levels of organizational support (though no cut off was given). Normal levels of resilience. Score of 20 on moral distress scale (no parameters as to what that means were given). Significant negative correlations between burnout and organizational support, intent to leave, and</td>
<td>Mention qualitative responses but not sure why when they were not in the associated article and there is no discussion of how they came to be. Aims of the two articles are stated differently though the research is called mixed methods.</td>
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| Rhéaume et al., 2022
January 11th to March 2nd, 2021
MMAT = 1 | To explore the causes of ICU nurses' distress during the [COVID-19] pandemic | Mixed methods study: Qualitative portion
Qualitative descriptive critical incident technique for interviews
Inductive thematic analysis | N = 236 ICU nurses out of 1400 who were invited
n = 108 responded also to the qualitative component of the previously listed study
Convenience sample recruited through CACCN email as well as social media | Four themes emerged:
1. Managing the pandemic – included constantly changing practices, not enough appropriate PPE, missing other resources, being short of staff, and feeling unsafe on many different levels.
2. Witness to families' grief – no visitor policies left nurses trying to connect families even during patient deaths; COVID-19 patients often died or had long-term effects.
3. Our safety – equipment was sometimes faulty or unavailable, leaving nurses at risk; decisions were made by management or physicians, but nurses bore the brunt of the consequences. | Based on recall of one critical event.
No discussion of why only 108 responded to qualitative questions, does it mean that the others did not recall a critical incident? What were the differences in the participants? |
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<td>Silverberg et al., 2021 March 16th to May 25th 2020 MMAT = 3</td>
<td>Examined how infection control procedures were perceived and followed by nurses as well as how concerned they were about their personal risk of infection.</td>
<td>Cross-sectional survey created by WHO Questions about trust based on another research project (see additional content).</td>
<td>From BC, Alberta, Ontario, and New Brunswick</td>
<td>4. Futility of care – nurses were not part of patient care decisions which prolonged life and suffering.</td>
<td>Critical care and emergency. No mention of why they added questions about institutional trust when the WHO survey already included related items.</td>
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<td>N = 319 &quot;Nurses&quot; unspecified what type n = bedside nurses n = other nursing roles Convenience sampling through email and Slack via CACCN and Canadian Association of Emergency Physicians (CAEP) listservs</td>
<td>PPE use was high for this population of nurses. Over 95% intended to use full PPE when looking after COVID-19 patients. PPE was perceived as moderately available to them. Fear of the infection passing to themselves, and their families caused the most concern, particularly in nurses with previous outbreak experience. Infection control procedures were seen as being an expectation of the nursing role that was important and supported. Infection control procedures added to nursing workload, but the majority felt that they were necessary.</td>
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<td>Silverberg et al., 2022/ April 29th to May 28th 2021</td>
<td>Aimed to compare previous findings one year from the original research as</td>
<td>Cross-sectional online survey Demographics</td>
<td>N = 141 &quot;Nurses&quot; unspecified type Convenience sampling via Email and Slack</td>
<td>99% intend to use PPE when working with COVID-19 patients 30% increase since last survey in number of nurses working directly with suspected and/or confirmed COVID-19 cases (over 90%)</td>
<td>No discussion on sample size or power analysis Follow-up to previous survey with a few</td>
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<td>Sample, Recruitment, Location</td>
<td>Findings Regarding COVID-19 Impacts</td>
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<td>Older and male nurses had less confidence in PPE and IPC procedures.</td>
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<td>Academic hospitals had higher scores on beliefs and emotions.</td>
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<td>No difference between ages, genders, marital statuses, number of children, workplace settings, experience working with novel pathogens, level of exposure or care for patients with COVID-19.</td>
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<td>More work experience and certain provinces had high trust.</td>
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<td>Least trust in national government.</td>
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<td>Source, Date of data collection, MMAT Score</td>
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<td>Tiagi, 2022 November 24th, 2020 to December 13th, 2020 MMAT = 2</td>
<td>To examine mental health outcomes of different groups of healthcare workers.</td>
<td>Cross-sectional online survey</td>
<td>N = 18,139 healthcare workers n = 5,361 &quot;nurses&quot; not defined n = 6,813 allied workers n = 572 doctors Analysis of data from Statistics</td>
<td>Nurses and doctors chose &quot;some stress&quot; and &quot;stressful&quot; more often than &quot;no life stress.&quot; Nurses chose &quot;somewhat worse/much worse&quot; for their mental health than before COVID-19 more often than other HCWs. Nurses and doctors rated their mental health during the pandemic as &quot;poor&quot; significantly more often than allied HCWs.</td>
<td>Differences between the sexes were noted, but since nurses are more often female, may have been skewed. Discussion of the data collection methods were missing resulting in</td>
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- No difference in trust with those who had exposure to COVID-19 and those who got COVID-19.
- Compared to first survey: Less trust overall, more trust in ability of systems to handle the pandemic. Lower emotions scores (more fear of infection). Higher beliefs score. Higher skills in PPE and strong intentions to use PPE.
<table>
<thead>
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<td>Canada's 2020 &quot;impacts of COVID-19 on healthcare workers&quot; crowdsource initiative BC, Alberta, Sask., Manitoba, Ontario, Quebec, Noa Scotia, Newfoundland, PEI, New Brunswick, and the Territories</td>
<td>Mental health outcomes for nurses didn't change as much as it did for doctors due to their poor mental health before the pandemic.</td>
<td>the low MMAT score. Did not separate acute care and long term care results.</td>
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