Understanding COVID-induced Public Health Practices and Protocols and Workplace Challenges: The Experiences of Child Care Professionals in Canada

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Abstract

While operating in Canada during the COVID-19 pandemic, child care professionals (CCPs) implemented and enforced COVID-induced public health practices and protocols (PHPPs), some of which have resulted in new challenges and risks to CCP's health and safety. However, the experiences of CCPs have been underreported in Canada despite the sector's large footprint in the Canadian economy and the reality that many other essential service sectors rely on child care to function. This research seeks to understand which COVID-induced public health practices and protocols were present in Canadian child care programs, how these PHPPs were perceived by CCPs, and the factors that contributed to impacts that were experienced by CCPs. The data came from a national, web-based survey (English/French), that yielded 1610 responses primarily from CCPs working at licenced child care programs within the Canadian Child Care Federation's email database and social media pages between June – August 2021. During the COVID-19 pandemic, CPPs implemented and enforced PHPPs and some PHPPs may have resulted in new challenges and risks to CCP's health and safety. Fomite-based PHPPs, including surface cleaning (99.7%), handwashing with soap (97.4%), and using sanitizer (96.0%), were more commonly reported than airborne-based PHPPs such as masking (93.0%), opening windows (55.9%), using an HVAC system (19.8%). A quarter of CCPs reported using devices that Health Canada either did not recommend or were not widely approved for use against COVID-19. CCPs reported challenges with PHPP implementation, notably not feeling well equipped or trained to use disinfecting and sanitizing products (74.8%), experiencing physical difficulties (74.3%), not having sufficient funds (65.2%), the need for more staff to make working during the pandemic easier (62.9%) and need better guidance from public health officials (61.5%). CCPs were more concerned about a child in their care catching COVID-19 (87.2%) than they were for personally

catching the virus (75.6%). Roughly 90% of CCPs experienced stress and other mental health challenges (SMC) and 26.6% reported being less interested in continuing to work in the sector. Four logistic regression models were constructed to determine the factors associated with CCPs' concerns with personally contracting COVID-19, a child in their care personally contracting COVID-19, as well as factors associated with increased SMC and finally factors associated with less interest in continuing to work in the sector. Independent variables related to demographic characteristics of CCPs and child care programs, PHPPs challenges, and other outcomes from survey questions were identified through bivariate analysis and subsequently entered into a series of multivariate logistical regression models using a backward stepwise algorithm. Several variables were significant in each model and only the most significant are reported here. CCPs were roughly 10 times more likely to report concern over contracting COVID-19 if they perceived the virus as a serious health threat (OR 9.9, 95% CI 6.1-16.0) and were approximately twice as likely to report concern if they reported insufficient funds for PHPP implementation (OR 1.8, 95% CI 1.4-2.4) (R^2=0.212). Similarly, the most significant factor associated with CCPs' concern for children contracting COVID-19 was if the CCP perceived the virus as a serious health threat (OR 6.3, 95% CI 3.7-10.8) (R^2=0.141). The two independent variables significantly affecting SMC (R^2 = .163) were having a pre-existing health condition (OR 2.4, 95% CI 1.6-3.6) and the need for additional staff (OR 2.2, 95% CI 1.5-3.3). Finally, CCPs were over seven times more likely to report being less interested in working in the child care sector if they had experienced SMC (OR 7.4, 95% CI 3.2-12.0) and were almost twice as likely to report being less interested if they reported being not well training and equipped to use disinfecting and sanitizing products as to not pose a risk to human health (OR 1.9, 95% CI 1.3-2.2) (R^2 = .148). The findings underscore the multifaceted challenges CCPs faced and the paramount importance

of workplace preparedness, contributing to a knowledge gap in current literature, particularly within a Canadian context. This study suggests that by addressing the dissemination of information (including guidance and training), CCPs will experience less SMC and be more likely to be interested in continuing to work in the sector. Moreover, investing in support (e.g., mental health support, financial compensation, more staff) for CCPs who have experienced SMC will improve not only the health of the professional but also the sustainability of the sector.

Au cours de la pandémie de COVID-19 au Canada, les professionnels de la garde d'enfants (PGE) ont mis en œuvre et appliqué les pratiques et protocoles de santé publique (PPSP) induits par le COVID, dont certains ont entraîné de nouveaux défis et risques pour la santé et la sécurité des professionnels de la garde d'enfants. Cependant, les expériences des PCC ont été peu rapportées au Canada, malgré l'importance du secteur dans l'économie canadienne et le fait que de nombreux autres secteurs de services essentiels dépendent des services de garde d'enfants pour fonctionner. Cette recherche détermine quels pratiques et protocoles de santé publique induits par le COVID étaient présents dans les programmes canadiens de garde d'enfants, et comment ces PPSP étaient perçus par les PGE et les facteurs qui ont contribué aux impacts subis par les PGE. Les données proviennent d'une enquête nationale en ligne (anglais/français), qui a permis d'obtenir 1 610 réponses de la part de professionnels de la garde d'enfants principalement agréés figurant dans la base de données de courriels et les pages de médias sociaux de la Fédération canadienne des services de garde à l'enfance, entre juin et août 2021. Pendant la pandémie de COVID-19, les PGE ont mis en œuvre et appliqué des PPSP, dont certains ont pu entraîner de nouveaux défis et risques pour la santé et la sécurité des PGE. Les PPSP à base de fomites, y compris le nettoyage des surfaces (99,7 %), le lavage des mains avec du savon (97,4 %) et l'utilisation de désinfectant (96 %), ont été plus souvent signalés que les PPSP à base de

particules aériennes comme le masquage (93 %), l'ouverture des fenêtres (55,9 %) et l'utilisation d'un système de chauffage, de ventilation et de climatisation (19,8 %). Un quart des PCC ont déclaré utiliser des dispositifs que Santé Canada ne recommandait pas ou dont l'utilisation contre COVID-19 n'était pas largement approuvée. Les PGE ont fait état de difficultés dans la mise en œuvre du PPSP, notamment le fait de ne pas se sentir bien équipés ou formés pour utiliser les produits de désinfection et d'assainissement (74,8 %), d'éprouver des difficultés physiques (74,3 %), de ne pas disposer de fonds suffisants (65,2 %), d'avoir besoin de plus de personnel pour faciliter le travail pendant la pandémie (62,9 %) et d'avoir besoin de meilleurs conseils de la part des responsables de la santé publique (61,5 %). Les PGE étaient plus préoccupés par le fait qu'un enfant dont ils s'occupaient ait contracté le COVID-19 (87,2 %) que par le fait qu'ils aient eux-mêmes contracté le virus (75,6 %). Environ 90 % des PGE ont souffert de stress et d'autres problèmes de santé mentale (SMC) et 26,6 % ont déclaré avoir moins envie de continuer à travailler dans le secteur. Quatre modèles de régression logistique ont été élaborés pour déterminer les facteurs associés à la crainte des PGE de contracter personnellement le COVID-19, de voir un enfant dont ils ont la charge contracter personnellement le COVID-19, ainsi que les facteurs associés à une augmentation du SMC et, enfin, les facteurs associés à une moindre envie de continuer à travailler dans le secteur. Les variables indépendantes liées aux caractéristiques démographiques des PGE et des programmes de garde d'enfants, aux défis posés par les PPSP et à d'autres résultats tirés des questions de l'enquête ont été identifiées au moyen d'une analyse bivariée, puis introduites dans une série de modèles de régression logistique multivariés à l'aide d'un algorithme pas à pas à rebours. Plusieurs variables étaient significatives dans chaque modèle et seules les plus significatives sont rapportées ici. Les PGE étaient environ 10 fois plus susceptibles de s'inquiéter face à la contraction du COVID-19 s'ils percevaient le

virus comme une menace sérieuse pour la santé (OR 9,9, 95% CI 6,1-16,0) et étaient environ deux fois plus susceptibles de s'inquiéter s'ils déclaraient que les fonds pour la mise en œuvre du PHPP étaient insuffisants (OR 1,8, 95% CI 1,4-2,4) (R2 =0,212). De même, le facteur le plus significatif associé à l'inquiétude des PGE concernant la contamination des enfants par le COVID-19 était le fait que les PGE considéraient le virus comme une menace sérieuse pour la santé (OR 6,3, 95% CI 3,7-10,8) (R2 =0,141). Les deux variables indépendantes ayant une incidence significative sur le CMS (R2 = 0,163) étaient le fait d'avoir un problème de santé préexistant (OR 2,4, IC à 95 % 1,6-3,6) et le besoin de personnel supplémentaire (OR 2,2, IC à 95 % 1,5-3,3). Enfin, les PCC étaient plus de sept fois plus susceptibles de déclarer être moins intéressées à travailler dans le secteur de la garde d'enfants si elles avaient fait l'expérience de la PMC (RC 7,4, IC à 95 % 3,2-12,0) et presque deux fois plus susceptibles de déclarer être moins intéressées si elles déclaraient ne pas être bien formées et équipées pour utiliser des produits de désinfection et d'assainissement ne posant pas de risque pour la santé humaine (RC 1,9, IC à 95 % 1,3-2,2) (R2 = 0,148). Les résultats soulignent les défis à multiples facettes auxquels sont confrontés les PGE et l'importance primordiale de la préparation du milieu de travail, ce qui contribue à combler une lacune dans la documentation actuelle, en particulier dans le contexte canadien. Cette étude suggère qu'en s'attaquant à la diffusion de l'information (y compris l'orientation et la formation), les CCP connaîtront moins de SMC et seront plus susceptibles de vouloir continuer à travailler dans le secteur. En outre, l'investissement dans le soutien (par exemple, le soutien à la santé mentale, la compensation financière, l'augmentation du personnel) pour les CCP qui ont connu des SMC améliorera non seulement la santé des professionnels, mais aussi la durabilité du secteur.

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List of Commonly Used Acronyms

CCDA – Chemical Cleaning and Disinfecting Agents

CCP – Child Care Professional

CCCF – Canadian Child Care Federation

CI – Confidence Interval

COVID-19 – SARS-CoV-2 Virus

CPCHE – Canadian Partnership for Children's Health and Environment

ECE – Early Childhood Educator

HVAC – Heating, Ventilation, and Air Conditions System

JD-R – Job Demands-Resources Model

OR – Odds Ratio, adjusted

PEHE – Prenatal Environmental Health Education Collaboration

PPE – Personal Protective Equipment

PHO – Public Health Official

PHPP – Public Health Practice and Protocol

QUATs – Quaternary Ammonium Compounds

SMC – Stress and Other Mental Health Challenges

List of Terms

Asymptomatic Host: an individual who is infected with a virus and does not show symptoms but can still transmit the virus to others.

Child Care Programs: any type of child care workplace (e.g., a home, centre, facility) that offers child care services.

Early Childhood Educator: a professional who plans, leads, and supervises educational and developmental activities for children aged from infancy to 12 years, ensuring their well-being and growth.

Electrostatic Sprayer: a device that positively charges liquid droplets to evenly apply solutions onto surfaces for tasks such as disinfection and pest control.

Environmental Health Standards: (understood within a workplace context) the established guidelines and regulations that outline safe and healthy working conditions, aiming to minimize occupational hazards and protect the well-being of employees.

Fomite Transmission: the transmission of infectious diseases, such as COVID-19, by objects.

Hazard: A potential source of harm or danger, where danger is something that may cause injury or harm.

Ozone-Emitting Device: a device that generates and releases ozone gas, a molecule composed of three oxygen atoms, typically used for purposes such as air purification, odour removal, and disinfection due to its strong oxidative properties.

Quaternary Ammonium Compounds: a type of chemical often found in disinfectant and cleaning products, used to kill bacteria, viruses, and mold.

Risk: the possibility that something bad or unpleasant will happen.

Situated Knowledge: knowledge that is shaped by the specific social, cultural, and environmental context in which it is acquired, emphasizing the interplay between the knower and their immediate circumstances.

Sprayer/Fogger: a device designed to disperse liquids in the form of fine droplets or mist, commonly used for spraying pesticides, applying disinfectants, distributing cleaning agents, or uniformly delivering other liquids over surfaces or into the air.

UV-Emitting Device: a device that produces ultraviolet radiation, a form of electromagnetic radiation, commonly used for applications such as sterilization, disinfection, and curing processes given its ability to destroy microorganisms and alter chemical properties of materials.

Working as a Child Care Professional during the COVID-19 Pandemic: The Presence and Impact of COVID-Induced Public Health Practices and Protocols

Chapter 1: Thesis Introduction

1.0 Introduction

Since the confirmation of its first cases in Canada, in March of 2020, the SARS-CoV-2 (COVID-19) virus has spread to every province and territory and resulted in over 4.6 million confirmed cases (as of May 17th, 2023) (Ritchie et al., 2023a). Of those to contract the virus, over 52,000 have died (as of May 17th, 2023) (Ritchie et al., 2023b) making it the deadliest pandemic in Canadian history since the Spanish Flu of 1918 (Bailey, 2023). At the start of this study, in June 2021, the rates of COVID-19 infection across each province and territory varied greatly (see Figure 1.1). The highest rates of COVID-19 infection were being recorded nationally across First Nation reserves with 24,712 cases being reported per 100,000 people (GOC, 2023).

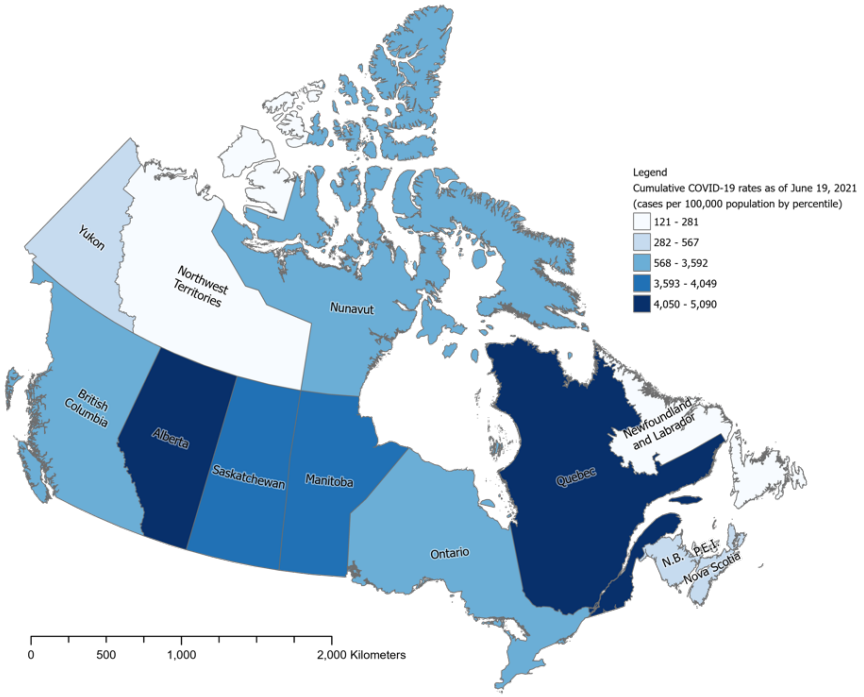

Figure 1.1: Rate of total reported cases (per 100,000 people) of COVID-19 across Canada as of June 19th, 2021 (GOC, 2023).

Research has shown that the most effective way to stop or slow the spread of a mass viral outbreak is through a combination of vaccination and public health practices and protocols (PHPPs) (Haldane et al., 2021; Mousazadeh et al., 2021; Flahault et al., 2006; Nichol & Treanor; 2006; Osterholm, 2005). Given the novelty of the virus; vaccine development, government approval, and mass distribution to populations aged five and up was not possible until the summer of 2021 (CIHI, 2022). For children under the age of five, vaccinations were not readily available for use in Canada until the summer of 2022 (Health Canada, 2022). This delay between the first confirmed case of the visrus in Canada and the mass distribution of a vaccine placed immense importance on the implementation and enforcement of PHPPs to limit the spread of transmission.

Provincial public health departments/agencies were tasked with creating and disseminating PHPPs in real-time for their respective jurisdictions and these measures changed frequently, with little notice, as our epidemiological understanding of the virus improved and as communities reacted to viral outbreaks.

While most of the population sheltered in their homes throughout the first year of the pandemic, for a subset of service workers, their professions were deemed essential and thus they were operating in-person on the frontlines of the pandemic. Child care services were deemed essential in many communities across Canada as they played (and continue to play) a crucial role in keeping other essential services such as health care operating at full capacity. In fact, many Canadians rely on child care with approximately 60% of all children aged 0-5 years participating in some form of child care. As of 2019, the Canadian child care sector employed approximately 302,000 child care professionals (CCPs), making up 1.6% of the Canadian labour force (Uppal and Savage, 2021; Findlay, 2019).

Child care in Canada can be categorized as 'formal' or 'informal', with formal including structured child care programs (eg. daycare, after school care) and informal including unstructured child care programs (e.g. child is cared for by a relative) (Findlay, 2019). For the purposes of this thesis, formal child care was broken down further into regulated and unregulated. Regulated child care includes larger facilities or licensed (regulated) home child care programs which must abide by various rules and regulations set out by their provincial government including specific educational qualifications for CCPs, menu planning, babyproofing throughout the program, visits from a ministry staff member to conduct spot-checks. Unregulated child care includes unlicensed home child care programs (i.e. not regulated by law, beyond restrictions on the number of and ages of children in the program) and is not required to follow a program or menu plan. These programs also do not need to have a visit from a government official and the CCP themselves do not need any educational background. However, it should be noted that unregulated CCPs may still choose to implement these standards, however, given the lack of government oversight and data reporting, much is unknown about how these programs function. Each provincial/ territorial jurisdiction has a different child care program composition with some provinces like British Columbia and Quebec having a subsidized system in place (Famille Québec, 2021; GOBC, 2021; Findlay, 2019).

The PHPPs within child care programs varied across the country. At the time of this study, several commonalities across various jurisdictions including mask-wearing, frequent cleaning of commonly used surfaces, physical distancing, hand washing and sanitizing, creating holding spaces for symptomatic children, time-slot-based pick-up and drop-off protocols, and cohorting children (i.e. keeping a child with the same group of children and the with same child care professional daily) (BCCDC, 2021; GNWT, 2021; Government of Alberta, 2021; GONFL, 2021; Government of Nova Scotia, 2021; Government of Ontario, 2021a; Government of Quebec, 2021;

Government of Yukon, 2021; GPEI, 2021; Saskatchewan Health Authority, 2021; CCC, 2020; Government of New Brunswick, 2020). Knowledge of the extent to which these PHPPs were implemented in child care programs and the experiences of CCPs who were tasked with implementing and enforcing these measures is limited. The experiences of CCPs have consistently been underreported in discourses on frontline, essential service workers, particularly in Canada, and the COVID-19 pandemic has exacerbated the disparity in knowledge between the experiences of those working in child care and those working other essential sectors such as health care.

1.1 Research Objectives

To shed light on the experiences of CCPs working in Canada during a public health crisis, this thesis seeks to understand the PHPPs that were used in Canadian child care programs and examine the perceived COVID-19 concerns and PHPP challenges CCPs have faced as a result of working during the COVID-19 pandemic. Finally, this thesis aims to better understand how these COVID-19 concerns and PHPP challenges have impacted CCPs' mental well-being as well as their interest in continuing to work in the sector. This research was approved by the University of Ottawa Research Ethics Board #S-05-21-6888 (Appendix A). The following research questions guided this study:

- Which PHPPs were implemented in child care programs across Canada to limit the transmission of COVID-19?
- What are the perceived COVID-19 concerns of CCPs and the workplace challenges experienced by CCPs as a result of COVID-induced PHPPs in child care programs?
- How have the PHPP challenges impacted CCPs' concerns regarding COVID-19, their experiences with SMC, and their interest in continuing to work in the child care sector?

The above research questions listed above were influenced in part by the principles of the Job Demands-Resources (JD-R) model (see Figure 1.2), which states that strain occurs in the presence of a discrepancy between job demands (i.e. aspects of the job that require a sustained physical and/or psychological output) and job resources (i.e. aspects that are functional in achieving work objectives, elevating job demands and/or supporting personal growth and development) (Bakker and Demerouti, 2007). Moreover, when the relationship between job demands and job resources is balanced, workers can meet their job demands. The model has been used in multiple studies to highlight the dynamic relationship between human health and occupational resilience to COVID-19 within essential service sectors (Johnston et al., 2022; Zhou et al., 2022; Barello et al., 2021; Sokal et al., 2020).

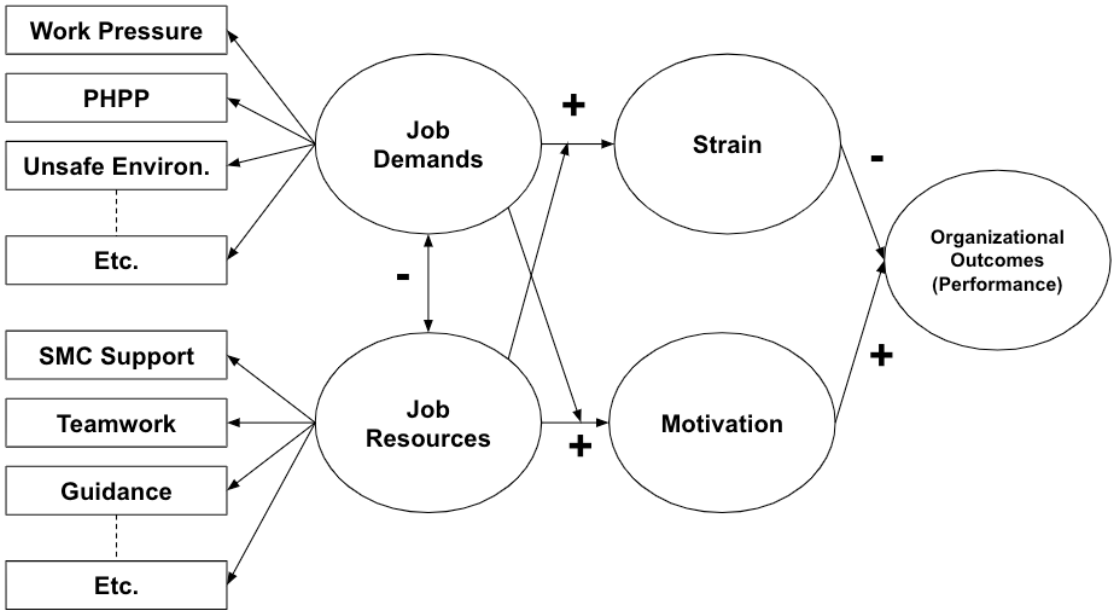

Figure 1.2: JD-R model taken from the revised model by Bakker and Demerouti 2007, including descriptive inputs relating to this study.

Given the findings in the current literature (Johnston et al., 2022; Zhou et al., 2022; Barello et al., 2021; Popov et al., 2021; Pressley, 2021; Atolani et al., 2020; Benfante et al., 2020; Sokal et al., 2020), there is reason to believe that CCPs have experienced an imbalance balance between job demand and job resources, resulting in personal strain which is likely to impact organizational outcomes.

1.2 Overview of Thesis

This thesis is constructed around two scholarly articles. In Chapter 2, the first article titled COVID-Induced Public Health Practices and Protocols: Challenges and Risks Posed to Child Care Professionals in Canada, presents the reported types of PHPPs that were to be implemented within child care programs across Canada as well as the reported COVID-induced PHPP challenges faced by CCPs. The second article titled COVID-Induced Stressors on Child Care Professionals in Canada, in Chapter 3, discusses the concerns CCPs had with COVID-19 transmission within the workplace and how the COVID-induced PHPPs manifested experiences of stress and other mental health challenges, leading to reduced interest in continuing to work in the sector. Lastly, Chapter 4 presents a summary of the research findings and recommendations for future studies are presented.

I was the principal writer of this thesis. Dr. Sawada assisted in editing Chapters 1 and 2 while Dr. Crighton, Dr. Phipps and Dr. Sawada all assisted with drafting and editing Chapters 2 and 3. The methods and materials used for data collection in this thesis were determined by myself, Dr. Crighton and Dr. Phipps. Data analysis was conducted by me and reviewed by Dr. Crighton and Dr. Sawada.

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Chapter 2: COVID-Induced Public Health Practices and Protocols: Challenges and Risks Posed to Child Care Professionals in Canada

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2.0 Introduction

Since the first known case of the SARS-CoV-2 (COVID-19) virus in Canada in March 2020, there have been over four million lab-confirmed cases, and over 52,000 deaths, making it the second deadliest pandemic in Canadian history behind the Spanish Flu of 1918 (Ritchie et al., 2023; Watts et al., 2020). In response to rising rates of transmission, public health practices and protocols (PHPPs) were put in place by all levels of government, with one of the first protocols being the closure of non-essential businesses (CIHI, 2022). Child care was deemed an essential service as it played (and continues to play) a vital role in keeping other essential services, such as healthcare, functioning. Child care programs were mandated to implement several PHPPs including mask wearing, frequent cleaning of commonly used surfaces, temperature checks, e pick-up and drop-off protocols, and grouping/cohorting of children and child care professionals (CCPs) (i.e., keeping a child with the same group of children and the with same CCP daily) (BCCDC, 2021; GNWT, 2021; Government of Alberta, 2021; Government of Manitoba, 2021; GONFL, 2021; Government of Nova Scotia, 2021; Government of Ontario, 2021a; Government of Quebec, 2021; Government of Yukon, 2021; GPEI, 2021; Saskatchewan Health Authority, 2021; CCC, 2020; Government of New Brunswick, 2020). Given studies on the implementation of COVID-induced PHPPs in other essential sectors (Leo et al., 2021; Popov et al., 2021; Pressley, 2021; Sharifi et al., 2021; Wu, et al., 2020) and involving parents/children who used child care

services during the pandemic (Herrenkohl et al., 2021; Patrick et al., 2020), we sought to understand whether CCPs endured new challenges and risks resulting from COVID-induced PHPPs. Current literature on COVID-19 rarely focuses on the perspective of CCPs, despite their key role on the frontlines of the pandemic to keep other essential services functioning. Thus, the goal of this study is to examine the COVID-induced PHPPs that were introduced into child care programs across Canada, the associated challenges and health risks CCPs have experienced by CCPs while working during the pandemic, and potential impacts of these challenges on CCPs.

2.1 Literature Review

During the COVID-19 pandemic, child care programs were able to operate under COVID-induced PHPPs. Each provincial/ territorial health unit outlined its guidelines for CCPs and while no two sets of guidelines were the same, several commonalities existed including mask wearing by CCPs and children (typically optional under the age of two), frequent cleaning of commonly used surfaces, physical distancing within indoor settings, frequent hand washing and sanitizing, designated spaces for temporarily separating symptomatic children, strict pick-up and drop-off protocols, and finally cohorting children and CCPs (BCCDC, 2021; GNWT, 2021; Government of Alberta, 2021; Government of Manitoba, 2021; GONFL, 2021; Government of Nova Scotia, 2021; Government of Ontario, 2021a; Government of Quebec, 2021; Government of Yukon, 2021; GPEI, 2021; Saskatchewan Health Authority, 2021; CCC, 2020; Government of New Brunswick, 2020). The above list of PHPPs was recorded during the time of the study, however, PHPPs implemented in Canadian child care programs frequently changed as the epidemiological understanding of the COVID-19 virus improved and as the circumstances of the pandemic changed. A notable shift took place in 2021 (the same year as this study) as PHPPs that focused on reducing fomite transmission of the virus were becoming less favourable to PHPPs that focused

on reducing airborne transmission (CDC, 2021a; Goldman, 2021; Greenhalgh et al., 2021; Marotta, 2021; Olsiewski et al., 2021). With this shift in understanding, public health officials (PHOs) called for improved ventilation inside public buildings and service centres (including child care programs), (GOC, 2021; Government of Ontario, 2021b; Olsiewski et al., 2021) mask wearing, and capacity limits were put on buildings to allow for improved physical distancing indoors (CIHI, 2022).

Despite the PHPPs put in place to limit the spread of COVID-19 in child care programs, there have been numerous outbreaks. In fact, between March 2020 and December 2021, there were over 9700 confirmed cases of COVID-19 in Ontario's regulated child care programs alone (Government of Ontario, 2021b). Research from Statistics Canada and the COVID-19 Immunity Task Force found, through antibody testing from November 2020 to April 2021, that Canadians aged 19 and younger made up the largest number of infections among any age cohort in Canada (CITF & STATCAN, 2021). It should be noted that tracking the virus has been more challenging in children as they are commonly asymptomatic hosts (Han et al., 2021; Lachassinne et al., 2021; Moore et al., 2020) and thus PHPPs implemented in child care programs to scan for common symptoms (e.g. temperature checks, examining children for coughs or a runny nose) are not always effective. Furthermore, the virus' high prevalence in children and its ability to remain undetected has caused parents to worry about the environmental health conditions within child care programs, causing some parents to not send their children for care (Dickson, 2022; Canadian Press, 2021a; Jones, 2021; Miller, 2021a; Thomson, 2020).

The challenges CCPs have faced and continue to face as a result of the COVID-induced PHPPs have been sparsely reported and few studies highlight a Canadian perspective. In current literature and media reports, four common themes appear related to COVID-induced challenges

for CCPs. First, there are challenges related to communication, including issues with accessing timely information that allows CCPs the ability to prepare for new changes within the workplace (BGC, 2022; Dickson, 2022; McSheffrey, 2022; Ramesar, 2021; Mitchell, 2020). Second, CCPs are experiencing increased financial burdens from the pandemic. A proportion of their budgets are now dedicated to cleaning supplies to comply with stricter environmental health standards, whereas they are often dealing with lower earnings as an increasing number of clients have decided to keep children out of care (Friendly et al., 2020; Mitchell, 2020; Workman & Jessen-Howard, 2020). Third, there are labour issues within the sector, translating to fewer CCPs available to implement and enforce PHPPs (BGC, 2022; Ferns, 2022; Schlieber et al., 2022). Finally, many CPPs are experiencing mental and physical burnout due to the aforementioned challenges associated with COVID-induced PHPP introduced in child care programs (BGC, 2022; Ferns, 2022; Schlieber et al., 2022; Miller, 2021b).

These themes have also been examined collectively when discussing workplace preparedness in child care programs. The 2020 report by the Early Childhood Workforce Index, which reports on the state of child care in North America, found that early childhood educators (ECEs) (including CCPs) perceived that their child care programs had poor working environments (classified as having limited access to personal protective equipment (PPE) while implementing PHPPs, combined with reduced health and financial insecurity for professionals) during the COVID-19 pandemic (McLean et al., 2021). Contributing factors included a perceived lack of support (e.g., lack of supervisor guidance, training, and/or resources) for professionals and a perceived lack of effective communication (preventing CCPs from having their concerns addressed) (McLean et al., 2021). The report also stressed the importance of preparedness and planning in the context of COVID-19, citing a lack of PPE for CCPs and issues with training on

appropriate actions to adopt and guidance for adapting to the public health crisis. The report goes on to highlight that new COVID-induced responsibilities (such as expanded workloads, implementing rapidly changing PHPPs, and managing financial insecurities with closures) have in turn increased existing time constraints, affecting CCPs' day-to-day planning (McLean et al., 2021). The report concluded that COVID-19 had reinforced poor working conditions in child care programs and exacerbated CCP's feelings of neglect from government officials/organizations.

As some PHPPs may pose new challenges to CCPs, others may also pose risks to their health and safety. For instance, one of the most common PHPPs used across the country was cleaning/disinfecting commonly used spaces (GOC, 2023; BCCDC, 2022; GONFL, 2022; Government of Quebec, 2022; PHO, 2021). This measure results in CCPs to frequently coming in contact with chemical cleaning and disinfecting agents (CCDAs), which can pose hazards to their health when applied incorrectly or without proper PPE (Chen, 2020a; Chen, 2020b). The need for an increase in the use of bleach, quaternary ammonium compounds (QUATS), chlorine dioxide and many more chemicals (BCCDC, 2021; Government of Alberta, 2021; Government of Manitoba, 2021; GONFL, 2021; Government of Nova Scotia, 2021; Government of Ontario, 2021a; GPEI, 2021; Government of Quebec, 2021; Saskatchewan Health Authority, 2021; Government of New Brunswick, 2020) has subsequently led to increased levels of exposure for CCPs. The exact level of exposure remains unknown as there was no literature found discussing CCPs' exposure to CCDAs during COVID-19. The chronic use of common cleaners recommended during the pandemic can result in chronic obstructive pulmonary disease, asthma, pneumonia, burning and swelling in the face and respiratory tract, along with an increased risk of death if not handled and applied correctly (Chen, 2020a; Chen, 2020b; Yari et al., 2020). Another cleaning/disinfecting practice in larger child care and education facilities across North America is

the use of spray-based disinfectants which have been linked to severe respiratory illnesses among users (EPA, 2021; Chen 2020b). Of particular concern for women of childbearing age, who represents roughly half of the sector's workforce in Canada (Uppal and Savage, 2021), chronic exposure to chemicals found in CCDAs has been associated with neurodevelopmental issues in children, preterm births and reduce fertility, among other things (Wang, 2016; Woodruff, 2011).

While the national trends of chemical exposure from CCDAs before the pandemic are unreported, over the first year of the pandemic the Canadian government took action against certain chemical-emitting devices being used to combat COVID-19. In 2021, then Canadian Minister of Health, Patty Hajdu, signed an interim order to regulate the use of UV and ozone-emitting devices in response to the risks they pose to human health and the environment and as a result of their increase in sales to combat the COVID-19 virus (Canadian Press, 2021b; Health Canada, 2021). As well, trends of exposure to CCDAs can be examined from the increase in calls to Canadian poison centres regarding exposure to bleaches, hand sanitizer, chlorine gas and chloramine gas (PHAC, 2020). Moreover, the pandemic has increased the use of CCDAs in Canadian child care programs and with it the risk of chemical exposure for CCPs, yet no current research exists on the exposure of CCDAs to CCPs from implementing PHPPs in their Canadian child care programs.

2.2 Methods and Materials

To understand which COVID-induced PHPPs were introduced into child care programs and the associated challenges and/or risks CCPs have experienced while working during the pandemic, we employed a cross-sectional survey of 1610 CCPs who had worked in a Canadian child care program (full time or part-time) between March 2020 and August 2021 (inclusive). The

survey was created and distributed in collaboration with the Canadian Partnership for Children's Health and Environment (CPCHE), the Canadian Child Care Federation (CCCF), and the Prenatal Environmental Health Education Collaboration (PEHE). Informed consent was obtained from participants before beginning the questionnaire (Appendix B). This research was approved by the University of Ottawa Research Ethics Board #S-05-21-6888 (Appendix A).

2.2.1 Positionality Statement

In an effort to situate myself within my work, I would like to note the following: I am a white male, born in Canada and remain a Canadian citizen. I have an undergraduate degree in BSocSci Environmental Economics and Public Policy (Urban Studies Option) and a Minor in Biology from the University of Ottawa. Beyond the classroom, I have extensive experience working with young children in child care programs in Mississauga, Ontario and Ottawa, Ontario. I have also volunteered for two years in Kindergarten classrooms within the Ottawa public school system.

I am the son of a CCP and have grown up my whole life in a home-based, child care program. At the time of this study, I still reside in this home-based child care program and have experienced first-hand, the challenges the COVID-19 pandemic has placed on CCPs and the programs they work in.

2.2.2 Instruments

Data collection occurred between June and August 2021, using a bilingual (French and English) web-based questionnaire hosted on Survey Monkey. An initial draft of the questionnaire was influenced in part by literature on the effects of COVID-19 on frontline essential workers (Lachassinne et al., 2021; Powell et al., 2021; Prime et al., 2020; Simon et al., 2020) and the risks

associated with the use of CCDAs (Chen et al., 2021; Chen, 2020a; Chen, 2020b; Dennerlein et al., 2020; Yari et al., 2020), as well as two existing questionnaires from published studies on related themes: one on environmental health perceptions, practices and educational preferences among reproductive-aged women (Laferriere et al., 2016) and one on radon awareness among CCPs (Phipps et al., 2017). Alpha testing was then conducted by CCCF and CPCHE members as well as environmental health experts who were deemed to be internal to questionnaire development. Their role was to assist in the tone and diction of the questions, and the categorizing of questions within the questionnaire. Following this round of testing, beta testing was conducted with CCPs to test of flow and efficiency of the questionnaire, including if the questions were easy to understand, and that the questionnaire did not take longer than 15 minutes to complete. Following this testing, the version of the final questionnaire was drafted and the survey was constructed.

The final questionnaire (Appendix C) was comprised of 5 sections: (1) workplace context; (2) COVID-19 knowledge and perceptions; (3) changes in day-to-day practices due to COVID-19; (4) perspectives on COVID-related challenges, concerns, and impacts; and (5) socioeconomic and demographic characteristics. Questions were formatted using a Likert scale, yes/no/unsure, multiple-choice, and open-ended response (allowing participants to provide more detailed responses). Efforts to reduce response bias were made including keeping questions short and using lay language that would be familiar to participants. The question formatting prioritized interval questions (e.g., Likert scale rather than yes/no/unsure) and provided participants the chance to elaborate when possible. The questionnaire took approximately 20 minutes to complete.

2.2.3 Procedure

The survey invitation was shared with over 7000 ECEs, including child care professionals (family/home providers) who work directly with children, as well as child care program

management personnel (executive directors and owners) who work indirectly with children and finally, support staff (that may work directly or indirectly with children depending on their role) from across Canada via the CCCF email list. CCCF sent the initial invitation email on June 24th, 2021 (Appendix D) followed by two reminder emails which were sent on July 13th, 2021, and August 17th, 2021, respectively. In the email, individuals were encouraged to share the survey with their colleagues in the sector. The survey was simultaneously publicized through posts on the CCCF Facebook and X (formerly Twitter) social media accounts (Appendix E). A link to the survey was also added to the New Brunswick Children's Environmental Health Collaborative July 2021 newsletter (Appendix F).

2.2.4 Statistical Analysis

Analysis began with data validation to ensure data received from Survey Monkey was accurate to the questions asked. Secondly, data was transferred to SPSS V.28 (IBM Corp. New York) where data cleaning began, which included adding labels to variables, coding qualitative values and missing/blank responses into numeric values (i.e., "Yes" responses coded at 1 and "No" response coded as 0). Open-ended survey responses were quantified to include them in the summation of closed-ended responses. If the open-ended response was similar to a closed-ended response choice given to the participant then it was numerically coded as such. If the response was unique to the closed-ended response options it was numerically coded as something new. The unique responses were counted and if they accounted for a low frequency of responses compared to the overall count, they were not included in the analysis. Crosstabulations and percentages were then calculated for all variables to determine how best to organize and categorize the data. Given the low frequency of responses from the Northern region (Nunavut n=1, Northwest Territories n=4, Yukon n=0) this data was omitted from the findings.

2.3 Results

The characteristics of participants and their programs are shown in Table 2.1. The majority of participants were women (94.9%), over the age of 35 (80.5%). There was an even distribution of participants who worked indirectly with children (administrators or support staff) (51.4%) and those who worked directly with children (childhood educators and support staff) (48.5%). The majority of child care programs representatives were located in Prairie provinces (52.6%), while central Canada (Ontario and Quebec) was least represented (11.3%) in the study. The regional variations of the data reflect the geographic distribution of the CCCF membership and that of their regional affiliates, and the interest of members to participate. The majority of child care programs were stand-alone facilities (35.1%). The least represented program type is home-based care (14.9%) which is commonly associated with unlicensed/unregulated child care and typically will have fewer CCPs operating within it compared to other settings.

Table 2.1: Characteristics of participants and child care context

	n	%
Gender identity (n=1586)		
Male	71	4.5
Female	1505	94.9
Other	10	0.6
Age group, years of age (n=1474)		
< 35	287	19.5
35-49	672	45.6
≥ 50	515	34.9
Identity (n=1484)*		
Indigenous	154	10.4
Visible Minority	173	11.6
Recent Immigrant (past 10 yrs)	59	4.0
None of the Above	1098	74.0
Family characteristics (n=1250)		
Have children	1045	83.6
Have no children	205	16.4
Role within the child care program (n=1375)		
Administrator	686	49.9
Early Childhood Educator	615	44.7
Support Staff (work directly with children)	53	3.8
Support Staff (do not work directly with children)	21	1.5
Region (n=1584)		
Atlantic	323	20.4
Central	179	11.3
Prairies	834	52.6
West	248	15.7
Type of child care program (n=1595)		
School-based	387	24.3
Workplace/other institution	405	25.4
Stand-alone	565	35.4
Home-based	238	14.9

*Participants may have selected multiple options.
n values in parenthesis represent the total number of responses and values listed under column n represent the number of positive responses.

The data provided in Table 2.2 outlines the various PHPPs being implemented in Canadian child care programs. A majority of these programs employed key practices such as surface cleaning (99.7%), handwashing with soap (97.4%), sanitizer use by staff (96.0%), and masking (93.9%). However, there was a noticeably lower usage for practices such as handwashing with antibacterial soap (75.5%) and sanitizer use by children (69.8%). Airborne-based PHPPs were less commonly used, with 55.9% of programs opening windows, 52.4% using face shields or eye protection, and fewer programs employing measures such as HVAC systems (19.8%), fans (19.1%), and air purifiers (13.5%). Certain techniques not recommended by Health Canada, such as using ultraviolet (UV) radiation devices (2.1%), and ozone-generating devices (0.7%), and some devices such as sprayers or foggers (24.8%) and electrostatic sprayers (5.9%), were not approved at large for use against COVID-19 but were nevertheless reported as being used in some programs. Lastly, it is worth noting that 69.9% of child care programs reported spending more time outdoors to reduce COVID-19 transmission. This suggests an emphasis on basic hygiene and social distancing practices, with a lesser, but still significant, adoption of more complex and often more costly ventilation and sanitizing methods.

Table 2.2: Reported Public Health Practices and Protocols used in child care programs

	n	%
Practice used in program (n=1610)*		
Surface cleaning	1605	99.7
Handwashing with soap	1568	97.4
Handwashing with anti-bacterial soap	1216	75.5
Hand sanitizer on staff	1545	96.0
Hand sanitizer on children	1123	69.8

Masking	1512	93.9
Opening windows	900	55.9
Face shields/eye protection	843	52.4
Sprayer/fogger +	399	24.8
HVAC System	319	19.8
Fans	308	19.1
Air purifier	217	13.5
Electrostatic sprayer +	95	5.9
UV radiation device ^	34	2.1
Ozone generating device ^	11	0.7
Spent more time outdoors (n=1603)		
Yes	1121	69.9
No	482	30.1

*Participants may have selected multiple options.
^ Note, these measures are not recommended by Health Canada to combat COVID-19 transmission (Health Canada, 2021).
+ Note, approval of these devices is dependent on their classification, purpose, and regulations set by Health Canada and extra caution should be taken when using them (Health Canada, 2023a; CUPE, 2020).
n values in parenthesis represent the total number of responses and values listed under column n represent the number of positive responses.

Table 2.3 displays reported challenges with PHPP implementation. When using disinfecting and sanitizing products, participants were more likely to have challenges with feeling well trained and equipped (74.8%) rather than using these products in a way that was unsafe or effective (12.2%). The majority of participants also reported experiencing physical difficulty with PHPP implementation (74.3%). When asked about potential improvements to make working during the pandemic easier (Table 2.3), more staff (62.9%), and better guidance from PHOs (61.5%) were recommended by the majority of participants. Alternatively, better guidance from a supervisor or colleague was much less frequently reported (18.9%). These findings suggest that participants are experiencing greater frustration with the dissemination of information from government officials rather than from within their child care programs. The impacts of working during the pandemic were also examined in Table 2.3. Stress and other mental health challenges

(SMC) were reported by a large majority of participants (90.1%) and over a quarter (26.6%) of participants indicated decreased interested in continuing to work in child care.

Open-ended responses highlighted that the challenges participants faced were contextualized around factors present in their child care programs. For instance, one participant highlighted issues of working alone…

> *[a]s many in-home caregivers work by themselves taking time off work may be a concern that they are leaving some families struggling to find care whilst they attend appointments.* - participant 1176

…another participant stated that their staffing issues were made worse by the community in which their programs operate…

> *[l]imited resources in rural areas…we are suffering a severe staffing shortage…* - participant 458

However, not all challenges were due to program constraints but rather challenges that stemmed from beyond their program's control, as noted by one participant…

> *[f]amilies appeared to be dishonest regarding childrens illnesses. Children who were gone for two weeks came back after having a "bad cold". We had zero families report [COVID-19] to us the entire year… These parents seemed to have little care for mask wearing and would peal the mask off at drop off and then stand around in very large groups not distancing and having animated chit chats with each other…* - participant 39

…and as another unlicensed participant noted, the challenges faced may be a result of the type of professional you are within the sector…

> *as an unlicensed Home Daycare worker for 29 years I was shocked, hurt and felt abandoned when the government only allowed licensed daycare employees to get vaccinated: as though we didn't exist and as though we weren't working and risking our health and even our lives…* - participant 1582

Thus, the reported challenges faced by participants were beyond the options provided in the questionnaire due to the contextual factors that impact their program and day-to-day operation.

Table 2.3: Respondent's perceptions of workplace changes and challenges with public health practice and protocol implementation

	n	%
Challenges with public health practice and protocol implementation*		
Not well trained and equipped to use disinfecting and sanitizing products to not pose a risk of human health (n=1602)	1198	74.8
Physical difficulty during implementation (n=1609)	1196	74.3
Do not have sufficient funds for implementation (n=1604)	1049	65.4
Not clear what protective measures should be taken and/or how they should be implemented (n=1609)	1028	63.9
Not using disinfecting and sanitizing products safely and effectively (n=1604)	196	12.2
Improvements that respondents felt would make working during the pandemic easier*		
More staff (n=1610)	1013	62.9
Better guidance from Public Health Officials (n=1610)	990	61.5
Better access mental health support (n= 1610)	603	37.5
More flexibility with implementation (n=1610)	529	32.9
Training on how to implement COVID-19 prevention measures (n=1610)	499	31.0
Better guidance from supervisor/colleagues (n=1610)	304	18.9
Better cooperation from client families (n=1603)	180	11.2
Reported impacts from working during the pandemic		
Stress and other mental health challenges (n=1607)	1448	90.1
Less interested in continuing to work in child care (n=1487)	396	26.6

*Participants may have selected multiple options.
n values in parenthesis represent the total number of responses and values listed under the column n represent number of positive responses.

Open-ended responses also provided context to the experiences participants had with government support. In fact, participants explained that the guidance they were receiving from government officials was not simply inefficient but also counterproductive:

> *The biggest let down is from the provincial government. Their messaging…has been degrading and unsupportive of the sector…This has brought down the moral of so many in the field…* - participant 63

> *I feel we have been overlooked….We are continuing to do extra work that we know is not necessary* – participant 57

One participant went further to say that the government does not see the child care sector as a priority:

> *Acknowledging the struggles in Childcare has not been a priority for the government…Our professionals deserve salaries that reflect their hard work; caregiving, and health and safety are added to the education piece and should be recognized - they deserve the same salaries as the public education sector…* - participant 111

Furthermore, the relationship between the sector and the regional governments seems to be fractured and the COVID-19 pandemic has only exacerbated this reality through a lack of guidance and support.

2.4 Discussion

COVID-induced PHPPs have placed new challenges on CCPs' day-to-day responsibilities and tested the child care sector's preparedness for a public health crisis. CCPs were tasked with implementing and enforcing numerous PHPPs to combat the spread of COVID-19, however, the measures put in place were not always the most optimal and, in some instances, may have

worsened environmental health conditions in the workplace. CCPs also faced numerous challenges related to their physical and mental health, communication with other professionals, and access to essential tools/knowledge.

The top three most reported PHPPs were aimed at limiting fomite transmission of COVID-19, including surface cleaning, handwashing with soap, and using hand sanitizer. Conversely, mask wearing and spending more time outdoors were the only airborne-based PHPPs used by the majority of CCPs. Fomite-based PHPPs were commonly recommended at the start of the pandemic, however, at the time of the study, PHOs had placed greater importance on PHPPs that combat airborne transmission (CIHI, 2022; PHO, 2022; Eykelbosh, 2020; Miller, 2020). Given the types of challenges with communication in child care programs that were reported by participants (i.e. those who reported unclear direction of what measures should be taken and/or how to implement them and the recommendation for better guidance and training), it appears that there were issues with the dissemination of information. Moreover, the limited use of airborne-based PHPPs used to combat COVID-19, as reported by participants suggests that CCPs were not using the most up-to-date measures at the time of the survey to prevent the transmission of COVID-19 in Canadian child care programs.

The study reported over 500 instances of devices that were either not widely recommended or not widely approved for use in Canadian child care programs with a quarter of CPPs having reported using a sprayer/fogger device to reduce transmission of COVID-19. The high prevalence of these devices is concerning given that the Canadian Union of Public Employees along with the World Health Organization warn against using devices such as sprayers/foggers (CUPE, 2020), particularly in environments children frequent (CDC, 2021b). Using these devices poses great risks including the prevalence of QUATS in the disinfection solution (EPA,

2021; Chen, 2020b; Basketter, 2004; Purohit et al., 2000; Bernstein et al., 1994), the false sense of security as sprayer-based devices are only effective on surfaces that have been cleaned of dust/dirt/debris (CDC, 2021b; Lelieveld et al., 2003), and its effectiveness against the COVID-19 virus (Meister et al., 2022; D'accolti et al., 2020). As well, ozone and UV-emitting devices are not recommended by Health Canada as they have not been proven effective against the COVID-19 virus and increase the risk of adverse health effects (Health Canada, 2023b). While concerning, the use of these devices could be explained by the aforementioned issues with communication in the workplace or perhaps these devices alleviated the challenge of physical difficulty with the implementation of PHPP. The use of these aerosols, UV, and ozone devices provided a rapid, seemingly effortless disinfecting alternative to physically cleaning/disinfecting surfaces for many CCPs, but in turn, may have exposed all those within the child care program to new health risks (Meister et al., 2022; D'accolti et al., 2020).

The reported challenges and improvements by CCPs demonstrated a limited degree of workplace preparedness for a public health crisis in many child care programs. In line with the findings from the 2020 report from the Early Childhood Workforce Index (McLean et al., 2021), this study highlighted key factors in workplace preparedness as CCPs desired more protective measures, more staffing, and more training on how to implement COVID-19 prevention measures. It is likely that some of the workplace challenges that CCPs experienced were exacerbated by the financial challenges experienced by the child care sector during the pandemic. Similar to this study's finding of funding challenges, results from a 2020 Canadian survey on the impact of the pandemic on the child care sector found that 67% of child care programs reported a worsening of their financial situation from pre-COVID times, with lost/reduced parents fees and lost/reduced government funding as the main contributors (Friendly

et al., 2020). Moreover, preparedness issues coupled with insufficient funding to support CCPs, may result in a work environment where professionals opt to leave. This study found that just over a quarter (26.6%) of CCPs were less interested in continuing to work in the child care sector after having worked during the pandemic. This figure aligns with reports from Statistics Canada indicating that 25% of CCPs from across the country, left the sector throughout the first year of the pandemic (Uppal and Savage, 2021). A similar exodus across multiple frontline sectors (including child care) was seen in the United States as a result, in part, of burnout and physical limitations of professionals (Lowrey, 2022).

The pandemic also resulted in a high prevalence of SMC for CCPs. This aligns with numerous studies on how COVID-19 has placed mental stress on essential workers through expanded working hours, issues with staffing, increased responsibilities, the introduction of new PHPPs, and concerns with contracting the virus themselves (Havaei, et al., 2023; Wilbiks et al., 2021; Benfante et al., 2020; Mrklas et al., 2020, Preti et al., 2020; Ricci-Cabello, 2020; Wu et al., 2020). Despite the current literature on essential workers, more work is needed to address the impacts on CCPs who work in Canada during a public health crisis.

This study has some limitations that should be noted. The regional representation in this study was not statistically representative of the Canadian population according to the recent census data (STATCAN, 2022). As well, the findings of this study represent participants' experience at the time of the survey and do not reflect the current state of COVID-19 in Canadian communities. Similarly, we recognize that participant bias may be present in this study given the novelty of the virus and the complex process of viral spread differentiated across provinces and territories, along with the individual belief systems and pre-existing knowledge/experiences of participants. Also, it is believed that most participants worked in

licensed/regulated child care programs however, that cannot be confirmed and thus results may be biased based on the experiences of unlicensed/unregulated CCPs who likely had less access to lines of communication, funding, resources, training, etc. Finally, the majority of participants are from licensed/regulated child care programs which, according to a recent survey, are not the most common type of child care program in the country (STATCAN, 2021).

Given the dynamic nature of the pandemic in Canada, evolving PHPPs, the appearance of new variants (PHAC, 2022a), and various rounds of mass vaccination (PHAC, 2022b), further analysis is needed to understand the current impact of the pandemic on the child care sector. As well, further investigation is needed to acknowledge the COVID-induced experiences of unlicensed/ unregulated CCPs to gain a clear understanding of how the Canadian child care sector and CCPs were impacted by the COVID-19 pandemic.

The findings of this study provide insights into the wide range of COVID-induced PHPPs within Canadian child care programs and reinforce the importance of communication between government officials and the child care sector. The study also highlights that most of the PHPPs implemented were approved and recommended by PHOs, however, more needs to be done to ensure that non-approved practices are not implemented in child care programs, for the safety of the professionals and the children they care for. As well, essential components to ensure a safe and efficient working environment during a public health crisis were not always met, including issues with training, staffing, and protective measures for chemical exposure. Finally, given the high prevalence of SMC and physical difficulty among CCPs, action is urgently needed to support and care for CCPs impacted by their experiences throughout the pandemic. These experiences remind us that frontline, essential workers have had to endure arduous workplace changes to ensure they can still service their community. As members of the community, it is

important that we continue to advocate for having these professionals' voices heard and responding to their experiences with mental and physical support, improving access to information, and implementing safeguards to improve healthy environmental standards in the workplace.

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Chapter 3: COVID-Induced Stressors on Child Care Professionals in Canada

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3.0 Introduction

The introduction of the SARS-CoV-2 (COVID-19) virus to Canada resulted in increased risk to personal health and unprecedented responses from public health officials (PHO) to quell rising rates of transmission including the closure of most non-essential services. Child care was considered an essential service and allowed to remain open, justified by the need to support workers from other essential services, such as health care. To minimize the risk to child care professionals (CCPs) and the children they look after, CCPs were mandated to implement numerous public health practices and protocols (PHPP) such as frequent handwashing and surface cleaning, social distancing of staff and visitors, grouping children with specific CCPs, and strict drop-off and pick-up protocols (BCCDC, 2021; Government of Alberta, 2021; Government of Nova Scotia, 2021; Government of Ontario, 2021; Government of Quebec, 2021; Government of Yukon, 2021; GPEI, 2021; Saskatchewan Health Authority, 2021; Government of New Brunswick, 2020). Studies on the impacts of the COVID-19 pandemic have shown that frontline workers including health care providers, teachers, and critical infrastructure professionals commonly experienced significant stress and other mental health challenges (SMC) resulting from fears of contracting the disease, expanded workloads, ever-changing safety protocols, unreliable access to authoritative information on the virus and related PHPPs, and a lack of training on PHPP implementation (Popov et al., 2021; Pressley, 2021; Atolani et al.,

2020; Benfante et al., 2020; Chen, 2020a; Chen, 2020b; De Brier et al., 2020; Simon et al., 2020; Wu et al., 2020). Despite the reliance of other essential sectors on child care and the inherent risks of working on the frontlines of the pandemic, little is known about the challenges CPPs faced (and continue to face) on a day-to-day basis due to COVID-19. Thus, the goal of this study is to examine COVID-induced concerns of CCPs during the first year of the pandemic and how such concerns manifested via their experiences of SMC and/or their interest in continuing to work in the child care sector.

3.1 Literature Review

The mental health impacts of the pandemic on essential, frontline workers such as health care professionals, are well-documented. Those working in health care have reported high levels of mental stress, burnout, and various other forms of mental health challenges, including insomnia and depression (Havaei et al., 2022; Wilbiks et al., 2021; Benfante et al., 2020; Mrklas et al., 2020, Preti et al., 2020; Ricci-Cabello et al., 2020; Wu et al., 2020). Factors reported to negatively influence mental health include overwhelming demand for services, longer working hours, increased responsibilities, tightening of workplace regulations such as quarantining and self-isolation, and concerns about contracting the virus and passing it to loved ones (Benfante et al., 2020; De Brier et al., 2020; Wu et al., 2020). These mental health impacts have also been reported to hinder professionals' ability to fulfill essential components of their jobs, such as maintaining strict attention to detail and efficient decision-making (Ricci-Cabello et al., 2020). For instance, a cross-sectional study examining the relationship between nurses' mental health and the quality and safety of patient care delivery in British Columbia found that COVID-induced stresses (notably anxiety, depression, burnout, and post-traumatic stress disorder), resulted in lower quality and safety of patient care delivery (Havaei et al., 2022). Conversely,

positive correlates of mental health included adequate workplace standards for employees, such as strong leadership and communication within the workplace; effective support networks, education/training programs focused on taking appropriate action in a public health; and easy access to and use of personal protective measures (e.g., personal protective equipment (PPE)) (Wilbiks et al., 2021; Benfante et al., 2020; Preti et al., 2020).

In contrast to knowledge of the pandemic's impact on health care professionals, CCPs' mental health experiences through a public health crisis have not been well documented, particularly in a Canadian context. Like other essential service workers, however, CCPs have faced additional workplace risks as a result of the pandemic. For instance, CCPs are routinely in close contact with young children. Children are recognized as largely asymptomatic carriers of the virus (Han et al., 2021; Lachassinne et al., 2021; Moore et al., 2020) and have accounted for the highest rates of infection among any age group in the country (CITF & STATCAN, 2021) while largely remaining unvaccinated (PHAC, 2022a).

Research on past public health crises, such as the 2003 SARS outbreak, detailed the impact of child care program closures on parents and on children's cognitive development (Rao, 2006; Maunder et al., 2003). The impact of the public health crisis on CCPs was not addressed. Similarly, research conducted on the effects of the COVID-19 pandemic has not focused on implications for CCPs (Deoni et al., 2021; Benner and Mistry, 2020; Patrick et al., 2020).

According to estimates from 2019, the Canadian child care sector employed roughly 302,000 CCPs (95% of whom were women) and accounted for 1.6% of the Canadian labour force (Uppal and Savage, 2021; Findlay, 2019). However, between February 2020 and February 2021, 21% of CCPs left the sector due, in part, to concerns over contracting COVID-19 and COVID-induced PHPP (Uppal and Savage, 2021). While these concerns are also believed to

result in SMC for CCPs (Simon et al., 2020), who carry the responsibility of keeping the children in their care and themselves safe, it is unclear if SMC influenced the exodus of professionals from the child care sector in Canada. When examining the impact of SMC on the labour force in the United States, the COVID-19 pandemic has been shown to have contributed to the departure of workers from three frontline sectors, including child care (Lowrey, 2022). A 2021 work and well-being study by the American Psychological Association (APA) found that CCPs, along with nurses and educators, reported high levels of work-related stress including cognitive weariness, emotional exhaustion, and a lack of interest, motivation, or energy during the pandemic (Lowrey, 2022). These factors have contributed to approximately 100,000 CCPs, 300,000 nurses, and 570,000 educators leaving their respective sectors in the United States (Lowrey, 2022).

When examining the SMC impact of the pandemic on frontline workers through a gendered lens, research suggests that the pandemic has had disproportionate impacts on women working in frontline roles throughout the pink-collar professions (i.e., professions with a high percentage of female workers, such as health care, child care, and social work) (Hodson and Sullivan, 2012). For instance, women working in the health care sector have been found to be more likely to experience SMC than their male counterparts (Benfante et al., 2020; Preti et al., 2020; Sriharan, 2020). Women in these sectors have also been more likely to experience increases in physical, mental, and financial stress as a result of the COVID-induced changes to workplace and home/familial responsibilities (Lowrey, 2022; Preti et al., 2020). This has resulted in an exodus of women from pink-collar industries (Lowrey, 2022).

A knock-on effect of a such labour movement is the disruption of these frontline industries to provide care to those in need. Ultimately, this shift in pink-collar industries exacerbates the impact of the pandemic on women in particular (Landivar and deWolf, 2022).

The importance of these sectors for women is clear when examining child care service, which plays an instrumental role in supporting women's participation in the labour force (Wasif et al., 2021; McKenna, 2015), and social mobility (McCartney & Phillips, 1988). Furthermore, without the operation of pink-collar sectors (like child care), progress made on women's presence in the labour force, especially women from marginalized communities, is at risk of stagnating or regressing (Harry et al., 2022; Landivar and deWolf, 2022).

Current literature suggests that frontline, essential workers have experienced a mental and physical burden of working during the pandemic and implementing COVID-induced PHPP. While the mental health impact of the COVID-19 pandemic on frontline essential workers such as nurses has been documented and is consistent with past public health crises, CCPs' experiences during these times remain underreported in Canada. This knowledge gap needs to be addressed to understand CCPs' experiences with SMC and the factors that contribute to CCPs being less interested in working in the sector and to better support the Canadian child care sector during public health crises.

3.2 Materials and Methods

We conducted a cross-sectional survey of 1610 CCPs who had worked in a Canadian child care program (full time or part-time) between March 2020 and August 2021 (inclusive). Analyses aimed to understand COVID-induced concerns of CCPs and the impact of such concerns on their experiences of SMC and/or their interest in continuing to work in the sector. The survey was created and distributed in collaboration with the Canadian Child Care Federation (CCCF), the Canadian Partnership for Children's Health and Environment (CPCHE), and the Prenatal Environmental Health Education Collaboration (PEHE). Informed consent was obtained

from participants before beginning the questionnaire (Appendix B). This research was approved by the University of Ottawa Research Ethics Board #S-05-21-6888 (Appendix A).

3.2.1 Positionality Statement

In an effort to situate myself within my work, I would like to note the following: I am a white male, born in Canada and remain a Canadian citizen. I have an undergraduate degree in BSocSci Environmental Economics and Public Policy (Urban Studies Option) and a Minor in Biology from the University of Ottawa. Beyond the classroom, I have extensive experience working with young children in child care programs in Mississauga, Ontario and Ottawa, Ontario. I have also volunteered for two years in Kindergarten classrooms within the Ottawa public school system.

I am the son of a CCP and have grown up my whole life in a home-based, child care program. At the time of this study, I still reside in this home-based child care program and have experienced first-hand, the challenges the COVID-19 pandemic has placed on CCPs and the programs they work in.

3.2.2 Instruments

Data was collected between June and August 2021 (inclusive), using a bilingual (English and French) web-based questionnaire hosted on Survey Monkey. We developed the questionnaire by reviewing literature on the effects of COVID-19 on frontline workers (Powell et al., 2021; Atolani et al., 2020; Benfante, et al., 2020; Prime et al., 2020; Simon et al., 2020; Sokal et al., 2020) as well as two existing questionnaires from published studies on related themes: one on environmental health perceptions, practices and educational preferences among reproductive-aged women (Laferriere et al., 2016) and one on radon awareness among CCPs (Phipps et al., 2017).

Alpha testing was then conducted by CCCF and CPCHE members as well as environmental health experts who were deemed to be internal to questionnaire development. Their role was to assist in the tone and diction of the questions, and the categorizing of questions within the questionnaire. Following this round of testing, beta testing was conducted with CCPs to test of flow and efficiency of the questionnaire, including if the questions were easy to understand, and that the questionnaire did not take longer than 15 minutes to complete. Following this testing, the version of the final questionnaire was drafted and the survey was constructed.

The final questionnaire (Appendix C) comprised five sections: (1) workplace context; (2) COVID-19 knowledge and perceptions; (3) changes in day-to-day practices due to COVID-19; (4) perspectives on COVID-related challenges, concerns, and impacts; and (5) socioeconomic and demographic characteristics. Survey questions were formatted using a Likert scale, Yes/No/Unsure, and multiple-choice questions as well as a small number of open-ended questions enabling participants to provide more detailed responses. Questions were kept short, used simple language that would be familiar to participants, and prioritized interval questions (e.g. Likert scale rather than yes/no/unsure), to reduce response bias. The questionnaire took approximately 20 minutes to complete.

3.2.3 Procedure

The survey was distributed through a CCCF email list of over 7000 CCPs including, early childhood educators (ECEs) who work directly with children and child care program management personnel (executive directors and owners) who work indirectly with children, and various members of program support staff from across Canada. CCCF sent the initial invitation email (Appendix D) on June 24th, 2021 followed by two reminder emails which were sent on July 13th, 2021, and August 17th, 2021 respectively. In the email, individuals were encouraged to

share the survey with colleagues in the sector. The survey was simultaneously publicized through posts on the CCCF's Facebook and X (formally known as Twitter) social media accounts (Appendix E). A link to the survey was also promoted in the New Brunswick Children's Environmental Health Collaborative July newsletter (Appendix F).

3.2.4 Statistical Analysis

Statistical analysis began with the validation of data from Survey Monkey. The data was then transferred to SPSS V.28 (IBM Corp. New York) and data cleaning began, which included adding labels to variables, coding qualitative values and missing/blank responses into numeric values (i.e., "Yes" responses coded at 1 and "No" response coded as 0). Open-ended survey responses were quantified to include them in the summation of non-open-ended responses. If the open-ended response was similar to a closed-ended response choice given to the participant then it was numerical coded as such. If the response was unique to the closed-ended response options it was numerically coded as something new. The unique responses were counted and if they accounted for a low frequency of responses compared to the overall count, they were not included in the analysisCrosstabulations and percentages were then calculated for all variables to determine how best to organize and categorize data. Given the low frequency of responses from the Northern region (Nunavut n=1, Northwest Territories n=4, Yukon n=0) data was omitted from the findings.

Data analysis also involved both bivariate and multivariate techniques. It began with bivariate analysis to distinguish survey responses and determine the potential explanatory variables for outcomes of interest. Next, multivariate logistic regression analysis was used to analyze the associations between outcomes and predictor variables, while adjusting for covariates.

Four logistical regression models were constructed based on participant responses to survey questions regarding:

- concern about contracting COVID-19 at work;
- concern about children in care contracting COVID-19;
- personal stress and other mental health challenges;
- interest in continuing to work in the child care sector.

To form the models, independent variables that were identified through a bivariate analysis were entered into a multivariate logistical regression model using a backward stepwise algorithm. Variables were kept in the model if their Wald inclusion test statistic was less than 0.05. All analysis was conducted using SPSS V.28 (IBM Corp. New York).

3.3 Results

The characteristics of participants and their programs are shown in Table 3.1. The participants were mostly women (94.9%) and over the age of 35 (80.5%). Roughly half (48.9%) of participants reported having a health condition that would make them more vulnerable to serious illness if they contracted COVID-19. Roughly 50% of participants worked directly with children in their child care programs as early childhood educators or support staff. The other 50% were administrators and those working as support staff indirectly with children. Most participants had worked in the child care sector for more than 10 years, with over a quarter (27.4%) having 11-20 years of experience and 611 (38.1%) having over 20 years. Nearly all regions in Canada are represented in this study, with most participants from Prairie provinces (Manitoba, Saskatchewan, and Alberta) (52.6%), and the least represented being Central provinces (Ontario and Quebec) (11.3%). The regional variations of the data reflect the

geographic distribution of the CCCF membership and that of their regional affiliates, and the interest of members to participate. Home-based child care programs were the least represented in the study (14.9%) and also are the only facilities that operate unlicensed/unregulated child care programs in Canada. Thus, the majority of participants (85.1%) are believed to be licenced/regulated CCPs.

Table 3.1: Characteristics of participants and child care contexts

	n	%
Gender identity (n=1586)		
Male	71	4.5
Female	1505	94.9
Other	10	0.6
Age group, years of age (n=1474)		
< 35	287	19.5
35-49	672	45.6
≥ 50	515	34.9
Family characteristics (n=1250)		
Have children	1045	83.6
Have no children	205	16.4
Pre-existing health condition (n=1610)		
No	822	51.1
Yes	788	48.9
Role within child care program (n=1375)		
Administrator	686	49.9
Early Childhood Educator	615	44.7
Support Staff (work directly with children)	53	3.9
Support Staff (do not work directly with children)	21	1.5
Years of working in child care sector (n=1603)		
≤ 5	310	19.3
6-10	243	15.2
11-20	439	27.4
≥ 20	611	38.1
Region (n=1584)		
Atlantic	323	20.4

Central	179	11.3
Prairies	834	52.6
West	248	15.7
Type of child care program (n=1595)		
School-based	387	24.3
Workplace/other institution	405	25.4
Stand-alone	565	35.4
Home-based	238	14.9

n values in parenthesis represent the total number of responses and values listed under column n represent the number of positive responses.

Participants' level of concern for the following health risks associated with COVID-19 is displayed in Table 3.2. The majority of participants expressed being concerned (somewhat or very) with personally contracting COVID-19 (75.7%) or a child in their program contracting COVID-19 (87.5%). However, participants were more likely to be very concerned about a child in their care contracting COVID-19 (51.3%) over themselves contracting the virus (31.4%).

Table 3.2: Respondents' reported level of concern about COVID-19 transmission in the child care program

	Not Concerned		Somewhat Unconcerned		Somewhat Concerned		Very Concerned	
	n	%*	n	%*	n	%*	n	%*
Personally catching COVID-19 (n=1608)	139	8.6	252	15.7	712	44.3	505	31.4
Children in your care catching COVID-19 (n=1604)	59	3.7	141	8.8	581	36.2	823	51.3

n values in parenthesis represent the total number of responses and values listed under column n represent the number of positive responses.

Table 3.3 displays the prevalence of positive change in participants' child care program during the COVID-19 pandemic. The majority of participants (66.6%) reported improvements to prevent fomite transmission with enhanced day-to-day surface cleaning practices whereas only

16.8% reported improvements to prevent airborne transmission with improved workplace ventilation. It should be noted that many participants who did not report improvements in the amount of time spent in outdoor play spaces added context to their response stating either that their workplace does not allow for further expansion of outdoor space due to physical/geographic barriers or that spending time in outdoor play spaces has always been prioritized and thus no improvement was necessary/possible.

When asked about assessing five challenges with PHPP implementation (Table 3.3), participants put more emphasis on the issue of support that was not provided when using disinfecting and sanitizing products as not being well trained and equipped to use disinfecting and sanitizing products to not pose a risk to human health was most reported (74.8%). In contrast, not using disinfecting and sanitizing products safely and effectively was the least reported (12.2%). Experiencing physical difficulty during PHPP implementation was also highly reported (74.2%).

The impacts of working during the pandemic are also examined in Table 3.3. Nine out of ten (90.1%) participants reported experiencing SMC. The other reported impact was being less interested in continuing to work in the child care sector, which was reported by over a quarter (26.6%) of participants.

Table 3.3: Respondent's perceptions of workplace changes, challenges, and desired improvements related to working in child care during the COVID-19 pandemic

	n	%
Positive changes to child care program*		
Improvement in day-to-day cleaning practices (n=1610)	1072	66.6
Improvement in staff communication and support (n=1610)	768	47.7
Improvement in outdoor play spaces (n=1610)	368	22.9
Improvement in workplace ventilation (n=1610)	270	16.8

Challenges with public health practice and protocol implementation*		
Not well trained and equipped to use disinfecting and sanitizing products to not pose a risk to human health (n=1602)	1198	74.8
Physical difficulty during implementation (n=1609)	1196	74.3
Do not have sufficient funds for implementation (n=1604)	1049	65.4
Not clear what protective measures should be taken and/or how they should be implemented (n=1609)	1028	63.9
Not using disinfecting and sanitizing products safely and effectively (n=1604)	196	12.2
Desired improvements to improve working conditions during the pandemic		
More staff (n=1610)	1013	62.9
Better guidance from Public Health Officials (n=1610)	990	61.5
Better access mental health support (n= 1610)	603	37.5
More flexibility with implementation (n=1610)	529	32.9
Training on how to implement COVID-19 prevention measures (n=1610)	499	31.0
Better guidance from supervisors/colleagues (n=1610)	304	18.9
Better cooperation from client families (n=1610)	180	11.2
Reported impacts from working during the pandemic		
Stress and other mental health challenges (n=1607)	1448	90.1
Decreased interest in continuing to work in child care (n=1487)	396	26.6

*Participants may have selected multiple options.
n values in parenthesis represent the total number of responses and values listed under column n represent the number of positive responses.

Participants were more likely to report concern with contracting COVID-19 themselves (Table 3.4) if they perceived COVID-19 as a moderate health threat (adjusted odds ratio [OR] 2.3, 95% confidence interval [CI] 1.4-3.8) or as a serious health threat (OR 9.9, 95% CI 6.1-16.0). If participants experienced SMC they were twice as likely to report concern (OR 2.0, 95% CI 1.4-3.0). Two PHPP implementation challenges factored into this concern as well including having insufficient funds needed to implement all PHPPs (OR 1.8, 95% CI 1.4-2.4) and not being well trained and equipped to use disinfecting and sanitizing products in ways that do not

pose human health risks (OR 1.5, 95% CI 1.1-2.1). Participants were less likely to be concerned about personally contracting COVID-19 if they reported physical difficulty during PHPP implementation (OR 0.7, 95% CI 0.5-0.9).

Participants were more likely to have reported concern about a child in their care contracting COVID-19 (Table 3.4) if they perceived COVID-19 as a moderate health threat (OR 2.0, 95% CI 1.1-3.4), perceived COVID-19 as a serious health threat (OR 6.3, 95% CI 3.7-10.8), or if their programs exhibited an increased priority on time spent outdoors (OR 1.6, 95% CI 1.2-2.3). The one PHPP challenge that factored into this model was if insufficient funds for PHPP implementation were reported (OR 1.6, 95% CI 1.1-2.2).

Table 3.4: Factors associated with respondents' concerns about COVID-19 transmission within child care programs

Variables	Concern about contracting COVID-19	Concern about children in the program contracting COVID-19
	Adjusted OR (95% CI)	
Child care professional to child contact		
Direct		1.0
Indirect		1.3 (1.0-1.9)
Perceived health threat of COVID-19		
Not/ minor	1.0	1.0
Moderate	2.3 (1.4-3.8)***	2.0 (1.1-3.4)*
Serious	9.9 (6.1-16.0)***	6.3 (3.7-10.8)***
Stress and other mental health challenges		
No	1.0	
Yes	2.0 (1.4-3.0)***	
Physical difficulty with implementation		
No	1.0	
Yes	0.7 (0.5-0.9)*	
Not well trained and equipped to use disinfecting and sanitizing products to not pose a risk to human health		
No	1.0	
Yes	1.5 (1.1-2.1)**	

Insufficient funds for public health practice and protocol implementation		
No	1.0	1.0
Yes	1.8 (1.4-2.4)***	1.6 (1.1-2.2)**
Better guidance from public health officials		
No	1.0	
Yes	1.4 (1.1-1.9)**	
Better guidance from supervisors/colleagues		
No	1.0	
Yes	1.6 (1.1-2.3)*	
Need more training on how to implement COVID-19 prevention measures		
No	1.0	1.0
Yes	1.4 (1.1-1.9)*	1.6 (1.1-2.3)*
Increased priority on time spent outdoors		
No		1.0
Yes		1.6 (1.2-2.3)**
Observations (unweighted)	n=1373	n=1250
Pseudo R^2 (Nagelkerke)	0.212	0.141

*p < 0.05, **p < 0.01, ***p < 0.001.

Table 3.5 displays two reported impacts of working during the pandemic: increased SMC and decreased interest in continuing to work in child care. One factor that was significant in both models: was being not well trained and equipped to use disinfecting and sanitizing products to not pose a risk to human health (OR 1.6, 95% CI 1.1-2.4 and OR 1.9, 95% CI 1.3-2.2) respectively. For the model examining SMC, the need for more staffing (OR 2.2, 95% CI 1.5-3.3), the challenge of insufficient funding (OR 1.5, 85% CI 1.0-2.2), and the desire for better mental health supports (OR 2.1, 95% CI 1.3-3.4) were also significant factors. Additionally, participants who were living with a health condition that would place them at higher risk of adverse health effects if they contracted COVID-19 (i.e., asthma or other respiratory condition,

cancer, chemical sensitivities, diabetes, heart condition, kidney disease, liver disease) were more likely to experience SMC (OR 2.4, 95% CI 1.6-3.6). Inversely, older participants were less likely to experience SMC, particularly those between 35-49 years of age (OR 0.4, 95% CI 0.4-0.8) and those 50 years and older (OR 0.3, 95% CI, 0.1-0.6).

As shown in Table 3.5, participants were more likely to be less interested in continuing to work in child care if they indicated that better client cooperation would have made working easier (OR 1.7, 95% CI 1.3-2.2), or if they did not report increased staff communication and support as a result of the pandemic (OR 2.1, 95% CI 1.6-2.7). Notably, participants who reported SMC were seven times more likely to be less interested in continuing to work in child care (OR 7.4, 95% CI 3.2-17.0).

Table 3.5: Factors associated with increased stress and other mental health challenges and decreased interest in continuing to work in the child care sector

Variables	Stress and other mental health challenges	Decreased interest in continuing to work in child care
	Adjusted OR (95% CI)	
Age group, years old		
< 35	1.0	
35-49	0.4 (0.2-0.8)**	
≥50	0.3 (0.1-0.6)***	
Pre-existing health condition		
No	1.0	
Yes	2.4 (1.6-3.6)***	
Post-secondary schooling		
No		1.0
Yes		1.4 (1.1-1.9)*
Stress and other mental health challenges		
No		1.0
Yes		7.4 (3.2-17.0)***
Better mental health support		
No	1.0	
Yes	2.1 (1.3-3.4)**	

Lack of funds		
No	1.0	
Yes	1.5 (1.0-2.2)**	
More staff		
No	1.0	
Yes	2.2 (1.5-3.3)***	
Not well trained and equipped to use disinfecting and sanitizing products to not pose a risk to human health		
No	1.0	1.0
Yes	1.6 (1.1-2.4)**	1.9 (1.3-2.2)***
Better client cooperation		
No		1.0
Yes		1.7 (1.3-2.2)***
No improvement in day-to-day cleaning practices		
No		1.0
Yes		1.7 (1.3-2.3)***
No improvement in staff communication and mutual support		
No		1.0
Yes		2.1 (1.6-2.7)***
Concern with contracting COVID-19		
No	1.0	
Yes	2.0 (1.4-3.0)**	
Observations (unweighted)	n=1462	n=1457
Pseudo R^2 (Nagelkerke)	0.163	0.148

*p < 0.05, **p < 0.01, ***p < 0.001.

3.4 Discussion

The COVID-19 virus created great levels of concern for CCPs regarding their own health and the health of the children in their care. Issues with the dissemination of information within the child care sector and between PHOs and CCPs were significant stressors contributing to the level of concern that CCPs had regarding COVID-19 transmission. This study suggests a high

prevalence of SMC experienced by CCPs, resulting from the combined danger the virus poses to human health and working in child care programs during the COVID-19 pandemic. These experiences of increased SMC influenced CCPs' thoughts about continuing to work in the child care sector altogether. Thus, our findings suggest that the pandemic has tested the robustness of the child care sector in Canada, impacting 90% of surveyed CCPs' mental health and resulting in a quarter of those surveyed being less interested in continuing to work in child care.

CCPs were concerned about personally contracting the virus, however, they were more likely to be very concerned about the children in their care contracting the virus. This is likely due to the nature of their job, primarily consisting of caring for children. This finding contrasts with current research which suggests that children are less likely to become severely ill from COVID-19 compared to adults, particularly those with pre-existing chronic health conditions, those who are immunocompromised, those living with obesity, and older adults (especially those over 60 years of age) (GOC, 2021).

While a CPP's age and health condition were found not to influence their level of concern about the virus, these factors did impact their likelihood of experiencing SMC while working during the pandemic. Younger CCPs were more likely to experience SMC which aligns with other Canadian surveys on the impact of the pandemic on Canadians' mental and physical well-being which have shown that youth are more likely to experience anxiety from COVID-induced impacts on personal finances and employment prospects, among other things (STATCAN, 2020a; STATCAN, 2020b). Increased levels of SMC for younger CCPs could be due to a lack of experience which has been shown to be a predictor of stress at work during a public health crisis (Nickell et al., 2004). In contrast to age, CCPs with a health condition that makes them more vulnerable to COVID-19 were more likely to have experienced SMC than

those without a condition. This finding is in line with an online survey conducted out of Lithuania in 2020 which found that individuals with pre-existing health conditions were more likely to fear COVID-19 in addition to suffering from depression and anxiety (Buneviciene et al., 2022). The National Institute for Occupational Safety and Health in the United States warns of the impact of working during the pandemic on individuals' mental health, citing increasing anxiety and the risk of personal harm among health care professionals (NIOSH, 2022), both of which can exacerbate the negative effects of pre-existing health conditions.

Working in a Canadian child care program during the COVID-19 pandemic resulted in one in four participants being less interested in continuing to work in the child care sector. This finding is in line with Government of Canada findings that show 25% of CCPs left the sector (Uppal and Savage, 2021) in 2021, a year into the pandemic in Canada. While the majority of CCPs that reported no positive change to staff communication and support or workplace cleaning, were more likely to be less interested in continuing to work in the sector, the most significant factor was experiencing SMC. This was also a main factor in the United States, as thousands of frontline essential workers (including teachers, nurses, and CCPs) left their sectors during the pandemic (Lowrey, 2022).

The prevalence of poor communication within the child care sector contributed to CCPs' concern over contracting COVID-19, as well as their experiences with SMC and their interest in continuing to work in child care. Issues with not having a clear direction on what protective measures should be taken and/or how they should be implemented, no positive improvement in staff support and communication, and a desire for better client collaboration, better training on PHPP implementation, and better guidance from supervisors/colleagues and PHOs were all reported. Our findings suggest that communication of which PHPPs should be implemented was

not sufficiently clear to support CCPs' needs. While concerning, this finding is not unique to this public health crisis, as issues with the dissemination of information were documented with the MERS and SARS epidemics (Mukhtar, 2020; Ro et al., 2017; Tseng et al., 2005). In fact, current research suggests that communication is a key factor in determining the readiness of an institution/sector for a public health crisis (Mukhtar, 2020; Rodriguez, et al., 2020). Other published research highlights the need for frontline, essential workers, (e.g., health care professionals) to receive guidance and information effectively while also working collaboratively with other teams/groups/organizations (e.g., clients, staff members) (Mukhtar, 2020; Rodriguez, et al., 2020). Furthermore, the challenges of working without clear direction or adequate training on daily tasks and insufficient teamwork/collaboration are likely to have impacted not only CCPs' perceptions of the virus but also their interest in continuing to work in their profession.

The findings of this study reinforce the importance of working conditions, communication, government support in ensuring that child care programs are equipped to handle a public health crisis. Moreover, the CCPs who operate these programs are at greater risk of experiencing SMC and being less interested in continuing to work in the sector if these elements are not present throughout the crisis.

This study also highlights the importance of CCPs' perception of the virus and that, demographic traits within a child care program may be a factor to understand if a CCP is concerned with COVID-19 transmission. It should be noted that some demographic characteristics, such as a CCP's ethnicity and whether or not they have children, were not as important when determining which CCPs were at highest risk of experiencing SMC or being less interested in continuing to work in the sector, despite what other frontline industries have reported (Harry et al., 2022; Preti, et al., 2020).

Our study has some limitations. The regional representation in this study was not statically representative of the Canadian population. For instance, Central Canada (Ontario and Quebec) only represents 11.3% of the sample yet reflects approximately 61.0% of the Canadian population (STATCAN, 2022). Similarly, the participant pool from this study is heavily weighted towards CCPs who work in licensed/regulated child care programs, given the survey's dissemination through CCCF, a professional association. This is in contrast to recent polling from Statistics Canada which found that the majority of CCPs work in unlicensed child care programs (STATCAN, 2021). As well, the climate of the COVID-19 pandemic changed frequently throughout the first two years, since its arrival in Canada, and so too did societal knowledge of the virus, the health impact on people (PHAC, 2022b), the PHPPs that were implemented and enforced, and the rates of vaccination (PHAC, 2022a). Thus, these findings only speak to the state of the pandemic, in the summer of 2021, at the time of the survey. Follow-up investigations will be necessary to get a clearer understanding of the pandemic's impact on different regions of Canada, and the change in SMC of CCPs within the current pandemic climate.

Given the low R2 value in each of the models, there are other variables not present in this analysis that have impacted the concerns, SMC, and career aspirations of CCPs. Given the high variability within the child care sector (e.g., type of child care program, roles and responsibilities, variation in regional government responses to COVID-19), and CCPs (e.g., localized knowledge and beliefs) further research should include regional-based assessments that examine specific jurisdictions rather than analyze COVID-19 perceptions and experiences on a national scale. Alternatively, a change in methodology could assist in explaining the lack of strength in the model. The in-depth testimonials from interviews and/or focus groups would

likely improve our understanding of the complex experiences of CCPs and ultimately the key variables missing from this study.

Our findings suggest that resources should be allocated to improve the dissemination of information within the child care sector and between the sector and government officials. Resources are also needed to ensure CCPs receive adequate training and appropriate equipment needed for the implementation and enforcement of PHPPs. As well, given the prevalence of SMC throughout the sector, mental health support must be treated as a foundational component of all child care programs in Canada, not only for the health of the professionals but for the sustainability of the sector in this country. Ensuring this would align with the recommendations from the Chief Public Health Officer of Canada's 2020 report on the State of Public Health in Canada, which speaks to the importance of creating safer spaces in child care to address CCP's mental health concerns and allow those who rely on caregivers, the opportunity to return to work (PHAC, 2022c). As this study demonstrates, CCPs' main concern is not for their own health but rather for those who are entrusted with their care. The same level of concern should be put into ensuring these frontline essential workers have adequate working conditions and clear lines of communication during a public health crises.

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4.0 Conclusion

4.1 Introduction

The main objective of this thesis was to better understand the SARS-CoV-2 (COVID-19) -induced public health practices and protocols (PHPPs) that were implemented in child care programs across Canada and how the perceived COVID-19 concerns and PHPP challenges impacted child care professionals (CCPs). Achieving this objective would provide a necessary perspective within current research on frontline, essential workers operating during the COVID-19 pandemic in Canada. Ultimately these findings would aid in understanding the state of the Canadian child care sector and CCPs through their own experiences during the COVID-19 pandemic.

Arguments were put forth that CCPs have faced challenges resulting from working during the COVID-19 pandemic and implementing COVID-induced PHPPs. The perspectives of

CCPs have been largely underreported despite the sector's importance in allowing other essential services to operate during a public health crisis and the day-to-day reliance of many Canadians on child care. Moreover, literature on the experiences of other essential service sectors working during the COVID-19 pandemic (Preti et al., 2020) and past public health crises (Rao, 2006; Maunder et al., 2003), as well as the experiences of female professionals during the COVID-19 pandemic (Canadian Women's Foundation, 2020) provided the impetus to conjecture that CCPs have been negatively impacted by COVID-induced PHPPs.

This section includes a brief review of the methodology used for this thesis as well as the major themes presented in the results of each article. The results are then discussed further for their contributions. Then the limitations of this thesis are presented, followed by recommendations for future research.

4.2 National Survey and Results

In response to the gaps in literature, this thesis put forward a national, web-based survey to allow for CCPs' experiences during the COVID-19 pandemic to be documented and to contribute to knowledge on how to better support these professionals and the sector. The questionnaire was developed to contextualize characteristics of child care programs and professionals, CCPs' knowledge and perceptions of COVID-19, COVID-induced day-to-day changes in practices and protocols within programs, and perceptions of COVID-related challenges, concerns, and impacts. The survey was disseminated through the contact list of professionals within the Canadian Child Care Federation (CCCF) email network and yielded 1610 responses.

Results from the survey suggest that CCPs had a high level of concern for the transmission of COVID-19 within their workplace. Findings also indicate that a variety of PHPPs were implemented within child care programs with a greater focus being placed on targeting fomite-based transmission of the virus. The PHPPs implemented were usually approved and recommended by Health Canada, except for the use of sprayers/foggers, ozone, and ultraviolet (UV) emitting devices which were reported by a roughly quarter of CCPs. The prevalence of these devices may have worsened the environmental health practices within child care programs, given their adverse health impacts when the devices are used frequently, without proper protective equipment, and/or around children. The survey found that CCPs endured many challenges with PHPP implementation including negative physical and mental health impacts, issues with the dissemination of information between the sector and with public health officials (PHOs), and challenges with access to tools/knowledge and funding needed for implementation. The impact of the pandemic on CCPs included a high prevalence of stress and other mental health challenges (SMC) and one in four professionals being less interested in continuing to work in the sector.

4.3 Impacts and Implications

This section includes a discussion of the various impacts and implications of the study findings. First, the contributions to literature are highlighted including the study's additions to empirical and theoretical literature. This is followed by contributions to reconceptualizing the Job Demands-Resources (JD-R) model, including an adapted JD-R model based on themes discussed in this study.

4.3.1 Impacts and Implications to Policy

Documenting the experiences of CCPs throughout a public health crisis was the most critical goal of this study. The child care sector has been historically underreported within public health and the scientific community, particularly when comparing it to other frontline-essential services sectors. The general trends presented in this study help to orient the experiences of CCPs with other service sector professionals who have had to work through the COVID-19 pandemic. Notably, the high prevalence the SMC among CCPs has been commonly reported by health care professionals working during the pandemic (Spoorthy et al., 2020; Vizheh et al., 2020). As well, the findings of this study can advise future policies that may be put in place to support a post-pandemic child care sector while building resilience to future environmental shocks.

The perspectives of CCPs are rarely the focus of child care research as more attention has historically been given to child development and/or the experiences of parents (Morrissey, 2017; Buchbinder et al., 2006; Scarr, 1998; Belsky, 1990). This trend has continued with current literature examining the sector through the COVID-19 pandemic (Herrenkohl et al., 2021; Patrick et al., 2020). Documenting the impacts the pandemic has had on CCPs, including on their mental health and interest in continuing to work in the sector, may fill a critical gap for informed advocacy and policy development which may improve support for CCPs and in turn improve CCPs' mental health and rates of retention.

The findings of this study also provide information on what PHPPs were implemented including measures that were recommended and highlighting any that were not, including the use of sprayers/foggers. During the initial data analysis of this study, when the high prevalence of sprayers/foggers was discovered, the former president of the CCCF was notified and they cautioned members of the CCCF community about the adverse health impacts these devices pose

if misused or used without proper equipment.. Findings such as these, inform management within the child care sector and government officials of the need to improve lines of communication with CCPs to ensure measures taken during a public health crisis are effective and safe. The knowledge of PHPP challenges documented in this study may result in informed policy development to ensure similar hurdles are not present in future public health crises.

This study also contributes to literature on women in the workplace as it documents the experiences of a female-dominated sector on the frontlines of a public health crisis. The high prevalence of CCPs being less interested in continuing to work in the sector could greatly influence the actions of policymakers, particularly as the federal government has promised $10/day child care and will now have to face the ramifications of an exodus of professionals from this essential service. It also may serve as a warning for immediate action to prevent severe consequences to women in the workplace, the child care sector, and the Canadian economy.

Another crucial implication of this study is the that it generated understanding about the Canadian context. Moreover,the conclusions made in this thesis provide context on the state of child care and CCPs' in Canada which can be compared to other countries such as the United States (Crouse et al., 2023; Lowrey, 2022) and the United Kingdom (Hobbs and Bernard, 2021). This research is among the first studies to examine the experiences of CCPs working in Canadian child care programs during the COVID-19 pandemic.

4.3.2 Impacts and Implications to JD-R Model

Given the findings of this study, the JD-R model has been adapted (Figure 1.2). The findings in Chapter 2 indicated that there was in fact an imbalance between increasing job demands (e.g., expanded workloads due to increases in cleaning and monitoring for symptoms)

and decreasing/stagnant job resources (e.g., challenges with guidance, unclear direction, not enough training). The findings of this chapter also highlight that CCPs experienced personal strain through SMC and physical difficulty with PHPP implementation, as well as being less interested in continuing to work in the sector. As the model suggests, such an imbalance between job demands and resources should result in increased personal strain and lack of motivation. Chapter 3 tested this relationship and found that the COVID-induced demands placed on CCPs coupled with the lack of resources (needed to buffer said demands) factored into CCPs experiences of strain (i.e., SMC). Similarly, the lack of job resources coupled with the increased job demands (which act to buffer said resources) factored into CCPs' motivation (being less interested in continuing to work in the sector).

The implications of organizational outcomes on societal outcomes are needed to situate the child care sector's role in society. Be it through its service to other essential services that keep our economy running, particularly through a public health crisis, or through the women who rely on the sector as a primary source of income or to pursue their careers outside of the home. This also provides context to better understand the implications of a quarter of CCPs being less interested in continuing to work in the sector given their experiences during the pandemic.

Secondly, these societal outcomes as well as organizational outcomes/performance can have a direct impact on job demands and resources. If CCPs feel they are not being supported, protected, and having their experiences heard they may choose to leave the sector, which may increase staffing shortages (adding to demands) and may impact morale, decreasing teamwork (taking from resources). Similarly, if parents doubt that their child care program is a safe space for their child (lose faith in the system), as was documented in the aforementioned literature of

this study, it may result in sentiments of an unsafe work environment for CCPs (adding to job demands) and less operational funding (taking from job resources). If parents choose to have their children out of child care due to their concerns with environmental health standards and/or the quality of the care within the child care program, this will impact the ability of other essential workers to go to their jobs and more generally, impact the mobility of women in particular within society.

This thesis did not evaluate the relationship between strain and organizational outcomes nor between organizational outcomes and societal outcomes. Rather, organizational outcomes are to be evaluated through performance indicators such as the ones detailed by the federal government in 2018 (GOC, 2019). Given the novelty of society factors to the JD-R model, it is unclear what the appropriate measures would be and thus more work is needed to understand the degree to which organizational outcomes impact societal outcomes.

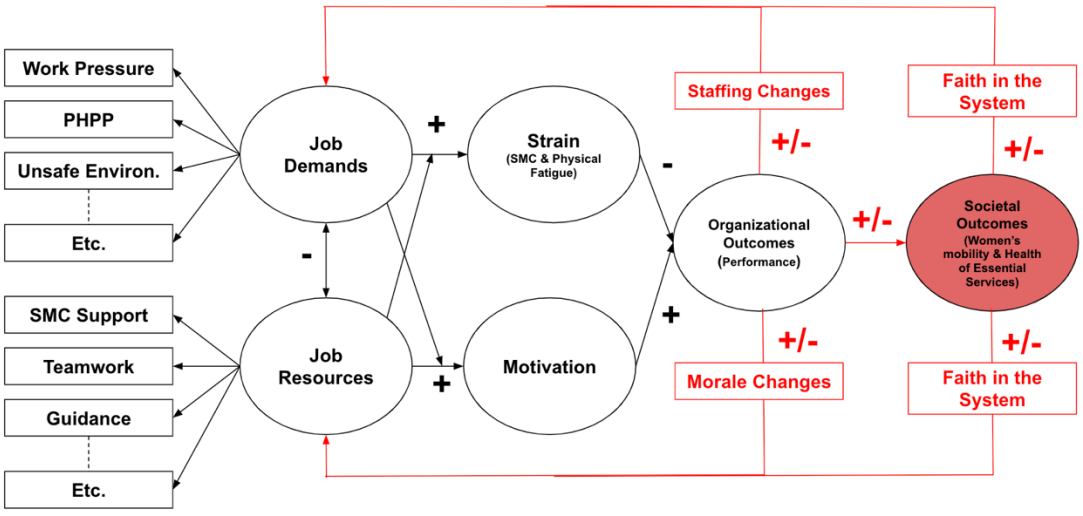

Figure 4.1: Adapted (in red) JD-R model taken from the revised model by Bakker and Demerouti 2007.

While the scenarios presented reflect negative outcomes, which is more accurate when examining this model during a pandemic, it is important to note that positive outcomes may stem from the organization and society. Additionally, it is important to recognize that understanding the experiences of CCPs through this model allows scholars to situate the implications of COVID-induced changes in the workplace and connects the workplace to the reader (i.e., society).

4.4 Limitations

The methodological approach of the study had its limitations including hindering the ability to gather in-depth findings beyond general trends. A qualitative approach would have provided an opportunity for deeper analysis of participants' experiences with COVID-19 and take better account of their personal biases, beliefs, and level of knowledge, all of which, according to the models of this study, might be too complex to fully understand through a survey. With the bulk of survey dissemination being conducted through the CCCF, the unregulated/non-licensed child care sub-sector was poorly represented in this study, despite recent data suggesting the majority (~54.0%) of CCPs operating in Canada are from that sub-sector (STATCAN, 2021). As well, the geographic distribution of participants does not reflect the current population distribution in Canada. In fact, our data does not include the perspectives or experiences of CCPs in the Northern territories. The lack of representation from regions such as Central and Northern Canada was likely to have contributed to the lack of representation from Indigenous Canadians in this study, given the Indigenous population distribution across Canada (STATCAN, 2022). Finally, this study did not include a comparative analysis between provinces as I, along with my research partners determined that doing so would fuel politically motivated discourse around PHPPs used within each province and which region of the country was

"successful" or "unsuccessful." Given the highly politicized nature of COVID-induced measures in Canada, it was decided to keep this analysis out of this thesis and thus allow the experiences of CCPs to be the focus.

The low R^2 values, although Beta coefficients were statistically significant across all four models, indicate the independent variables do not explain the majority of the variation of the dependent variables. Thus, the findings of this study indicate that key variables impacting CCPs' concern over COVID-19, SMC, and interest in continuing to work in the sector remain unknown. Given the complexity of roles, responsibilities, workplace settings, the differences in knowledge between CCPs observed in this study, and the divergence in PHPP responses across different regions of Canada, scoping the sample size around a given community may produce a stronger effect between independent variables and the dependent variable in question.

4.5 Contributions

This thesis benefited from the knowledge of several experts. Here I outline the impact of each contributor to this thesis:

Teagan Gran-Ruaz: I am the primary writer for all chapters. I was the principal author of the questionnaire, messaging used in participant recruitment, and was the primary data analyst for this thesis.

Dr. Erica Phipps: Dr. Phipps oversaw the development of the survey and provided critical expertise on environmental health concerns in child care settings. She also facilitated connections with and input from leading experts in child care and children's environmental health to help ensure substantive accuracy as well as the practical relevance of the study to real-

world concerns. Finally, Dr. Phipps' expertise was crucial in the development of Chapters 2 and 3.

*Dr. Eric Crighton***:** Dr. Crighton's expertise in designing surveys was critical in ensuring the questionaries included measurable objectives and an effective survey question design. Dr. Crighton also oversaw the development of Chapters 2 and 3. Finally, he provided invaluable guidance on the data analysis, including insight into the appropriate SPSS syntax to interpret the data.

*Dr. Michael Sawada***:** Dr. Sawada assisted with editing Chapters 2 and 3 and oversaw the development of Chapters 1 and 4.

*Don Giesbrecht***:** In his role as ED and CEO of the Canadian Child Care Federation (CCCF), Mr. Giesbrecht provided his expertise on the Canadian child care sector which was critical in the development of the survey. He also oversaw the dissemination of the survey through the CCCF network which allowed the survey to reach professionals across the country.

4.6 Future Research

Future research would benefit from qualitative-based methodologies that seek to hear in-depth testimonials from CCPs, to reflect relevant challenges and concerns more accurately within a Canadian context. Qualitative methods have been used to examine the experiences of COVID-19 in frontline service sectors (Sirisakpanich, 2022; Rücker et. al., 2021), however, CCPs' experiences throughout the pandemic have yet to be examined in this way. Given the findings of this study, a more in-depth analysis may provide clarity into the missing variables within this study's models and would lend itself to improving the generalization of this study's results. Such research should aim to understand the communication networks and dissemination

of information within the child care sector to enhance our understanding of why there are varying degrees of concern for COVID-19 and knowledge of appropriate PHPPs.

To date, there is still an important knowledge gap in our understanding of how demographic characteristics affect essential workers' perceptions of COVID-19 in child care programs. A place-based, participatory research methodology that focuses on community-level challenges and concerns of this population would allow for a comprehensive evaluation of the themes presented in this study. Such a methodology would provide an opportunity to examine intersectionalities within communities that may impact the concerns, knowledge level, and challenges faced. This in turn would provide recommendations for the development of tools and support programs that are contextually appropriate and allow this population to have direct input in their design and implementation.

To gain a true understanding of the experiences of CCPs during COVID-19 the unlicensed/unregulated sub-sector, which represents the majority of CCPs (STATCAN, 2021), needs to be examined. The high degree of autonomy and lack of oversight from governing bodies has led to concerns from members of the child care community and resulted in a discourse that discredits the work of women and the sector as a whole (CBC News, 2013a; CBC News, 2013b; Sagan, 2013). While much of this discourse has been based on situated knowledge (Stoetzler and Yuval-Davis, 2002), the true experiences of these professionals operating in Canada remain unknown. Addressing this gap will provide government officials with the knowledge to better support the sector and ensure these professionals have the support they need. The knowledge gained may also contribute to more positive discourse for the work that these professionals do.

4.7 Closing Remarks

It was hypothesized that working in a Canadian child care program during the COVID-19 pandemic would have resulted in new challenges relating to PHPP implementation. It was also predicted that such experiences would have impacted CCP's mental state and interest in continuing to work in the child care sector. The results of this present work could suggest a lack of support for professionals and crisis preparedness within the sector, similar to other frontline essential sectors, as noted in the aforementioned literature.

Through our national, web-based survey it was determined that PHPPs resulted in new challenges for CCPs notably physical fatigue and exhaustion, not receiving enough support/guidance from government officials, and the dissemination of information. The use of PHPPs also posed new risks to the health and safety of CCPs and those in their care, as a quarter of professionals reported using disinfecting devices not approved by Health Canada given their adverse health effects. The experiences of CCPs, along with select demographic characteristics, were seen to contribute to an increase in their SMC and reduced interest in continuing to work in the child care sector. As was previously noted, the findings of this study are not exhaustive and come with limitations. Additional research is needed to understand the perceptions of CCPs, the role that their experiences had in affecting their health and how their experiences may result in an exodus of professionals from the sector.

The role of CCPs has always been (and will continue to be) critical to the health of other essential sectors and the health of the Canadian economy. The level of support and guidance these professionals provide to the children entrusted in their care must be reciprocated by their communities and government officials. The absence of these qualities places a burden on CCPs that not only has an impact on their well-being but the well-being of the sector at large. This research seeks to shed light on a sector too often forgotten in public discourse with the goal of

documenting the experiences of CCPs through a public health crisis. I hope these findings build on existing knowledge and assist in the creation of informed interventions to support the child care sector and all who serve within it.

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Appendix A

University of Ottawa Research Ethics Board Protocol Certificate

Université d'Ottawa
Bureau d'éthique et d'intégrité de la recherche

University of Ottawa
Office of Research Ethics and Integrity

S-05-21-6888 - REG-6888 - Certificat d'approbation éthique / Certificate of Ethics Approval

(English message follows)

Cher/Chère Eric Crighton,

Veuillez trouver ci-joint le certificat d'approbation éthique pour le projet intitulé «Factors affecting environmental health perceptions and practices among child care professionals».

Le certificat est valide jusqu'au : 17-06-2022

Recherche financée : veuillez faire suivre une copie du certificat au Service de gestion de la recherche.

Si vous avez des questions, n'hésitez pas à communiquer avec le Bureau d'éthique à ethique@uottawa.ca ou en composant le 613-562-5387.

Vous pouvez voir votre demande en vous connectant à votre compte eReviews.

Cordialement,

Riana Marcotte
Responsable d'éthique en recherche

Ceci est une réponse automatisée, merci de ne pas répondre à ce courriel.

Dear Eric Crighton,

Please find attached the certificate of ethics approval for your research project titled "Factors affecting environmental health perceptions and practices among child care professionals".

This certificate is valid until: 17-06-2022

Funded research: A reminder that you must provide a copy of this certificate to Research Management Services.

If you have any questions, please contact the Ethics Office at ethics@uottawa.ca or by telephone at 613-562-5387.

You can view your project at any time by logging into eReviews.

Best regards,

Riana Marcotte
Protocol Officer

This is an automated message. Please do not reply directly to this email.

Attachement(s) / Attachment(s)
approvalLetter1624027267715.pdf

550, rue Cumberland, pièce 154
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Appendix B

Informed Consent for Survey (English Version)

Protective practices in the child care sector during the COVID-19 pandemic

INFORMATION & CONSENT

You are invited to participate in a survey about your experiences working in the child care sector during the COVID-19 pandemic.

The goal of the survey is to better understand the use of COVID-related protective practices in the child care setting, and challenges associated with implementing these practices. The results will be used to identify ways that child care professionals can be better supported in their efforts to protect the health of children and staff.

This study is being conducted by researchers at the University of Ottawa in collaboration with the Canadian Child Care Federation (CCCF). This research has been reviewed and has received ethical approval by the University of Ottawa's Research Ethics Board. The study is supported by a grant from the Canadian Institutes of Health Research.

Your decision to participate is voluntary. You may refuse to answer any question or stop at any time. The questionnaire should take about 15 minutes to complete. At the end of the survey, you will be given the option to enter your email address in a draw to win one of five $50.00 VISA gift cards (see details below).

We follow ethical guidelines to ensure your privacy. The questionnaire is anonymous and all personal information will be kept confidential.

Responses to this survey are collected and stored by SurveyMonkey® and are governed by SurveyMonkey® privacy policies. Any data collected in the survey may be transferred to various countries including the United States and other locations in which SurveyMonkey® has offices. As such, responses will be subject to the laws of a jurisdiction outside Canada. Once the survey has closed and the results have been analyzed, the information stored by SurveyMonkey® will be deleted from the SurveyMonkey® account. The data collected through the survey will also be stored on a restricted access, secure server at the University of Ottawa for a period of ten years, after which it will be deleted.

Because your responses are not linked to your name, it will not be possible to withdraw your responses once you have completed the survey and clicked 'Done.'

If you experience anxiety while answering any of the questions and would like to speak with someone, you can access support by calling 211 or your local public health department. If you have questions about environmental health concerns in child care settings, you may contact Dr. Erica Phipps.

Draw for prizes:

Everyone who completes the survey will be invited to enter their email address in a draw to win one of five $50 VISA gift cards. As an early-bird incentive, the first 100 respondents who enter the draw will have double the chances of winning.

After the survey closes in July 2021, five emails will be randomly selected amongst those who have entered the draw. The winners will be notified by email by a member of the University of Ottawa research team (Teagan Gran-Ruaz). If a selected winner cannot be reached within 14 days of being notified, a new winner will be randomly selected. The odds of winning a prize are dependent on the number of research participants who enter the draw. The prize must be accepted as awarded or forfeited. We reserve the right to cancel the draw if the integrity of the draw, the research, or participant confidentiality is compromised. The draw is governed by the applicable laws of Canada.

The email address that you provide to enter the draw is collected solely for the purposes of contacting you if you are selected as a winner. Your email will not be linked to your responses and it will be deleted once the prizes have been awarded.

Contacts:

Should you have any comments or concerns about this study, please contact:

Teagan Gran-Ruaz, Graduate Student

Erica Phipps, MPH, PhD, Postdoctoral Fellow

Eric Crighton, PhD, Professor

Department of Geography, Environment & Geomatics

Phone: 613-562-5800 (x1065)

eric.crighton@uottawa.ca

If you have questions or concerns about research ethics related to this study, please contact the University of Ottawa Research Ethics Board at 613-562-5387 or ethics@uottawa.ca.
The ethics reference number is XXXXXXXX .

You may save this Information and Consent agreement by right-clicking to download or print.

Ready to participate? Click **CONTINUE** to access the questionnaire.

Appendix C

Questionnaire Employed for Data Collection (English Version)

Protective practices in the child care sector during the COVID-19 pandemic

Questionnaire

June 15, 2021

Contacts:

Teagan Gran-Ruaz,

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University of Ottawa

Eric Crighton, PhD, Principal Investigator

Professor, Department of Geography, Environment and Geomatics

University of Ottawa

eric.crighton@uottawa.ca

Erica Phipps, MPH, PhD

Postdoctoral Fellow, Department of Geography, Environment and Geomatics

University of Ottawa

Eligibility questions:

E1. Are you a child care professional who has worked in a Canadian child care setting between March 2020 and now?

Yes, worked full-time continuously between March 2020 and now (with or without some minor gaps)
Yes, worked part-time continuously between March 2020 and now (with or without some minor gaps)
Yes, I worked in some other capacity for most of the time between March 2020 and now
No, I have not worked throughout this time period (Go to text for ineligible respondents)

For ineligible respondents (Q.E1 option 2):

Thank you for your interest, but this survey is specifically for child care professionals who have worked in a Canadian child care setting between March 2020 and now. Thank you for your time.

For eligible respondents (Q.E1 option 1)

E2. It will take approximately 15 minutes to complete the questionnaire. Do you agree to participate?

Yes (go to instructions)
No (go to end of survey)

Instructions for filling out the questionnaire

Please answer each question by selecting the response that best reflects your opinion or experience. There are no 'right' or 'wrong' answers. Your views and experiences are what matter.

SECTION 1: Workplace Context

Q1 Which of the following best describes your child care program?

Child care program located in a school
Child care program located in a workplace, public building or other institution
Child care program—stand-alone facility
Child care program in a home – regulated/licenced
Child care program in a home – unregulated/unlicenced [Go to Q3]
Other. Please specify:

Q2 Which of the following best describes your job?

Early childhood educator (working directly with children)
Administrator (Executive Director/Director/Assistant Director)
Support staff (working directly with children)
Support staff (not working directly with children, e.g. cooking, office work)
Other. Please specify:

Q3 How many children attend the child care program where you work?

5 or fewer
6 to 10
11 to 20
21 to 50
More than 50

Q4 How long have you worked in the child care sector?

Less than 1 year
Between 1 and 5 years
Between 6 and 10 years
Between 11 and 20 years
More than 20 years

Q5 Which of the following best describes the community where your child care program is located?

Big city (more than 300,000 people)
Suburbs of a big city
Town or small city
Country village
Rural area / countryside
On reserve
Other, please specify _____

To the best of your knowledge, please indicate the approximate percentage of children in your child care program who fall into the following categories:

	0%	25%	50%	75%	100%	Don't know
Q6 Children whose families live on low income						
Q7 Children who belong to a visible minority (for example, Arab, Asian, Black, Hispanic)						
Q8 Children who identify as Indigenous or whose parent(s) identify as Indigenous						
Q9 Children who speak a language other than English or French at home						

SECTION 2: COVID-19 knowledge and perceptions

Q10 To what extent would you say that you are knowledgeable about the COVID-19 virus, including the health risks it poses and how it can spread from one person to another?

Very knowledgeable
Somewhat knowledgeable
Not very knowledgeable
Not at all knowledgeable

Q11 To what extent do you believe that COVID-19 poses a health threat to people in Canada?

I believe that COVID-19 is a **serious** health threat

I believe that COVID-19 is a **moderate** health threat
I believe that COVID-19 is a **minor** health threat
I believe that COVID-19 is **not a real** health threat

SECTION 3: Changes in day-to-day practices due to COVID-19

We are interested in understanding how your day-to-day practices have changed during the COVID-19 pandemic. For each of the following practices, please indicate if you are now doing it **much more**, **more**, **the same**, **less**, or **much less**, compared to before the pandemic. Please select 'not applicable' if the practice was not used before the pandemic or now.

	Much more	More	Same	Less	Much less	Not applicable (we don't use this practice)
Q12 Hand-washing with regular soap and water (staff and children)						
Q13 Hand-washing with antibacterial soap and water (staff and children)						
Q14 Using alcohol-based hand sanitizers (staff)						
Q15 Using alcohol-based hand sanitizers (children)						
Q16 Surface cleaning with disinfectants (sprays, wipes, liquid solutions)						
Q17 Wearing masks						
Q18 Wearing protective eyewear and/or face shields						

Q19. Please indicate if your child care program is using or has at any point used any of the following to prevent COVID transmission (Select all that apply).

Portable air purifier(s)
Disinfectant space sprayer or 'fogger'
Electrostatic sprayer
Ultraviolet radiation-emitting device
Ozone-generating device
Opening windows for ventilation
Using fans to bring in outdoor air for ventilation
Using the HVAC system to increase ventilation
None of these measures
Don't know
Other measures, please specify:

Q20 Are children in your child care program spending more time outdoors to reduce the risk of COVID-19 transmission?

Yes, [Go to Q21]
No, [Go to Q20a]

Q20a To the best of your knowledge, which of the following are reasons that children in your child care program are not spending more time outdoors during the pandemic? [select all that apply]

No outdoor space available
The outdoor space available is not safe for children (e.g., no fenced-in play area)
The outdoor space available is not practical (e.g., requires crossing roadway)
Not all kids have appropriate clothing
Poor weather conditions
Lack of adequate insurance
Parents are not supportive
The children are too young
Person(s) responsible for deciding do not perceive a benefit
Don't know
Other, please specify

Please think about the guidance you've received since the start of the pandemic from public health officials and/or your supervisor(s) on protective measures to combat the spread of COVID-19. For each of the following measures please indicate whether you feel it is now given **more priority**, the **same priority**, or **less priority**, as compared to the first few months of the pandemic (i.e. Spring 2020).

	More priority	Same priority (as in Spring 2020)	Less priority	This has never been a priority
Q21 Surface cleaning/ disinfecting (e.g., cleaning floors, tables, toys)				
Q22 Improved ventilation (e.g., opening windows, use of fans)				
Q23 Spending more time outside				

SECTION 4: Perspectives on COVID-related challenges, concerns and impacts

We are interested in understanding challenges that you may have faced in implementing COVID related protective measures. Please indicate whether you **agree**, **somewhat agree**, **somewhat disagree**, or **disagree** with the following statements:

	Agree	Somewhat agree	Somewhat disagree	Disagree
Q24 Our child care program does not have sufficient funds to implement all of the recommended measures				
Q25 It is not always clear what protective measures we should be taking and/or how they should be implemented				
Q26 It is physically difficult to implement some/all of the protective measures (e.g., extra cleaning)				

Q27 More could be done to reduce children/staff exposure to chemicals in cleaning, disinfecting and sanitizing products				
Q28 The majority of client families are eager to comply with protective measures at the child care program				
Q29 I feel well trained and equipped to use disinfecting and sanitizing products in ways that do not pose health risks to children and staff				
Q30 I feel confident that our child care program is using disinfecting and sanitizing products that are both effective and safe				

Other challenges?

What is your level of concern for the following health risks associated with COVID-19?

	Very concerned	Somewhat concerned	Somewhat unconcerned	Not at all concerned
Q31 Personally catching COVID-19 in the child care program				
Q32 Passing COVID-19 on to your family or friends				
Q33 Children in your care catching COVID-19				
Q34 Increased personal exposure to chemicals in disinfectants and sanitizers				
Q35 Increased exposure of the children to chemicals in disinfectants and sanitizers				

Other concerns?

Q36 Have you experienced stress or other mental health challenges as a result of working in a child care program during the pandemic?

Yes, definitely
Yes, somewhat
No

Q37 In your opinion, which if any of the following barriers might child care professionals face in getting support for their mental/emotional well-being? (select all that apply)

Stigma associated with mental health issues
Fear of losing clients
Judgement or lack of support from colleagues or supervisors
Financial concerns (e.g. taking time off work, paying out-of-pocket for support)
Lack of available support services
Other, please specify:
None of the above. I am not aware of any barriers

Q38 What would have made working in your child care program during COVID-19 easier? [select all that apply]

Better guidance from public health and government officials
Better guidance from colleagues or supervisors

Training on how to implement COVID-19 prevention measures
Better access to mental health supports
Better cooperation from client families
Financial support measures such as overtime pay
Additional staff to assist with cleaning and other protective measures
More flexibility in implementing protective practices
Other, please specify

Q39 Has the pandemic led to any positive changes in your child care program? [select all that apply]
Facing the pandemic together has increased team work and mutual support among staff
Communication and mutual support between staff and client families has improved
Day-to-day cleaning practices have been improved
Ventilation of our indoor spaces has been improved
Our outdoor space has been expanded or improved
Other, please specify:

Q40 Have your experiences of working during the pandemic changed your desire to continue to work in the child care sector?
Yes, I am now **more** interested in continuing to work in the child care sector
Yes, I am now **less** interested in continuing to work in the child care sector
No
Comment (optional):

Q41 Is there anything else you would like to share about your experiences working as a child care professional during the pandemic?

SECTION 5: Socioeconomic and Demographic Characteristics

Q42 Indicate your sex:
Male
Female
Other: please specify_____

Q43 In what year were you born?
Year _____

Q44 Do you consider yourself to be any of the following? (Select all that apply)
Indigenous person (e.g. First Nations, Métis or Inuk (Inuit))
Visible minority (eg. Black, Latinx, Asian, Arab)
Recent immigrant (immigrated to Canada within the past 10 years)
None of the above
Prefer not to answer

Q45 Which of the following best reflects your current family situation [select all that apply]?
I have children (adopted or biological)
I am currently trying to have a child
I am currently pregnant
I anticipate trying to have a child in the future
I do not anticipate having children in the future
I have no children
Prefer not to answer

Q46 Do you have any of the following health conditions that may make you more vulnerable to potential health risks associated with the pandemic? (Select all that apply)
Asthma or other respiratory condition
Cancer

Chemical sensitivities
Diabetes
Heart condition
Kidney disease
Liver disease
Other, please specify
Prefer not to answer

Q47 Have you received at least one dose of a COVID-19 vaccine?
Yes
No
Prefer not to answer

Q48 What is the highest level of education you have completed?
Elementary, middle school or some high school
Graduated from high school
Completed some CEGEP, college or university
Graduated from CEGEP, college or university (any level)

Q49 Have you received formal child care education (i.e. ECE credentials/ diploma/ degree)?
Yes
No

Q50 What province or territory do you work in?
Alberta
British Columbia
Manitoba
New Brunswick
Newfoundland
Northwest Territory
Nova Scotia
Nunavut
Ontario
Prince Edward Island
Quebec
Saskatchewan
Yukon
Refused

Q50 Thank you for participating, if you are interested in having your name entered into a draw to win one of five $50.00 VISA gift cards, enter your email address here. Please note that your email address will be immediately delinked from your responses. Following the completion of the draw, your email address will be deleted.

Add email address here: _____

THANK YOU

Thank you very much for your time and for sharing your views and experiences. If you would like to know more about this study, please contact: Dr. Eric Crighton (eric.crighton@uottawa.ca), Dr. Erica Phipps, and/or Teagan Gran-Ruaz.

Appendix D

Recruitment Email used by CCCF (English Version)

INVITATION TO PARTICIPATE IN A SURVEY ON COVID-19 PRACTICES IN THE CHILD CARE SECTOR

You are invited to participate in a survey about your experiences working in the child care sector during the COVID-19 pandemic.

If you've been working in a child care program in Canada from the start of the pandemic (March 2020) to now, we want to hear from you!

In recognition of your time, after completing the survey you will have a chance to enter a draw to **win one of five $50 VISA gift cards**. Double your chances of winning by being one of the first 100 respondents to enter the draw.

This survey is being conducted by researchers at the **University of Ottawa** in collaboration with the **Canadian Child Care Federation**. The goal is to better understand the use of COVID-related protective practices in the child care setting, and challenges associated with implementing these practices. The results will be used to identify ways that child care professionals can be better supported in their efforts to protect the health of children and staff.

The online survey is anonymous and confidential. No one will know whether you participated, and all personal information will be kept confidential. The survey should take about 15 minutes to complete.

To learn more and to access the survey, **please click** [https://www.surveymonkey.ca/r/F7LXXR5]

Please feel free to share this invitation with your colleagues.

Thanks in advance for considering this invitation. Your views and experiences are important.

For more information, please contact the University of Ottawa research team:

Teagan Gran-Ruaz, Graduate Student

Erica Phipps, MPH, PhD, Postdoctoral Fellow

Eric Crighton, PhD, Professor
Department of Geography, Environment & Geomatics
Phone: 613-562-5800 (x1065)
Email: eric.crighton@uottawa.ca

Appendix E

Social Media Scripts used by CCCF (English Versions)

Twitter Script:
Have you worked in child care during the COVID pandemic? If so, please tell us about your experiences in implementing increased health-protection measures by completing a short online survey. Act soon to double your chance to win a $50 prize! Learn more: https://www.surveymonkey.ca/r/F7LXXR5

Facebook Option 1:
Have you been working as a child care professional during the COVID-19 pandemic? If so, we want to hear from you! Please click here to access an online survey about your experiences implementing increased health protection measures during the pandemic. Act soon! Everyone who completes the survey will be eligible to enter a draw for prizes (one of five $50 VISA gift cards). The first 100 respondents will have double the chances of winning.

To learn more, and to access the survey, click here: https://www.surveymonkey.ca/r/F7LXXR5

Facebook Option 2:
Have you been working as a child care professional during the COVID-19 pandemic? If so, we want to hear from you! Please tell us about your experiences in implementing increased measures to protect the health of children and staff by completing this online survey. To thank you for your time, you will have a chance to enter a draw to win one of five $50 VISA gift cards. Act soon! The first 100 respondents will have double the chances of winning.

The survey is being conducted by researchers at the University of Ottawa in collaboration with the Canadian Child Care Federation.

To learn more, and to access the survey, click here: https://www.surveymonkey.ca/r/F7LXXR5

Facebook Option 3:
As a child care professional, you know that our sector has been on the front lines of the COVID-19 pandemic, responsible for implementing increased measures to safeguard the health of children and staff.

We want to hear your views and experiences from this challenging and unprecedented time. Please consider completing this online survey to share your experiences as a child care professional during the pandemic, including issues you may have faced in implementing enhanced cleaning/disinfection and other health protection measures. The results will inform future improvements in policy and practice.

The survey is being conducted by researchers at the University of Ottawa in collaboration with CCCF, and takes about 15 minutes to complete. In recognition of your time, you will have a chance to enter a draw to win one of five $50 VISA gift cards. Act soon! As an early-bird incentive, the first 100 respondents will have double the chances of winning.

Thank you for considering this request. Your views and experiences are important.

To learn more, and to access the survey, click here: https://www.surveymonkey.ca/r/F7LXXR5

Appendix F

Excerpt from New Brunswick Children's Environment Health Collaborative July 2021 Newsletter featuring access to the survey.

Survey: Protective practices in the child care sector during the COVID-19 pandemic

The University of Ottawa in collaboration with the Canadian Child Care Federation and the Canadian Partnership for Children's Health and the Environment are inviting all individuals who work in the child care sector to share their experiences from the COVID-19 pandemic. The questionnaire takes about 15 minutes to complete. At the end of the survey, you will be given the option to enter your email address in a draw to win one of five $50 VISA gift cards.

Click here for more information.