Four Papers on the Nursing Labour Market in Ontario

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A Thesis Submitted to the School of Graduate Studies
in Partial Fulfilment of the Requirements for
the Degree of Doctor of Philosophy

McMaster University DOCTOR OF PHILOSOPHY (2024) Hamilton, Ontario (Economics)

TITLE:	Four Papers on the Nurse Labour Market in Ontario
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NUMBER OF PAGES:	xxi, 270

Lay Abstract

This thesis examines health policy relevant issues in the Ontario nursing labour market. Reports of health human resource deficiencies, especially in the nursing profession and the long-term care home (LTCH) sector, increased throughout the COVID-19 pandemic. I perform empirical analysis to ratify such claims. First, I compare the rate of multiple jobholding, part-time and casual employment, and other individual and job-related characteristics among nurses employed in LTCHs compared to five other healthcare sectors. Next, I measure nursing job turnover in LTCHs compared to six other healthcare sectors. Third, I examine the count and share of nurses employed at private staffing agencies, and the rate at which nurses in traditional jobs transition to agency employment. Finally, in contrast to job turnover, which includes nurses who change jobs within the profession, I measure occupational turnover at the individual level where nurses leave the profession altogether. In most analyses, I compare pre-pandemic and pandemic (2020 and 2021 where possible) trends.

Abstract

This thesis examines issues pertaining to health human resources in the Ontario nursing profession, focusing on registered nurses (RNs) and registered practical nurses (RPNs). It consists of four chapters that explore the following nursing labour market trends: (1) multiple jobholding, part-time and casual employment, and other individual nurse and job-level characteristics (2) nursing job instability as measured by turnover and the number of years a job-worker (job-nurse) match exists, (3) nurse staffing agency employment, and (4) occupational attrition or turnover rates. The first two chapters compare nurses employed in the long-term care home (LTCH) sector, to the following healthcare sectors: hospitals, primary care, home care, supportive housing, public health (Chapter 2 only), and an aggregate "other" category. In Chapters 2 to 4, pre-COVID-19 trends are compared with the first, and where possible, the second year of the pandemic. All chapters in this thesis employ the Health Professions Database (HPDB), a dataset from the Ontario Ministry of Health, which derives from regulatory registration data.

Chapter 1 examines the prevalence of multiple jobholding, part-time and casual employment, employment status versus employment preference, and other individual nurse and job level characteristics (e.g., the location of first education, languages spoken in practice). The results indicate the likelihood of multiple jobholding does not significantly differ in the LTCH sector compared to other healthcare sectors, especially among RPNs. Moreover, there is no evidence of excessive part-time and casual employment in LTCHs compared to other sectors. However, LTCH RNs and RPNs are significantly more likely to prefer full-time employment, while being employed in part-time or casual positions, referred to as involuntary part-time or casual status. Nurses are heterogenous across sectors in their individual characteristics and

employment preferences. Notably, LTCH nurses are more likely to be internationally educated, and primary care nurses are more likely to prefer part-time employment.

Chapter 2 investigates nursing job instability across the healthcare sectors found in Chapter 1, with the addition of public health. Average annual turnover (2014-2019) was 25.7 percent among LTCH RNs and 22.9 percent among LTCH RPNs. These findings demonstrate RN job turnover rates in LTCHs do not substantially deviate from those observed in other sectors and fall in the middle of the distribution. RPN job turnover rates in LTCHs are the second lowest observed, where turnover rates are lower in the hospital sector. Across both nurse categories, hospital jobs are the most durable, where a job-nurse match lasts 0.6 to 0.8 years longer than the average RN LTCH job, and 0.1 to 0.2 years longer than the average RPN LTCH job (over a five-year period). Results from 2020 indicate turnover increased the most in the LTCH and supportive housing sectors (by a maximum of 7.5 percent among LTCH RPNs) – the only two sectors where a single site restriction was implemented in 2020, making it difficult to interpret the cause of these findings.

Chapter 3 documents the share of agency employed nurses, and the rate at which previously non-agency employed nurses obtain at least one agency position (the agency transition rate) over the 2011-2021 period. The results show that over the data period, the share of agency RNs was small (ranging from 2.4 to 3.4 percent), and slightly higher among RPNs (ranging from 6.1 to 7.1 percent). The agency transition rate is also low – ranging from 0.7 to 1.1 percent among RNs and 1.9 to 2.5 percent among RPNs from 2011-2021. The share of agency employment and the agency transition rate decreased during the first year of the pandemic (2020), and subsequently increased back to pre-pandemic levels in 2021. However, mean hours of work increased among agency (and non-agency) nurses, which may explain a small part of the

increase in public spending on agency fees.

Chapter 4 measures occupational turnover, where nurses leave the profession altogether, as opposed to job turnover (Chapter 2), which includes nurses who change jobs within the profession. Occupational turnover, or attrition rates, are lower compared to the job turnover rates found in Chapter 2. Annual attrition rates ranged from 6.1 to 7.2 percent among RNs and 6.6 to 7.5 percent among RPNs pre-pandemic (2014-2019). In the first two years of the pandemic, attrition rates increased modestly to 7.7 (2020) and 8.1 (2021) percent among RNs, and 8.0 (2020) and 8.6 percent (2021) among RPNs. Over the entire period of analysis, a larger share of attrition derives from nurses who register active, but are without Ontario nursing employment, compared to nurses who register inactive or do not register. Nurses who register active without Ontario nursing employment may be viewed as undertaking a more temporary exit, as such nurses are significantly more likely to return to the profession.

Acknowledgments

First and foremost, I would like to express my sincere gratitude to my co-supervisors, Professor Arthur Sweetman and Professor Mike Veall, for their continuous guidance and support throughout my PhD. I thank you both for your tireless dedication to your students. Professor Sweetman provided his time generously, from academic support to mentorship and career advice. In addition to academic supervision, Professor Mike Veall is my current supervisor in my role as the Research Coordinator for the Productivity Partnership, Social Science and Humanities Research Council Grant (SSHRC). I am indebted to him for this opportunity and for his patience as I navigated working while pursuing my PhD part-time.

I am also immensely grateful for my committee member, Professor Michel Grignon, whose invaluable advice, and feedback improved my research. Professor Grignon taught the first health economics course I took at McMaster, which lead to my interest in the field.

Many thanks the Economics Department staff and Faculty for providing their guidance, knowledge, and support to students.

I would like to thank my sister Lauren, my friends, and my pets, Murphy, Maggie, and Hershey, for their emotional support which made this challenging endeavour easier. To my future husband, Cory, whom I met during the first year of my PhD, thank you for always believing in me, and supporting me on this journey. Finally, to my parents, Lisa and Michael, I thank you for your unconditional love and support. I could not have done this without you, I dedicate this thesis to you.

Declaration of Academic Achievement

Chapter 1 is co-authored with Professor Arthur Sweetman, M Injamam Alam, Dr. Sheila Boamah, Dr. Boris Kralj, and Dr. Andrew Costa. Chapters 2 and 4 are co-authored with Professor Arthur Sweetman. Chapter 3 is co-authored with Professor Arthur Sweetman, and Dr. Houssem Eddine Ben-Ahmed. The material in this dissertation consists of my own research. I conducted all the empirical analysis and was responsible for writing the manuscripts throughout 2020 to 2023.

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Introduction

On March 11, 2020 the World Health Organization (WHO) declared the novel coronavirus disease 2019 (COVID-19) outbreak a global pandemic (WHO 2020). Across the globe, and especially in Canada, healthcare systems experienced challenges and increased health human resource deficiencies. Long-term care homes (LTCHs, also sometimes referred to as nursing homes) in particular have been heavily impacted by the pandemic, reporting higher COVID-19 mortality rates among residents compared to the general population. From February 2020 to mid-January 2021, Comas-Herrera et al. (2020) found 59 percent of Canadian COVID-19 related deaths occurred in LTCHs, amounting to 2.6 percent of the LTCH population. In addition to poor infection prevention and control, outdated infrastructure, and inadequate funding, the Ontario LTCH sector has faced reports of nursing staff instability. The LTCH sector has been described as exhibiting high turnover, excessive rates of multiple jobholding and part-time or casual employment, and difficulty recruiting and retaining nurses. However, nurses across all healthcare sectors experienced stress and burnout, and reports have warned of a major exodus from the profession altogether (Registered Nurses Association of Ontario 2021). In addition to nurses leaving the profession and changing jobs, the popular media has also reported nurses are leaving their traditional, public sector jobs to work at private nurse staffing agencies.

In this thesis, I examine health-policy relevant labour market trends in the Ontario nursing sector prior to, and during the COVID-19 pandemic, with a focus on registered nurses (RNs) and registered practical nurses (RPNs). First, I examine the prevalence of multiple jobholding, part-time and casual employment, and other individual nurse characteristics in LTCHs compared to the following sectors: hospitals, primary care, home care, supportive housing, and a category aggregating all remaining sectors, “other.” Second, I compare nursing

job instability, measured by job turnover rates (i.e., when nurses change jobs) and the number of years a job-worker match exists, in LTCHs and the aforementioned sectors. Next, I examine the annual share of agency-employed nurses, and the rate at which previously non-agency employed nurses transition to employment in at least one nurse agency job. Finally, in contrast to job turnover, I determine occupational turnover (i.e., when nurses exit the profession altogether), or attrition rates, in the nursing sector overall to establish if the pandemic may have led to abnormally low retention in the profession. My analyses were performed using the Health Professions Database (HPDB), an Ontario Ministry of Health dataset of regulated healthcare professionals in Ontario that is derived from regulatory College registration data (i.e., the College of Nurses of Ontario [CNO]).

More specifically, in Chapter 1, I investigate whether LTCH nurses differ from their counterparts across five other healthcare sectors in terms of multiple jobholding, part-time and casual employment, and individual characteristics such as location of first practice, and employment preference. Among other factors, multiple jobholding and excessive part-time and casual employment have been discussed as vectors for the rapid spread of COVID-19 within LTCHs. Several US and Canadian studies have documented the extent of multiple jobholding (e.g., Chen et al. 2020 and Jones et al. 2020) and part-time or casual employment in LTCHs (e.g., Austin et al. 2020). However, these studies do not include comparator sectors, and multiple jobholding and part-time/casual employment may be common in healthcare overall. The 2019 and 2020 HPDB were employed in this study, the most recent COVID-19 relevant data available at the time this chapter was written.

In 2019, among those whose first reported job was in a LTCH, approximately 19.0 percent of RNs and 21.0 percent of RPNs held multiple jobs. Among RPNs, this percentage was

identical to the provincial average, while for RNs this was 2.5 percentage points above the provincial average. Moreover, using logistic regression analysis to control for personal characteristics, I find the likelihood of multiple jobholding in LTCHs was fairly similar among RPNs, and only slightly higher among RNs compared to their counterparts in all sectors (except supportive housing). The proportion of part-time and casual employment in LTCHs was also only slightly above the provincial average for both sets of nurses. However, LTCH nurses, especially RNs, who were employed in part-time or casual jobs were more likely to prefer full-time employment. These nurses could be characterized as "involuntarily" part-time or casual.

In 2020, multiple jobholding decreased significantly among LTCH and supportive housing nurses after a pandemic single site restriction limited within-sector multiple jobholding in these two sectors. Still, this period of restriction aside, the evidence suggests that the LTCH sector labour market may not substantially differ from the norms of healthcare in terms of multiple jobholding, and part-time and casual employment.

Chapter 2 of my thesis studies whether the LTCH sector exhibits particularly low job stability among nurses, characterized by especially high turnover rates. Similar to the previous chapter, I compare LTCHs to the above-mentioned sectors, with the addition of public health. To my knowledge, there are no studies that measure or compare turnover rates by sector across all nursing jobs in any jurisdiction. I transform the 2014-2020 HPDB (individual-level data) to job-level data. To compare job instability across sectors, I measure turnover rates, and perform Poisson regression analysis on the number of years a job exists for each nurse. For a subsample of nurses, I also investigate sector switching and attachment. Finally, I compare workforce characteristics, sector and occupation (RN versus RPN) growth, and the share of new nurses (graduates plus migrants) entering each sector.

The 2014-2019 average year-over-year turnover rate in LTCHs was 25.7 percent for RNs, and 22.9 percent for RPNs. Among RNs, the turnover rate in LTCHs is higher than that in hospitals, public health and home care, but lower than that in primary care, supportive housing, and "other". For LTCH RPNs, the turnover rate is lower than that in all sectors except hospitals. Turnover increased the most in LTCHs and supportive housing in 2020, the only two sectors impacted by the single site restrictions, making it difficult to disentangle restriction effects from other factors. However, among new nurses, I find a modest decrease in the share of full-time equivalent LTCH RNs, despite a greater share of full-time employment in the sector, indicating the sector may have experienced minor recruitment issues. The Poisson regression analysis results also reveal LTCH RN jobs continue to be in the middle of the distribution in terms of job stability, while LTCH RPN jobs are the second most stable across sectors. Among both RNs and RPNs, hospital jobs are the most stable; during the five-year period the average hospital job lasted almost 10 and 3 months longer than the average LTCH RN and RPN job, respectively.

Chapter 3 investigates the count and share of agency-employed RNs and RPNs from 2011-2021. The popular media reported that during the pandemic, a significant share of nurses were leaving their traditional jobs to work at private nurse staffing agencies, which may offer higher hourly wages and greater flexibility. These reports were often anecdotal, though there was quantitative evidence from journalists (based on public sector financial records) that public spending on agency nurses increased significantly compared to pre-pandemic norms (e.g., Grant, 2023). I measure the count and share of agency-employed nurses (i.e., employed in at least one agency job) each year from 2011-2021. I also investigate annual agency employment transition rates, (i.e., the rate of previously non-agency employed nurses that transition to at least one

agency job the following year), and the compare hours of practice among agency versus non-agency nurses.

I find the count and share of agency nurses did not increase significantly during 2020 and 2021 compared to pre-pandemic trends (2011-2019). From 2011-2021, the annual share of agency employed nurses ranged from 2.4 to 3.4 percent (RNs), and 6.1 to 7.1 percent (RPNs) The share of agency-employed nurses decreased slightly from 2019-2020 (0.4 and 1.4 percentage points among RNs and RPNs), and subsequently increased from 2020-2021 (0.2 percentage points among both RNs and RPNs). Similarly, the agency employment transition rate decreased slightly from 2019-2020, and returned to pre-pandemic rates from 2020-2021. However, mean hours of practice increased for both agency and non-agency nurses in 2020 and 2021. Thus, this increase in hours of practice may explain a small part of the increased spending on agency nurses.

In my final Chapter, I investigate if occupation attrition rates (i.e., the rate of nurses that leave the profession) increased during the first two years of the pandemic (2020 and 2021) compared to historical pre-COVID trends (2014-2019). Across all years, occupation turnover is much lower than job turnover. During the 2013-2019 period, annual attrition rates ranged from 6.1 to 7.2 percent among RNs, and 6.6 to 7.5 percent among RPNs. Attrition rates increased slightly in both 2020 and 2021, by a respective 12.0 and 15.0 percent (or 0.8 and 1.1 percentage point) increase in the attrition rate from 2019. Though attrition increased slightly in 2021, the most recent year of data available, I do not find evidence of a major exodus from the RN or RPN professions. Moreover, attrition primarily derives from nurses who register active with the regulatory authority, but report no Ontario nursing employment (as opposed to nurses who do not register, or who register inactive). Such nurses are significantly more likely to return to the profession after an initial exit.

This thesis contributes to the existing literature in health human resources, and provides new evidence of the Ontario nursing labour market before, and during the first two years of the COVID-19 pandemic. At the beginning of the pandemic, the Ontario LTCH sector experienced reports of longstanding deficiencies including excessive multiple jobholding and part-time or casual employment, high turnover rates, and increased difficulty recruiting and retaining nurses. Reports of nurses leaving their jobs to work at private nurse staffing agencies, and leaving the profession altogether also increased during the pandemic. However, comparing these aspects across healthcare sectors in Chapter 1 and 2, I find no evidence that the LTCH sector labour market deviates in many respects from the norms in Ontario healthcare. However, a significantly higher proportion of LTCH nurses, especially RNs, are involuntary part-time or casual.

Reports of nurses leaving their jobs to work at private nurse staffing agencies, and leaving the profession altogether also increased during the pandemic. In Chapter 3, I do not find evidence of an increase in the share, or rate of nurses that transition to agency employment in 2020 and 2021. In fact, agency employment slightly decreased in 2020, and slightly increased in 2021, returning to approximate pre-pandemic norms. Moreover, in Chapter 4, I find the attrition rates during the first two years of the pandemic (2020 and 2021) increased only slightly among RNs and RPNs. While overall annual job turnover may be high, annual occupational turnover is lower. However, 2022 data were not available at the time of this thesis, and further research is required to understand any long-term effects the pandemic may have on nurse retention and the Ontario nursing labour market.

Throughout this thesis, I used the Health Professions Database (HPDB), with permission from the Ontario Ministry of Health (Hamilton Integrated Research Ethics Board project 10947).

The views expressed in this thesis are entirely my own and should not necessarily be taken to represent the views of the Government of Ontario, or the Ontario Ministry of Health.

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Chapter 1

Multiple Jobholding and Part-time Work Among Nurses in Long-term Care Homes Compared to Other Healthcare Sectors: Evidence from Ontario

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Abstract

About two-thirds of Canadian COVID-19 related deaths occurred in long-term care homes (LTCHs). Multiple jobholding and excessive part-time work among staff have been discussed as vectors of transmission. Using an administrative census of registered nurses (RNs) and registered practical nurses (RPNs) in the Canadian province of Ontario, this paper contrasts the prevalence of multiple jobholding, part-time or casual work, and other job and worker characteristics across health sectors in 2019 and 2020 to establish whether the LTCH sector deviates from the norms in Ontario healthcare. Prior to COVID-19, about 19.0 percent of RNs and 21.0 percent of RPNs in LTCHs held multiple jobs. For RPNs, this was almost identical to the RPN provincial average, while for RNs this was 2.5 percentage points above the RN provincial average. In 2020, multiple jobholding fell significantly in LTCHs after the province passed a single site order to reduce COVD-19 transmission. Although there are many similarities across sectors, nurses, especially RNs, in LTCHs differ on some dimensions. They are more likely to be internationally educated and, together with nurses in hospitals, those who work part- time/casual are more likely to prefer full-time hours (involuntary part-time or casual). Overall, while multiple jobholding and part-time work among nurses are problematic for infection prevention and control, these employment practices in LTCHs did not substantially deviate from the norms in the rest of healthcare in Ontario.

1.1 Introduction

Long-term care homes (LTCHs), also known as nursing homes, have been a key battleground in the fight against COVID-19 in Canada (e.g., Grant and Anderssen, 2020). As of August 23, 2021, about 6.0 percent of reported Canadian COVID-19 cases, and 57.0 percent of total deaths, had been linked to LTCHs (National Institute on Aging [NIA], 2021), while 3,793 COVID-19 deaths were reported among Ontario LTCH residents (Government of Ontario, 2021a). Demographic and epidemiologic factors partly explain the deaths in Canada's LTCHs, however attention has also focused on long-standing deficiencies in this sector as contributors to COVID-19's spread within homes (Faghanipour et al., 2020; Dosa et al., 2020; Gardner et al., 2020). For example, three and four person rooms and other design issues associated with older facilities are key drivers of cross-infection and rapid spread of infectious diseases (Applegate and Ouslander, 2020; Stall et al., 2020; Boscart et al., 2018; Keller et al., 2017).

International comparisons of Canada's LTCH sector's performance during COVID- 19 are ongoing, with preliminary results sometimes making non-standard comparisons due to data limitations. For example, a report by the Canadian Institute for Health Information (CIHI, 2020) showed that during the first wave of the pandemic (February 2020 to August 2020), Canada reported the highest proportion of all COVID-19 deaths in LTCHs among 16 other Organization for Economic Co-operation and Development (OECD) countries. However, the report did not consider, among other issues, the varying shares of individuals living in LTCHs across these nations. In more detailed work, Comas-Herrera et al. (2021) show that, as of late 2020, Canada's COVID-19 deaths per LTCH resident were roughly in line with those in other developed countries given the prevalence of COVID-19 in the non-LTCH population, and the share of the population living in LTCHs. These authors found that while in Canada 59.0 percent of COVID-

19 attributed deaths occurred in LTCHs, this represented 2.6 percent of the LTCH population, whereas in the United Kingdom these figures were 34.0 percent and 7.2 percent respectively.

Taking both the relative size of the LTCH population and community spread into account are key insights of Comas-Herrera et al. The importance of community spread is also observed in research comparing across regions (typically health regions) in Canada. Deaths per capita in LTCHs are highly correlated with (some would say driven by) the prevalence of COVID-19 in the surrounding community (e.g., Stall et al. 2020; Ontario Ministry of Health/Ministry of Long-term Care, 2021). Keeping COVID from entering a residence is crucial since the results of such a breach can be devastating given the frailty and proximity of residents. CIHI (2021) reports that for Ontario in wave 1, 26 homes, or 5.0 percent of the total, accounted for 54.0 percent of COVID-19 deaths. Ontario's Long-Term Care COVID-19 Commission discusses many relevant issues in depth (e.g., outdated infrastructure, pandemic unpreparedness, and staffing instability) (Marrocco, Coke, and Kitts, 2021).

Provincial governments have been urgently seeking to stop the introduction of the disease into LTCHs and its spread (Fox, 2020; Wyton, 2020). Lockdowns dramatically reducing the number of visitors were a key response. Other key factors discussed as vectors for the spread of COVID-19 are multiple jobholding (Jeffords, 2020), and excessive part-time work that increases the number of persons entering each home. Some provincial governments in Canada, including Ontario, introduced regulations to stop multiple jobholding in LTCHs (Wyton, 2020). Past studies have shown multiple jobholding and part-time work to be a common phenomenon in healthcare (Russo et al., 2018; Ferrinho et al., 2004; Daniels et al., 2012; Statistics Canada, 2019). Part-time and casual work may be more common in healthcare due to budget constraints and demands to provide around the clock care where service intensity has time-of-day peaks and

troughs (Wetzel, Soloshy and Gallagher, 1990; Jamieson et al., 2007; Baumann, Hunsberger and Crea-Arsenio, 2013). On the supply side, nurses have diverse preferences. Part-time or casual working arrangements are desirable for many (Jamieson et al., 2007), while at the same time involuntary part-time work is also common and monitored by the Ontario government.

Recent studies in the United States (U.S.) have looked at the extent of multiple jobholding in LTCHs. Van Houtven's (2020) study of 30 nursing homes in the northeastern U.S. find LTCH workers commonly hold second jobs, with one in six workers reporting a second job of 20 hours or more. Baughman et al. (2020) using the Current Population Survey in the U.S. find approximately 6.0 percent of licensed practical nurses and registered nurses hold second jobs. Furthermore, using device-level geolocation data in the U.S., Chen et al. (2020) show that 5.1 percent of individuals present in one nursing home travelled to at least one other nursing home shortly thereafter. The study suggests eliminating these linkages could reduce infections in nursing homes by up to 44.0 percent. A similar Ontario study show that human transitions between LTCHs, approximated by cell phone location data, fell sharply – from 42.7 percent to 12.7 percent – after a provincial emergency order restricting multiple jobholding in LTCHs (Jones et al., 2020).

Apart from COVID-19 related issues, this paper presents a useful description of multiple jobholding, and part-time work among nurses across healthcare sectors. This is relevant both to COVID-19 and infection transmission in general. Studying these issues contributes to a long-standing literature in nursing human resources (review articles include: Kiwanuka et al., 2011; Russo et al., 2018; Blythe et al., 2005; Creegan, Duffield, and Forrester, 2003; Registered Nurses Association of Ontario, 2003).

We use an administrative census of registered nurses (RNs) and registered practical

nurses (RPNs) in Ontario (called licensed practical nurses or LPNs in the rest of Canada) to ascertain the prevalence of multiple jobholding and part-time or casual work in LTCHs relative to other healthcare sectors. In addition, we examine demographic and work characteristics.

1.2 Data and Methods

Administrative data used with provincial permission (Hamilton Integrated Research Ethics Board project 10947) from Ontario's Health Professions Database (HPDB) are employed in the study. This database derives from regulatory college registration records (which nurses are obligated to provide under the Regulated Health Professions Act, 1991) collected at the end of each calendar year, and provides information on employment, education, and demographic characteristics of regulated healthcare professionals in Ontario (Ontario Ministry of Health/ Ministry of Long-term Care, 2018). We focus on RNs and RPNs in 2019 and 2020, the most recent years for which data are available. Variables in the study include characteristics of each job (the healthcare sector, full-time/part-time or casual status, and geographic location); this information is collected for up to three jobs per nurse, and individual-level variables (agency employment, age, sex, year of first registration in Ontario, preference for full-time/part- time/casual work, education level, year and location of first practice, location of first education in the profession, and languages spoken). Full-time is defined within the HPDB as working 30 or more hours per week, part-time as working less than 30 hours per week, and casual implies working on an as-needed basis.

We compare across healthcare sectors: LTCHs, hospitals, primary care, home care, supportive housing/retirement homes and "other", where the last aggregates all other practice settings (e.g., rehabilitation facilities). Nurses are assigned to the sector of their first reported job. We provide the distribution of multiple jobholders in each healthcare sector. Next, we compare nurses' actual employment status and their preferred employment status. Further, for multiple

jobholders, we provide a cross- tabulation of the sectors of their first and second job to determine the degree to which multiple jobholders work in a single sector, and whether there are employment-linkages between sectors. Lastly, we employ logistic regression analyses to identify individual characteristics of nurses that may be associated with multiple jobholding, part-time/casual employment, and involuntary part-time or casual employment.

We only include nurses actively working at least one job in Ontario and remove all jobs located outside the province. The data were self-reported, thus, imputations are made for a small number of respondents with incomplete responses to relevant questions. For example, among those who answered "none of the above" for their education level, we take their education as equivalent to a diploma. Furthermore, for those answering "unknown" for their country of first practice, we assume this was the same as the location of their earliest professional education. For those with a missing year of first practice in the profession, we impute this to equal the year of first practice in Ontario if their first place of professional practice was Ontario. Lastly, we assume the healthcare sector is "other" for those that answered "unknown" for their practice setting. For any other relevant questions where the respondent did not provide an answer, we remove the observation; this amounts to the removal of fewer than 20 each of RNs and RPNs (across both years) leaving a dataset for analysis of approximately 98,350 RNs and 49,110 RPNs in 2019, and 99,250 RNs and 49,820 RPNs in 2020.

1.3 Results

1.3.1 Multiple jobholding

The upper panel of Table 1 displays the distribution of multiple jobholding in 2019 by sector. Approximately 19.0 percent of RNs and 21.0 percent of RPNs reporting a first job in LTCHs are multiple jobholders. Among LTCH RNs multiple jobholding is statistically significantly lower in

all sectors with the exception of supportive housing where it is almost identical. However, the gaps across sectors, except for home care, are modest and not obviously significant in terms of policy. Tests of statistical significance are provided in Table 5. In contrast, for RPNs who list LTCHs as their first place of practice, multiple jobholding is essentially identical to that in hospitals, primary care, and "other".

The 2020 data were collected in late December 2020, after a single site order was passed by the province in April 2020 restricting LTCH and retirement home staff from working at multiple homes (Government of Ontario 2020a,2020b). Results for 2020 appear in Appendix 1. Compared to 2019, in 2020 (Appendix 1, Table 1), multiple jobholding among RNs and RPNs remained similar in all sectors except LTCHs and supportive housing, the only two sectors affected by the restriction. Multiple jobholding decreased significantly in these sectors for both sets of nurses. Multiple jobholding also fell among home care RPNs.

1.3.2 Agency Nurses

The second panel of Table 1 displays the percentage of nurses employed in at least one agency job across sectors in 2019. In the HPDB, information on agency employment is not collected for each job, thus among multiple jobholders it is not possible to determine how many and which job(s) are with an agency. For multiple jobholders that identify as agency nurses, we assume agency employment is in the sector of the first reported job. Due to this data limitation, we cannot compare each sector's reliance on agency nurses. Overall, a small percentage of RNs, 2.8 percent, and a slightly larger share of RPNs, 7.1 percent, report working for an agency in 2019.

Across most sectors, the majority of agency nurses are multiple jobholders, except in home care and "other" for both RNs and RPNs. In 2020 (Appendix 1, Table 1), the percentage of agency nurses decreased modestly across most sectors.

1.3.3 Employment Status by Sector

Following the section on agency nurses, Table 1 displays the employment status of single jobholders, and the first and second jobs of multiple jobholders (excluding agency nurses) in 2019. About 69.0 percent of RNs in LTCHs with one job are full-time, compared to 58.0 percent of RPNs. The percentage of full-time employment among LTCH RNs is identical to hospitals, higher than in primary care and supportive housing, but lower than in home care and "other." The percentage of full-time work among LTCH RPNs is similar to most sectors with the exception of primary care. For multiple jobholders, the probability of a full-time first job is lower in LTCHs than most sectors: approximately 51.0 percent for RNs, and about 40 percent for RPNs compared to 57.0 percent and 44.0 percent overall. For both RNs and RPNs, home care is most likely to have a full-time first job, while primary care (LTCHs) is least likely to have a full-time first job for RNs (RPNs). A much smaller share of second jobs is full-time. Some workers' second job is full-time because their first job is (unusually) part time. Among multiple jobholders, approximately 3.0 percent of LTCH RNs and 4.0 percent of LTCH RPNs have two full-time jobs.

The Ontario Long-term Care Commission noted some homes provided more full- time hours to adjust for reduced staffing from the single site order (Marrocco, Coke, and Kitts, 2021). In 2020, Appendix 1, Table 1, shows the percentage of full-time jobs among single jobholders remained fairly similar in LTCHs and most sectors, except in supportive housing, where full-time employment increased for both RNs and RPNs. However, among multiple jobholders in LTCHs and supportive housing, full-time employment in the first job increased for both sets of nurses. Our findings suggest the single site order reduced multiple jobholding, and there is some evidence of an associated increase in full-time hours (especially among multiple jobholders), in

both LTCHs and supportive housing.

In the next three panels of Table 1, we report the employment status for nurses with at least one agency job. For single jobholders, LTCH RNs and RPNs are least likely to have full-time employment. For RNs with multiple jobs, the differences in full- time employment in the first job are modest across sectors, while for RPNs there are greater sectoral differences. Refer to Appendix 1, Table 1 for the 2020 results.

1.3.4 Involuntary Part-time or Casual Employment

The last panel of Table 1 displays the percentage of RNs and RPNs who, preferring full-time, are involuntary part-time or casual in 2019. We interpret this mismatch as a measure of dissatisfaction. The first row of the panel contains the results of involuntary part-time or casual employment among all nurses within each sector, while the second row is restricted to part-time or casual nurses in their first job. These results are striking; 39.0 percent of part-time or casual RNs, and 55.0 percent of RPNs, in LTCHs are dissatisfied with part-time or casual work. This is much higher than in other sectors with the cross-sector differences being more pronounced for RNs. However, among RPNs, the prevalence of involuntary part-time or casual work is quite similar in LTCHs and supportive housing. We additionally subdivide those in part-time or casual positions into single and multiple jobholders. Multiple jobholding part-time or casual nurses are significantly less satisfied with their employment status across all sectors than single jobholders, with those in LTCHs continuing to be the least satisfied especially among RNs.

The 2020 results appear in Appendix 1, Table 1. Despite an increase in full-time employment among multiple jobholders in LTCHs, the large sectoral gaps persist in 2020, with LTCH nurses being least satisfied with their employment status.

1.3.5 RN and RPN Characteristics

Table 2 provides descriptive statistics for RNs and RPNs by sector in 2019. While a sizeable minority of nurses want part-time employment, approximately 72.0-79.0 percent of RNs and RPNs prefer full-time work, which, as seen in Table 1, is appreciably lower than the share working full time. This important mismatch is explored in Table 3.

Some notable differences exist across sectors and occupations. RNs in LTCHs are much more likely to have been educated and first practiced outside of Canada and the U.S. This pattern is not as obvious for RPNs, although RPNs in LTCHs are slightly above the provincial averages for these characteristics. Similar patterns can be observed in language(s) of practice, with RNs in LTCHs being more likely to speak English and another language other than French. RNs in LTCHs are about three years older than the profession average though their years of practice are more similar; this pattern is similar, though not as pronounced, for RPNs. On average, nurses in LTCHs have spent more years out of nursing than those in other sectors as might be expected given the interruption associated with the migration implicit in the aforementioned place of first nursing education/practice.

Finally, like their peers in primary care, nurses in LTCHs are much more likely to practice in a rural area than the profession average. RNs in LTCHs are also more likely to have a diploma. For the same set of statistics in 2020, refer to Appendix 1, Table 2.

1.3.6 Actual Versus Preferred Employment Status

Table 3 presents a cross-tabulation of RNs' and RPNs' actual employment status (in the first job for multiple jobholders) versus their preferred employment status. About 41.0 percent of RNs, and 57.0 percent of RPNs, who work part-time in LTCHs prefer to work full-time. This reflects a higher rate of mismatch than any other sector, except supportive housing RPNs. The pattern

across sectors is similar, though not as large, for casual workers. If we take this mismatch as a proxy of job dissatisfaction, we conclude that the LTCH sector workforce, alongside supportive housing RPNs are the most dissatisfied. For the profession as a whole, while a subset of the workforce prefers part-time, a large share, 32.0 percent and 51.0 percent of RNs and RPNs, are involuntary part-time. The cross-tabulation for 2020 can be found in Appendix 1, Table 3.

1.3.7 Multiple Jobholders Across Sectors

In Table 4 we provide a cross-tabulation of the healthcare sector in which nurses work for their first and second jobs in 2019. Around 61.0 percent of RNs who work in LTCHs in their first job also work in LTCHs in their second job. This is the highest level of sector congruence. For example, in the hospital sector, the degree of congruence is 46.0 percent. A similar pattern of results is observed for RPNs.

The 2020 results in Appendix 1, Table 4 show a reduction in multiple jobholding in LTCHs and supportive housing. However, despite the single site order restricting within- sector multi-jobholding, some nurses were employed in two LTCHs or two supportive housing jobs. The single site restriction did not affect agency nurses, and never completely prohibited working in two LTCHs where the benefit outweighed the risk.

1.3.8 Determinants of Multiple Jobholding, Part-time or Casual Employment, and Involuntary Part-time or Casual Employment

1.3.8.1 Likelihood of Multiple Jobholding

Table 5 displays logistic regression results for multiple jobholding, a binary dependent variable equal to one if the individual has two or more jobs, and zero otherwise. For each regression, we display odds ratios and average marginal effects (i.e., the average change in the dependent variable – the probability that respondents hold multiple jobs – given a one-unit change in the

independent variable). Odds ratios are more common in the literature, but we provide both since quantifying the magnitude of any change in probabilities is useful to our policy question.

Without controlling for covariates, the results in columns 1–4 show RNs whose first practice location is in LTCHs are slightly more likely to be multiple jobholders compared to other sectors, except supportive housing. However, the statistical significance is partly attributable to the large number of observations rather than there being a large difference across sectors. The marginal effects indicate that while multiple jobholding in LTCHs does differ from that in the majority of sectors, the differences are not large in magnitude. Even more similarity is observed for RPNs in columns 3 and 4; there are no highly statistically significant differences across sectors.

In columns 5–8 of Table 5, we control for individual characteristics. In the controlled analyses, we exclude variables representing languages spoken and location of the earliest professional education since they are highly collinear with place of first practice, and similarly years of practice and age since they are highly collinear with years of practice in Ontario (Wooldridge, 2013); but, see Appendix 2, Table 1 (2019) and Table 2 (2020) for results with all these regressors. Furthermore, we include a squared term on years of practice variables, despite both coefficients being statistically insignificant and equal to one, meaning there is no evidence of diminishing returns to years of experience in and outside of Ontario. We do so for consistency with our regression analysis for part-time or casual employment, and involuntary part-time or casual employment (Tables 6 to 11), where these coefficients are statistically significant and slightly greater than one, and since there is little harm in including them. However, regression models that do not include these terms are in Appendix 2, Table 3 (2019) and Table 4 (2020).

The controls affect the sectoral gaps in multiple jobholding, but the changes are modest.

For example, one of the larger changes follows from primary care RNs, without controls, being 2.1 percentage points less likely to hold multiple jobs; introducing controls "explains" that gap effectively reducing it to zero. With controls, none of the sectoral coefficients are large in magnitude/statistically significant for RPNs.

As seen in Table 5, most control variables' coefficients are statistically insignificant and/or small in magnitude, although there are some exceptions. RNs who began practicing outside of Canada/the U.S. are 4.4 percentage points more likely to be multiple jobholders compared to those who began practicing in Ontario.

Appendix 1, Table 5 displays the logistic regression results for multiple jobholding in 2020. LTCH and supportive housing RNs and RPNs are now less likely to be multiple jobholders compared to most sectors, with larger sectoral gaps compared to 2019. For the 2020 regressions, regressions with additional variables, and regressions with linear specifications, refer to Appendix 1, Table 5, and Appendix 2, Tables 2 and 4.

1.3.8.2 Likelihood of Having Part-time or Casual Employment Only

Table 6 (single jobholders) and Table 7 (multiple jobholders) are similar to Table 5, but the dependent binary variable is equal to one if an individual is only employed in part-time or casual positions (i.e., no full-time employment). In Table 8 (single jobholders) and Table 9 (multiple jobholders) the dependent variable is equal to one if the nurse is involuntary part-time or casual; it thus considers employment preferences. We perform separate analyses on single jobholders (Table 6 and Table 8) and multiple jobholders (Table 7 and Table 9), as there may be inherent differences between these groups. For example, single jobholders may prefer part-time or casual work and self-select into these positions, while multiple jobholders may prefer full-time employment but work multiple part-time or casual jobs in the absence of full-time work.

LTCH RNs that have one job (Table 6) are similarly likely as the hospital sector, but about 11.0 percentage points less (more) likely than primary care (home care) RNs to be part-time or casual. RPNs have a broadly similar pattern, except in primary care and supportive housing where the opposite results are found. Compared to the uncontrolled results, when covariates are added (columns 5-8), the sectoral coefficients decrease slightly in magnitude for RNs. However, among RPNs, the sectoral gaps are now larger in primary care, home care, and supportive housing. Lastly, RNs with a university degree, male RNs/RPNs, and RNs/RPNs that began their first practice outside of Canada/the U.S. are less likely to be part-time or casual.

The results for multiple jobholders, Table 7, are fairly similar to those for single jobholders. However, what changes there are may suggest heterogeneity in part- time/casual status among single and multiple jobholders. For example, among RNs, the likelihood of part-time or casual work is lower for hospital multiple jobholders compared to those in LTCHs, which is not the case for single jobholders. For results in 2020 refer to Appendix 1, Table 6, and Table 7.

1.3.8.3 Likelihood of Involuntary Part-time or Casual Employment

Tables 8 (single jobholders) and 9 (multiple jobholders) display the logistic regression results for nurses with involuntary part-time or casual employment as the dependent variable. Involuntary part-time or casual employment is a binary variable equal to one if an individual prefers full-time work but is employed part-time or casually, and zero otherwise. We also perform the same analyses for nurses overall, and part-time and casual nurses only in Table 10 (part-time and casual nurses only) and Table 11 (part-time and casual nurses only).

For both single and multiple jobholders, RNs and RPNs working in LTCHs are more likely to be involuntary part-time or casual compared to all sectors. The coefficients on all

sectors are statistically significant, and significant in magnitude. However, as with the results for part-time or casual employment, hospital RNs and RPNs with one job are more similar to their counterparts in LTCHs than are those in other sectors. For example, hospital RNs with more than one job are 9.9 percentage points less likely than LTCH RNs to be involuntary part-time or casual. The corresponding figure for single jobholders is only 1.7 percentage points. As with our results for multiple jobholding, few control variables are statistically significant, or significant in size. The results for 2020 are found in Appendix 1, Tables 8 to 11.

1.4 Discussion

The COVID-19 pandemic brought attention to multiple jobholding and part-time employment in healthcare, especially LTCHs, as an important element of infection prevention and control as well as influencing other aspects of quality of care. This paper documents employment status and other worker and job characteristics among RNs and RPNs by sector, and compares LTCHs to the rest of healthcare in Ontario.

Overall, while there are some statistically significant differences across sectors, we do not find that LTCHs differed substantially from the rest of healthcare in terms of the prevalence of multiple jobholding and part-time work in 2019. LTCHs most resemble hospitals in these aspects of their human resource practice, and supportive housing has a similar share of multiple jobholders. However, 2020 shows a significant decrease in multiple jobholding in LTCHs and supportive housing, likely a result of the provincial single site restriction (not prohibition) passed in April 2020 to reduce the spread of COVID-19 within homes. Despite this decline in multiple jobholding, a number of nurses continued to work in two LTCHs or two supportive housing homes.

We find that certain characteristics are unique to the LTCH workforce compared to other

sectors. Both RNs and RPNs in LTCHs are more likely to be able to practice in more than one language, and to have received their first level of professional education outside of Canada/the U.S. We also find that beginning one's practice in a country outside of Canada/the U.S. is associated with a modestly higher likelihood of multiple jobholding among RNs. Covell et al. (2017) found that Internationally Educated Nurses (IENs) experience difficulty securing their first Canadian nursing job, leading to a higher likelihood of multiple jobholding. An Australian study by Chu et al. (2018) reported IENs may face covert and overt prejudices during the hiring process for full-time employment. However, our results for part-time or casual employment only (Table 6 and Table 7) indicate RNs who began their practice outside of Canada/the U.S. are, perhaps surprisingly, less likely to be employed in part-time or casual positions only. Furthermore, we do not find a strong association between the location of first practice and involuntary part-time or casual employment, which is higher among LTCH RNs and RPNs.

Due to data limitations, our study focuses on RNs and RPNs, and does not capture the prevalence of multiple jobholding among the entire LTCH workforce. Personal support workers (PSWs) also play a critical role in the care of LTCH residents and accounted for 59.0 percent of the average proportion of staff employed in LTCHs in 2018, while RNs and RPNs accounted for 8.0 percent and 17.0 percent respectively (Government of Ontario, 2021b). Another 2015 study, using a sample of eleven for-profit LTCHs in Ontario, found nursing assistants provided the majority of care (76.5 percent) (Boscart et al., 2018).

Although we classify the first job listed as an individuals' primary job, this may not be the case. Among multiple jobholders, 5.1 percent list a second job that is full-time, however the percentage of multiple jobholders with two full-time jobs is slightly lower at 3.1 percent. Thus, it is reasonable to assume most RNs and RPNs list their primary job first, and our results would not

significantly change. We also remove jobs outside of Ontario; thus, it is possible a small percentage of single jobholders are multiple jobholders with employment outside Ontario.

Our findings have implications for health systems, specifically for the delivery of quality and safe patient care, and nurses/providers' welfare. Though we find multiple jobholding in LTCHs does not significantly differ from the norms in healthcare, the rate of multiple jobholding in healthcare overall may be high. Research on the role multiple jobholding has on patient care is limited. However, multiple jobholding may be associated with other factors that contribute to quality of patient care. For example, Lombardi et al. (2010) found multiple jobholding increases LTCH workers' risk of work and non-work injury, sick leave, absenteeism, burnout, and physical and mental stress. Turnover, closely related to absenteeism and burnout, has been shown to reduce quality of patient care (Antwi and Bowblis, 2018; Castle and Anderson, 2011). Policies aimed at reducing multiple jobholding and part-time work in LTCHs may be useful given that LTCH nurses were more likely to be dissatisfied with part-time work.

1.5 Conclusion

Overall, our study of Ontario RNs and RPNs in 2019 and 2020, finds that in 2019 18.8 percent of RNs, and 20.8 percent of RPNs, in LTCHs held multiple jobs (two or more jobs).

While this number may seem high, the rates for all of healthcare in Ontario are 16.3 percent and 20.5 percent for RNs and RPNs respectively; LTCHs are not much different. Furthermore, the prevalence of part-time and casual work is similar between the hospital and LTCH sectors. However, we observe that RNs and RPNs in LTCHs are more likely to be dissatisfied with part-time or casual employment than nurses in other sectors.

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Table 1.1: Multiple Jobholding and Employment Status by Healthcare Sector of First Job 2019

	RNs							RPNs						
	Long-term Care	**Hospitals**	**Primary Care**	**Home Care**	**Supp. Housing**	**Other**	**Total**	**Long-term Care**	**Hospitals**	**Primary Care**	**Home Care**	**Supp. Housing**	**Other**	**Total**
% of Workforce	7.3	61.3	4.0	4.5	0.8	22.1	100.0	26.7	32.3	6.3	2.6	8.1	23.9	100.0
	Number of Jobs Held													
1 Job	81.2	84.0	83.3	87.1	80.9	83.3	83.7	79.2	79.7	80.1	76.4	77.6	80.4	79.5
2 Jobs	15.9	14.0	14.5	11.6	16.2	14.1	14.1	18.0	17.7	17.0	20.7	19.2	17.1	17.8
3 Jobs	2.5	1.7	1.7	1.2	2.8	2.2	1.8	2.5	2.3	2.7	2.6	2.6	2.3	2.4
4+ jobs	0.4	0.3	0.5	0.2	0.0	0.5	0.3	0.3	0.3	0.2	0.0	0.5	0.3	0.3
N (All jobs)	7190	60320	3890	4380	790	21770	98350	13110	15890	3080	1290	3980	11750	49110
Agency Nurses	1.5	0.7	1.3	5.3	2.7	8.5	2.8	2.5	1.3	2.5	26.9	3.5	20.1	7.1
Single Jobholders	25.0	15.7	46.0	72.3	33.3	79.7	65.3	25.2	8.1	34.6	73.5	25.4	74.3	62.7
Multiple Jobholders	75.0	84.3	54.0	27.7	66.7	20.3	34.7	74.8	91.9	65.4	26.5	74.6	25.7	37.3
	Employment Status: Single Jobholders													
FT	68.5	68.5	56.7	81.4	60.0	71.7	69.2	57.6	54.4	70.1	64.0	59.4	61.9	58.5
PT	23.6	25.8	32.7	12.0	23.6	18.8	23.9	32.0	39.0	24.2	25.7	28.8	28.2	32.7
Casual	7.9	5.7	10.6	6.6	16.4	9.4	6.9	10.4	6.6	5.7	10.3	11.8	10.0	8.8
N (Single Jobholders)	5810	50600	3220	3650	630	16660	80570	10300	12650	2440	730	3060	7690	36870
	Employment Status: First job for those with 2 or more jobs													
FT	50.7	57.5	44.1	78.9	47.8	58.8	57.3	39.6	41.7	49.6	55.9	43.2	48.9	43.5
PT	38.9	35.9	43.7	15.3	34.6	31.4	34.8	47.0	50.6	42.6	33.3	43.6	38.9	45.7
Casual	10.4	6.6	12.2	5.8	17.6	9.8	7.9	13.4	7.7	7.8	10.8	13.2	12.2	10.7
	Employment Status: Second job for those with 2 or more jobs													
FT	5.4	3.6	4.3	4.4	4.0	4.1	3.9	6.0	3.6	5.7	7.5	6.2	6.6	5.3
PT	31.3	27.6	30.7	21.7	35.0	29.4	28.3	37.9	36.2	35.3	35.7	33.7	34.0	36.0
Casual	63.3	68.8	65.0	74.0	61.0	66.5	67.8	56.1	60.2	59.0	56.8	60.1	59.3	58.7
Two FT Jobs	3.1	2.7	3.2	4.0	N/A	3.2	2.9	4.0	2.5	5.3	7.0	3.7	4.9	3.8
N (Multiple Jobholders)	1270	9280	620	500	140	3260	15070	2490	3020	560	210	790	1700	8770
	Employment Status: Agency Nurses with 1 job													
FT	22.2	28.6	47.8	52.7	71.4	66.0	62.4	18.1	N/A	55.6	49.0	37.1	61.3	57.5
PT	22.2	27.1	26.1	26.9	N/A	19.4	20.6	28.9	47.1	N/A	31.4	20.0	23.7	25.0
Casual	55.6	44.3	26.1	20.4	N/A	14.6	17.0	53.0	N/A	N/A	19.6	42.9	14.9	17.4

Table 1.1 Continued: Multiple Jobholding and Employment Status by Healthcare Sector of First Job 2019

	RNs							RPNs						
	Long-term Care	**Hospitals**	**Primary Care**	**Home Care**	**Supp. Housing**	**Other**	**Total**	**Long-term Care**	**Hospitals**	**Primary Care**	**Home Care**	**Supp. Housing**	**Other**	**Total**
	Employment Status: First job for Agency Nurses with 2 or more jobs													
FT	61.7	61.3	59.3	60.9	N/A	59.3	60.0	41.3	42.8	60.8	51.1	35.9	47.0	45.2
PT	22.2	30.0	N/A	21.9	N/A	27.4	27.3	40.1	50.5	N/A	33.7	47.6	34.3	38.9
Casual	16.0	8.8	N/A	17.2	35.7	13.3	12.8	18.6	6.7	N/A	15.2	16.5	18.8	15.9
	Employment Status: Second job for Agency Nurses with 2 or more jobs													
FT	N/A	3.2	N/A	N/A	N/A	7.2	4.9	5.7	N/A	N/A	8.7	N/A	6.3	5.3
PT	N/A	19.1	N/A	N/A	N/A	27.4	22.8	30.0	N/A	N/A	34.8	N/A	34.8	31.6
Casual	71.6	77.7	88.9	71.9	85.7	65.4	72.3	64.4	74.2	74.5	56.5	64.1	59.0	63.1
Two FT Jobs	N/A	1.6	0.0	N/A	0.0	6.4	3.7	3.2	N/A	N/A	6.5	0.0	4.0	3.4
	Involuntary PT/Casual													
All RNs/RPNs	13.7	10.2	7.1	3.0	9.8	7.2	9.4	25.5	21.6	15.3	19.8	24.4	18.8	21.7
PT/Casual Nurses	39.1	30.7	15.6	14.9	23.1	23.5	28.5	54.9	44.8	45.1	48.1	54.7	45.9	48.8
Single Jobholders	33.7	28.6	12.7	12.1	20.2	20.7	25.9	51.8	41.1	40.0	42.5	51.4	43.4	45.3
Multiple Jobholders	54.4	39.1	27.0	31.3	32.1	33.3	38.5	63.5	55.9	57.6	64.0	63.0	53.6	58.5
N (PT/Casual)	2510	20080	1760	890	330	6700	32280	6080	7650	1050	530	1780	4800	21890
N (Single jobholders)	1850	15990	1410	760	250	5210	25470	4440	5780	740	390	1260	3610	16220
N (Multiple jobholders)	660	4090	360	130	80	1490	6810	1650	1870	300	140	510	1190	5670

Notes: N/A = supressed for confidentiality. Observations have been rounded to the nearest ten for confidentiality and the totals may therefore be affected by rounding. Agency employment is captured on an individual basis, and not on a per-job basis. The first three panels on employment status exclude agency nurses. N(RNs) = 98,350. N(RPNs) = 49,110.

Table 1.2: Means of Selected Variables by Healthcare Sector of First Job 2019

	RNs							RPNs						
Variables	**Long-term Care**	**Hospitals**	**Primary Care**	**Home Care**	**Supp. Housing**	**Other**	**Total**	**Long-term Care**	**Hospitals**	**Primary Care**	**Home Care**	**Supp. Housing**	**Other**	**Total**
Age (years)	46.7	41.6	47.6	46.2	48.2	46.8	43.6	41.2	38.2	39.3	40.1	39.8	41.3	40.0
Yrs Practice-Ontario	16.3	14.9	20.6	19.4	20.4	19.5	16.5	9.9	9.8	11.5	8.5	9.1	11.2	10.2
Yrs Practice-Outside Ontario	3.2	1.4	1.5	1.1	2.0	1.5	1.5	0.7	0.4	0.5	0.7	0.7	0.6	0.6
Yrs Practice	19.5	16.3	22.1	20.5	22.4	21.0	18.1	10.8	10.3	12.1	9.5	10.1	12.0	10.9
Yrs Practice Missing (%)	0.5	0.2	0.2	0.2	N/A	0.2	0.2	2.6	2.0	1.9	5.7	4.7	2.5	2.6
Female (%)	92.4	91.6	95.6	94.9	95.9	90.9	91.8	90.7	90.2	96.6	89.4	92.0	88.2	90.4
Rural (%)	15.3	2.2	13.4	2.5	6.2	3.4	3.9	11.1	4.4	13.6	3.9	6.4	3.7	6.8
	Location of First Practice (%)													
Ontario	70.8	83.8	81.7	86.8	79.0	83.1	82.7	91.9	94.7	93.8	88.6	88.5	92.7	92.8
Other Province	4.0	4.2	8.2	4.8	5.2	6.4	4.9	1.6	1.2	1.8	N/A	1.9	1.8	1.6
U.S.	2.1	2.3	3.2	2.4	3.4	2.9	2.5	0.2	0.1	0.2	N/A	0.3	0.3	0.2
Other Country	23.1	9.6	7.0	5.9	12.4	7.6	9.9	6.3	4.0	4.2	9.8	9.2	5.2	5.5
	Employment Preference (%)													
Full-time	76.1	74.3	57.3	78.9	63.6	71.9	73.4	77.7	71.5	78.4	77.3	78.5	75.4	75.3
Part-time	18.8	20.5	33.7	15.1	23.8	19.8	20.5	18.3	24.8	18.5	18.0	17.1	18.8	20.4
Casual	5.1	5.2	9.0	5.9	12.6	8.3	6.1	3.9	3.7	3.1	4.7	4.4	5.8	4.3
	Highest Education (%)													
Diploma	45.3	32.5	44.1	34.4	46.2	31.5	33.9	90.7	93.0	93.2	85.0	86.3	91.5	91.3
Bachelors	51.3	62.9	52.0	61.7	49.7	57.6	60.3	8.7	6.6	6.3	13.9	13.0	8.0	8.2
Graduate	3.5	4.5	3.9	4.0	4.1	10.9	5.8	0.6	0.4	0.5	1.1	0.7	0.5	0.5
	First Nursing Education (%)													
Ontario	69.0	84.0	82.1	87.2	79.0	83.7	82.9	84.3	90.5	89.4	80.8	78.0	87.4	86.8
Other Province	3.9	4.5	8.9	4.8	6.4	6.7	5.2	1.8	1.3	2.0	N/A	2.2	1.8	1.7
U.S.	0.9	0.6	1.4	1.2	1.1	1.1	0.8	0.3	0.1	0.3	N/A	0.2	0.4	0.2
Other Country	26.2	10.8	7.6	6.8	13.5	8.6	11.1	13.6	8.1	8.2	17.7	19.5	10.4	11.3

Table 1.2 Continued: Means of Selected Variables by Healthcare Sector of First Job 2019

Variables	RNs							RPNs						
	Long-term Care	Hospitals	Primary Care	Home Care	Supp. Housing	Other	Total	Long-term Care	Hospitals	Primary Care	Home Care	Supp. Housing	Other	Total
	Language(s) of Practice (%)													
English only	62.8	75.1	77.0	78.8	78.3	77.1	74.9	61.3	73.5	74.5	61.1	62.0	68.6	67.9
English and French only	4.9	6.3	8.4	7.3	5.2	7.1	6.5	4.1	5.4	6.5	4.0	3.8	4.7	4.8
English and Other	30.7	17.8	13.3	13.5	15.0	14.8	17.7	33.1	20.2	18.4	33.6	32.4	25.7	26.2
Other	1.6	0.8	1.3	0.4	1.4	1.0	0.9	1.5	0.9	0.6	1.2	1.9	1.0	1.1
N	7190	60320	3890	4380	790	21770	98350	13110	15890	3080	1290	3980	11750	49110

Notes: Nurses are assigned to the sector of their first reported job. N/A = suppressed for confidentiality. Observations have been rounded to the nearest ten for confidentiality and the totals may therefore be affected by rounding. Rural only includes the first job an RN/RPN works in 2019.

Table 1.3: Actual Employment Status vs. Preferred Employment Status for Registered Nurses (RNs) and Registered Practical Nurses (RPNs) by Healthcare Sector of First Job 2019 (%)

	RNs				RPNs			
	Preferences				Preferences			
Actual Work Status of First Job	Full-time	Part-time	Casual	N	Full-time	Part-time	Casual	N
	Long-term Care							
Full-time	96.0	3.3	0.7	4680	97.5	2.1	0.4	7030
Part-time	41.1	57.6	1.4	1890	57.4	41.8	0.8	4590
Casual	33.1	17.6	49.4	620	47.5	22.8	29.8	1490
	Hospitals							
Full-time	96.1	3.3	0.6	40240	96.4	3.0	0.5	8230
Part-time	34.4	64.0	1.5	16530	47.1	52.2	0.8	6570
Casual	13.4	13.0	73.6	3550	30.7	23.9	45.4	1080
	Primary Care							
Full-time	91.8	7.1	1.1	2130	95.5	3.6	0.9	2040
Part-time	15.5	81.7	2.8	1330	45.3	53.0	1.6	860
Casual	16.0	16.5	67.5	430	44.2	22.1	33.7	190
	Home Care							
Full-time	95.3	4.4	0.3	3490	97.8	N/A	N/A	760
Part-time	15.1	81.6	3.3	580	48.6	50.0	1.4	370
Casual	14.6	13.0	72.4	320	46.9	19.8	33.3	160
	Supp. Housing							
Full-time	93.6	N/A	N/A	450	97.7	2.0	0.2	2200
Part-time	N/A	69.8	N/A	200	58.2	40.5	1.3	1280
Casual	14.4	15.2	70.5	130	45.9	23.5	30.6	500
	Other							
Full-time	93.5	5.4	1.1	15070	95.7	3.1	1.1	6950
Part-time	26.7	69.5	3.7	4550	49.1	49.1	1.8	3450
Casual	16.8	15.0	68.2	2150	37.8	22.3	39.8	1350
	Total							
Full-time	95.3	4.0	0.7	66050	96.6	2.7	0.7	27210
Part-time	32.0	65.9	2.0	25080	51.0	47.9	1.1	17110
Casual	16.3	14.2	69.4	7200	40.6	22.8	36.5	4770

Notes: N/A = suppressed for confidentiality. Observations have been rounded to the nearest ten for confidentiality and the totals may therefore be affected by rounding. Some percentages have been rounded to the nearest whole number for confidentiality, and total percentages may therefore be affected by rounding.

Table 1.4: Sector of First Job vs. Second Job for Multiple Jobholders 2019 (%)

RNs	Sector (2nd Job)						
Sector (1st Job)	Long-term Care	Hospitals	Primary Care	Home Care	Supp. Housing	Other	Total
Long-term Care	60.9	12.8	2.3	1.6	2.7	19.7	1350
Hospitals	10.1	46.1	5.3	1.4	1.4	35.6	9660
Primary Care	8.0	30.8	30.0	1.1	1.4	28.7	650
Home Care	8.3	41.1	2.3	12.9	2.1	33.3	570
Supp. Housing	10.7	19.3	4.0	4.0	27.3	34.7	150
Other	8.7	32.6	3.6	1.2	1.1	52.8	3630
Total	2230	6280	890	290	280	6050	16010

RPNs	Sector (2nd Job)						
Sector (1st Job)	Long-term Care	Hospitals	Primary Care	Home Care	Supp. Housing	Other	Total
Long-term Care	56.9	6.3	3.4	2.4	11.1	19.9	2730
Hospitals	21.9	32.2	6.7	2.9	7.5	28.8	3220
Primary Care	20.7	15.4	25.0	3.9	8.9	26.0	620
Home Care	23.0	9.8	3.6	28.9	11.8	23.0	310
Supp. Housing	29.7	7.2	4.6	4.2	34.6	19.8	890
Other	21.3	13.8	5.2	3.1	8.8	47.9	2310
Total	3210	1720	630	380	1150	2980	10070

Notes: Observations have been rounded to the nearest ten for confidentiality and the totals may therefore be affected by rounding.

Table 1.5: Logistic Regressions - Multiple Jobholding 2019

	RNs		RPNs		RNs		RPNs	
	OR (1)	ME (2)	OR (3)	ME (4)	OR (5)	ME (6)	OR (7)	ME (8)
Long-term Care (base)								
Hospital	0.823***	-0.028***	0.965	-0.006	0.825***	-0.026***	0.965	-0.006
	(0.026)	(0.005)	(0.028)	(0.005)	(0.028)	(0.005)	(0.029)	(0.005)
Primary Care	0.864**	-0.021**	0.947	-0.009	1.052	0.007	1.000	0.000
	(0.045)	(0.008)	(0.047)	(0.008)	(0.057)	(0.008)	(0.051)	(0.008)
Home Care	0.642***	-0.059***	1.176*	0.028*	0.746***	-0.039***	1.073	0.012
	(0.035)	(0.007)	(0.081)	(0.012)	(0.042)	(0.007)	(0.075)	(0.012)
Supp. Housing	1.020	0.003	1.095*	0.015*	1.188	0.026	1.028	0.005
	(0.098)	(0.015)	(0.048)	(0.007)	(0.116)	(0.015)	(0.046)	(0.007)
Other	0.865***	-0.021***	0.929*	-0.012*	0.958	-0.006	0.962	-0.006
	(0.030)	(0.005)	(0.029)	(0.005)	(0.035)	(0.005)	(0.031)	(0.005)
Male					1.181***	0.023***	0.959	-0.007
					(0.035)	(0.004)	(0.036)	(0.006)
Years Practice-Ontario					0.972***	-0.004***	0.965***	-0.006***
					(0.002)	(0.000)	(0.004)	(0.000)
Years Practice-Ontario^2					1.000	----	1.000	----
					(0.000)	----	(0.000)	----
Years Practice-Outside Ontario					1.019*	0.002*	1.024	0.004
					(0.009)	(0.001)	(0.018)	(0.003)
Years Practice-Outside Ontario^2					0.999	----	1.000	----
					(0.000)	----	(0.001)	----
Missing Yrs Practice					1.416*	0.051	1.090	0.014
					(0.237)	(0.027)	(0.154)	(0.024)
Education-Diploma (base)								
Education-Bachelors					1.143***	0.017***	1.350***	0.051***
					(0.029)	(0.003)	(0.055)	(0.007)
Education-Graduate					1.825***	0.090***	1.412*	0.059*
					(0.068)	(0.006)	(0.194)	(0.026)
Rural					0.918	-0.011	0.887*	-0.018*
					(0.045)	(0.006)	(0.043)	(0.007)
First Practice-Ontario (base)								
First Practice-Other Province					0.659***	-0.048***	0.759*	-0.041**
					(0.036)	(0.006)	(0.085)	(0.015)
First Practice-U.S.					0.866*	-0.018*	1.393	0.058
					(0.056)	(0.008)	(0.349)	(0.047)
First Practice-Other Country					1.352***	0.044***	1.114	0.018
					(0.079)	(0.009)	(0.145)	(0.022)
Observations	98350	98350	49110	49110	98350	98350	49110	49110

Notes: Standard errors in parentheses. *p<0.05, **p<0.01, ***p<0.001. Observations rounded to the nearest ten for confidentiality. OR=Odds Ratio. ME=Marginal Effect. Average marginal effects are used.

Table 1.6: Logistic Regressions - Part-time/Casual Employment in All Jobs Among Single Jobholders 2019

	RNs		RPNs		RNs		RPNs	
	OR (1)	ME (2)	OR (3)	ME (4)	OR (5)	ME (6)	OR (7)	ME (8)
Long-term Care (base)								
Hospital	1.002	0.000	1.126***	0.029***	1.038	0.008	1.069*	0.015*
	(0.030)	(0.006)	(0.030)	(0.007)	(0.033)	(0.006)	(0.030)	(0.006)
Primary Care	1.598***	0.108***	0.572***	-0.128***	1.467***	0.082***	0.512***	-0.141***
	(0.073)	(0.011)	(0.028)	(0.010)	(0.070)	(0.010)	(0.026)	(0.010)
Home Care	0.546***	-0.113***	0.880	-0.031	0.582***	-0.097***	0.699***	-0.078***
	(0.027)	(0.009)	(0.060)	(0.016)	(0.030)	(0.009)	(0.050)	(0.015)
Supp. Housing	1.414***	0.078***	0.922	-0.020	1.243*	0.045*	0.784***	-0.053***
	(0.122)	(0.020)	(0.038)	(0.010)	(0.112)	(0.019)	(0.034)	(0.010)
Other	0.861***	-0.031***	0.827***	-0.046***	0.880***	-0.025***	0.810***	-0.047***
	(0.028)	(0.007)	(0.024)	(0.007)	(0.031)	(0.007)	(0.025)	(0.007)
Male					0.717***	-0.063***	0.824***	-0.042***
					(0.022)	(0.006)	(0.031)	(0.008)
Years Practice-Ontario					0.891***	-0.004***	0.837***	-0.022***
					(0.002)	(0.000)	(0.003)	(0.000)
Years Practice-Ontario^2					1.003***	----	1.004***	----
					(0.000)	----	(0.000)	----
Years Practice-Outside Ontario					1.008	0.002	1.038*	0.008*
					(0.008)	(0.001)	(0.018)	(0.004)
Years Practice-Outside Ontario^2					1.000	----	0.998*	----
					(0.000)	----	(0.001)	----
Missing Yrs Practice					1.078	0.015	1.422*	0.079*
					(0.202)	(0.038)	(0.204)	(0.032)
Education-Diploma (base)								
Education-Bachelors					0.775***	-0.052***	0.906*	-0.022*
					(0.017)	(0.004)	(0.041)	(0.010)
Education-Graduate					0.494***	-0.131***	0.980	-0.004
					(0.021)	(0.007)	(0.156)	(0.035)
Rural					1.055	0.011	0.975	-0.005
					(0.042)	(0.008)	(0.042)	(0.010)
First Practice-Ontario (base)								
First Practice-Other Province					1.070	0.014	1.147	0.030
					(0.044)	(0.008)	(0.113)	(0.022)
First Practice-U.S.					1.109*	0.021*	1.185	0.038
					(0.055)	(0.010)	(0.328)	(0.062)
First Practice-Other Country					0.724***	-0.061***	0.776*	-0.054*
					(0.040)	(0.010)	(0.100)	(0.027)
Observations	82340	82340	39040	39040	82340	82340	39040	39040

Notes: Standard errors in parentheses. *p<0.05, **p<0.01, ***p<0.001. Observations rounded to the nearest ten for confidentiality. OR=Odds Ratio. ME=Marginal Effect. Average marginal effects are used.

Table 1.7: Logistic Regressions - Part-time/Casual Employment in All Jobs Among Multiple Jobholders 2019

	RNs		RPNs		RNs		RPNs	
	OR (1)	ME (2)	OR (3)	ME (4)	OR (5)	ME (6)	OR (7)	ME (8)
Long-term Care (base)								
Hospital	0.807***	-0.053***	0.968	-0.008	0.781***	-0.058***	0.978	-0.005
	(0.047)	(0.014)	(0.051)	(0.013)	(0.048)	(0.015)	(0.054)	(0.012)
Primary Care	1.367**	0.078**	0.686***	-0.094***	1.220*	0.047*	0.640***	-0.102***
	(0.131)	(0.024)	(0.061)	(0.022)	(0.122)	(0.024)	(0.060)	(0.021)
Home Care	0.334***	-0.240***	0.553***	-0.147***	0.327***	-0.236***	0.478***	-0.168***
	(0.038)	(0.022)	(0.067)	(0.030)	(0.039)	(0.022)	(0.061)	(0.028)
Supp. Housing	1.310	0.067	0.900	-0.026	1.178	0.039	0.743***	-0.067***
	(0.226)	(0.043)	(0.070)	(0.019)	(0.210)	(0.042)	(0.061)	(0.019)
Other	0.760***	-0.067***	0.718***	-0.082***	0.740***	-0.070***	0.735***	-0.070***
	(0.049)	(0.016)	(0.041)	(0.014)	(0.051)	(0.016)	(0.044)	(0.014)
Male					0.561***	-0.126***	0.721***	-0.075***
					(0.032)	(0.012)	(0.050)	(0.016)
Years Practice-Ontario					0.901***	-0.009***	0.833***	-0.028***
					(0.004)	(0.001)	(0.006)	(0.001)
Years Practice-Ontario^2					1.003***	----	1.004***	----
					(0.000)	----	(0.000)	----
Years Practice-Outside Ontario					0.987	-0.003	1.020	0.004
					(0.017)	(0.003)	(0.034)	(0.007)
Years Practice-Outside Ontario^2					1.001	----	0.999	----
					(0.001)	----	(0.001)	----
Missing Yrs Practice					1.218	0.046	1.019	0.004
					(0.359)	(0.069)	(0.262)	(0.058)
Education-Diploma (base)								
Education-Bachelors					0.922	-0.019	0.788***	-0.054***
					(0.046)	(0.011)	(0.055)	(0.016)
Education-Graduate					0.760***	-0.062***	0.986	-0.003
					(0.054)	(0.016)	(0.237)	(0.054)
Rural					1.272**	0.056**	1.363**	0.069***
					(0.115)	(0.021)	(0.129)	(0.021)
First Practice-Ontario (base)								
First Practice-Other Province					1.344**	0.069**	1.010	0.002
					(0.137)	(0.024)	(0.213)	(0.048)
First Practice-U.S.					1.316*	0.064*	0.405	-0.202*
					(0.164)	(0.030)	(0.188)	(0.097)
First Practice-Other Country					0.635***	-0.100***	0.960	-0.009
					(0.072)	(0.024)	(0.228)	(0.054)
Observations	16010	16010	10070	10070	16010	16010	10070	10070

Notes: Standard errors in parentheses. *p<0.05, **p<0.01, ***p<0.001. Observations rounded to the nearest ten for confidentiality. OR=Odds Ratio. ME=Marginal Effect. Average marginal effects are used.

Table 1.8: Logistic Regressions - Involuntary Part-time/Casual Employment Among Single Jobholders 2019

	RNs		RPNs		RNs		RPNs	
	OR (1)	ME (2)	OR (3)	ME (4)	OR (5)	ME (6)	OR (7)	ME (8)
Long-term Care (base)								
Hospital	0.828***	-0.017***	0.814***	-0.033***	0.710***	-0.027***	0.752***	-0.041***
	(0.037)	(0.004)	(0.027)	(0.005)	(0.035)	(0.004)	(0.026)	(0.005)
Primary Care	0.488***	-0.052***	0.482***	-0.101***	0.584***	-0.039***	0.465***	-0.099***
	(0.043)	(0.006)	(0.032)	(0.008)	(0.053)	(0.006)	(0.032)	(0.008)
Home Care	0.206***	-0.083***	0.718***	-0.052***	0.277***	-0.073***	0.539***	-0.083***
	(0.023)	(0.005)	(0.063)	(0.013)	(0.032)	(0.005)	(0.050)	(0.011)
Supp. Housing	0.730*	-0.027*	0.936	-0.011	0.830	-0.015	0.777***	-0.037***
	(0.111)	(0.012)	(0.047)	(0.008)	(0.132)	(0.012)	(0.041)	(0.008)
Other	0.529***	-0.047***	0.701***	-0.055***	0.627***	-0.035***	0.702***	-0.051***
	(0.028)	(0.004)	(0.025)	(0.006)	(0.036)	(0.005)	(0.027)	(0.005)
Male					0.944	-0.004	0.982	-0.003
					(0.042)	(0.003)	(0.043)	(0.006)
Years Practice-Ontario					0.835***	-0.009***	0.833***	-0.021***
					(0.003)	(0.000)	(0.004)	(0.000)
Years Practice-Ontario^2					1.003***	----	1.003***	----
					(0.000)	----	(0.000)	----
Years Practice-Outside Ontario					0.941***	-0.004***	0.972	-0.004
					(0.013)	(0.001)	(0.023)	(0.003)
Years Practice-Outside Ontario^2					1.002**	----	1.001	----
					(0.001)	----	(0.001)	----
Missing Yrs Practice					0.607	-0.028*	0.853	-0.021
					(0.160)	(0.012)	(0.152)	(0.023)
Education-Diploma (base)								
Education-Bachelors					0.654***	-0.031***	1.294***	0.037***
					(0.030)	(0.004)	(0.065)	(0.008)
Education-Graduate					0.802**	-0.017**	1.399*	0.049
					(0.060)	(0.006)	(0.232)	(0.026)
Rural					0.870	-0.009*	0.873*	-0.018*
					(0.064)	(0.005)	(0.051)	(0.008)
First Practice-Ontario (base)								
First Practice-Other Province					1.051	0.003	1.026	0.004
					(0.083)	(0.005)	(0.133)	(0.018)
First Practice-U.S.					1.939***	0.055***	1.115	0.015
					(0.179)	(0.009)	(0.410)	(0.053)
First Practice-Other Country					1.316**	0.020**	1.360	0.045
					(0.129)	(0.008)	(0.226)	(0.026)
Observations	82340	82340	39040	39040	82340	82340	39040	39040

Notes: Standard errors in parentheses. *p<0.05, **p<0.01, ***p<0.001. Observations rounded to the nearest ten for confidentiality. OR=Odds Ratio. ME=Marginal Effect. Average marginal effects are used.

Table 1.9: Logistic Regressions - Involuntary Part-time/Casual Employment Among Multiple Jobholders 2019

	RNs		RPNs		RNs		RPNs	
	OR (1)	ME (2)	OR (3)	ME (4)	OR (5)	ME (6)	OR (7)	ME (8)
Long-term Care (base)								
Hospital	0.551***	-0.099***	0.781***	-0.056***	0.568***	-0.084***	0.795***	-0.049***
	(0.037)	(0.013)	(0.043)	(0.012)	(0.041)	(0.012)	(0.045)	(0.012)
Primary Care	0.488***	-0.115***	0.643***	-0.098***	0.623***	-0.072***	0.658***	-0.086***
	(0.062)	(0.018)	(0.063)	(0.020)	(0.082)	(0.019)	(0.067)	(0.020)
Home Care	0.216***	-0.192***	0.666**	-0.090**	0.255***	-0.162***	0.587***	-0.108***
	(0.038)	(0.016)	(0.088)	(0.028)	(0.045)	(0.016)	(0.080)	(0.026)
Supp. Housing	0.582*	-0.091**	0.921	-0.019	0.694	-0.057	0.789**	-0.050**
	(0.131)	(0.033)	(0.074)	(0.019)	(0.162)	(0.034)	(0.066)	(0.017)
Other	0.441***	-0.128***	0.617***	-0.106***	0.555***	-0.087***	0.640***	-0.092***
	(0.035)	(0.013)	(0.038)	(0.013)	(0.047)	(0.013)	(0.041)	(0.013)
Male					0.688***	-0.044***	0.912	-0.019
					(0.052)	(0.008)	(0.066)	(0.015)
Years Practice-Ontario					0.881***	-0.012***	0.869***	-0.024***
					(0.006)	(0.001)	(0.007)	(0.001)
Years Practice-Ontario^2					1.002***	----	1.002***	----
					(0.000)	----	(0.000)	----
Years Practice-Outside Ontario					0.957	-0.005	1.032	0.006
					(0.022)	(0.003)	(0.038)	(0.007)
Years Practice-Outside Ontario^2					1.001	----	0.999	----
					(0.001)	----	(0.001)	----
Missing Yrs Practice					1.230	0.028	1.125	0.024
					(0.404)	(0.047)	(0.309)	(0.058)
Education-Diploma (base)								
Education-Bachelors					0.742***	-0.040***	1.037	0.007
					(0.057)	(0.011)	(0.075)	(0.015)
Education-Graduate					0.899	-0.015	1.508	0.088
					(0.093)	(0.014)	(0.352)	(0.052)
Rural					1.237	0.029	1.172	0.033
					(0.141)	(0.016)	(0.113)	(0.020)
First Practice-Ontario (base)								
First Practice-Other Province					0.892	-0.014	0.814	-0.041
					(0.137)	(0.018)	(0.185)	(0.044)
First Practice-U.S.					1.364	0.043	0.476	-0.133
					(0.245)	(0.027)	(0.257)	(0.081)
First Practice-Other Country					1.089	0.011	1.112	0.022
					(0.168)	(0.020)	(0.287)	(0.054)
Observations	16010	16010	10070	10070	16010	16010	10070	10070

Notes: Standard errors in parentheses. *p<0.05, **p<0.01, ***p<0.001. Observations rounded to the nearest ten for confidentiality. OR=Odds Ratio. ME=Marginal Effect. Average marginal effects are used.

Table 1.10: Logistic Regressions - Involuntary Part-time/Casual Employment Among Part-time and Casual Nurses Only 2019

	RNs		RPNs		RNs		RPNs	
	OR (1)	ME (2)	OR (3)	ME (4)	OR (5)	ME (6)	OR (7)	ME (8)
Long-term Care (base)								
Hospital	0.709***	-0.077***	0.666***	-0.101***	0.634***	-0.079***	0.703***	-0.080***
	(0.032)	(0.010)	(0.023)	(0.009)	(0.033)	(0.009)	(0.026)	(0.008)
Primary Care	0.278***	-0.235***	0.673***	-0.099***	0.487***	-0.120***	0.915	-0.020
	(0.022)	(0.013)	(0.046)	(0.017)	(0.043)	(0.014)	(0.067)	(0.016)
Home Care	0.280***	-0.234***	0.744**	-0.074**	0.442***	-0.135***	0.858	-0.035
	(0.029)	(0.015)	(0.068)	(0.023)	(0.050)	(0.017)	(0.084)	(0.022)
Supp. Housing	0.460***	-0.160***	0.991	-0.002	0.680*	-0.067*	0.999	0.000
	(0.064)	(0.025)	(0.054)	(0.014)	(0.108)	(0.027)	(0.058)	(0.013)
Other	0.475***	-0.154***	0.693***	-0.092***	0.686***	-0.066***	0.838***	-0.040***
	(0.024)	(0.011)	(0.027)	(0.010)	(0.040)	(0.010)	(0.035)	(0.009)
Male					1.177**	0.027**	1.162**	0.034**
					(0.060)	(0.009)	(0.057)	(0.011)
Years Practice-Ontario					0.884***	-0.017***	0.931***	-0.016***
					(0.004)	(0.000)	(0.004)	(0.001)
Years Practice-Ontario^2					1.001***	----	1.000	----
					(0.000)	----	(0.000)	----
Years Practice-Outside Ontario					0.944***	-0.009***	0.933**	-0.015**
					(0.013)	(0.002)	(0.025)	(0.006)
Years Practice-Outside Ontario^2					1.001	----	1.002*	----
					(0.000)	----	(0.001)	----
Missing Yrs Practice					0.656	-0.065	0.602*	-0.112**
					(0.170)	(0.037)	(0.120)	(0.042)
Education-Diploma (base)								
Education-Bachelors					0.761***	-0.044***	1.588***	0.104***
					(0.035)	(0.007)	(0.089)	(0.012)
Education-Graduate					1.317***	0.047***	2.016***	0.155***
					(0.100)	(0.013)	(0.400)	(0.041)
Rural					0.897	-0.018	0.994	-0.001
					(0.066)	(0.012)	(0.060)	(0.014)
First Practice-Ontario (base)								
First Practice-Other Province					0.898	-0.017	0.946	-0.012
					(0.075)	(0.013)	(0.128)	(0.031)
First Practice-U.S.					1.322**	0.047**	0.983	-0.004
					(0.134)	(0.017)	(0.370)	(0.085)
First Practice-Other Country					2.063***	0.127***	2.052***	0.158***
					(0.207)	(0.018)	(0.378)	(0.038)
Observations	31630	31630	21670	21670	31630	31630	21670	21670

Notes: Standard errors in parentheses. *p<0.05, **p<0.01, ***p<0.001. Observations rounded to the nearest ten for confidentiality. OR=Odds Ratio. ME=Marginal Effect. Average marginal effects are used.

Table 1.11: Logistic Regressions - Involuntary Part-time/Casual Employment Among All Nurses 2019

	RNs		RPNs		RNs		RPNs	
	OR (1)	ME (2)	OR (3)	ME (4)	OR (5)	ME (6)	OR (7)	ME (8)
Long-term Care (base)								
Hospital	0.720***	-0.034***	0.805***	-0.039***	0.653***	-0.039***	0.764***	-0.043***
	(0.027)	(0.004)	(0.022)	(0.005)	(0.026)	(0.004)	(0.023)	(0.005)
Primary Care	0.483***	-0.066***	0.529***	-0.102***	0.603***	-0.045***	0.522***	-0.096***
	(0.034)	(0.006)	(0.029)	(0.008)	(0.045)	(0.006)	(0.029)	(0.007)
Home Care	0.198***	-0.106***	0.724***	-0.056***	0.265***	-0.090***	0.559***	-0.087***
	(0.019)	(0.005)	(0.053)	(0.012)	(0.026)	(0.005)	(0.042)	(0.010)
Supp. Housing	0.688**	-0.038***	0.946	-0.010	0.802	-0.021	0.784***	-0.039***
	(0.086)	(0.011)	(0.040)	(0.008)	(0.105)	(0.012)	(0.035)	(0.007)
Other	0.494***	-0.064***	0.676***	-0.067***	0.604***	-0.045***	0.686***	-0.059***
	(0.021)	(0.004)	(0.021)	(0.005)	(0.028)	(0.004)	(0.023)	(0.005)
Male					0.879***	-0.010***	0.959	-0.006
					(0.034)	(0.003)	(0.036)	(0.006)
Years Practice-Ontario					0.845***	-0.010***	0.840***	-0.022***
					(0.003)	(0.000)	(0.003)	(0.000)
Years Practice-Ontario^2					1.002***	----	1.002***	----
					(0.000)	----	(0.000)	----
Years Practice-Outside Ontario					0.947***	-0.004***	0.992	-0.001
					(0.011)	(0.001)	(0.020)	(0.003)
Years Practice-Outside Ontario^2					1.001***	----	1.000	----
					(0.000)	----	(0.001)	----
Missing Yrs Practice					0.792	-0.017	0.933	-0.010
					(0.160)	(0.013)	(0.139)	(0.022)
Education-Diploma (base)								
Education-Bachelors					0.690***	-0.031***	1.238***	0.034***
					(0.027)	(0.004)	(0.051)	(0.007)
Education-Graduate					0.897	-0.010	1.460**	0.062**
					(0.054)	(0.005)	(0.196)	(0.024)
Rural					0.940	-0.005	0.933	-0.011
					(0.058)	(0.005)	(0.046)	(0.007)
First Practice-Ontario (base)								
First Practice-Other Province					0.970	-0.002	0.939	-0.009
					(0.068)	(0.005)	(0.106)	(0.017)
First Practice-U.S.					1.749***	0.052***	0.877	-0.019
					(0.143)	(0.009)	(0.266)	(0.043)
First Practice-Other Country					1.291**	0.021**	1.303	0.043
					(0.106)	(0.007)	(0.181)	(0.023)
Observations	98350	98350	49110	49110	98350	98350	49110	49110

Notes: Standard errors in parentheses. *p<0.05, **p<0.01, ***p<0.001. Observations rounded to the nearest ten for confidentiality. OR=Odds Ratio. ME=Marginal Effect. Average marginal effects are used.

Appendix 1.1

Appendix 1.1 Table 1: Multiple Jobholding and Employment Status by Healthcare Sector of First Job 2020

	RNs							RPNs						
	Long-term Care	**Hospitals**	**Primary Care**	**Home Care**	**Supp. Housing**	**Other**	**Total**	**Long-term Care**	**Hospitals**	**Primary Care**	**Home Care**	**Supp. Housing**	**Other**	**Total**
% of Workforce	7.2	61.3	3.8	4.9	0.8	22.1	100.0	26.3	34.1	6.0	4.1	7.9	21.7	100.0
	Number of Jobs Held													
1 Job	88.3	84.6	82.3	87.1	86.8	82.2	84.4	87.7	81.4	81.2	83.5	87.1	82.3	83.8
2 Jobs	10.1	13.5	14.6	11.5	10.9	15.1	13.5	10.9	16.2	16.3	14.3	11.2	15.4	14.2
3 Jobs	1.3	1.7	2.6	1.2	N/A	2.3	1.8	1.3	2.1	2.3	N/A	1.4	2.1	1.8
4+ jobs	0.2	0.3	0.5	0.2	N/A	0.4	0.3	0.1	0.3	0.2	N/A	0.3	0.2	0.2
N (All jobs)	7150	60850	3760	4850	750	21890	99240	13110	16970	2970	2030	3930	10810	49820
Agency Nurses	1.1	0.7	1.4	4.2	2.0	7.3	2.4	1.7	1.2	2.3	15.2	2.3	17.7	5.6
Single Jobholders	46.2	22.5	51.9	69.3	53.3	77.9	65.6	41.3	8.1	44.9	78.8	35.2	78.0	68.1
Multiple Jobholders	53.8	77.5	48.1	30.7	46.7	22.1	34.4	58.7	91.9	55.1	21.2	64.8	22.0	31.9
	Employment Status: Single Jobholders													
FT	67.5	69.7	59.2	82.2	66.3	72.3	70.2	58.6	56.5	71.2	66.9	64.0	63.6	60.3
PT	25.3	25.0	30.3	11.7	20.7	18.7	23.2	32.9	37.5	22.4	23.3	27.0	27.9	32.1
Casual	7.2	5.4	10.5	6.1	13.1	9.1	6.5	8.5	6.0	6.3	9.8	9.0	8.4	7.6
N (Single Jobholders)	6280	51360	3070	4080	640	16760	82190	11420	13800	2380	1450	3390	7410	39850
	Employment Status: First job for those with 2 or more jobs													
FT	59.2	59.6	45.7	81.3	52.2	62.9	60.5	48.0	47.8	56.3	62.8	59.1	52.9	50.8
PT	32.7	33.4	42.7	14.3	32.6	27.9	31.7	41.3	45.3	37.5	26.0	29.3	36.1	40.3
Casual	8.1	7.1	11.6	4.5	15.2	9.3	7.8	10.7	6.8	6.2	11.2	11.6	11.0	8.9
	Employment Status: Second job for those with 2 or more jobs													
FT	6.9	4.6	3.1	5.7	8.7	4.8	4.8	10.0	5.1	7.3	9.3	10.3	7.9	7.3
PT	35.0	27.1	28.2	21.1	30.4	27.3	27.4	38.0	34.4	35.2	33.5	32.0	34.7	35.1
Casual	58.1	68.3	68.7	73.2	60.9	67.9	67.8	52.0	60.5	57.5	57.2	57.7	57.3	57.6
Two FT Jobs	4.9	3.2	2.7	4.5	7.6	3.6	3.4	7.0	3.3	6.7	8.9	7.4	5.7	5.3
N (Multiple Jobholders)	792	9074	639	560	92	3543	14700	1480	2974	520	269	447	1488	7178

Appendix 1.1 Table 1 Continued: Multiple Jobholding and Employment Status by Healthcare Sector of First Job 2020

	RNs							RPNs						
	Long-term Care	Hospitals	Primary Care	Home Care	Supp. Housing	Other	Total	Long-term Care	Hospitals	Primary Care	Home Care	Supp. Housing	Other	Total
	Employment Status: Agency Nurses with 1 job													
FT	33.3	43.0	53.6	63.4	N/A	67.2	64.2	36.7	50.0	51.6	58.3	37.5	64.4	61.5
PT	30.6	14.0	N/A	17.6	N/A	18.5	18.7	21.1	N/A	25.8	26.0	43.8	20.1	21.3
Casual	36.1	43.0	N/A	19.0	N/A	14.3	17.0	42.2	N/A	22.6	15.7	18.8	15.6	17.2
	Employment Status: First job for Agency Nurses with 2 or more jobs													
FT	52.4	64.1	61.5	65.1	N/A	59.3	61.3	50.0	48.6	60.5	50.8	44.1	53.1	51.3
PT	26.2	29.1	N/A	17.5	N/A	24.5	25.8	35.9	47.5	N/A	29.2	42.4	29.6	34.8
Casual	21.4	6.9	N/A	17.5	N/A	16.2	12.9	14.1	3.9	N/A	20.0	13.6	17.3	13.9
	Employment Status: Second job for Agency Nurses with 2 or more jobs													
FT	N/A	1.9	N/A	N/A	0.0	10.5	6.2	9.4	4.4	N/A	N/A	10.2	8.8	7.6
PT	N/A	15.3	N/A	N/A	N/A	25.6	20.4	26.6	17.7	N/A	N/A	27.1	34.8	28.9
Casual	73.8	82.8	88.5	76.2	N/A	63.8	73.4	64.1	77.9	73.7	63.1	62.7	56.4	63.5
Two FT Jobs	N/A	1.6	N/A	N/A	N/A	6.3	4.1	N/A	N/A	0.0	N/A	N/A	5.0	4.0
	Involuntary PT/Casual													
All RNs/RPNs	13.4	9.4	6.3	2.9	7.5	7.4	8.8	23.6	18.9	12.1	15.5	18.7	16.0	19.0
PT/Casual Nurses	39.9	29.3	14.7	15.7	20.9	25.0	28.0	55.1	42.0	38.2	44.0	50.3	42.0	46.1
Single Jobholders	37.8	27.2	12.5	13.4	19.0	22.2	25.8	53.7	39.6	33.5	41.1	48.9	39.8	44.2
Multiple Jobholders	52.2	38.0	22.4	29.9	29.8	34.8	36.9	63.2	50.7	51.7	56.8	58.8	49.8	53.8
N (PT/Casual)	2410	19410	1620	910	270	6510	31120	5620	7650	940	710	1460	4130	20510
N (Single jobholders)	2060	15630	1260	780	220	5050	25010	4780	6010	700	580	1240	3230	16540
N (Multiple jobholders)	340	3790	360	130	50	1460	6120	830	1640	240	130	220	900	3970

Notes: Notes: N/A = suppressed for confidentiality. Observations have been rounded to the nearest ten for confidentiality and the totals may therefore be affected by rounding. Agency employment is captured on an individual basis, and not on a per-job basis. The first three panels on employment status exclude agency nurses. N(RNs) = 99,240. N(RPNs) = 49,820.

Appendix 1.1 Table 2: Means of Selected Variables by Healthcare Sector of First Job 2020

	RNs							RPNs						
Variables	**Long-term Care**	**Hospitals**	**Primary Care**	**Home Care**	**Supp. Housing**	**Other**	**Total**	**Long-term Care**	**Hospitals**	**Primary Care**	**Home Care**	**Supp. Housing**	**Other**	**Total**
Age (years)	46.3	41.2	47.4	45.6	48.1	46.1	43.1	41.3	37.8	40.1	39.7	40.4	41.6	40.0
Yrs Practice-Ontario	14.9	13.4	19.2	17.7	19.5	17.8	15.0	8.9	8.4	11.1	7.8	8.4	10.6	9.2
Yrs Practice-Outside Ontario	4.2	2.4	2.4	2.0	2.7	2.4	2.5	1.6	1.3	1.5	1.6	1.6	1.5	1.5
Yrs Practice	19.2	15.8	21.7	19.7	22.2	20.2	17.5	10.8	9.9	12.7	9.6	10.3	12.3	10.8
Yrs Practice Missing (%)	0.6	0.2	0.2	0.2	0.0	0.2	0.2	2.9	2.1	1.8	4.1	4.9	2.4	2.7
Female (%)	92.1	91.2	95.1	94.0	96.0	90.6	91.5	90.4	89.9	96.6	90.1	91.5	87.9	90.1
Rural (%)	14.8	2.2	13.7	2.5	6.1	3.3	3.8	10.9	3.9	13.9	4.3	6.0	4.1	6.6
	Location of First Practice (%)													
Ontario	69.9	83.9	82.8	86.9	79.9	83.5	82.9	91.3	94.6	93.5	90.2	88.2	93.3	92.7
Other Province	3.4	4.0	7.5	4.3	5.1	6.3	4.6	1.6	1.2	N/A	N/A	2.0	1.7	1.6
U.S.	2.0	2.2	2.9	2.4	4.3	2.8	2.4	0.2	0.1	N/A	N/A	0.2	0.3	0.2
Other Country	24.6	9.9	6.7	6.4	10.8	7.4	10.1	6.9	4.1	4.3	7.8	9.6	4.7	5.6
	Employment Preference (%)													
Full-time	77.2	74.9	58.8	80.8	69.2	73.0	74.3	79.2	71.7	77.4	78.0	80.1	75.1	75.7
Part-time	17.8	20.1	31.7	13.7	21.5	19.1	19.9	17.4	24.7	19.2	16.6	15.8	19.4	20.2
Casual	5.0	5.0	9.5	5.5	9.3	7.8	5.8	3.4	3.6	3.3	5.4	4.1	5.5	4.0
	Highest Education (%)													
Diploma	42.1	29.5	41.7	31.4	45.7	28.4	30.8	90.1	93.1	93.8	88.3	84.9	91.5	91.1
Bachelors	54.3	65.7	54.2	63.9	49.6	60.4	63.1	9.3	6.6	5.8	10.9	14.1	8.0	8.3
Graduate	3.7	4.8	4.1	4.7	4.7	11.2	6.1	0.6	0.3	0.4	0.8	1.0	0.5	0.5
	First Nursing Education (%)													
Ontario	67.6	83.9	83.1	87.3	80.3	84.0	82.8	83.1	90.3	89.6	82.3	76.7	88.0	86.5
Other Province	3.4	4.4	8.2	4.3	6.1	6.6	4.9	1.7	1.3	2.5	N/A	2.2	1.7	1.6
U.S.	0.9	0.7	1.3	1.2	1.3	1.0	0.8	0.2	0.1	0.3	N/A	0.2	0.4	0.2
Other Country	28.2	11.1	7.4	7.2	12.3	8.4	11.4	14.9	8.4	7.6	15.7	20.9	9.9	11.6

Appendix 1.1 Table 2 Continued: Means of Selected Variables by Healthcare Sector of First Job 2020

Variables	RNs							RPNs						
	Long-term Care	Hospitals	Primary Care	Home Care	Supp. Housing	Other	Total	Long-term Care	Hospitals	Primary Care	Home Care	Supp. Housing	Other	Total
	Language(s) of Practice (%)													
English only	61.4	74.6	76.7	78.3	80.1	76.6	74.4	60.4	72.8	74.6	64.6	61.2	68.5	67.5
English and French only	4.4	6.1	8.1	7.1	5.6	7.2	6.4	3.8	5.2	5.9	4.1	3.6	4.9	4.6
English and Other	32.5	18.3	13.9	14.0	13.5	15.2	18.2	34.3	21.0	18.8	30.4	33.7	25.7	26.8
Other	1.7	0.9	1.2	0.5	0.8	1.0	1.0	1.5	1.0	0.7	0.8	1.5	0.9	1.1
N	7150	60850	3760	4850	750	21890	99240	13110	16970	2970	2030	3930	10810	49820

Notes: Nurses are assigned to the sector of their first reported job. N/A = suppressed for confidentiality. Observations have been rounded to the nearest ten for confidentiality and the totals may therefore be affected by rounding. Rural only includes the first job an RN/RPN works in 2020.

Appendix 1.1 Table 3: Actual Employment Status vs. Preferred Employment Status for Registered Nurses (RNs) and Registered Practical Nurses (RPNs) by Healthcare Sector of First Job 2020 (%)

	RNs				RPNs			
	Preferences				Preferences			
Actual Work Status of First Job	Full-time	Part-time	Casual	N	Full-time	Part-time	Casual	N
	Long-term Care							
Full-time	96.2	3.1	0.7	4740	97.3	2.3	0.3	7490
Part-time	43.0	55.2	1.8	1870	58.0	41.1	0.9	4430
Casual	28.9	16.8	54.3	540	44.4	23.4	32.1	1190
	Hospitals							
Full-time	96.2	3.2	0.6	41430	96.1	3.3	0.5	9320
Part-time	32.7	65.7	1.7	15960	43.8	55.3	0.9	6610
Casual	13.9	13.2	72.9	3450	30.6	21.7	47.7	1040
	Primary Care							
Full-time	92.3	6.9	0.8	2140	95.7	3.7	0.6	2030
Part-time	15.1	80.7	4.2	1220	39.9	59.0	1.1	750
Casual	13.3	15.6	71.1	410	31.8	28.7	39.5	200
	Home Care							
Full-time	95.76	3.63	0.61	3940	96.5	2.9	0.6	1310
Part-time	17.31	80.50	2.18	600	46.3	51.2	2.4	490
Casual	12.54	12.86	74.60	310	39.0	21.1	39.9	220
	Supp. Housing							
Full-time	96.1	N/A	N/A	480	97.7	2.1	0.2	2470
Part-time	N/A	76.2	N/A	170	52.4	46.5	1.1	1090
Casual	18.0	16.0	66.0	100	44.4	17.5	38.2	370
	Other							
Full-time	93.4	5.5	1.1	15380	95.6	3.3	1.1	6690
Part-time	28.8	67.0	4.2	4430	45.0	53.3	1.7	3030
Casual	17.1	17.7	65.3	2080	33.5	23.8	42.7	1090
	Total							
Full-time	95.4	3.8	0.7	68110	96.4	3.0	0.6	29310
Part-time	31.4	66.3	2.3	24240	48.3	50.6	1.1	16400
Casual	16.0	15.0	69.0	6880	37.1	22.7	40.2	4110

Notes: N/A = suppressed for confidentiality. Observations have been rounded to the nearest ten for confidentiality and the totals may therefore be affected by rounding. Some percentages have been rounded to the nearest whole number for confidentiality, and total percentages may therefore be affected by rounding.

Appendix 1.1 Table 4: Sector of First Job vs. Second Job for Multiple Jobholders 2020 (%)

RNs	Sector (2nd Job)						
Sector (1st Job)	**Long-term Care**	**Hospitals**	**Primary Care**	**Home Care**	**Supp. Housing**	**Other**	**Total**
Long-term Care	54.9	14.4	2.2	2.2	2.6	23.7	830
Hospitals	6.2	48.8	5.2	2.0	1.6	36.2	9390
Primary Care	4.5	33.2	26.0	3.0	0.9	32.3	670
Home Care	6.9	37.9	2.6	17.5	2.2	32.9	620
Supp. Housing	8.1	26.3	N/A	N/A	26.3	28.3	100
Other	5.9	35.3	3.9	2.3	1.4	51.2	3890
Total	1350	6560	850	430	270	6040	15510

RPNs	Sector (2nd Job)						
Sector (1st Job)	**Long-term Care**	**Hospitals**	**Primary Care**	**Home Care**	**Supp. Housing**	**Other**	**Total**
Long-term Care	56.5	6.2	3.4	3.9	9.5	20.6	1610
Hospitals	15.5	36.5	8.3	3.1	5.7	30.9	3160
Primary Care	12.2	18.5	28.5	3.6	8.2	29.0	560
Home Care	15.6	10.5	5.1	31.7	8.1	29.0	330
Supp. Housing	23.9	7.3	6.9	7.7	33.0	21.1	510
Other	16.3	17.2	6.8	4.0	7.3	48.4	1910
Total	1950	1750	660	400	710	2600	8070

Notes: N/A = supressed for confidentiality. Observations have been rounded to the nearest ten for confidentiality and the totals may therefore be affected by rounding.

Appendix 1.1 Table 5: Logistic Regressions - Multiple Jobholding 2020

	RNs		RPNs		RNs		RPNs	
	OR (1)	ME (2)	OR (3)	ME (4)	OR (5)	ME (6)	OR (7)	ME (8)
Long-term Care (base)								
Hospital	1.382***	0.038***	1.634***	0.063***	1.399***	0.037***	1.643***	0.063***
	(0.053)	(0.004)	(0.054)	(0.004)	(0.056)	(0.004)	(0.055)	(0.004)
Primary Care	1.627***	0.060***	1.653***	0.065***	1.993***	0.087***	1.788***	0.076***
	(0.092)	(0.007)	(0.089)	(0.008)	(0.115)	(0.008)	(0.098)	(0.008)
Home Care	1.116	0.012	1.413***	0.042***	1.276***	0.026***	1.364***	0.037***
	(0.063)	(0.006)	(0.093)	(0.009)	(0.074)	(0.006)	(0.090)	(0.008)
Supp. Housing	1.151	0.015	1.057	0.006	1.373**	0.035*	1.020	0.002
	(0.131)	(0.013)	(0.058)	(0.006)	(0.159)	(0.014)	(0.056)	(0.006)
Other	1.638***	0.061***	1.535***	0.054***	1.802***	0.072***	1.614***	0.060***
	(0.067)	(0.005)	(0.056)	(0.005)	(0.076)	(0.005)	(0.060)	(0.005)
Male					1.160***	0.020***	0.985	-0.002
					(0.034)	(0.004)	(0.040)	(0.005)
Years Practice-Ontario					0.976***	-0.003***	0.989**	-0.003***
					(0.002)	(0.000)	(0.004)	(0.000)
Years Practice-Ontario^2					1.000	----	0.999***	----
					(0.000)	----	(0.000)	----
Years Practice-Outside Ontario					1.018	0.002*	1.071***	0.008***
					(0.010)	(0.001)	(0.022)	(0.002)
Years Practice-Outside Ontario^2					1.000	----	0.998**	----
					(0.000)	----	(0.001)	----
Missing Yrs Practice					1.481*	0.057*	1.381	0.047
					(0.256)	(0.028)	(0.228)	(0.027)
Education-Diploma (base)								
Education-Bachelors					1.167***	0.019***	1.335***	0.042***
					(0.031)	(0.003)	(0.059)	(0.007)
Education-Graduate					1.920***	0.095***	1.268	0.034
					(0.072)	(0.006)	(0.197)	(0.024)
Rural					0.933	-0.009	0.904	-0.013
					(0.047)	(0.006)	(0.050)	(0.007)
First Practice-Ontario (base)								
First Practice-Other Province					0.663***	-0.046***	0.642***	-0.051***
					(0.037)	(0.006)	(0.080)	(0.012)
First Practice-U.S.					0.853*	-0.019*	0.813	-0.026
					(0.057)	(0.008)	(0.247)	(0.036)
First Practice-Other Country					1.240***	0.030***	0.916	-0.011
					(0.074)	(0.009)	(0.127)	(0.018)
Observations	99240	99240	49820	49820	0 99240	99240	49820	49820

Notes: Standard errors in parentheses. *p<0.05, **p<0.01, ***p<0.001. Observations rounded to the nearest ten for confidentiality. OR=Odds Ratio. ME=Marginal Effect. Average marginal effects are used.

Appendix 1.1 Table 6: Logistic Regressions - Part-time/Casual Employment in All Jobs Among Single Jobholders 2020

	RNs		RPNs		RNs		RPNs	
	OR (1)	ME (2)	OR (3)	ME (4)	OR (5)	ME (6)	OR (7)	ME (8)
Long-term Care (base)								
Hospital	0.899***	-0.023***	1.084**	0.020**	0.918**	-0.017**	1.029	0.007
	(0.026)	(0.006)	(0.028)	(0.006)	(0.028)	(0.006)	(0.028)	(0.006)
Primary Care	1.381***	0.074***	0.574***	-0.125***	1.265***	0.050***	0.568***	-0.120***
	(0.063)	(0.011)	(0.028)	(0.010)	(0.060)	(0.010)	(0.029)	(0.010)
Home Care	0.475***	-0.138***	0.732***	-0.073***	0.489***	-0.128***	0.638***	-0.097***
	(0.023)	(0.008)	(0.040)	(0.012)	(0.024)	(0.008)	(0.036)	(0.012)
Supp. Housing	1.052	0.011	0.801***	-0.053***	0.915	-0.018	0.705***	-0.076***
	(0.092)	(0.019)	(0.032)	(0.009)	(0.084)	(0.018)	(0.030)	(0.009)
Other	0.793***	-0.048***	0.799***	-0.053***	0.787***	-0.047***	0.822***	-0.044***
	(0.025)	(0.007)	(0.023)	(0.007)	(0.027)	(0.007)	(0.025)	(0.007)
Male					0.730***	-0.058***	0.798***	-0.049***
					(0.022)	(0.005)	(0.028)	(0.008)
Years Practice-Ontario					0.905***	-0.003***	0.858***	-0.020***
					(0.002)	(0.000)	(0.003)	(0.000)
Years Practice-Ontario^2					1.003***	----	1.003***	----
					(0.000)	----	(0.000)	----
Years Practice-Outside Ontario					1.012	0.002	0.997	-0.001
					(0.008)	(0.001)	(0.017)	(0.003)
Years Practice-Outside Ontario^2					1.000	----	1.000	----
					(0.000)	----	(0.001)	----
Missing Yrs Practice					1.065	0.013	1.012	0.003
					(0.196)	(0.037)	(0.146)	(0.032)
Education-Diploma (base)								
Education-Bachelors					0.835***	-0.036***	0.827***	-0.041***
					(0.018)	(0.004)	(0.035)	(0.009)
Education-Graduate					0.519***	-0.119***	0.955	-0.010
					(0.021)	(0.007)	(0.140)	(0.032)
Rural					1.019	0.004	0.953	-0.011
					(0.041)	(0.008)	(0.041)	(0.009)
First Practice-Ontario (base)								
First Practice-Other Province					1.082	0.016	1.122	0.026
					(0.045)	(0.009)	(0.105)	(0.021)
First Practice-U.S.					1.104	0.020	0.991	-0.002
					(0.056)	(0.010)	(0.267)	(0.059)
First Practice-Other Country					0.737***	-0.057***	1.076	0.016
					(0.040)	(0.010)	(0.129)	(0.027)
Observations	83730	83730	41750	41750	83730	83730	41750	41750

Notes: Standard errors in parentheses. *p<0.05, **p<0.01, ***p<0.001. Observations rounded to the nearest ten for confidentiality. OR=Odds Ratio. ME=Marginal Effect. Average marginal effects are used.

Appendix 1.1 Table 7: Logistic Regressions - Part-time/Casual Employment in All Jobs Among Multiple Jobholders 2020

	RNs		RPNs		RNs		RPNs	
	OR (1)	ME (2)	OR (3)	ME (4)	OR (5)	ME (6)	OR (7)	ME (8)
Long-term Care (base)								
Hospital	0.981	-0.004	1.077	0.019	0.912	-0.021	1.006	0.001
	(0.073)	(0.018)	(0.066)	(0.015)	(0.070)	(0.018)	(0.064)	(0.015)
Primary Care	1.772***	0.141***	0.794*	-0.057*	1.474***	0.092***	0.734**	-0.073**
	(0.187)	(0.026)	(0.079)	(0.024)	(0.160)	(0.026)	(0.075)	(0.024)
Home Care	0.377***	-0.195***	0.676**	-0.096**	0.355***	-0.206***	0.608***	-0.116***
	(0.047)	(0.023)	(0.083)	(0.029)	(0.045)	(0.024)	(0.077)	(0.029)
Supp. Housing	1.359	0.075	0.697***	-0.089***	1.074	0.017	0.615***	-0.113***
	(0.290)	(0.053)	(0.072)	(0.025)	(0.236)	(0.052)	(0.066)	(0.024)
Other	0.869	-0.033	0.855*	-0.039*	0.774**	-0.058**	0.861*	-0.036*
	(0.068)	(0.019)	(0.058)	(0.017)	(0.064)	(0.019)	(0.060)	(0.017)
Male					0.592***	-0.111***	0.777***	-0.059***
					(0.035)	(0.012)	(0.059)	(0.018)
Years Practice-Ontario					0.930***	-0.005***	0.879***	-0.021***
					(0.004)	(0.001)	(0.007)	(0.001)
Years Practice-Ontario^2					1.002***	----	1.003***	----
					(0.000)	----	(0.000)	----
Years Practice-Outside Ontario					0.996	0.000	1.086*	0.018*
					(0.019)	(0.003)	(0.044)	(0.009)
Years Practice-Outside Ontario^2					1.000	----	0.998	----
					(0.001)	----	(0.001)	----
Missing Yrs Practice					1.334	0.066	2.074*	0.169*
					(0.418)	(0.074)	(0.638)	(0.068)
Education-Diploma (base)								
Education-Bachelors					0.996	-0.001	0.819*	-0.047*
					(0.052)	(0.012)	(0.064)	(0.018)
Education-Graduate					0.809**	-0.046**	0.545*	-0.138*
					(0.058)	(0.016)	(0.156)	(0.061)
Rural					1.167	0.035	1.439***	0.086***
					(0.112)	(0.022)	(0.152)	(0.025)
First Practice-Ontario (base)								
First Practice-Other Province					1.422***	0.083***	0.868	-0.033
					(0.148)	(0.025)	(0.205)	(0.055)
First Practice-U.S.					1.182	0.039	0.349	-0.226*
					(0.154)	(0.031)	(0.216)	(0.112)
First Practice-Other Country					0.558***	-0.123***	0.562*	-0.131*
					(0.067)	(0.024)	(0.145)	(0.055)
Observations	15510	15510	8070	8070	15510	15510	8070	8070

Notes: Standard errors in parentheses. *p<0.05, **p<0.01, ***p<0.001. Observations rounded to the nearest ten for confidentiality. OR=Odds Ratio. ME=Marginal Effect. Average marginal effects are used.

Appendix 1.1 Table 8: Logistic Regressions - Involuntary Part-time/Casual Employment Among Single Jobholders 2020

	RNs		RPNs		RNs		RPNs	
	OR (1)	ME (2)	OR (3)	ME (4)	OR (5)	ME (6)	OR (7)	ME (8)
Long-term Care (base)								
Hospital	0.639***	-0.041***	0.723***	-0.051***	0.600***	-0.040***	0.670***	-0.057***
	(0.026)	(0.004)	(0.023)	(0.005)	(0.027)	(0.004)	(0.023)	(0.005)
Primary Care	0.382***	-0.072***	0.375***	-0.126***	0.516***	-0.050***	0.416***	-0.110***
	(0.034)	(0.006)	(0.027)	(0.007)	(0.048)	(0.006)	(0.031)	(0.008)
Home Care	0.179***	-0.099***	0.572***	-0.082***	0.244***	-0.083***	0.477***	-0.096***
	(0.019)	(0.005)	(0.042)	(0.009)	(0.027)	(0.005)	(0.036)	(0.008)
Supp. Housing	0.489***	-0.059***	0.749***	-0.046***	0.607**	-0.040***	0.637***	-0.063***
	(0.080)	(0.010)	(0.037)	(0.008)	(0.103)	(0.012)	(0.033)	(0.007)
Other	0.472***	-0.061***	0.585***	-0.079***	0.599***	-0.040***	0.627***	-0.065***
	(0.023)	(0.005)	(0.022)	(0.005)	(0.032)	(0.004)	(0.025)	(0.005)
Male					0.961	-0.003	1.030	0.004
					(0.042)	(0.003)	(0.044)	(0.006)
Years Practice-Ontario					0.844***	-0.009***	0.850***	-0.018***
					(0.003)	(0.000)	(0.004)	(0.000)
Years Practice-Ontario^2					1.003***	----	1.002***	----
					(0.000)	----	(0.000)	----
Years Practice-Outside Ontario					0.957**	-0.003**	0.961	-0.005
					(0.014)	(0.001)	(0.023)	(0.003)
Years Practice-Outside Ontario^2					1.001	----	1.001	----
					(0.000)	----	(0.001)	----
Missing Yrs Practice					0.843	-0.011	0.857	-0.019
					(0.205)	(0.014)	(0.161)	(0.023)
Education-Diploma (base)								
Education-Bachelors					0.698***	-0.026***	1.146**	0.018**
					(0.033)	(0.004)	(0.056)	(0.007)
Education-Graduate					0.744***	-0.022***	1.190	0.024
					(0.057)	(0.005)	(0.190)	(0.023)
Rural					1.022	0.001	0.835**	-0.023**
					(0.072)	(0.005)	(0.050)	(0.007)
First Practice-Ontario (base)								
First Practice-Other Province					0.883	-0.008	1.025	0.003
					(0.075)	(0.005)	(0.129)	(0.016)
First Practice-U.S.					1.621***	0.037***	1.260	0.032
					(0.161)	(0.009)	(0.453)	(0.052)
First Practice-Other Country					1.383***	0.024**	1.572**	0.066**
					(0.132)	(0.008)	(0.250)	(0.025)
Observations	83730	83730	41750	41750	83730	83730	41750	41750

Notes: Standard errors in parentheses. *p<0.05, **p<0.01, ***p<0.001. Observations rounded to the nearest ten for confidentiality. OR=Odds Ratio. ME=Marginal Effect. Average marginal effects are used.

Appendix 1.1 Table 9: Logistic Regressions - Involuntary Part-time/Casual Employment Among Multiple Jobholders 2020

	RNs		RPNs		RNs		RPNs	
	OR (1)	ME (2)	OR (3)	ME (4)	OR (5)	ME (6)	OR (7)	ME (8)
Long-term Care (base)								
Hospital	0.661***	-0.062***	0.737***	-0.063***	0.622***	-0.066***	0.694***	-0.072***
	(0.059)	(0.015)	(0.049)	(0.014)	(0.058)	(0.014)	(0.048)	(0.014)
Primary Care	0.500***	-0.094***	0.592***	-0.104***	0.541***	-0.082***	0.591***	-0.101***
	(0.073)	(0.019)	(0.068)	(0.021)	(0.082)	(0.019)	(0.070)	(0.021)
Home Care	0.238***	-0.154***	0.594***	-0.103***	0.265***	-0.142***	0.536***	-0.117***
	(0.045)	(0.017)	(0.084)	(0.026)	(0.051)	(0.018)	(0.077)	(0.025)
Supp. Housing	0.603	-0.073	0.687**	-0.077***	0.634	-0.064	0.608***	-0.096***
	(0.181)	(0.038)	(0.079)	(0.023)	(0.197)	(0.039)	(0.072)	(0.021)
Other	0.549***	-0.084***	0.629***	-0.093***	0.584***	-0.073***	0.648***	-0.085***
	(0.053)	(0.015)	(0.048)	(0.015)	(0.060)	(0.015)	(0.050)	(0.015)
Male					0.692***	-0.040***	0.901	-0.019
					(0.056)	(0.008)	(0.076)	(0.015)
Years Practice-Ontario					0.888***	-0.011***	0.900***	-0.017***
					(0.006)	(0.001)	(0.008)	(0.001)
Years Practice-Ontario^2					1.002***	----	1.001***	----
					(0.000)	----	(0.000)	----
Years Practice-Outside Ontario					0.958	-0.004	1.078	0.013
					(0.025)	(0.003)	(0.051)	(0.008)
Years Practice-Outside Ontario^2					1.001	----	0.998	----
					(0.001)	----	(0.002)	----
Missing Yrs Practice					1.009	0.001	1.859	0.127
					(0.365)	(0.043)	(0.652)	(0.078)
Education-Diploma (base)								
Education-Bachelors					0.785**	-0.030**	1.178	0.031
					(0.066)	(0.011)	(0.099)	(0.016)
Education-Graduate					0.996	-0.001	0.623	-0.078
					(0.107)	(0.014)	(0.203)	(0.047)
Rural					1.369*	0.041*	1.177	0.031
					(0.170)	(0.017)	(0.139)	(0.023)
First Practice-Ontario (base)								
First Practice-Other Province					1.258	0.029	0.737	-0.054
					(0.188)	(0.020)	(0.204)	(0.045)
First Practice-U.S.					1.454	0.049	0.543	-0.099
					(0.283)	(0.028)	(0.374)	(0.095)
First Practice-Other Country					1.188	0.021	0.734	-0.054
					(0.200)	(0.021)	(0.217)	(0.048)
Observations	15510	15510	8070	8070	15510	15510	8070	8070

Notes: Standard errors in parentheses. *p<0.05, **p<0.01, ***p<0.001. Observations rounded to the nearest ten for confidentiality. OR=Odds Ratio. ME=Marginal Effect. Average marginal effects are used.

Appendix 1.1 Table 10: Logistic Regressions - Involuntary Part-time/Casual Employment Among Part-time and Casual Nurses Only 2020

	RNs		RPNs		RNs		RPNs	
	OR (1)	ME (2)	OR (3)	ME (4)	OR (5)	ME (6)	OR (7)	ME (8)
Long-term Care (base)								
Hospital	0.631***	-0.103***	0.592***	-0.130***	0.585***	-0.092***	0.613***	-0.111***
	(0.028)	(0.011)	(0.021)	(0.009)	(0.031)	(0.009)	(0.023)	(0.008)
Primary Care	0.256***	-0.250***	0.505***	-0.168***	0.456***	-0.131***	0.717***	-0.075***
	(0.021)	(0.013)	(0.037)	(0.017)	(0.042)	(0.015)	(0.056)	(0.018)
Home Care	0.283***	-0.237***	0.645***	-0.109***	0.421***	-0.142***	0.715***	-0.076***
	(0.029)	(0.016)	(0.052)	(0.020)	(0.047)	(0.017)	(0.061)	(0.019)
Supp. Housing	0.375***	-0.197***	0.827**	-0.047**	0.719	-0.058	0.828**	-0.043**
	(0.061)	(0.026)	(0.049)	(0.015)	(0.132)	(0.031)	(0.052)	(0.014)
Other	0.494***	-0.150***	0.588***	-0.132***	0.746***	-0.052***	0.700***	-0.081***
	(0.025)	(0.011)	(0.025)	(0.010)	(0.044)	(0.011)	(0.031)	(0.010)
Male					1.165**	0.025**	1.289***	0.057***
					(0.060)	(0.009)	(0.065)	(0.011)
Years Practice-Ontario					0.878***	-0.018***	0.934***	-0.015***
					(0.003)	(0.000)	(0.004)	(0.001)
Years Practice-Ontario^2					1.001***	----	1.000	----
					(0.000)	----	(0.000)	----
Years Practice-Outside Ontario					0.953**	-0.007***	0.969	-0.007
					(0.015)	(0.002)	(0.027)	(0.006)
Years Practice-Outside Ontario^2					1.001	----	1.000	----
					(0.001)	----	(0.001)	----
Missing Yrs Practice					0.738	-0.047	0.913	-0.020
					(0.201)	(0.040)	(0.199)	(0.049)
Education-Diploma (base)								
Education-Bachelors					0.742***	-0.048***	1.642***	0.112***
					(0.036)	(0.008)	(0.097)	(0.013)
Education-Graduate					1.215*	0.033*	1.330	0.065
					(0.094)	(0.013)	(0.266)	(0.045)
Rural					1.163*	0.025*	0.900	-0.024
					(0.086)	(0.012)	(0.057)	(0.014)
First Practice-Ontario (base)								
First Practice-Other Province					0.843*	-0.027*	0.905	-0.023
					(0.073)	(0.013)	(0.126)	(0.031)
First Practice-U.S.					1.317**	0.046*	1.381	0.073
					(0.141)	(0.018)	(0.584)	(0.095)
First Practice-Other Country					2.280***	0.145***	1.700**	0.119**
					(0.234)	(0.019)	(0.310)	(0.040)
Observations	30440	30440	20260	20260	30440	30440	20260	20260

Notes: Standard errors in parentheses. *p<0.05, **p<0.01, ***p<0.001. Observations rounded to the nearest ten for confidentiality. OR=Odds Ratio. ME=Marginal Effect. Average marginal effects are used.

Appendix 1.1 Table 11: Logistic Regressions - Involuntary Part-time/Casual Employment Among All Nurses 2020

	RNs		RPNs		RNs		RPNs	
	OR (1)	ME (2)	OR (3)	ME (4)	OR (5)	ME (6)	OR (7)	ME (8)
Long-term Care (base)								
Hospital	0.666***	-0.041***	0.755***	-0.047***	0.623***	-0.042***	0.698***	-0.054***
	(0.025)	(0.004)	(0.021)	(0.005)	(0.025)	(0.004)	(0.021)	(0.005)
Primary Care	0.436***	-0.071***	0.445***	-0.115***	0.562***	-0.049***	0.483***	-0.101***
	(0.033)	(0.006)	(0.027)	(0.007)	(0.044)	(0.006)	(0.030)	(0.007)
Home Care	0.195***	-0.105***	0.593***	-0.081***	0.255***	-0.089***	0.501***	-0.096***
	(0.018)	(0.005)	(0.038)	(0.009)	(0.024)	(0.005)	(0.033)	(0.008)
Supp. Housing	0.521***	-0.060***	0.743***	-0.049***	0.632**	-0.041***	0.636***	-0.067***
	(0.075)	(0.010)	(0.034)	(0.007)	(0.094)	(0.011)	(0.030)	(0.007)
Other	0.519***	-0.060***	0.616***	-0.076***	0.629***	-0.041***	0.654***	-0.063***
	(0.022)	(0.004)	(0.021)	(0.005)	(0.029)	(0.004)	(0.023)	(0.005)
Male					0.896**	-0.008**	1.002	0.000
					(0.035)	(0.003)	(0.038)	(0.005)
Years Practice-Ontario					0.853***	-0.009***	0.860***	-0.018***
					(0.003)	(0.000)	(0.003)	(0.000)
Years Practice-Ontario^2					1.002***	----	1.002***	----
					(0.000)	----	(0.000)	----
Years Practice-Outside Ontario					0.959**	-0.003***	0.994	-0.001
					(0.012)	(0.001)	(0.021)	(0.003)
Years Practice-Outside Ontario^2					1.001*	----	1.000	----
					(0.000)	----	(0.001)	----
Missing Yrs Practice					0.938	-0.005	1.051	0.007
					(0.188)	(0.014)	(0.173)	(0.024)
Education-Diploma (base)								
Education-Bachelors					0.734***	-0.025***	1.178***	0.024***
					(0.030)	(0.003)	(0.050)	(0.006)
Education-Graduate					0.892	-0.010	1.043	0.006
					(0.055)	(0.005)	(0.149)	(0.020)
Rural					1.081	0.006	0.885*	-0.017*
					(0.066)	(0.005)	(0.047)	(0.007)
First Practice-Ontario (base)								
First Practice-Other Province					0.921	-0.006	0.931	-0.010
					(0.068)	(0.005)	(0.106)	(0.015)
First Practice-U.S.					1.553***	0.037***	1.009	0.001
					(0.137)	(0.009)	(0.321)	(0.045)
First Practice-Other Country					1.350***	0.024***	1.301	0.039
					(0.112)	(0.007)	(0.181)	(0.022)
Observations	99240	99240	49820	49820	99240	99240	49820	49820

Notes: Standard errors in parentheses. *p<0.05, **p<0.01, ***p<0.001. Observations rounded to the nearest ten for confidentiality. OR=Odds Ratio. ME=Marginal Effect. Average marginal effects are used.

Appendix 1.2

Appendix 1.2 Table 1: Logistics Regressions with Additional Variables 2019

	Multiple Jobholding				Involuntary Part-time/Casual			
	RNs		RPNs		RNs		RPNs	
	OR (1)	ME (2)	OR (3)	ME (4)	OR (5)	ME (6)	OR (7)	ME (8)
Long-term Care (base)								
Hospital	0.903**	-0.013**	1.048	0.007	0.643***	-0.040***	0.756***	-0.045***
	(0.031)	(0.005)	(0.032)	(0.005)	(0.026)	(0.004)	(0.023)	(0.005)
Primary Care	1.121*	0.016*	1.079	0.012	0.598***	-0.046***	0.517***	-0.097***
	(0.061)	(0.008)	(0.055)	(0.008)	(0.045)	(0.006)	(0.029)	(0.007)
Home Care	0.792***	-0.030***	1.090	0.014	0.263***	-0.092***	0.558***	-0.088***
	(0.044)	(0.007)	(0.077)	(0.011)	(0.026)	(0.005)	(0.042)	(0.010)
Supp. Housing	1.271*	0.035*	1.042	0.006	0.797	-0.022	0.782***	-0.040***
	(0.125)	(0.015)	(0.047)	(0.007)	(0.104)	(0.012)	(0.035)	(0.007)
Other	1.020	0.003	1.001	0.000	0.599***	-0.046***	0.683***	-0.060***
	(0.038)	(0.005)	(0.033)	(0.005)	(0.028)	(0.004)	(0.023)	(0.005)
Age	1.087***	0.003***	1.047***	0.002***	0.990	0.000*	1.032***	0.000
	(0.009)	(0.000)	(0.009)	(0.000)	(0.010)	(0.000)	(0.009)	(0.000)
Age^2	0.999***	----	1.000***	----	1.000	----	1.000***	----
	(0.000)	----	(0.000)	----	(0.000)	----	(0.000)	----
Male	1.110***	0.014***	0.913*	-0.014*	0.885**	-0.009**	0.957	-0.007
	(0.033)	(0.004)	(0.035)	(0.006)	(0.034)	(0.003)	(0.036)	(0.006)
Yrs Practice-Ontario	0.918*	-0.010	0.954*	-0.007	0.867**	-0.008*	0.901***	-0.010**
	(0.036)	(0.005)	(0.023)	(0.004)	(0.045)	(0.004)	(0.021)	(0.004)
Yrs Practice-Ontario^2	1.000*	----	1.000	----	1.002***	----	1.003***	----
	(0.000)	----	(0.000)	----	(0.000)	----	(0.000)	----
Yrs Practice	1.015	0.004	0.995	-0.001	0.982	-0.002	0.933**	-0.011**
	(0.040)	(0.005)	(0.024)	(0.004)	(0.051)	(0.004)	(0.022)	(0.004)
Yrs Practice^2	1.000**	----	1.000	----	1.000	----	1.000	----
	(0.000)	---	(0.000)	---	(0.000)	---	(0.000)	---
Yrs Practice-Outside Ontario	0.965	-0.005	1.025	0.004	0.978	-0.001	1.074*	0.011*
	(0.039)	(0.005)	(0.031)	(0.005)	(0.052)	(0.004)	(0.033)	(0.005)
Yrs Practice-Outside Ontario^2	1.000	----	1.000	----	1.001**	----	1.001	----
	(0.000)	----	(0.001)	----	(0.000)	----	(0.001)	----
Missing Yrs Practice	1.306	0.038	1.080	0.012	0.799	-0.016	0.756	-0.040
	(0.333)	(0.039)	(0.197)	(0.030)	(0.231)	(0.019)	(0.139)	(0.025)
Education-Diploma (base)								
Education-Bachelors	1.152***	0.018***	0.997	0.000	0.683***	-0.032***	1.219***	0.031***
	(0.030)	(0.003)	(0.051)	(0.008)	(0.027)	(0.004)	(0.063)	(0.008)
Education-Graduate	1.858***	0.092***	0.986	-0.002	0.889	-0.011*	1.463**	0.062*
	(0.070)	(0.006)	(0.140)	(0.022)	(0.054)	(0.005)	(0.205)	(0.025)
Rural	0.965	-0.005	0.972	-0.004	0.938	-0.005	0.941	-0.009
	(0.047)	(0.006)	(0.048)	(0.008)	(0.058)	(0.005)	(0.047)	(0.007)

Appendix 1.2 Table 1 Continued: Logistics Regressions with Additional Variables 2019

	Multiple Jobholding				Involuntary Part-time/Casual			
	RNs		RPNs		RNs		RPNs	
	OR (1)	ME (2)	OR (3)	ME (4)	OR (5)	ME (6)	OR (7)	ME (8)
First Practice-Ontario (base)								
First Practice-Other Province	0.839*	-0.022**	0.823	-0.029	1.086	0.006	1.311	0.043
	(0.059)	(0.008)	(0.139)	(0.024)	(0.101)	(0.007)	(0.226)	(0.029)
First Practice-U.S.	0.819**	-0.025**	1.148	0.023	1.825***	0.056***	1.233	0.033
	(0.060)	(0.009)	(0.462)	(0.069)	(0.169)	(0.010)	(0.615)	(0.082)
First Practice-Other Country	1.034	0.004	0.836	-0.027	1.318*	0.023*	1.190	0.027
	(0.083)	(0.011)	(0.116)	(0.020)	(0.153)	(0.010)	(0.173)	(0.024)
First Nursing Education-Ontario (base)								
First Nursing Education-Other Province	0.781***	-0.030***	0.863	-0.022	0.836*	-0.013*	0.633**	-0.063**
	(0.052)	(0.008)	(0.140)	(0.023)	(0.072)	(0.006)	(0.110)	(0.021)
First Nursing Education-U.S.	1.192	0.024	1.137	0.021	0.860	-0.011	0.669	-0.056
	(0.130)	(0.016)	(0.408)	(0.060)	(0.125)	(0.010)	(0.305)	(0.057)
First Nursing Education-Other Country	1.151*	0.019*	1.327***	0.048***	0.903	-0.008	0.969	-0.005
	(0.069)	(0.009)	(0.071)	(0.010)	(0.079)	(0.007)	(0.055)	(0.009)
English (base)								
English and French	0.871***	-0.017***	0.925	-0.011	1.018	0.001	1.029	0.004
	(0.035)	(0.005)	(0.054)	(0.008)	(0.049)	(0.004)	(0.060)	(0.009)
English and Other	1.360***	0.043***	1.366***	0.051***	1.028	0.002	1.075*	0.011*
	(0.035)	(0.004)	(0.039)	(0.005)	(0.035)	(0.003)	(0.031)	(0.005)
Other	1.216*	0.027*	1.920***	0.117***	1.065	0.005	1.289*	0.040*
	(0.104)	(0.012)	(0.180)	(0.019)	(0.117)	(0.009)	(0.134)	(0.017)
Observations	98350	98350	49110	49110	0 98350	98350	49110	49110

Notes: Standard errors in parentheses. *p<0.05, **p<0.01, ***p<0.001. Observations rounded to the nearest ten for confidentiality. OR=Odds Ratio. ME=Marginal Effect. Average marginal effects are used.

Appendix 1.2 Table 2: Logistics Regressions with Additional Variables 2020

	Multiple Jobholding				Involuntary Part-time/Casual			
	RNs		RPNs		RNs		RPNs	
	OR (1)	ME (2)	OR (3)	ME (4)	OR (5)	ME (6)	OR (7)	ME (8)
Long-term Care (base)								
Hospital	1.529***	0.046***	1.762***	0.071***	0.620***	-0.042***	0.695***	-0.055***
	(0.061)	(0.004)	(0.060)	(0.004)	(0.026)	(0.004)	(0.021)	(0.005)
Primary Care	2.123***	0.092***	1.904***	0.083***	0.564***	-0.049***	0.480***	-0.101***
	(0.123)	(0.008)	(0.105)	(0.008)	(0.044)	(0.006)	(0.030)	(0.007)
Home Care	1.363***	0.032***	1.402***	0.039***	0.255***	-0.090***	0.498***	-0.097***
	(0.079)	(0.006)	(0.093)	(0.008)	(0.024)	(0.005)	(0.033)	(0.008)
Supp. Housing	1.467***	0.041**	1.036	0.004	0.634**	-0.040***	0.637***	-0.067***
	(0.170)	(0.014)	(0.057)	(0.006)	(0.094)	(0.012)	(0.031)	(0.007)
Other	1.924***	0.077***	1.681***	0.064***	0.630***	-0.041***	0.651***	-0.064***
	(0.082)	(0.004)	(0.063)	(0.005)	(0.030)	(0.004)	(0.023)	(0.005)
Age	1.063***	0.003***	1.035***	0.001***	0.994	0.000	1.032***	0.000
	(0.008)	(0.000)	(0.009)	(0.000)	(0.010)	(0.000)	(0.009)	(0.000)
Age^2	1.000***	----	1.000**	----	1.000	----	1.000***	----
	(0.000)	----	(0.000)	----	(0.000)	----	(0.000)	----
Male	1.096**	0.012**	0.940	-0.008	0.897**	-0.008**	0.998	0.000
	(0.033)	(0.004)	(0.038)	(0.005)	(0.035)	(0.003)	(0.038)	(0.005)
Yrs Practice-Ontario	0.924	-0.010	1.012	0.001	0.858**	-0.009*	0.858***	-0.018***
	(0.037)	(0.005)	(0.024)	(0.003)	(0.043)	(0.004)	(0.019)	(0.003)
Yrs Practice-Ontario^2	1.000	----	1.000	----	1.002***	----	1.003***	----
	(0.000)	----	(0.000)	----	(0.000)	----	(0.001)	----
Yrs Practice	1.019	0.004	0.966	-0.004	0.998	0.000	1.002	-0.001
	(0.041)	(0.005)	(0.023)	(0.003)	(0.051)	(0.004)	(0.023)	(0.003)
Yrs Practice^2	1.000***	----	1.000	----	1.000	----	0.999	----
	(0.000)	---	(0.000)	---	(0.000)	---	(0.001)	---
Yrs Practice-Outside Ontario	0.964	-0.005	1.102**	0.012**	0.974	-0.002	1.002	0.000
	(0.040)	(0.005)	(0.035)	(0.004)	(0.051)	(0.004)	(0.031)	(0.004)
Yrs Practice-Outside Ontario^2	1.000	----	0.997**	----	1.001	----	1.000	----
	(0.000)	----	(0.001)	----	(0.000)	----	(0.001)	----
Missing Yrs Practice	1.375	0.045	1.205	0.026	1.032	0.002	1.130	0.018
	(0.328)	(0.037)	(0.245)	(0.030)	(0.264)	(0.020)	(0.215)	(0.028)
Education-Diploma (base)								
Education-Bachelors	1.179***	0.020***	1.083	0.011	0.729***	-0.025***	1.171**	0.023**
	(0.031)	(0.003)	(0.060)	(0.008)	(0.030)	(0.004)	(0.064)	(0.008)
Education-Graduate	1.970***	0.098***	1.011	0.001	0.889	-0.010	1.029	0.004
	(0.074)	(0.006)	(0.162)	(0.021)	(0.055)	(0.005)	(0.153)	(0.021)
Rural	0.975	-0.003	0.981	-0.003	1.084	0.006	0.890*	-0.016*
	(0.050)	(0.006)	(0.054)	(0.007)	(0.066)	(0.005)	(0.047)	(0.007)

Appendix 1.2 Table 2 Continued: Logistics Regressions with Additional Variables 2020

	Multiple Jobholding				Involuntary Part-time/Casual			
	RNs		RPNs		RNs		RPNs	
	OR (1)	ME (2)	OR (3)	ME (4)	OR (5)	ME (6)	OR (7)	ME (8)
First Practice-Ontario (base)								
First Practice-Other Province	0.826**	-0.023**	0.730	-0.038	1.137	0.010	1.152	0.021
	(0.059)	(0.008)	(0.134)	(0.020)	(0.110)	(0.008)	(0.196)	(0.026)
First Practice-U.S.	0.825*	-0.023**	0.687	-0.045	1.688***	0.046***	1.304	0.040
	(0.063)	(0.009)	(0.324)	(0.049)	(0.170)	(0.010)	(0.688)	(0.084)
First Practice-Other Country	0.945	-0.007	0.766	-0.033	1.217	0.015	1.221	0.029
	(0.078)	(0.010)	(0.114)	(0.017)	(0.141)	(0.010)	(0.179)	(0.023)
First Nursing Education-Ontario (base)								
First Nursing Education-Other Province	0.772***	-0.030***	0.810	-0.026	0.736***	-0.021***	0.727	-0.042*
	(0.052)	(0.007)	(0.145)	(0.020)	(0.068)	(0.006)	(0.125)	(0.021)
First Nursing Education-U.S.	1.118	0.015	1.127	0.016	0.763	-0.018	0.739	-0.040
	(0.126)	(0.015)	(0.459)	(0.058)	(0.120)	(0.010)	(0.356)	(0.058)
First Nursing Education-Other Country	1.158*	0.020*	1.123	0.016	1.015	0.001	0.953	-0.007
	(0.071)	(0.009)	(0.067)	(0.008)	(0.087)	(0.007)	(0.057)	(0.008)
English (base)								
English and French	0.941	-0.007	0.898	-0.013	0.987	-0.001	1.107	0.014
	(0.037)	(0.005)	(0.058)	(0.008)	(0.050)	(0.004)	(0.067)	(0.009)
English and Other	1.322***	0.038***	1.370***	0.044***	1.023	0.002	1.069*	0.009*
	(0.034)	(0.004)	(0.043)	(0.004)	(0.035)	(0.003)	(0.032)	(0.004)
Other	1.389***	0.045***	1.864***	0.095***	0.964	-0.003	1.171	0.023
	(0.113)	(0.012)	(0.190)	(0.018)	(0.108)	(0.008)	(0.128)	(0.016)
Observations	99240	99240	49820	49820	0 99240	99240	49820	49820

Notes: Standard errors in parentheses. *p<0.05, **p<0.01, ***p<0.001. Observations rounded to the nearest ten for confidentiality. OR=Odds Ratio. ME=Marginal Effect. Average marginal effects are used.

Appendix 1.2 Table 3: Logistic Regressions with Linear Specifications 2019

	Multiple Jobholding				Involuntary Part-time/Casual			
	RNs		RPNs		RNs		RPNs	
	OR	ME	OR	ME	OR	ME	OR	ME
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Long-term Care (base)								
Hospital	0.826***	-0.026***	0.965	-0.006	0.645***	-0.041***	0.770***	-0.043***
	(0.028)	(0.005)	(0.029)	(0.005)	(0.026)	(0.004)	(0.023)	(0.005)
Primary Care	1.054	0.008	0.998	0.000	0.597***	-0.047***	0.533***	-0.094***
	(0.057)	(0.008)	(0.051)	(0.008)	(0.044)	(0.006)	(0.030)	(0.008)
Home Care	0.744***	-0.039***	1.070	0.011	0.246***	-0.095***	0.581***	-0.083***
	(0.041)	(0.007)	(0.075)	(0.012)	(0.024)	(0.005)	(0.044)	(0.010)
Supp. Housing	1.190	0.027	1.026	0.004	0.829	-0.019	0.812***	-0.034***
	(0.116)	(0.015)	(0.046)	(0.007)	(0.108)	(0.013)	(0.036)	(0.007)
Other	0.958	-0.006	0.961	-0.006	0.593***	-0.047***	0.695***	-0.058***
	(0.035)	(0.005)	(0.031)	(0.005)	(0.027)	(0.004)	(0.023)	(0.005)
Male	1.182***	0.023***	0.959	-0.007	0.888**	-0.009**	0.961	-0.006
	(0.035)	(0.004)	(0.036)	(0.006)	(0.034)	(0.003)	(0.036)	(0.006)
Yrs Practice-Ontario	0.974***	-0.004***	0.962***	-0.006***	0.911***	-0.007***	0.896***	-0.017***
	(0.001)	(0.000)	(0.001)	(0.000)	(0.002)	(0.000)	(0.002)	(0.000)
Yrs Practice-Outside Ontario	1.004	0.001	1.012	0.002	0.982***	-0.001***	0.990	-0.002
	(0.003)	(0.000)	(0.007)	(0.001)	(0.004)	(0.000)	(0.008)	(0.001)
Missing Yrs Practice	1.339	0.042	1.032	0.005	0.948	-0.004	0.903	-0.015
	(0.220)	(0.026)	(0.123)	(0.019)	(0.185)	(0.015)	(0.110)	(0.018)
Education-Diploma (base)								
Education-Bachelors	1.146***	0.017***	1.350***	0.051***	0.737***	-0.026***	1.232***	0.034***
	(0.029)	(0.003)	(0.055)	(0.007)	(0.028)	(0.003)	(0.050)	(0.007)
Education-Graduate	1.825***	0.090***	1.404*	0.058*	0.870*	-0.012*	1.548**	0.074**
	(0.068)	(0.006)	(0.193)	(0.026)	(0.052)	(0.005)	(0.206)	(0.024)
Rural	0.919	-0.011	0.887*	-0.019*	0.973	-0.002	0.944	-0.009
	(0.045)	(0.006)	(0.043)	(0.007)	(0.059)	(0.005)	(0.047)	(0.007)
First Practice-Ontario (base)								
First Practice-Other Province	0.684***	-0.044***	0.782*	-0.036*	0.919	-0.006	0.957	-0.007
	(0.034)	(0.005)	(0.081)	(0.014)	(0.059)	(0.005)	(0.098)	(0.016)
First Practice-U.S.	0.881*	-0.016*	1.475	0.068	1.640***	0.046***	0.847	-0.025
	(0.056)	(0.008)	(0.352)	(0.046)	(0.132)	(0.009)	(0.245)	(0.041)
First Practice-Other Country	1.447***	0.055***	1.175	0.027	1.071	0.006	1.321*	0.046*
	(0.064)	(0.007)	(0.124)	(0.018)	(0.068)	(0.005)	(0.144)	(0.019)
Observations	98350	98350	49110	49110 0	98350	98350	49110	49110

Notes: Standard errors in parentheses. *p<0.05, **p<0.01, ***p<0.001. Observations rounded to the nearest ten for confidentiality. OR=Odds Ratio. ME=Marginal Effect. Average marginal effects are used.

Appendix 1.2 Table 4: Logistic Regressions with Linear Specifications 2020

	Multiple Jobholding				Involuntary Part-time/Casual			
	RNs		RPNs		RNs		RPNs	
	OR	ME	OR	ME	OR	ME	OR	ME
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Long-term Care (base)								
Hospital	1.400***	0.038***	1.637***	0.062***	0.618***	-0.043***	0.705***	-0.054***
	(0.056)	(0.004)	(0.055)	(0.004)	(0.025)	(0.004)	(0.021)	(0.005)
Primary Care	1.994***	0.087***	1.784***	0.076***	0.558***	-0.051***	0.483***	-0.101***
	(0.115)	(0.008)	(0.097)	(0.008)	(0.044)	(0.006)	(0.030)	(0.007)
Home Care	1.277***	0.026***	1.355***	0.036***	0.242***	-0.093***	0.508***	-0.095***
	(0.074)	(0.006)	(0.089)	(0.008)	(0.023)	(0.005)	(0.034)	(0.008)
Supp. Housing	1.373**	0.035*	1.010	0.001	0.654**	-0.039**	0.650***	-0.065***
	(0.159)	(0.014)	(0.056)	(0.006)	(0.097)	(0.012)	(0.031)	(0.007)
Other	1.803***	0.072***	1.612***	0.060***	0.627***	-0.042***	0.656***	-0.063***
	(0.077)	(0.005)	(0.060)	(0.005)	(0.029)	(0.004)	(0.023)	(0.005)
Male	1.161***	0.020***	0.985	-0.002	0.902**	-0.008**	1.001	0.000
	(0.034)	(0.004)	(0.040)	(0.005)	(0.035)	(0.003)	(0.038)	(0.005)
Yrs Practice-Ontario	0.976***	-0.003***	0.972***	-0.004***	0.914***	-0.007***	0.903***	-0.015***
	(0.001)	(0.000)	(0.001)	(0.000)	(0.002)	(0.000)	(0.002)	(0.000)
Yrs Practice-Outside Ontario	1.008*	0.001*	1.011	0.001	0.981***	-0.001***	0.986	-0.002
	(0.003)	(0.000)	(0.008)	(0.001)	(0.005)	(0.000)	(0.008)	(0.001)
Missing Yrs Practice	1.416*	0.050	1.046	0.006	1.060	0.005	0.980	-0.003
	(0.238)	(0.027)	(0.142)	(0.019)	(0.202)	(0.015)	(0.128)	(0.018)
Education-Diploma (base)								
Education-Bachelors	1.166***	0.019***	1.331***	0.041***	0.747***	-0.024***	1.181***	0.025***
	(0.031)	(0.003)	(0.059)	(0.007)	(0.030)	(0.003)	(0.050)	(0.006)
Education-Graduate	1.920***	0.095***	1.230	0.029	0.834**	-0.015**	1.100	0.014
	(0.072)	(0.006)	(0.191)	(0.023)	(0.051)	(0.005)	(0.156)	(0.021)
Rural	0.933	-0.009	0.901	-0.014*	1.111	0.008	0.891*	-0.016*
	(0.047)	(0.006)	(0.049)	(0.007)	(0.067)	(0.005)	(0.047)	(0.007)
First Practice-Ontario (base)								
First Practice-Other Province	0.678***	-0.044***	0.732**	-0.037**	0.898	-0.008	0.958	-0.006
	(0.035)	(0.005)	(0.084)	(0.012)	(0.061)	(0.005)	(0.100)	(0.014)
First Practice-U.S.	0.863*	-0.018*	1.042	0.005	1.504***	0.035***	0.999	0.000
	(0.057)	(0.008)	(0.306)	(0.040)	(0.130)	(0.008)	(0.306)	(0.043)
First Practice-Other Country	1.294***	0.036***	1.144	0.019	1.214**	0.015**	1.344**	0.045*
	(0.060)	(0.007)	(0.133)	(0.017)	(0.076)	(0.005)	(0.152)	(0.018)
Observations	99240	99240	49820	49820	99240	99240	49820	49820

Notes: Standard errors in parentheses. *p<0.05, **p<0.01, ***p<0.001. Observations rounded to the nearest ten for confidentiality. OR=Odds Ratio. ME=Marginal Effect. Average marginal effects are used.

Chapter 2

Nursing Job Stability in Ontario: Comparing Long-Term Care Homes With Other Healthcare Sectors

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Abstract

Claims of high turnover, reflecting worker dissatisfaction, in the long-term care home (LTCH) sector have been common during the coronavirus disease 2019 pandemic. Using a census of registered nurses (RNs) and registered practical nurses (RPNs) in Ontario from 2014-2020, we compare LTCHs and other healthcare sectors in terms of: (i) worker and job characteristics, and (ii) job turnover (distinct from occupational turnover). RNs in LTCHs are older, have lower levels of education and are more likely to be trained outside of Canada compared with the provincial average, whereas RPNs are more similar to that norm. LTCH jobs are more likely to be rural, and to involve casual contracts and casual hours than those in most, but not all, sectors. Pre-pandemic, RNs in LTCHs were in the middle of the sectoral turnover distribution, whereas RPNs were lower than all sectors except hospitals. Among nurses who changed jobs, LTCH sectoral retention was similar to that in other sectors. Overall, turnover measures do not suggest lower job satisfaction in LTCHs than other sectors. During the first year of the pandemic small changes in turnover were observed, but it is difficult to disentangle pandemic restrictions on multiple job holding from other causes.

2.1 Introduction

The coronavirus diseases 2019 (COVID-19) pandemic has drawn attention to staffing instability within the long-term care home (LTCH, also known as the nursing home) sector in Ontario and other jurisdictions. In the first two waves of the pandemic, residents and staff in these homes were much more likely to become infected and subsequently die than were individuals of a similar age in the community.[1] Weekly COVID-19 deaths per 10,000 LTCH residents, and per 100,000 community-dwelling individuals 70 years and older, from March 25, 2020, to April 2, 2022, are displayed in Figure 1.[2] In mid-April 2020, weekly LTCH mortality was about double the pre-COVID-19 five-year average; excess mortality returned to close to zero by June 2020 as the first wave subsided but increased again as the second wave started in September 2020 (Akhtar-Danesh et al. 2022; Stall 2021). By the third wave, however, LTCHs were given more resources including priority access to vaccines, and homes improved their infection prevention and controls measures (Ontario Agency for Health Protection and Promotion, 2021a,2021b). Compared with earlier waves, deaths in LTCHs were relatively low despite those in the community increasing (Government of Ontario, 2022). As seen in Figure 1, the dominant variant in the fourth wave again negatively affected LTCHs, but the impact was less severe than during the first and second waves.

Comas-Herrera et al. (2021, especially Figures 1 and 2), using national-level data to late

[1] The overall COVID-19 mortality rate (in LTCHs and/or the community) can be decomposed into the *case rate* times the *case fatality rate*. The values, dynamics and determinants of these two components of the overall mortality rate may differ appreciably in LTCHs and the community. Also, although not the focus of this study, some care is needed in interpreting COVID-19 statistics given associated measurement challenges. Especially, (i) there has been some confounding of deaths attributable to COVID-19 compared with deaths among those with COVID-19 where that disease was not the primary cause and, (ii) testing rates have varied over time and context with more pervasive testing in LTCHs.

[2] For weekly deaths per 100,000 in both populations, see Appendix 1 Figure 1.

2020 or early 2021, show that the overall COVID-19 mortality rate in Canadian LTCHs was comparable with that in other developed nations conditional on COVID-19's prevalence in the community as proxied by deaths in the non-care home population, and the proportion of the population in LTCHs. Although the medical frailty and advanced age (more than 50 percent of residents are over the age of 85) of LTCH residents offers some explanation for high case fatality rates, many have questioned what led to the high case rates (Ng et al. 2020; Ontario Long-term Care Association [OLTCA], 2019). In addition to staff instability, suggestions include inadequate infection prevention and control protocols, restricted access to personal protective equipment, insufficient funding and outdated building designs (especially three and four person rooms) as contributors (Akhtar- Danesh et al. 2022; Brown et al. 2020; Faghanipour et al. 2020; Holroyd-Leduc and Laupacis 2020; Stall et al. 2020; and especially the Ontario COVID-19 Long-term Care Commission's final report by Marrocco, Coke, and Kitts 2021).

In this paper, using 2014-2020 administrative data, we investigate whether workforce or job characteristics and job stability among registered nurses (RNs) and registered practical nurses (RPNs) in LTCHs differ from those in other Ontario healthcare sectors. Workforce characteristics include the level of education, location of first education and practice in the profession, years of practice, and languages spoken. Job characteristics include employment status (full-time, part-time, or casual), employment category (permanent, temporary, or casual), and location of the job. To investigate job stability, we contrast the LTCH sector and other sectors in healthcare by measuring (1) the year-over-year rate of job turnover, and (2) for jobs that exist in 2014, the number of years each job continues in our data window. We estimate count regression models to compare across healthcare sectors. We also examine the share of new nurses entering each sector, sector growth, and whether the pool of normally non-practicing

nurses who may maintain their registration but are "inactive" in the profession was a resource during the pandemic.[3] Importantly, we perform almost all of our analysis from the employer or job perspective. Hence the unit of analysis is the job, not the worker, since turnover occurs at the job level.

We focus on turnover as a measure of job instability for two reasons. First, job instability reduces continuity of care, which potentially affects quality of care; training is more frequent, and turnover serves as a vector for infectious disease transmission. Second, labour economists have long used job turnover as a measure of a job's or job-worker match's quality; the basic idea is that higher quality matches endure longer (e.g., Pries and Rogerson 2022; Abraham and Farber 1987). We want to see if the characterization of the LTCH sector as having low wages, chronic staff shortages, and high rates of part-time or casual work (e.g., Covert, 2020; Grant and Stone, 2020; Grant and Anderssen, 2020; Jeffords, 2020) is indicative of low job quality leading to higher turnover than in other nurse employment environments in Ontario.

As background, the Canadian healthcare labour market is far from a textbook competitive market. It has been traditionally argued, perhaps with a US-UK lens, that the nursing labour market is monopsonistic with employers having appreciable market power (e.g., Sullivan 1989). As early as 1970, Yett saw the monopsonistic labour market structure as explaining the reports of chronic nursing shortages, which he documented as going back to at least the 1930s in varying jurisdictions (Yett 1975). A variant on this, recognizing Canadian nursing's high unionization rate, suggests the market is better characterised as a bilateral monopoly (Sweetman 2022). In

[3] This group of nurses includes those who do not have an active registration status and are not actively practicing, but still participate in the data collection, and those who have an active registration status but are not actively practicing (e.g., they are on leave or retired but still maintain their registration). For the purpose of this paper, both groups of nurses are labelled as "inactive."

either case, the market structure problematizes the interpretation of nominal shortages.

More recently, using data from 2018 Austin et al. (2020) report that 60 percent of RNs, and 61 percent of RPNs in LTCHs had part-time or casual positions, whereas only about 24 percent preferred part-time work. However, their analysis has no comparator sectors and it is well known that part-time and casual work are common among nurses in Canadian healthcare. Another report from Toronto Metropolitan University's National Institute on Ageing ([NIA], 2019) expressed concern that Canadian LTCHs experience difficulty attracting and retaining nursing staff. This report, however, did not examine recruitment and retention issues in other healthcare sectors. It is unclear whether what was interpreted as high percentages of part-time or casual work, and difficulty recruiting and retaining staff, are a LTCH issue or a broader healthcare one.[4] This is one key piece of evidence that we seek to clarify in order to inform policy development in the LTCH sector and healthcare more broadly.

2.2 Literature Review

Turnover is inconsistently defined across the literature (Cavanagh, 1989; Castle, 2006; Duffield et al. 2014; Hayes et al., 2006, 2012). A Canadian study by O'Brien et al. (2008), that defined turnover as staff voluntarily leaving their position, found an average annual turnover rate of 19.9 percent in a particular sample of hospitals. Using a similar definition of turnover, North et al. (2013) found a turnover rate of 44.3 percent for a participating sample of hospitals across 11 of New Zealand's 21 health boards, and Roche et al. (2014) found a turnover rate of 15.1 percent in 11 hospitals across three states in Australia. On the other hand, a two-part US study by Jones

[4] In contrast, Austin et al. (2020) provide comparisons of RN and RPN wages across sectors showing that, although there is heterogeneity across individual employers, LTCHs tend to pay hourly wages to RNs and RPNs that are somewhat less than hospitals and more than the home and community care sector, which is consistent with common understandings in nursing about the sectoral wage hierarchy.

(1990a, 1990b) defines turnover as the involuntary or voluntary transition of nursing staff, and found an average annual turnover rate of 26.8 percent in four acute care hospitals.

Measured turnover rates in LTCHs differ substantially across homes, methodologies, and data sources. In a literature review covering 1990-2003, Castle (2006) observed reports of average annual turnover rates in the US ranging from 8 to 103 percent for LPNs, and from 19 to 64 percent for RNs. Donoghue (2010) uses the 2004 US National Nursing Home Survey and reported an annual turnover rate of 56.1 percent for RNs and 51 percent for LPNs, although turnover rates also tend to move with the economy, so no single year is fully representative (Staiger et al. 2012). Furthermore, annual sampling rates do not usually take very short jobs into account. Baughman and Smith (2012) take this into consideration by using the 1996 and 2001 Survey of Income and Program Participation (SIPP) to examine the employment duration of direct care workers (nursing assistants or aides, home health aides, personal care aides), who provide the majority of care in US nursing homes. They find mean and median employment durations of 9.7 and 5 months respectively (Baughman and Smith 2012).

Aside from COVID-19, staff turnover is a concern in healthcare since increasing turnover has a negative impact on patient care quality (Castle and Anderson 2011; Collier and Harrington 2008; Zimmerman et al. 2002). US studies have shown that health improvements from reducing turnover are highest among those 85 years and older, and especially among nursing home residents (Miller et al. 2009; Stevens et al. 2015). To the best of our knowledge, however, there are no studies that measure LTCH turnover rates in Canada, although some research focuses on predictors of intentions to quit or actual turnover in LTCHs among narrow samples of nurses – for example, a single year of data from a particular home or set of homes (e.g., Chu et al. 2014; McGilton et al. 2013; Tourangeau et al. 2010). We fill in this knowledge gap, however, by using

a census of RNs and RPNs in Ontario from 2014-2020 to compare nursing turnover and related job characteristics across sub-sectors of healthcare.

Antwi and Bowblis (2018) argue that most previous studies linking turnover and quality of care are correlational, not causal. Moreover, they suggest that unobserved factors influencing quality may also be associated with turnover. Using US data, they account for endogeneity using fixed effects (FE) panel instrumental variable (IV) regression. Using the local unemployment rate as an instrument for turnover, these authors show that a 10-percentage point increase in nurse turnover leads to a 16.5 percent increase in deficiency citations received by a nursing home, and an increase in resident discharges due to death. Lin (2014) also employs an IV approach and finds RN staffing levels, which may be related to turnover, have a large and statistically significant impact on nursing home residents' quality of care. Both studies found ignoring endogeneity underestimates the impact of staffing levels and turnover on quality of care. Although we examine the relationship among turnover, job quality, and quality of patient care in depth, in this paper we do not investigate the causal relationships. Nevertheless, understanding potential differences between causal and observational studies matters in interpreting our results.

2.3 Methods and Data

In this study we use the Ontario Health Professions Database (HPDB), which is an annual census of licensed nurses in the province collected late in each calendar year that is linked longitudinally by nurse. It derives from regulatory college registration records that, under the *Regulated Health Professions Act, 1991*, nurses in Ontario are obliged to provide (Government of Ontario, 1991). The dataset contains information on employment, education, and demographic characteristics (Ontario Ministry of Health and Long-term Care, 2018). We use data for 2014-2020 (the most

recent year available). However, in much of the analysis we separate the pre-COVID-19 years, 2014-2019, and analyze the first year of COVID-19 independently to highlight any discontinuity.

Following the questionnaire, a practice setting is one of the following healthcare sectors: LTCH (e.g., nursing home), hospital, primary care (e.g., physician's offices), home care (primarily for assistance with chronic conditions and aging), supportive housing or retirement home (e.g., assisted living home), public health and a composite "other" aggregating practice settings less relevant to our analysis.[5]

The registration process categorizes nurses as either active (including those who are unemployed), or inactive. Inactive categories include: retired, left the country, changing profession, on leave, resigned, and other. Of course, care is required in interpreting these inactive categories since they are only relevant to nurses who participate in the data collection, despite being inactive. For example, a nurse who retires or leaves the country may simply cease to participate in the data collection if they no longer maintain their Ontario registration. However, in practice the vast majority of nurses who exit practice in Ontario register as inactive for at least one year before leaving the dataset.

A job, as identified in our data, consists of a unique nurse, an employer postal code in Ontario (we exclude jobs outside Ontario, and the employer is not observed other than via a postal code), and a practice setting.[6] Since the data are collected annually, usually in December, we do not capture jobs with durations of less than one year that do not cross the data collection window. Our measure of turnover includes job- to-job transitions as well as transitions to non-

[5] For a description of each healthcare sector, refer to the "Glossary of Healthcare Sectors," in Appendix 2.

[6] We do not include the employment status (full-time/part-time or casual) in our definition of the job, nor do we perform our measure of turnover based on full-time equivalent (FTE) jobs.

employment. If we observe a nurse who is employed in one or more jobs in year t to cease to have any job in year t+1, then that job ends (those jobs end). For nurses who continue to work in the province across years, for each job, if a nurse-employer postal code-practice setting ceases, then the initial job has transitioned. If a nurse changes duties (or even employers), but the postal code and practice setting remain constant, we would not see this in our data and no job transition would be recorded. Alternatively, if an employer changes postal codes, then this will be recorded as a job transition. If the postal code is recorded as "unknown", we set it to that in the following year if the setting and province of practice are the same in both years. Where this is not possible, we drop the job; however, missing data are rare and we remove only about 570 jobs out of 1,179,610 – less than 0.05 percent.[7]

Missing annual characteristics (sometimes coded as not applicable in the datafile) are imputed, where possible, using data from subsequent years. Education data prior to 2017 was reported differently than in subsequent years. In response to this, to generate a consistent series we did the following: we set education to equal that in the most recent year available and adjust reports in earlier years to never be higher than that in the most recent year.

For some of the analysis, we quantify sector switching, which means that jobs that come to an end and are replaced need to be matched with new jobs that start. We first limit this analysis to single jobholders, where there are one-to-one job transitions. However, we subsequently perform a similar analysis for the subset of multiple jobholders who prefer full-time hours but have multiple part-time or casual jobs in year t, and transition to at least one full-time job in year t+1.[8] While it is straightforward to identify sectoral transitions when a single full-time

[7] All counts are rounded to the nearest 10 for confidentiality.
[8] For this analysis, multiple jobholders are assigned to the sector of their first listed job. This analysis is performed at the individual-level, as opposed to the job-level.

job is observed in year t+1, an identification strategy is required in the case where multiple full-time jobs are observed in year t+1. We elect to assign the transition to the sector of the first listed full-time job in year t+1.

Overall, the dataset is an unbalanced panel of jobs (with holes since, although rare, nurses may leave and return to a job) containing a total of 130,100 unique RNs who across the seven years of data available held 243,430 distinct jobs, and 67,060 unique RPNs who similarly held 145,690 jobs.

2.4 Results

2.4.1 Workforce and Job Characteristics

Table 1 displays statistics characterizing nurses and their jobs (with each job defined by the postal code and practice setting) on a per job basis. Focusing first on the bottom two rows of Table 1, the average number of jobs per year shows that RPNs hold about 32 percent of combined RN and RPN jobs in Ontario, but about 63 percent of those in LTCHs. This coincides with just over 8 percent of RN, and 29 percent of RPN, jobs being in LTCHs.

In Table 1, the characteristics of RNs in LTCHs differ from the average RN in the province (the total column), whereas RPNs in LTCHs are more similar to the provincial norm. RNs holding jobs in LTCHs are slightly older and have lower levels of education than the provincial average. They are also much more likely to have been educated and first practised outside of Canada or the US than typical RNs and RPNs. Corresponding to this, RNs and RPNs in LTCHs are similarly likely to speak both English and another language, with RNs in LTCHs much more likely to do so than the provincial average. Among RNs, jobs in LTCHs are more likely to be casual in terms of hours worked and casual in terms of employment category than the provincial norm, whereas the gaps relative to provincial norms for RPNs are much smaller.

Notable differences in characteristics are apparent across sectors, especially for RNs. The LTCH sector is not an outlier, although its jobs are more similar to those in primary care and supportive housing than they are to those in the hospital and public health sectors. For example, the educational distribution in LTCHs, primary care and supportive housing are broadly similar, with a higher share of diploma educated RNs compared with hospitals and public health. Two areas in which LTCHs stand out are in having positions filled by individuals who speak English and another language (there is much more linguistic diversity, especially among RNs), and in being geographically rural (this latter is similar to primary care). Overall, although jobs in the LTCH sector clearly differ from those in the hospital sector in terms of the characteristics presented, there is no evidence here that LTCH jobs differ from norms in healthcare overall.

2.4.2 Pre-Pandemic Turnover Rates (2014-2019)

Table 2, Panel A, shows average year over year job turnover rates for 2014-2019. Turnover includes jobs that end and are (a) replaced (job transitions), or (b) not replaced (job ends), by one or more new Ontario nursing jobs.[9] The reason a job ends is subdivided into four exhaustive and mutually exclusive categories: retired, on-leave, working outside the profession or Ontario and other.[10] For well less than 1.0 percent of jobs, where a nurse has four or more jobs, we cannot always determine whether jobs continue or end since information is only collected on three jobs. Among RNs, the turnover rate in LTCHs is similar to that in home care, higher than hospitals and public health, and lower than primary care, supportive housing, and "other". Among RPNs, however, the turnover rate in LTCHs is lower than that in all other sectors except the hospital

[9] For multiple jobholders, a job transition occurs if the job that changes is replaced by at least one new Ontario nursing job. For example, if a nurse has two jobs, and both jobs change, this is considered a job transition for both jobs if the nurse in question gains at least one new Ontario nursing job the following year.

[10] Further details are in Appendix 1 Figures 3 to 5.

sector, which has the lowest turnover rate. Overall, we do not find any evidence supporting excessive job dissatisfaction – at least not dissatisfaction resulting in abnormally high turnover – in the LTCH sector, especially for RPNs.[11]

2.4.3 Trends and Pandemic Turnover, Retirement, and Leave Rates

Although discussions of nursing shortages are not novel – indeed as discussed earlier they have been ongoing since the 1930s – the pandemic has increased concerns about nurses leaving the profession as a result of stress and burnout. Our data are collected circa December, so the 2020 data in Panel B of Table 2 allow a window into turnover rates relevant to the initial COVID-19 waves. Compared with the 2014-2019 average, both RNs and RPNs exhibit a modest increase in turnover across all sectors. For turnover rates in each year, refer to Appendix 1 Figure 2.

The largest turnover increase in 2020 occurs for LTCH and supportive housing RNs (5.7 and 4.1 percentage points respectively) and RPNs (7.5 and 6.6 percentage points respectively). This increase in turnover arises from an increase in job transitions, as opposed to jobs ending. However, some of these increases undoubtedly resulted from the pandemic order preventing within-sector multi-job holding in nursing and retirement homes (Government of Ontario 2020a, 2020b), since a large share of these jobs are replaced by another Ontario nursing job. Among jobs that come to an end and are not replaced by the data collection date, a historically high percentage of both RNs and RPNs report being on leave, compared with the 2014-2019 average. However, the increase in LTCHs is modest. Compared with the previous year, 2019, the difference is only 1.0 percentage point for RNs and 2.0 for RPNs.[12] Moreover, this small increase does not

[11] For turnover rates by age group, since young nurses have been shown to be more mobile (LaVassuer et al. 2009), refer to Appendix 3 Tables 1 to 3. We also find higher turnover rates among young nurses.

[12] Refer to Appendix 1 Figure 3 for yearly rates of jobs that end due to nurses reporting they are on leave.

indicate a higher percentage of nurses went on leave in 2020, as going on leave is an individual-level concept, and our analysis is at the job level. Lastly, the percentage not working or leaving Ontario declines, as does the percentage who retire, conditional on the job ending.[13]

Ontario's LTCH Commission noted that some homes offered full-time hours to those working part-time to account for lower staffing levels that resulted from the single- site restriction in LTCHs (Marrocco, Coke, and Kitts, 2021). However, although part of the increase in turnover in LTCHs seen in 2020 may be due to the collapse of two part-time positions into one full-time job, this is not the only explanation. For example, if a nurse worked two part-time jobs in different LTCHs, and this transitioned to one full-time job in 2020 with one job continuing in one of the two original homes, this would be labelled as one job ending (i.e., our definition of a job includes the practice setting and postal code, not the employment status). However, if this nurse also gained employment in a different sector (which was permitted because the single-site order only applied within sectors), this would be labelled as a job transition.[14] Overall, in the first approximately ten months of the pandemic covered by these data, there appears to have been at most a very small increase in jobs ending where the nurse did not relatively quickly transition to a new nursing position in Ontario.

2.4.4 Sector Transitions for Single Jobholders

In Table 3 we consider jobs that terminate in one year where each nurse (who is a single jobholder) in question finds one new Ontario nursing job the following year or becomes inactive.

[13] Trends in the retirement rate, and the rate of nurses leaving the Ontario nursing profession (resulting from jobs ending) can be found in Appendix 1 Figure 4 and Appendix 1 Figure 5 respectively. For similar analyses by age group, refer to the discussion in Appendix 3," Supplementary Analysis by Age Group," and Appendix 3 Figures 1 through 8.

[14] Similarly, if a nurse had part-time employment in one LTCH, but transitioned to a new full-time job in a different LTCH, this would be labelled as a job transition.

The table shows, for example in the upper left corner (Table 3, Panel A), that 28.3 percent of jobs held by RNs in LTCHs that come to an end in one year are replaced by another job in the same sector in the next year (averaged over 2014-2019). The similar percentage for RPNs is 16.9 (Table 3, Panel A).

It is, however, difficult to compare rates of same-sector transitions across sectors since the sectors are of different sizes. For example, as seen in Table 1, 57.4 percent of RNs' jobs are in hospitals, whereas only 8.2 percent are in LTCHs. If new job finding was purely random and new jobs were available in proportion to each sector's size, then we would expect, for example, that 57.4 percent of new jobs would be obtained in hospitals. On this basis we calculate the relative likelihood of finding a job in the same sector as the previous job compared with the sector's size. Although jobs are unlikely to be available in direct proportion to each sector size since, as seen in Table 2, turnover rates vary across sector, the comparison does provide some insight. Focusing again on RNs in the LTCH sector, those who lose a job in that sector are 3.4 times more likely (Table 3, Panel C) to obtain a job in the same sector than would be expected on the basis of the size of the sector. In contrast, RPNs (Table 3, Panel C) whose job ends in a LTCH are less likely to obtain a new job in the same sector than would be expected on the basis of the size of the sector. RNs appear to be more attached to the LTCH sector than are RPNs. Comparing across sectors and among jobs that end, nurse retention in the LTCH sector appears to be on the low side compared with the rest of healthcare, but as seen in Table 2 it also has fewer jobs that end. Sectoral retention of workers is, of course, a combination of these two rates.

Sector transitions and retention for 2020 are displayed in Panels B and D. From 2019 to 2020, our measure of sector retention increases for most sectors, except among primary care

RNs and RPNs, however, the changes are small (with the exception of public health RNs).[15]

2.4.5 Transitions for Inactive Nurses

Nurses who have withdrawn from active practice are frequently thought of as a reservoir of talent that may be drawn upon in a crisis, and there are media reports about former nurses returning to the profession to assist during the pandemic (e.g., Beauchemin and Jones 2020; Lowrie 2020). We explore this among single jobholders (Table 3), which is (unusually for this paper) from the individual perspective.[16]

There are a number of reasons why a nurse may be inactive including: going on leave (including maternity leave), retiring, leaving the country/province, changing professions, and so forth.[17] For single jobholders (Table 3), in the last row of Panels A and B, we show the sector to which inactive nurses transition to the following year (including remaining inactive).[18]

Among RNs and RPNs who are single jobholders, most inactive nurses remain inactive. For example, averaged over 2014-2019, 81.9 percent of nurses who are inactive in an initial year remain inactive the following year. Similarly, among all nurses (single and multiple jobholders), the majority of inactive nurses remain inactive or leave the dataset the following year.[19]

Focusing on the pandemic in 2020 (Table 3, Panel B), for both RNs and RPNs (both

[15] Sector transitions among single jobholders for each year (2014-2019) can be found in Appendix 4 Tables 1 to 5. For sector retention in 2019, refer to Appendix 4 Table 5, Panel B.
[16] The same analysis, also from the individual perspective, is performed among all nurses (both single and multiple jobholders) in Appendix 4 Table 6.
[17] In practice not all leaves are associated with an inactive registration status, however for the purposes of this paper nurses on leave are identified as inactive.
[18] For all nurses who are inactive (Appendix 4 Table 6) we determine the percentage who (1) remain inactive, (2) leave the dataset, (3) report an active registration status and no employment, or (4) report an active status and employment.
[19] However, among all nurses (Appendix 4 Table 6), starting in 2016-2017 there is a decrease in the percent of both RNs and RPNs who remain inactive, and an increase in the percent who leave the HPDB.

single jobholders, and all nurses) we see an increase in the percentage of nurses who were inactive in 2019 and report employment in 2020. For example, among all RNs who were inactive in 2018, 9.7 percent came back to work in 2019, whereas for those who were inactive in 2019, 16.6 percent came back to work in 2020, representing a 71 percent increase in the return rate compared with the previous year; this implies an increase of about 690 RNs or a 0.6 percent increase in the number working.[20] For RPNs, there is a 46 percent increase, or about 300 returnees, representing a 0.5 percent increase in the workforce. In our transition matrix for single jobholders, we see a similar result (Table 3, Panel B).[21] Overall, although there is evidence of above normal returns to practice from inactive status in the first year of the crisis, the overall scale of the effect is modest.

2.4.6 Turnover and Job-Worker Match Quality

While we do not investigate the causal relationship between turnover and job quality, in Table 4 we investigate the percentage of nurses (single jobholders) who transition jobs, and move up (i.e., to a higher quality worker-job match) based on their employment status in year t+1. We take into account employment preferences for work schedules to define higher quality job-worker matches. Table 4 considers four groups of nurses: (1) involuntary part-time or casual, (2) voluntary part-time or casual, (3) involuntary full-time, and (4) voluntary full-time nurses. Involuntary part-time or casual nurses prefer full-time employment, but are employed in a part-time or casual job; involuntary full-time nurses prefer part-time or casual employment but are employed in a full-time job. Voluntary part-time or casual and full-time nurses, by contrast, are employed in a job with the desired characteristics. For example, averaged over 2014-2019,

[20] Refer to Appendix 4 Table 6.
[21] For inactive transitions among single jobholders in each year refer to Appendix 4 Tables 1 to 5.

(Table 4, Panel A) 48.3 percent of LTCH RNs who are involuntary part-time or casual in year t, transition to a full-time job in year t+1, and 51.7 percent transition to a new job that is part-time or casual.

Among both RNs and RPNs, across all sectors (except hospital RNs), it is slightly more common for nurses with involuntary part-time or casual jobs to transition to a new job that is part-time or casual, as opposed to transitioning to a new job that is full-time (i.e., move up to a higher quality job-worker match based on their stated preference in the first year). Involuntarily part-time or casual RNs in LTCHs appear to be slightly less successful at transitioning to a full-time job compared with nurses in hospitals and home care, and more successful compared with nurses in primary care and "other". LTCH RPNs are more successful at transitioning to a full-time job compared with all sectors, except supportive housing. Interestingly, across most sectors, it is uncommon for involuntarily full-time RNs and RPNs to move to a higher quality job-worker match (i.e., move to a part- time or casual position). Within the LTCH sector, involuntarily full-time RNs are less likely to transition to a desired part-time or casual job, whereas RPNs are more likely to do so.

Compared with the 2014-2019 year over year average (Table 4, Panel A), in 2020 (Table 4, Panel B), there appears to be improvement in the percentage of nurses who transition to a higher quality job-worker match across most sectors (except home care) for both RNs and RPNs who are involuntarily part-time or casual.[22] For example, in 2020, 53.9 percent of involuntarily part-time or casual LTCH RNs transitioned to a full-time job, compared with an average of 48.3 percent over 2014-2019. However, when we compare the average of involuntary full-time nurses

[22] Transition rates in each year can be found in Appendix 4 Tables 7 to 11 (refer to Appendix 4 Table 11 for 2018-2019 transition rates). Results are similar when comparing 2019-2020 transition rates to the year prior.

and their transitions to part-time or casual work in 2020 with the 2014-2019 average, we see a decline.[23]

We also perform a similar analysis on the sub-sample of multiple jobholders who involuntarily work part-time or casual schedules and have two or more such jobs (those who have multiple non-full-time jobs, whose hours are comparable to full-time, and report wanting a full-time job). [24] Among this group, in Table 5 we investigate who gains full-time employment and whether the job is in the same sector. This analysis is from the individual perspective, where multiple jobholders are assigned to the sector of their first listed job. Furthermore, in the rare case of two or more full-time jobs in year t+1, the sector is defined as that of the first listed full-time job.

Table 5, Panel A, shows that among involuntarily part-time or casual nurses in LTCHs, 24.2 percent of RNs, and 14.5 percent of RPNs found at least one full-time job by year t+1. The rate of success in obtaining full-time employment in year t+1 is slightly higher for LTCH RNs and lower for LTCH RPNs compared with the provincial norm, but the differences in the magnitudes are modest. Among these LTCH nurses who find full- time employment, about half do so in the same sector. Across all sectors, it is more likely for involuntarily part-time or casual nurses to remain part-time or casual, or not change or transition jobs.

Table 5, Panel B, displays the transition rates between 2019 and 2020. The percentage of

[23] However, when we compare this transition rate to the year prior (Appendix 4, Table 11), we see a decline or increase depending on the sector. In 2020 there was an increase in the percentage of full-time LTCH RNs who transitioned to a part-time/casual job by 12.1 percentage points. On the other hand, for hospitals there was a decline by 15.9 percentage points.

[24] Surprisingly, averaged over 2014-2020, 58.2 percent of RNs with two or more part-time/casual jobs prefer part-time or casual hours. For these workers combining two part-time jobs is preferred. In contrast, among single job holders who work part- time/casual jobs, only 21.2 percent prefer part-time or casual hours. The similar figures for RPNs are 14.4 and 36.6 percent respectively. There is substantial heterogeneity in tastes and outcomes.

involuntarily part-time or casual multiple jobholders who transition to at least one full-time job increases slightly across most sectors for both RNs and RPNs (with the exception of home care RNs) compared with the 2014-2019 year over year average (Table 5, Panel A).[25]

2.4.7 New Nurses and Sector Growth

Table 6, Panel A, displays the total number of full-time equivalent (FTE) jobs held by nurses new in Ontario (new graduates plus migrants) and the distribution of those jobs across sectors (each year's row sums to 100 percent).[26] For example, in 2014, 3,110 FTE positions were obtained by new nurses, 12.7 percent of which were in LTCHs. For new RNs, the total number of FTE jobs varies non-monotonically over time. Across sectors, the shares of new FTE jobs are approximately stable from 2014-2019. However, during the first year of the pandemic, 2020, there is a marked decline in the share of FTE jobs in the LTCH sector, and a dramatic increase in the share of those in public health. Of course, the total also increased. Notably, the percentage of FTE jobs held by new RNs in public health increased from 1.0 percent in 2019 to 6.5 percent in 2020, which is unsurprising during a pandemic. Among RPNs, Table 6, Panel A, also shows year-to-year variation in the number of FTE jobs held by new entrants, with 2014 and 2016 being the lowest under study. As with RNs, across sectors there is also broad stability in shares from 2014-2019, although there is a modest trend toward a higher percentage going to

[25] For transition rates in each year refer to Appendix 4 Tables 12 to 16. Comparing 2019 to the year prior (Appendix 4 Table 16), the percentage of involuntarily part- time/casual multiple jobholders who transition to at least one full-time job also increases slightly across most sectors for both RNs and RPNs (with the exception of primary care RNs and RPNs, and home care RPNs).

[26] Our data capture weekly hours across all jobs, as opposed to weekly hours for each job. Thus, in our definition of full-time equivalents (FTEs), one full-time job equals one FTE, and one part-time or casual job equals half an FTE.

hospitals.[27]

Panel B of Table 6 displays the year-to-year net growth (i.e., entrants minus exits) of FTE jobs, and the share of this total in each sector. The row percentages sum to 100 percent, and a negative percentage implies that the sector's growth is in the opposite direction from provincial growth (i.e., the "Total" column). For example, between 2015 and 2016, there were 2,480 FTE positions obtained by new RNs, and exits of 2,900 FTE positions, leading to an overall decrease of 420 FTE positions. However, home care and supportive housing saw increases in FTE positions (i.e., new nurse FTE positions exceeded FTE exits), whereas all other sectors experienced a decline (note that here a positive percentage implies a decline because there was an overall provincial decline in FTEs). Furthermore, between 2014 and 2015, the total number of FTE positions among new RNs in LTCHs (395 FTEs), exactly offset the number of exits, resulting in 0 percent net growth. With the exception of 2019-2020, there have been more net new FTE RPN positions than RN ones. Lastly, in Panel C, we display the share of all (new and existing) FTE positions across sectors. For example, in 2014, among RNs, there were 87,940 FTEs, 58.2 percent of which (or 51,180 FTEs) were in hospitals. From 2014-2020, total FTE positions increased by about 5 percent among RNs, and by 27 percent among RPNs. This aligns with research demonstrating that the RPN workforce in Canada is growing faster than the RN workforce (Olaizola and Sweetman, 2019).

As previously discussed, Toronto Metropolitan University's National Institute on Ageing (2019) reported concerns with staff recruitment and retention in Canadian LTCHs, but as seen in previous tables (especially Table 2) turnover in LTCHs does not differ much from the rest of

[27] For the same analysis using headcounts instead of FTEs see Appendix 4 Table 17; despite a decrease in FTE positions among new LTCH RNs, the percentage of full- time positions increased from 20 percent in 2019 to 35.6 percent in 2020.

healthcare. In 2020, however, there was a decline in the share of new nurses (Table 6, Panel A) and net (Panel B) FTE positions in LTCHs among both RNs and RPNs (although, the decrease in new nurse FTE positions among LTCH RPNs is small). This may lead one to conclude that LTCHs faced challenges recruiting nurses during the first year of the pandemic. However, this may represent a temporary shift among nurses to other sectors. For example, many resources were devoted to hospitals, especially at the beginning of the pandemic, which can be seen in the large share of net FTE position growth in hospitals among RPNs (413.1 percent), compared with the precious year (40.4 percent). It is also notable that the decline in the share of new nurse FTE positions in LTCHs is not as sharp compared with the decline in the share of net FTE growth for both RNs and RPNs. Future analysis is required to determine any long-standing effects the early days of the pandemic may have had on recruitment and retention in the LTCH sector.

2.4.8 Count Data

In Table 7 we take a different approach to measuring job stability by reporting the number of years jobs observed in 2014 continue to exist between then and 2019. If a nurse leaves and returns to an employer (postal code and practice setting), this is treated as a single job, although our count does not include the years away. This does not measure completed job duration because our data are left and right censored, but the comparison across sectors provides an estimate of relative job instability or turnover.

The percentage of 2014 jobs that continue throughout the entirety of our period is 37.3 percent and 41.9 percent for RNs and RPNs in LTCHs respectively. For RNs in LTCHs, this is low compared with hospitals, home care, and public health, but high compared with primary care, supportive housing, and “other”. It is several percentage points below the healthcare average. For RPNs, the same percentage for LTCHs is higher than all sectors, except hospitals,

and 7.4 percentage points above the overall average.

In an effort to understand the sensitivity of the results to left censoring, we perform the same analysis for jobs that start in 2017 (Appendix 1 Table 1) in which the job does not exist in 2014, 2015, or 2016. One concern is nurses on leave from 2014 to 2016: such jobs would be inaccurately defined as 2017 job starts. However, it appears to be rare for a nurse to be on leave for more than two years. In general, the relationships found in 2017 are similar to those of 2014. Although, among RNs, the percentage of jobs worked by the same nurse for the entire period of analysis is now higher in LTCHs compared with home care (i.e., 35.0 percent vs. 29.7 percent), and about the same in supportive housing (34.1 percent). Overall, job instability in LTCHs does not seem very different from the rest of healthcare among RNs, and among RPNs it seems to be particularly low.

2.4.9 Count Model Regression Analyses

Using the data described in Table 7, in Table 8 we estimate Poisson regressions to compare job instability across sectors and display average marginal effects (and Appendix 1 Table 2 displays those for jobs starting in 2017).[28] Columns 1 and 4 display differences across sectors without any controls. Column (1), for RNs, is similar to Table 7 showing that jobs in LTCHs are less durable (more unstable) than those in hospitals, home care, and public health, but more stable than those in primary care, supportive housing and "other". In the five years under study, the average RN hospital job lasted almost 0.8 years longer than the average LTCH job. In contrast, LTCH RPN jobs are more stable than all sectors except hospitals.

Nurse characteristics, and job characteristics exogenous to the employer (i.e., rural job

[28] As a sensitivity test, we also perform negative binomial regression (Appendix 1 Tables 3 and 4). Results from both methods are identical, since our data do not exhibit overdispersion.

location) are introduced as controls in models 2 and 5 of Table 8, and job characteristics over which the employer has more immediate control (part-time or casual status with full-time omitted) are added in models 3 and 6. Note that variables representing location of first practice, and languages spoken in the profession are excluded because they are extremely highly collinear with the location of first education. Similarly, variables representing employment categories (permanent/temporary/casual) are excluded because they are highly collinear with employment status. Although the sector coefficients change in the controlled models, they remain broadly similar, and statistically significant, across all models for both RNs and RPNs.

Most control variables' coefficients are statistically significant, but small in magnitude, although there are exceptions. Unsurprisingly, RN jobs with casual schedules exist fewer years than full-time RN jobs; perhaps surprisingly, they exist only 1.3 to 1.4 years less. Nurses who do not report their education to the regulator have much shorter job durations; however, for some this relationship is spurious.[29] Interestingly, jobs involving RNs and RPNs with higher levels of education tend to exist for a shorter time, especially among RPNs. Furthermore, jobs employing RNs and RPNs who began their education outside Canada or the US exist longer, although the coefficients are small in magnitude for both RNs and RPNs.[30]

[29] Education is imputed at the individual-level, not at the job-level. Thus, the relationship between those with missing education and job instability may be spurious for those, for example, who did not report their education in 2014-16, and disappear from the data set in later years, preventing the imputation.

[30] To investigate the control variables' coefficients by sector, we run regressions separately for LTCHs (columns 1 to 4) and hospitals (columns 5 to 8) in Appendix 4 Table 18. Of particular interest is that the sign of the education coefficient remains the same among RNs and RPNs in both sectors, while the coefficient on location of first practice outside Canada/the US increases in magnitude for LTCH RNs and RPNs and remains similar among hospital RNs and RPNs (though the sign changes among RPNs). This latter may suggest heterogeneity in the suitability of education levels/location of first education across healthcare sectors and within the nursing profession (RNs vs RPNs). The 2017 results restricted to hospitals and LTCHs appear in Appendix 4 Table 19.

The Poisson regression results for jobs that start in 2017 appear in Appendix 1 Table 2. The patterns of relationships are fairly similar to those for 2014 for both RNs and RPNs.

2.5 Discussion

Discussions of LTCH nurse job instability, including high turnover rates and high proportions of part-time or casual employment, have been heard throughout the pandemic. However, no studies have investigated how LTCHs compare with other healthcare sectors on these dimensions despite healthcare staffing being associated with quality of care, including poorer infection prevention and control. We seek to close this gap by comparing employment stability and job or workforce characteristics in LTCHs compared with the rest of healthcare among RNs and RPNs in Ontario.

Overall, we find differences in job and workforce characteristics across sectors. The proportion of jobs worked by internationally educated nurses (IENs) is markedly higher among LTCH RNs, and slightly above average for LTCH RPNs. Moreover, although the prevalence of part-time or casual work schedules is higher than the provincial average among LTCH RNs, the sector is not an outlier with primary care, supportive housing, and "other" having similar, but slightly higher levels. Moreover, the share of part-time or casual employment is similar to the overall average among RPNs. In contrast, if we focus on new entrants to nursing in Ontario, we see the smallest percentage with full-time employment in LTCHs and supportive housing for both RNs and RPNs.[31]

We find that employment instability, measured by turnover rates and count data, is slightly above the provincial average among LTCH RNs, and lower among LTCH RPNs. However, job stability among LTCH RNs is not an outlier. It is low compared with primary care, supportive housing, and "other", and high compared with most other sectors. Among both RNs

[31] Refer to Appendix 4 Table 17, Panel A.

and RPNs, hospitals have the lowest turnover rates. Indeed, across the industry the hospital sector tends to be the outlier on most dimensions. This may be due to varying government funding levels, and hence wages, across sectors. For example, although there is institution-specific variation, wages are typically higher in hospitals, and lower in home care, compared with the LTCH sector (Austin et al. 2020). See also Olaizola et al. (2020) for trends in pay in home care.

There has also been increasing concern among some that the pandemic may result in an increase in the number of nurses who retire (i.e., the great resignation), or leave the profession pre-retirement. We only have the first year of pandemic data and can therefore only provide preliminary evidence on the effect of the pandemic on nursing supply. Overall, the data suggest that the 2020 rate at which jobs ended because nurses went on leave, retired, or exited the profession in Ontario does not substantially differ from 2019. However, we find a large increase in the turnover rate from 2019 to 2020 among LTCH RNs and RPNs, and a concomitant increase in the share of full-time employment among existing and new nursing entrants (despite a decrease in FTE positions overall), which suggests that this may follow, at least in part, from the single-site-of-work order issued during the pandemic. Aligned with the single- site order as a key source of this change is that supportive housing, the only other sector also faced with this order, had similar patterns.

One limitation is that our measure of turnover is calculated annually and thus does not capture jobs that last less than one year and are not active at data collection. Still, the analysis captures relative job instability as long as such very short jobs are not too common and/or unevenly distributed across sectors.

2.6 Conclusion

Overall, perhaps surprisingly given media reports, we observe that RNs in LTCHs are in the middle of the distribution compared with those in the rest of healthcare on most measures of job stability. Moreover, pre-pandemic, LTCH RPNs, who form the majority of the nursing staff, have job stability that is greater than that of RPNs in all sectors except hospitals.

In 2020, the first year of the pandemic, turnover rates remained similar across most sectors, but increased in LTCHs and supportive housing for both RNs and RPNs. Nurses in LTCHs and supportive housing, exclusively, also experienced a shift to more full-time employment, which may in part be due to the single site restriction introduced only in these two sectors. Turning to the distribution of new nurses in Ontario, which was relatively stable across sectors from 2014-2019, in LTCHs we observe a decrease in the percentage of new full-time equivalent (FTE) RNs in 2020. This occurred despite a greater share of full-time employment, which appears to indicate some trouble recruiting, but the magnitude is modest.

Using count data regression analysis for the number of years a job continues to exist in our data period pre-COVID-19, we find that for LTCH RNs, jobs tend to exist longer than those in primary care, supportive housing, and "other", and for fewer years than those in hospitals, public health, and home care. This continues a pattern of LTCHs having outcomes in the middle of the distribution of sectors. In contrast, LTCH RPN jobs tend to exist longer than jobs in all sectors except hospitals. Our analysis demonstrates that turnover and job instability may be an issue in healthcare overall, but it is not limited to LTCHs.

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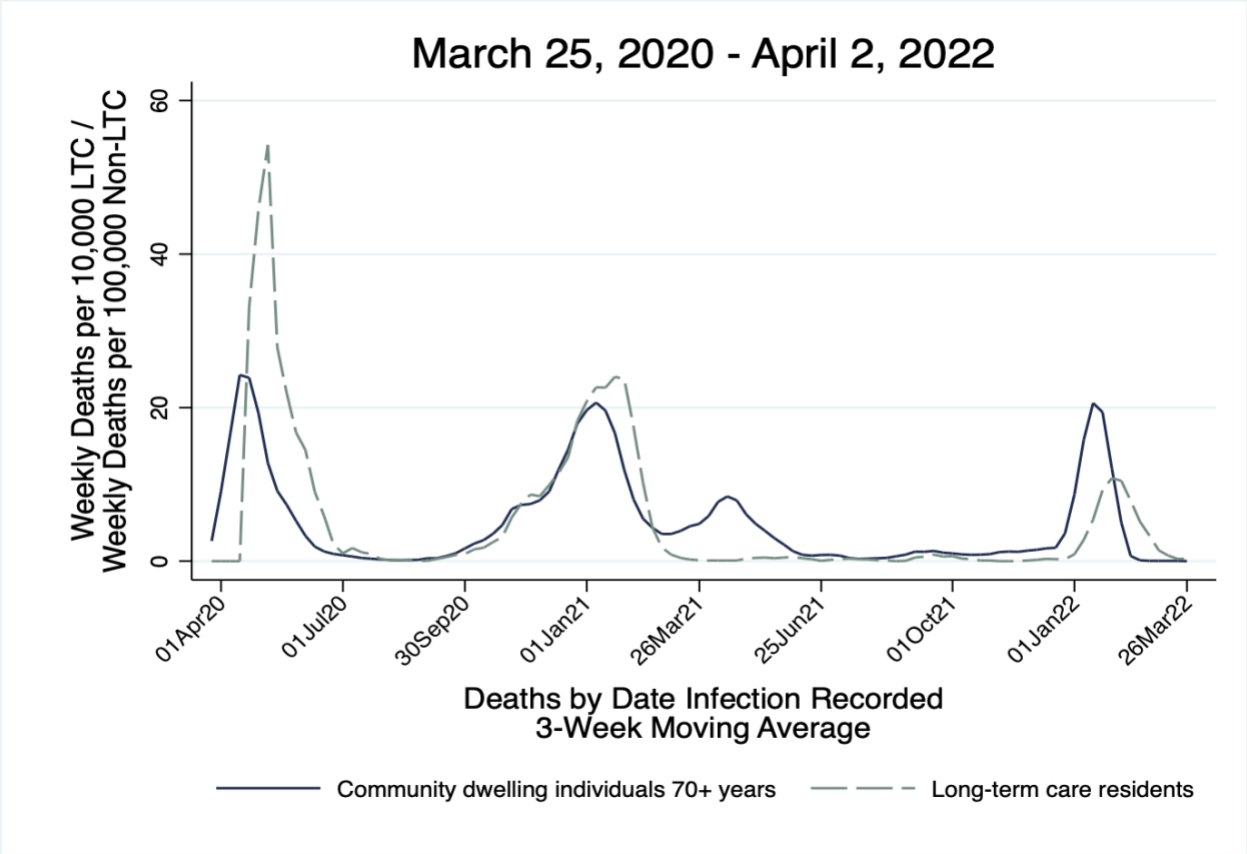
Figure 2.1:Weekly COVID-19 Death Rates Among the Long-term Care and the 70+ Non-Long-term Care Population



Note: Long-term care deaths are reported as 0 prior to April 4, 2020 – the initial reporting date. Deaths include those who died with and from COVID-19.

Source: Government of Ontario. Long-Term Care Home COVID-19 Data 2020-2022; Confirmed positive cases of COVID-19 in Ontario 2020-2022.

Table 2.12: Descriptive Statistics of Job Holders and Jobs (2014-2020)

	RNs								RPNs							
Variables	**Long-term Care**	**Hospital**	**Primary Care**	**Home Care**	**Supp. Housing**	**Public Health**	**Other**	**Total**	**Long-term Care**	**Hospital**	**Primary Care**	**Home Care**	**Supp. Housing**	**Public Health**	**Other**	**Total**
Mean Age (yrs)	45.8	42.2	47.1	46.0	47.1	43.8	46.6	43.9	40.7	39.0	39.7	40.0	39.6	41.8	41.5	40.2
Male (%)	7.4	8.0	4.1	5.0	4.1	3.3	9.6	7.8	9.4	9.3	3.6	10.7	7.9	10.0	11.5	9.4
	Highest Education (%)															
Diploma	45.6	37.0	47.3	36.5	45.1	6.0	38.1	37.3	90.3	92.7	93.0	86.7	85.3	89.4	90.5	90.7
Bachelors	50.6	58.0	48.4	58.9	49.9	84.5	50.4	56.2	8.5	6.1	6.0	11.7	13.2	8.8	8.2	8.0
Graduate	3.1	4.5	3.3	4.0	3.9	8.9	10.8	5.8	0.5	0.3	0.4	0.8	0.7	N/A	0.5	0.5
Missing	0.7	0.5	1.1	0.7	1.2	0.5	0.7	0.6	0.7	0.9	0.7	0.8	0.8	N/A	0.8	0.8
	Location of First Education (%)															
Ontario	68.0	82.2	81.7	85.8	77.9	89.6	81.5	81.1	82.7	89.0	88.3	79.0	76.5	86.4	86.1	84.9
Other Prov/Terr	3.6	4.6	7.8	4.9	6.0	6.1	6.3	5.1	1.7	1.5	2.1	1.9	2.5	2.6	1.7	1.8
U.S.	0.9	0.7	1.3	1.2	1.2	0.9	1.1	0.8	0.3	0.1	0.4	0.3	0.2	N/A	0.4	0.3
Not Canada/U.S.	25.7	11.1	7.5	6.8	12.8	2.4	9.5	11.2	13.5	7.3	7.8	16.7	19.2	8.2	10.0	11.0
Missing	1.9	1.4	1.7	1.3	2.2	0.9	1.7	1.7	1.8	2.0	1.4	2.0	1.6	N/A	1.8	2.0
	Location of First Practice (%) and Mean Years of Practice															
Ontario	66.2	79.5	79.2	82.8	75.6	86.7	78.6	78.5	82.3	87.1	84.5	76.3	77.3	87.3	83.3	83.5
Other Prov/Terr	3.6	4.4	7.3	5.1	5.3	6.3	6.2	4.9	1.4	1.4	1.8	1.8	2.1	2.2	1.6	1.5
U.S.	2.0	2.6	3.0	2.8	3.0	2.1	2.9	2.6	0.2	0.1	0.2	N/A	0.2	N/A	0.3	0.2
Not Canada/U.S.	22.9	10.0	6.8	6.2	11.6	2.3	8.4	10.2	3.9	2.1	2.6	4.9	4.7	2.3	2.6	3.0
Missing (%)	5.3	3.6	3.7	3.0	4.5	2.6	4.0	3.8	12.2	9.3	10.9	N/A	15.7	N/A	12.3	11.7
Yrs practice CAN	16.4	15.9	21.4	19.8	20.1	18.8	19.9	17.3	10.2	11.1	12.8	9.6	9.9	14.4	12.5	11.1
Yrs practice non-CAN	11.5	11.3	11.5	11.5	11.5	11.5	11.4	11.2	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.7
Missing (%)	8.2	4.6	4.5	3.6	6.0	2.9	5.0	4.9	14.1	10.5	12.4	19.3	18.6	9.0	13.6	13.3
	Language(s) of Practice (%)															
English only	59.2	72.7	75.8	76.3	74.4	79.4	73.7	72.3	58.7	71.4	72.7	59.4	58.6	68.2	67.1	65.3
English & French only	5.4	7.2	9.0	8.2	7.5	10.4	7.7	7.4	5.1	6.5	6.9	4.9	5.4	N/A	5.7	5.8
English and other	34.0	19.2	14.1	14.8	16.7	9.5	17.5	19.3	34.8	21.2	19.7	34.7	34.4	23.1	26.2	27.7
Other	1.5	1.0	1.1	0.7	1.4	0.7	1.1	1.0	1.4	1.0	0.8	0.9	1.7	N/A	1.0	1.2

Table 2.1 Continued: Descriptive Statistics of Job Holders and Jobs (2014-2020)

	RNs								RPNs							
Variables	**Long-term Care**	**Hospital**	**Primary Care**	**Home Care**	**Supp. Housing**	**Public Health**	**Other**	**Total**	**Long-term Care**	**Hospital**	**Primary Care**	**Home Care**	**Supp. Housing**	**Public Health**	**Other**	**Total**
	Work Time Category (%)															
Full-time	49.0	60.4	43.2	73.8	43.7	79.0	48.6	57.2	43.2	47.4	53.5	43.9	43.6	62.0	45.8	45.8
Part-time	28.1	26.8	35.0	15.2	24.7	11.5	26.1	26.1	35.7	39.8	31.0	33.1	34.0	11.4	32.1	35.4
Casual	22.9	12.8	21.7	11.0	31.6	9.5	25.3	16.7	21.1	12.8	15.4	23.0	22.5	26.7	22.1	18.8
	Job Characteristics (%)															
Permanent	74.2	86.1	74.3	85.0	66.8	86.4	64.3	79.7	73.7	84.0	79.8	63.8	72.4	66.0	70.0	75.8
Temporary	3.1	2.5	3.7	2.1	2.6	5.7	8.7	4.0	5.0	4.6	4.9	3.9	4.0	N/A	5.3	4.9
Casual	21.7	11.1	19.4	7.9	27.0	7.7	21.7	14.5	20.7	11.3	14.3	21.2	22.3	23.3	20.7	17.7
Self-Employed	1.1	0.3	2.5	5.1	3.5	0.1	5.3	1.8	0.6	0.1	1.0	11.0	1.2	N/A	3.9	1.6
Rural	14.3	2.4	12.3	2.8	6.2	2.8	3.3	4.1	11.0	5.0	12.6	4.2	6.1	2.5	3.7	7.0
Sector Job Share (%)	8.2	57.4	4.5	4.2	0.9	3.6	21.2	100.0	29.0	29.6	6.0	3.0	8.4	0.5	23.6	100.0
Avg Jobs/Year	9380	65380	5070	4740	1060	4090	24090	113810	15870	16170	3300	1630	4590	260	12890	54710

Notes: Observations are at the job-level. Counts have been rounded to the nearest ten for confidentiality. Average jobs per year is calculated by pooling the number of jobs in each year, and dividing by 7 (years).

Table 2.13: Job Turnover Rates Across Healthcare Sector 2014-2020 (%)

	RNs								RPNs							
	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Total	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Total
	Panel A: Average Year to Year Job Turnover Rates (2014-2019)															
Job Continues	73.9	85.7	62.4	76.4	65.5	85.0	64.1	78.4	76.8	80.7	53.8	35.2	65.4	68.4	58.8	70.2
Turnover	25.7	14.2	37.0	23.5	33.9	15.0	35.2	21.3	22.9	19.1	45.9	64.2	34.1	30.9	40.6	29.4
A. Job Transitions (New Ont Job)	18.5	8.6	28.1	16.9	24.6	9.0	27.7	14.9	15.7	11.5	37.8	55.4	25.5	22.9	32.1	21.6
B. Job Ends (No Ont Job)	7.2	5.6	8.9	6.6	9.3	6.0	7.5	6.4	7.2	7.6	8.1	8.8	8.6	8.0	8.6	7.9
4 or More Jobs	0.5	0.2	0.6	0.2	0.6	0.0	0.7	0.3	0.3	0.2	0.3	0.6	0.6	N/A	0.5	0.4
N (Avg Jobs)	9510	64970	5130	4650	1060	3920	24160	113390	15990	15720	3240	1500	4570	240	12830	54080
	Panel B: Job Turnover Rates (2019 to 2020)															
Job Continues	67.8	84.4	60.6	77.8	62.0	84.5	61.2	76.6	69.3	79.4	51.3	36.7	58.6	72.9	52.3	65.1
Turnover	31.4	15.4	38.5	22.1	38.0	15.5	37.9	23.0	30.4	20.4	48.1	62.4	40.7	27.1	47.2	34.5
A. Job Transitions (New Ont Job)	23.2	8.7	28.8	15.1	28.0	9.3	29.8	15.7	21.2	11.4	38.7	51.0	31.0	22.7	37.6	25.2
B. Job Ends (No Ont Job)	8.2	6.7	9.7	7.0	10.0	6.2	8.2	7.3	9.2	9.0	9.4	11.4	9.6	4.4	9.6	9.3
4 or More Jobs	0.8	0.2	1.0	0.1	0.0	0.0	0.8	0.4	0.3	0.2	0.5	0.9	0.7	0.0	0.5	0.4
N (Jobs)	8610	67840	4700	5290	1040	5140	23690	116310	15150	18830	3650	2460	4700	380	13260	58430

Notes: Observations have been rounded to the nearest ten for confidentiality. Job turnover consists of job transitions (jobs that end and are replaced with at least one Ontario nursing job) plus job ends (jobs that end and are not replaced with an Ontario nursing job). In some circumstances (<1%) we cannot determine if the job continues for those that have 4+ jobs.

Table 2.14:Transition Matrix and Sector Retention Among Single Jobholders Who Change Jobs 2014-2020 (%)

	RNs									RPNs								
	Sector Year t									Sector Year t								
	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Inactive	N	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Inactive	N
	Panel A: 2014-2019 Average Year to Year Transitions (%)																	
Sector Year t-1																		
Long-term Care	28.3	14.3	N/A	2.4	2.8	N/A	15.7	34.2	940	16.9	14.2	2.8	N/A	8.2	N/A	16.2	40.1	1410
Hospital	2.4	28.0	3.1	1.8	0.3	0.5	20.6	43.2	4630	7.6	18.1	3.3	N/A	1.2	N/A	23.5	45.5	1580
Primary Care	1.5	11.4	29.0	3.4	0.5	1.6	27.6	24.9	1000	3.1	6.5	35.9	4.9	N/A	N/A	31.5	15.6	730
Home Care	2.7	7.6	3.9	11.1	N/A	N/A	46.0	26.9	630	4.2	N/A	6.9	8.9	3.5	N/A	59.2	14.0	460
Supp. Housing	19.1	7.6	3.2	3.8	16.0	0.0	19.8	30.5	160	19.7	6.8	4.1	N/A	20.2	N/A	19.5	26.9	580
Public Health	N/A	2.8	3.9	N/A	2.9	38.4	12.1	37.7	360	N/A	N/A	N/A	N/A	0.0	N/A	29.5	32.9	30
Other	3.1	20.1	6.6	7.6	1.0	0.9	38.3	22.3	3940	6.3	15.6	8.8	10.5	3.8	0.4	32.4	22.3	2410
Inactive	1.2	10.4	1.0	0.8	0.1	0.9	3.6	81.9	5330	6.8	6.3	1.6	N/A	1.7	N/A	5.7	77.0	2260
	Panel B: 2020 Transitions (%)																	
Long-term Care	27.2	15.6	1.3	3.0	2.4	2.3	11.9	36.3	1080	17.4	15.5	2.4	2.2	7.8	0.5	12.7	41.4	1970
Hospital	1.9	24.2	2.3	1.7	0.3	3.1	16.5	50.0	5420	6.5	14.7	2.7	1.2	1.5	0.3	20.5	52.7	1920
Primary Care	N/A	10.7	24.3	5.2	N/A	4.8	25.6	27.6	970	5.7	9.5	30.7	8.2	3.5	1.0	22.7	18.7	950
Home Care	3.5	7.9	7.5	15.6	1.0	3.0	28.3	33.2	630	5.4	7.4	10.7	12.0	3.7	0.0	39.1	21.7	520
Supp. Housing	15.2	12.9	N/A	5.8	14.0	N/A	14.0	32.7	170	21.2	11.8	N/A	3.8	20.0	N/A	15.0	24.7	860
Public Health	N/A	2.6	2.1	N/A	0.0	46.2	10.7	36.8	380	N/A	N/A	N/A	N/A	0.0	N/A	34.4	21.9	30
Other	3.2	19.5	5.3	11.7	0.9	2.9	32.0	24.4	4470	7.6	15.6	8.0	18.8	3.4	0.3	24.6	21.5	3520
Inactive	3.0	20.3	1.9	1.7	0.2	2.6	6.5	63.8	4080	8.9	10.7	2.7	2.0	2.8	0.3	8.2	64.2	2410
	Panel C: 2014-2019 Average Year to Year Sector Retention																	
Avg Same Sector (%)	28.3	28.0	29.0	11.1	16.0	38.4	38.3	-	-	16.9	18.1	35.9	8.9	20.2	N/A	32.4	-	-
Avg Share of Jobs (%)	8.2	57.4	4.5	4.2	0.9	3.6	21.2	-	-	29.0	29.6	6.0	3.0	8.4	0.5	23.6	-	-
Avg Pr(sector)/E(sector)	3.4	0.5	6.5	2.7	17.2	10.7	1.8	-	-	0.6	0.6	6.0	3.0	2.4	N/A	1.4	-	-

Table 2.3 Continued: Transition Matrix and Sector Retention Among Single Jobholders Who Change Jobs 2014-2020 (%)

	RNs									RPNs								
	Sector Year t									Sector Year t								
	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Inactive	N	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Inactive	N
	Panel D: 2020 Sector Retention																	
Same Sector (%)	27.2	24.2	24.3	15.6	14.0	46.2	32.0	-	-	17.4	14.7	30.7	12.0	20.0	N/A	24.6	-	-
Share of Jobs (%)	7.4	58.3	4.0	4.6	0.9	4.4	20.4	-	-	25.9	32.2	6.3	4.2	8.1	0.6	22.7	-	-
Pr(sector)/E(sector)	3.7	0.4	6.0	3.4	15.6	10.5	1.6	-	-	0.7	0.5	4.9	2.9	2.5	N/A	1.1	-	-

Notes: Observations are at the individual-level. Sample is based on nurses who are single jobholders in year t-1 and year t, and who change jobs in year t. Rows total 100% in Panel's A and B. N/A = supressed for confidentiality. Observations have been rounded to the nearest ten for confidentiality and the totals may therefore be affected by rounding.

Table 2.15: Employment Status Transitions Among Involuntary Part-time, Casual, and Full-time Single Jobholders Who Change Jobs 2014-2020 (%)

	RNs								RPNs							
	Sector Year t-1								Sector Year t-1							
	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Total	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Total
	Panel A: 2014-2019 Average Year over Year Transitions (%)															
Type of Nurse Year t-1 (N)																
Employment Status Year t (%)																
Involuntary Part-time/Casual	120	400	70	40	10	10	290	940	270	210	110	80	110	10	380	1180
Switch to Full-time	48.3	53.0	38.3	48.8	N/A	N/A	42.7	47.9	36.7	34.4	35.9	33.1	37.5	N/A	33.0	34.9
Stay Part-time/Casual	51.7	47.0	61.7	51.2	N/A	N/A	57.3	52.1	63.3	65.6	64.1	66.9	62.5	N/A	67.0	65.1
Voluntary Part-time/Casual	80	450	210	100	30	20	620	1510	140	170	80	80	60	0	310	850
Switch to Full-time	17.6	15.0	8.3	8.4	N/A	N/A	8.2	10.7	14.3	13.2	12.3	9.9	14.1	0.0	10.7	12.1
Stay Part-time/Casual	82.4	85.0	91.7	91.6	N/A	N/A	91.8	89.3	85.7	86.8	87.7	90.1	85.9	0.0	89.3	87.9
Involuntary Full-time	30	120	30	20	10	20	160	380	20	20	20	10	10	0	60	150
Stay Full-time	51.4	42.9	55.2	46.5	N/A	58.8	63.0	54.1	29.1	45.4	51.9	N/A	N/A	0.0	59.2	50.0
Switch to Part-time/Casual	48.6	57.1	44.8	53.5	N/A	41.2	37.0	45.9	70.9	54.6	48.1	N/A	N/A	0.0	40.8	50.0
Voluntary Full-time	120	400	70	40	10	10	290	940	120	400	70	40	10	10	290	940
Stay Full-time	83.7	84.7	88.9	89.4	N/A	N/A	93.1	89.0	76.7	88.0	88.1	N/A	N/A	N/A	88.1	85.5
Switch to Part-time/Casual	16.3	15.3	11.1	10.6	N/A	N/A	6.9	11.0	23.3	12.0	11.9	N/A	N/A	N/A	11.9	14.5
	Panel B: 2020 Transitions (%)															
Involuntary Part-time/Casual	130	450	50	30	20	0	280	960	380	220	120	60	210	0	550	1550
Switch to Full-time	53.9	58.9	51.0	42.3	50.0	0.0	46.1	53.3	40.5	50.9	42.6	29.7	43.9	0.0	33.9	39.7
Stay Part-time/Casual	46.1	41.1	49.0	57.7	50.0	0.0	53.9	46.7	59.5	49.1	57.4	70.3	56.1	0.0	66.1	60.3
Voluntary Part-time/Casual	100	530	200	90	20	20	690	1640	230	210	110	80	110	0	420	1160
Switch to Full-time	27.4	29.2	13.8	12.2	N/A	N/A	13.3	19.4	22.6	19.1	13.3	19.5	22.4	0.0	17.5	19.0
Stay Part-time/Casual	86.3	70.8	86.2	87.8	N/A	N/A	86.7	80.6	77.4	80.9	86.7	80.5	77.6	0.0	82.5	81.0
Involuntary Full-time	20	100	30	20	0	10	130	310	10	20	20	0	10	0	70	120
Stay Full-time	54.5	62.0	67.9	68.8	0.0	N/A	68.8	65.8	N/A	47.1	68.4	0.0	N/A	0.0	65.7	63.6
Switch to Part-time/Casual	45.5	38.0	32.1	31.3	0.0	N/A	31.3	34.2	N/A	52.9	31.6	0.0	N/A	0.0	34.3	36.4
Voluntary Full-time	420	1580	400	270	70	210	2160	5110	470	430	510	240	320	10	1650	3630
Stay Full-time	81.6	80.8	90.2	88.5	83.6	93.7	91.6	87.1	71.3	79.8	82.7	86.1	75.7	N/A	86.3	82.1
Switch to Part-time/Casual	25.0	19.2	9.8	11.5	16.4	6.3	8.4	12.9	28.7	20.2	17.3	13.9	24.3	N/A	13.7	17.9

Notes: Observations are at the individual-level. Sample is based on nurses who are single jobholders in year t-1 and year t, and who change jobs in year t. Sector analysis is based on the sector in year t-1, thus the sector in which nurses transition to in year t may not be the same sector as listed in year t-1. N/A = supressed for confidentiality. Observations have been rounded to the nearest ten for confidentiality and the totals may therefore be affected by rounding.

Table 2.16: Transitions Among Involuntary Part-time/Casual Multiple Jobholders Who Change Jobs 2014-2020 (%)

	RNs								RPNs							
	Sector Year t-1								Sector Year t-1							
	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Total	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Total
	Panel A: 2014-2019 Average Year over Year Transitions (%)															
Year t																
Find Full-time	24.2	21.4	24.5	33.5	30.0	26.5	22.2	22.5	14.5	15.9	23.1	24.4	19.9	N/A	19.3	17.0
Stay Part-time/Casual	31.5	30.2	37.7	34.5	35.0	N/A	38.0	32.3	36.8	38.0	45.9	55.8	41.5	N/A	45.3	40.1
No Transition	44.3	48.4	37.8	31.9	35.1	N/A	39.8	45.2	48.7	46.1	31.0	19.8	38.6	N/A	35.4	42.8
N	410	1450	100	40	30	20	500	2550	1130	770	140	80	320	10	590	3040
Full-time Sector t:																
Same Sector	50.8	74.6	34.1	N/A	N/A	N/A	45.0	61.3	51.8	70.7	49.1	26.9	52.2	N/A	54.3	55.6
Different Sector	49.2	25.4	65.9	N/A	N/A	N/A	55.0	38.7	48.3	31.7	52.9	75.7	48.9	N/A	46.3	44.4
	Panel B: 2019-2020 Transitions (%)															
Find Full-time	26.4	24.9	24.7	28.2	48.0	29.6	21.2	24.8	22.9	20.4	29.5	24.7	32.2	N/A	25.3	23.9
Stay Part-time/Casual	38.3	29.5	41.6	38.5	36.0	N/A	39.1	32.9	44.4	35.9	44.0	39.5	36.9	N/A	46.3	41.1
No Transition	35.3	45.7	33.7	33.3	16.0	N/A	39.8	42.3	32.7	43.7	26.5	35.8	30.9	N/A	28.4	35.0
N	330	1510	90	40	30	30	430	2440	990	1010	170	80	300	N/A	590	3140
Full-time Sector t:																
Same Sector	61.6	79.5	31.8	N/A	N/A	N/A	46.7	68.4	60.2	78.2	42.9	N/A	63.9	N/A	47.3	60.5
Different Sector	38.4	20.5	68.2	N/A	N/A	N/A	53.3	31.6	39.8	21.8	57.1	N/A	36.1	N/A	52.7	39.5

Notes: Observations are at the individual-level. Sample is based on multiple jobholders who change jobs. Nurses are assigned to the sector of their first job in each year. Nurses that obtain two full-time jobs in year t are assigned to the sector of the full-time job listed first. N/A = supressed for confidentiality. Observations have been rounded to the nearest ten for confidentiality and the totals may therefore be affected by rounding.

Table 2.17:New Entrants to the Profession, Sector Growth and Overall Share of Positions in Ontario 2014-2020 (%)

	RNs								RPNs							
	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Others	Total (N)	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Others	Total (N)
	Panel A: Full-time Equivalent Share of New Entrants to Ontario (%)															
2014	12.7	65.2	2.9	1.8	1.1	2.0	14.3	3110	34.1	21.8	6.8	3.6	12.1	0.3	21.3	2130
2015	13.0	64.9	3.2	1.7	1.0	1.8	14.3	2480	33.3	22.5	6.1	4.5	13.6	0.3	19.7	2230
2016	13.0	63.2	2.8	2.8	0.9	2.0	15.4	2980	30.1	23.4	7.1	N/A	13.7	N/A	20.8	2050
2017	11.6	64.8	2.9	2.6	0.9	1.9	15.3	3380	28.8	23.0	6.1	4.7	13.1	0.3	24.1	2510
2018	13.8	64.6	2.9	1.8	1.2	1.2	14.5	3980	29.7	23.9	5.8	5.2	14.4	0.2	20.8	2990
2019	12.5	65.9	2.7	1.7	1.3	1.0	14.9	3910	29.6	25.8	6.2	N/A	13.2	N/A	21.4	2340
2020	9.6	65.8	2.6	2.3	0.9	6.5	12.3	4190	29.1	33.8	3.8	4.5	11.0	0.5	17.4	2140
	Panel B: Full-time Equivalent Sector Net Growth (%)															
2014-15	0.0	214.0	-101.4	132.2	-28.7	-51.7	-64.3	70	20.6	22.9	8.9	N/A	12.5	N/A	30.1	1950
2015-16	12.6	56.1	18.3	-15.2	-3.0	11.0	20.2	-420	2.1	21.7	8.8	11.2	18.6	0.8	36.8	1370
2016-17	-7.2	70.7	-10.8	2.8	-2.0	0.6	45.9	960	9.6	29.5	10.6	7.9	9.0	0.4	33.1	2120
2017-18	11.4	70.0	N/A	N/A	0.8	-2.2	20.6	2040	17.6	30.8	6.3	N/A	10.1	N/A	30.1	2470
2018-19	12.6	92.6	-11.6	4.0	4.3	-20.9	19.1	610	3.2	40.4	14.2	-5.7	10.7	0.4	36.8	1330
2019-20	-39.4	77.4	-6.6	41.5	-1.2	86.9	-58.5	1280	-187.8	413.1	-22.0	244.5	-55.2	32.8	-325.5	270
	Panel C: Full-time Equivalent Share of All (New and Existing) Positions (%)															
2014	8.0	58.2	4.4	4.4	0.9	4.1	20.1	87940	31.1	29.9	6.0	2.2	7.7	0.5	22.6	34570
2015	8.0	58.3	4.3	4.5	0.8	4.1	20.0	88010	30.5	29.5	6.1	2.4	8.0	0.5	23.0	36520
2016	7.9	58.3	4.2	4.6	0.9	4.0	20.0	87590	29.5	29.2	6.2	2.7	8.4	0.5	23.5	37890
2017	7.8	58.4	4.0	4.6	0.8	4.0	20.3	88550	28.5	29.2	6.4	3.0	8.4	0.5	24.0	40000
2018	7.9	58.7	4.0	4.5	0.8	3.9	20.3	90590	27.8	29.3	6.4	3.1	8.5	0.5	24.4	42470
2019	7.9	58.9	3.9	4.5	0.9	3.7	20.3	91200	27.1	29.7	6.7	2.8	8.6	0.5	24.7	43800
2020	7.2	59.2	3.7	5.0	0.8	4.8	19.2	92490	25.8	32.0	6.5	4.3	8.2	0.7	22.6	44070

Notes: Observations are at the job-level. Some observations have been suppressed for confidentiality. Observations have been rounded to the nearest ten for confidentiality and the totals may therefore be affected by rounding. <1% of new nurses did not report a sector.

Table 2.18: Number of Years Jobs in 2014 are Observed to Exist Between 2014 and 2019

Years Job Exists (2014-2019)	RNs (%)							
	Long-term Care	**Hospital**	**Primary Care**	**Home Care**	**Supp. Housing**	**Public Health**	**Other**	**Total**
0	21.5	11.2	30.0	18.1	31.7	12.8	27.9	17.0
1	13.9	8.8	15.5	9.7	14.9	10.0	16.1	11.2
2	11.0	8.7	12.0	8.1	12.3	6.5	11.5	9.6
3	8.2	7.1	9.7	8.2	8.9	12.3	9.3	8.0
4	8.2	10.2	9.6	10.2	8.1	7.5	10.0	9.8
5	37.3	54.1	23.3	45.7	24.1	50.8	25.3	44.3
N	9460	63670	5390	4530	1060	4070	23770	111940

Years Job Exists (2014-2019)	RPNs (%)							
	Long-term Care	**Hospital**	**Primary Care**	**Home Care**	**Supp. Housing**	**Public Health**	**Other**	**Total**
0	18.4	14.1	36.1	54.7	28.5	26.2	31.3	22.7
1	12.6	11.3	16.0	18.2	14.6	11.1	15.9	13.4
2	9.5	10.6	10.5	11.2	12.3	12.9	11.8	10.7
3	8.1	8.6	8.3	5.3	8.9	4.9	9.6	8.6
4	9.6	11.5	10.0	5.7	8.9	6.7	9.7	10.0
5	41.9	43.9	19.1	4.9	26.7	38.2	21.6	34.5
N	15030	13950	2700	1100	3730	230	10780	47510

Notes: Observations are at the job-level and have been rounded to the nearest ten for confidentiality. Totals may be affected by rounding.

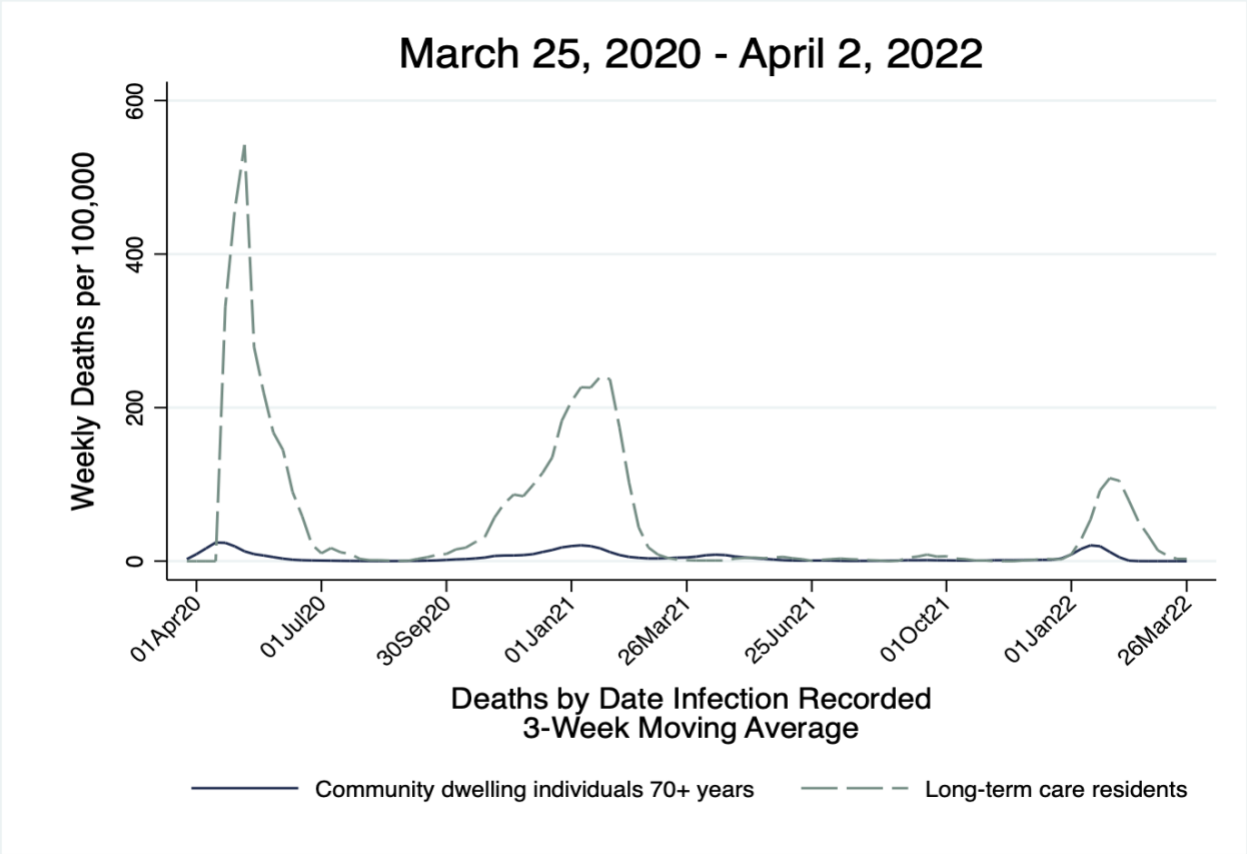
Table 2.19:Poisson Regression Analysis Job Stability (2014-2019)

	RNs			RPNs		
	(1)	(2)	(3)	(4)	(5)	(6)
Sector - Long-term Care (base)						
Hospital	0.790***	0.750***	0.629***	0.202***	0.240***	0.133***
	(0.022)	(0.022)	(0.021)	(0.023)	(0.022)	(0.021)
Primary Care	-0.563***	-0.485***	-0.503***	-1.063***	-1.036***	-1.108***
	(0.034)	(0.034)	(0.034)	(0.041)	(0.040)	(0.038)
Home Care	0.401***	0.386***	0.216***	-1.999***	-1.963***	-1.968***
	(0.037)	(0.035)	(0.033)	(0.049)	(0.048)	(0.048)
Supp. Housing	-0.603***	-0.505***	-0.467***	-0.682***	-0.609***	-0.628***
	(0.065)	(0.065)	(0.067)	(0.037)	(0.037)	(0.035)
Public Health	0.645***	0.648***	0.447***	-0.343*	-0.307*	-0.325**
	(0.036)	(0.036)	(0.034)	(0.142)	(0.137)	(0.124)
Other	-0.461***	-0.437***	-0.430***	-0.883***	-0.858***	-0.852***
	(0.025)	(0.024)	(0.024)	(0.025)	(0.024)	(0.024)
Education - Diploma (base)						
Missing		-2.977***	-2.945***		-2.497***	-2.484***
		(0.017)	(0.018)		(0.026)	(0.026)
Baccalaureate		-0.130***	-0.114***		-0.676***	-0.616***
		(0.014)	(0.013)		(0.047)	(0.047)
Graduate Degree		-0.151***	-0.150***		-1.068***	-0.957***
		(0.031)	(0.030)		(0.160)	(0.164)
Location First Education - Ontario (base)						
Missing		-0.293***	-0.274***		-0.330***	-0.220*
		(0.058)	(0.056)		(0.094)	(0.096)
Other Prov/Terr		-0.105***	-0.105***		-0.267***	-0.238***
		(0.025)	(0.025)		(0.062)	(0.061)
U.S.		-0.273***	-0.220**		-0.424*	-0.398*
		(0.068)	(0.067)		(0.180)	(0.172)
Outside Canada/U.S.		0.143***	0.162***		0.063	0.125**
		(0.018)	(0.017)		(0.043)	(0.042)
Age Category - Less than/equal to 35 Yrs (base)						
36-55 Yrs		0.496***	0.464***		0.465***	0.343***
		(0.015)	(0.014)		(0.019)	(0.019)
55+ Yrs		-0.246***	-0.210***		0.023	-0.103***
		(0.019)	(0.018)		(0.027)	(0.027)
Male		0.004	0.012		-0.025	0.005
		(0.023)	(0.022)		(0.033)	(0.032)
Rural		-0.112***	-0.088**		-0.071*	-0.064*
		(0.031)	(0.031)		(0.032)	(0.031)
Employment Status - (Full-time base)						
Part-time			-0.271***			-0.372***
			(0.013)			(0.019)
Casual			-1.262***			-1.326***
			(0.016)			(0.024)
Observations	111940	111940	111940	47510	47510	47510

Notes. Standard errors in parentheses, *p<0.05, **p<0.01, ***p<0.001, observations have been rounded to the nearest ten for confidentiality. Average marginal effects are used.

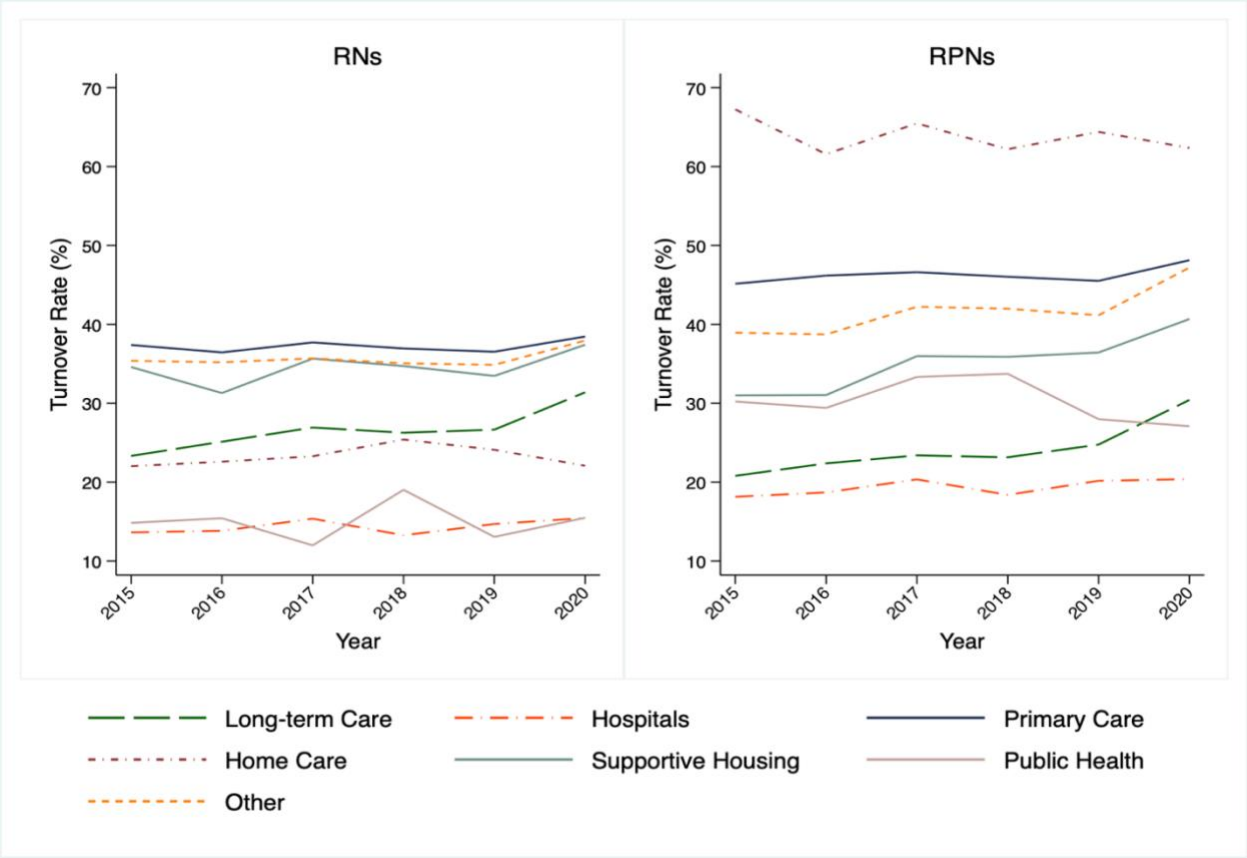
Appendix 2.1

Appendix 2.1 Figure 1: Weekly COVID-19 Death Rates Among the Long-term Care and the 70+ Non-Long-term Care Population



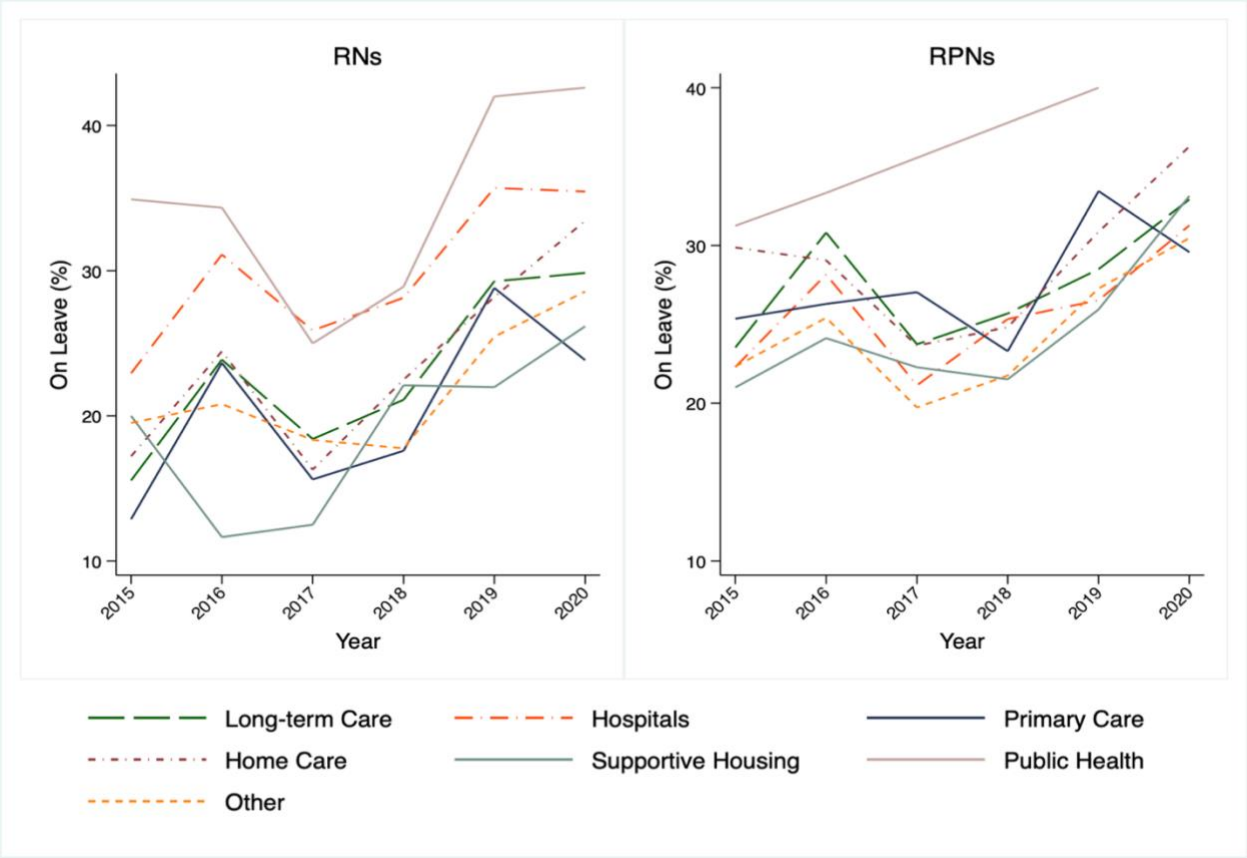
Note: Long-term care deaths are reported as 0 prior to April 4, 2020 – the initial reporting date. Deaths include those who died with and from COVID-19.
Source: Government of Ontario. Long-Term Care Home COVID-19 Data 2020-2022; Confirmed positive cases of COVID-19 in Ontario 2020-2022.

Appendix 2.1 Figure 2: Yearly Turnover Rates 2014-2020



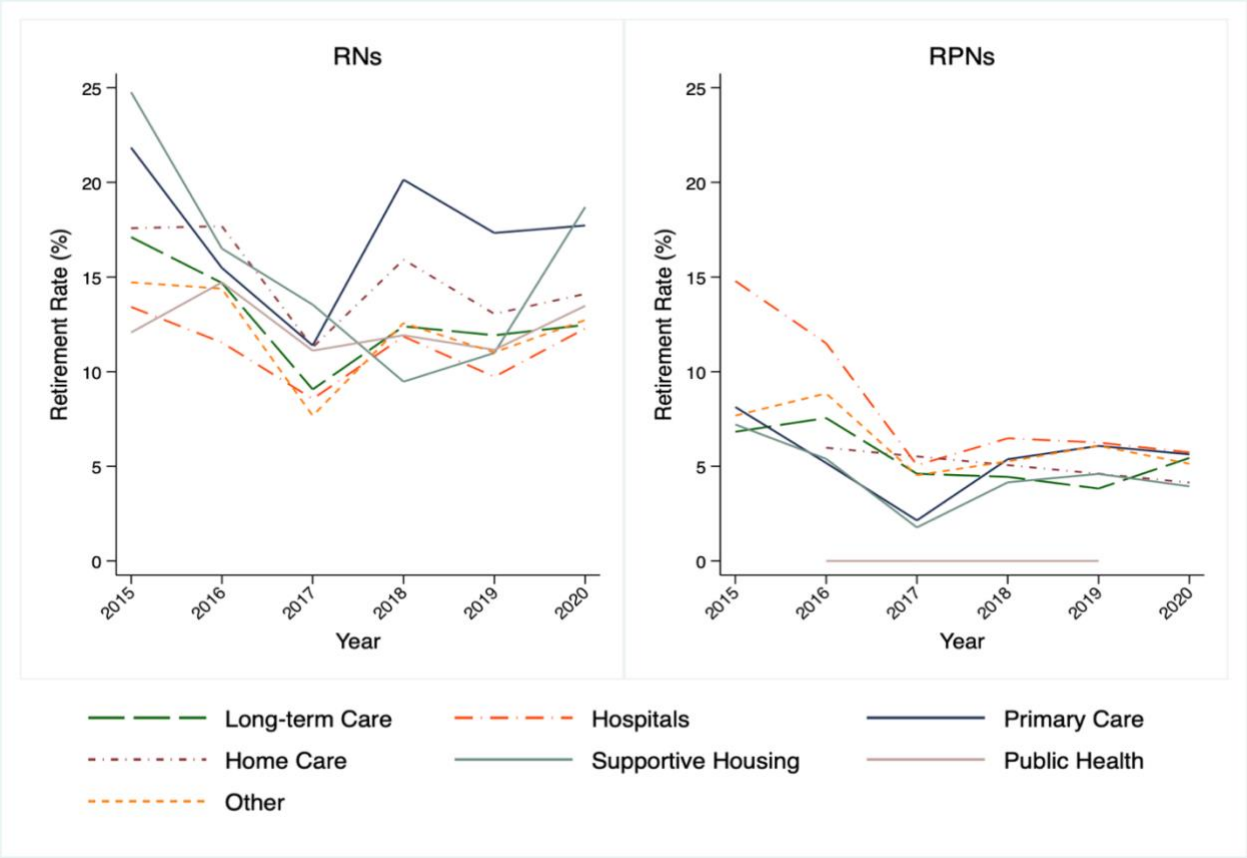
Notes: Turnover rates are at the job-level and include both jobs that end and are/are not replaced with an Ontario nursing job.

Appendix 2.1 Figure 3: Yearly Leave Rates as a Percentage of Jobs that End, 2014-2020



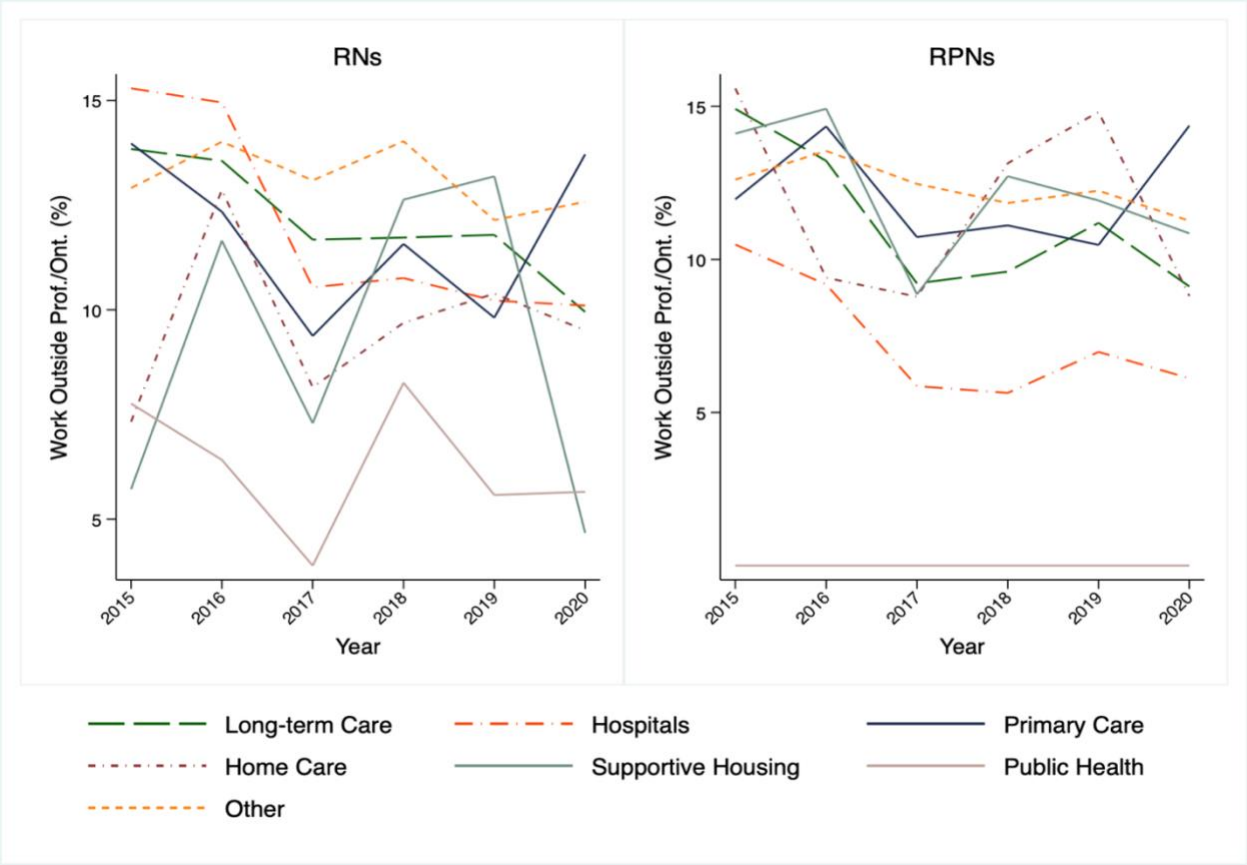
Note: Yearly leave rates are expressed as a percentage of jobs that end and are not replaced by an Ontario nursing job because the nurse employed in the job(s) went on leave. Some percentages have been supressed for confidentiality.

Appendix 2.1 Figure 4: Yearly Retirement Rates as a Percentage of Jobs that End, 2014-2020



Note: Yearly retirement rates are expressed as a percentage of jobs that end and are not replaced by an Ontario nursing job because the nurse employed in the job(s) retired. Some percentages have been supressed for confidentiality.

Appendix 2.1 Figure 5:Yearly Exit Profession/Ontario Nursing Profession Rates as a Percentage of Jobs that End, 2014-2020



Note: Yearly exit rates are expressed as a percentage of jobs that end and are not replaced by an Ontario nursing job because the nurse employed in the job(s) left the Ontario nursing profession or the profession altogether.

Appendix 2.1 Table 1: Stability of 2017 Nursing Jobs Across Sectors (2017-2019)

	RNs (%)							
Years Job Exists (2017-2019)	**Long-term Care**	**Hospital**	**Primary Care**	**Home Care**	**Supp. Housing**	**Public Health**	**Other**	**Total**
0	45.8	21.7	54.4	51.5	44.8	30.2	49.5	37.7
1	19.2	16.6	19.4	18.8	21.1	19.3	22.6	19.3
2	35.0	61.6	26.2	29.7	34.1	50.5	27.9	43.0
N	2290	9120	1480	950	340	370	7530	22080

	RPNs (%)							
Years Job Exists (2017-2019)	**Long-term Care**	**Hospital**	**Primary Care**	**Home Care**	**Supp. Housing**	**Public Health**	**Other**	**Total**
0	41.0	25.6	61.1	65.1	49.1	65.9	52.7	45.8
1	19.9	18.6	19.3	23.0	21.6	10.6	23.5	21.0
2	39.1	55.8	19.6	11.9	29.3	23.5	23.8	33.1
N	3580	3470	1500	1060	1810	90	5340	16850

Notes: Observations are at the job-level and have been rounded to the nearest ten for confidentiality. Totals may be affected by rounding.

Appendix 2.1 Table 2: Poisson Regression Analysis Job Stability (2017-2019)

	RNs			RPNs		
	(1)	(2)	(3)	(4)	(5)	(6)
Sector - Long-term Care (base)						
Hospital	0.507***	0.494***	0.423***	0.320***	0.315***	0.249***
	(0.021)	(0.021)	(0.022)	(0.021)	(0.021)	(0.021)
Primary Care	-0.174***	-0.165***	-0.201***	-0.396***	-0.398***	-0.453***
	(0.029)	(0.030)	(0.030)	(0.026)	(0.026)	(0.026)
Home Care	-0.110**	-0.105**	-0.150***	-0.513***	-0.511***	-0.555***
	(0.034)	(0.035)	(0.034)	(0.026)	(0.027)	(0.027)
Supp. Housing	0.001	0.008	0.008	-0.180***	-0.177***	-0.203***
	(0.053)	(0.053)	(0.055)	(0.025)	(0.026)	(0.026)
Public Health	0.312***	0.306***	0.220***	-0.405***	-0.402***	-0.402***
	(0.049)	(0.050)	(0.050)	(0.093)	(0.094)	(0.096)
Other	-0.108***	-0.103***	-0.132***	-0.271***	-0.272***	-0.315***
	(0.021)	(0.022)	(0.022)	(0.019)	(0.019)	(0.020)
Education - Diploma (base)						
Missing		-0.111	-0.108		-0.160	-0.154
		(0.196)	(0.199)		(0.148)	(0.147)
Baccalaureate		-0.036	-0.033		-0.207***	-0.211***
		(0.019)	(0.018)		(0.027)	(0.026)
Graduate Degree		-0.020	-0.028		-0.157	-0.167*
		(0.030)	(0.029)		(0.080)	(0.078)
Location First Education - Ontario (base)						
Missing		0.002	0.004		0.020	0.030
		(0.054)	(0.053)		(0.074)	(0.075)
Other Prov/Terr		-0.106***	-0.110***		-0.045	-0.049
		(0.026)	(0.026)		(0.050)	(0.049)
U.S.		-0.142*	-0.131*		-0.148	-0.131
		(0.062)	(0.062)		(0.137)	(0.135)
Outside Canada/U.S.		0.020	0.025		0.045	0.058*
		(0.021)	(0.021)		(0.028)	(0.028)
Age Category - Less than/equal to 35 Yrs (base)						
36-55 Yrs		-0.015	-0.012		0.038**	0.037**
		(0.015)	(0.015)		(0.014)	(0.014)
55+ Yrs		-0.127***	-0.110***		-0.066*	-0.072*
		(0.023)	(0.024)		(0.030)	(0.029)
Male		-0.001	-0.008		0.011	0.011
		(0.019)	(0.019)		(0.022)	(0.022)
Rural		-0.056	-0.056		-0.042	-0.042
		(0.031)	(0.030)		(0.027)	(0.027)
Employment Status - (Full-time base)						
Part-time			-0.072***			-0.009
			(0.013)			(0.017)
Casual			-0.309***			-0.253***
			(0.015)			(0.018)
Observations	22080	22080	22080	16850	16850	16850

Notes. Standard errors in parentheses, *p<0.05, **p<0.01, ***p<0.001, observations have been rounded to the nearest ten for confidentiality. Average marginal effects are used.

Appendix 2.1 Table 3: Negative Binomial Regression Analysis Job Stability (2014-2019)

	RNs				RPNs		
	(1)	(2)	(3)		(4)	(5)	(6)
Sector - Long-term Care (base)							
Hospital	0.790***	0.751***	0.629***		0.202***	0.245***	0.144***
	(0.022)	(0.022)	(0.021)		(0.023)	(0.022)	(0.022)
Primary Care	-0.563***	-0.485***	-0.503***		-1.063***	-1.036***	-1.110***
	(0.034)	(0.034)	(0.034)		(0.041)	(0.040)	(0.039)
Home Care	0.401***	0.386***	0.216***		-1.999***	-1.961***	-1.966***
	(0.037)	(0.035)	(0.033)		(0.049)	(0.048)	(0.048)
Supp. Housing	-0.603***	-0.504***	-0.467***		-0.682***	-0.606***	-0.628***
	(0.065)	(0.065)	(0.067)		(0.037)	(0.037)	(0.036)
Public Health	0.645***	0.648***	0.447***		-0.343*	-0.308*	-0.347**
	(0.036)	(0.036)	(0.034)		(0.142)	(0.138)	(0.125)
Other	-0.461***	-0.437***	-0.430***		-0.883***	-0.860***	-0.849***
	(0.025)	(0.024)	(0.024)		(0.025)	(0.025)	(0.024)
Education - Diploma (base)							
Missing		-2.977***	-2.945***			-2.495***	-2.483***
		(0.017)	(0.018)			(0.027)	(0.027)
Baccalaureate		-0.130***	-0.114***			-0.684***	-0.629***
		(0.014)	(0.013)			(0.049)	(0.048)
Graduate Degree		-0.147***	-0.150***			-1.086***	-0.982***
		(0.032)	(0.030)			(0.159)	(0.162)
Location First Education - Ontario (base)							
Missing		-0.295***	-0.274***			-0.348***	-0.230*
		(0.058)	(0.056)			(0.096)	(0.098)
Other Prov/Terr		-0.105***	-0.105***			-0.272***	-0.240***
		(0.026)	(0.025)			(0.063)	(0.062)
U.S.		-0.272***	-0.220**			-0.426*	-0.409*
		(0.068)	(0.067)			(0.181)	(0.172)
Outside Canada/U.S.		0.143***	0.162***			0.074	0.132**
		(0.018)	(0.017)			(0.045)	(0.044)
Age Category - Less than/equal to 35 Yrs (base)							
36-55 Yrs		0.498***	0.464***			0.473***	0.351***
		(0.015)	(0.014)			(0.020)	(0.019)
55+ Yrs		-0.244***	-0.210***			0.037	-0.084**
		(0.019)	(0.018)			(0.027)	(0.027)
Male		0.005	0.012			-0.016	0.011
		(0.023)	(0.022)			(0.033)	(0.033)
Rural		-0.110***	-0.088**			-0.063	-0.060
		(0.031)	(0.031)			(0.033)	(0.032)
Employment Status - (Full-time base)							
Part-time			-0.271***				-0.377***
			(0.013)				(0.019)
Casual			-1.263***				-1.328***
			(0.016)				(0.024)
Observations	111940	111940	111940	#	47510	47510	47510

Notes. Standard errors in parentheses, *p<0.05, **p<0.01, ***p<0.001, observations have been rounded to the nearest ten for confidentiality. Average marginal effects are used.

Appendix 2.1 Table 4: Negative Binomial Regression Analysis Job Stability (2017-2019)

	RNs			RPNs		
	(1)	(2)	(3)	(4)	(5)	(6)
Sector - Long-term Care (base)						
Hospital	0.507***	0.494***	0.423***	0.320***	0.315***	0.249***
	(0.021)	(0.021)	(0.022)	(0.021)	(0.021)	(0.021)
Primary Care	-0.174***	-0.165***	-0.201***	-0.396***	-0.398***	-0.453***
	(0.029)	(0.030)	(0.030)	(0.026)	(0.026)	(0.026)
Home Care	-0.110**	-0.105**	-0.150***	-0.513***	-0.511***	-0.555***
	(0.034)	(0.035)	(0.034)	(0.026)	(0.027)	(0.027)
Supportive Housing	0.001	0.008	0.008	-0.180***	-0.177***	-0.203***
	(0.053)	(0.053)	(0.055)	(0.025)	(0.026)	(0.026)
Public Health	0.312***	0.306***	0.220***	-0.405***	-0.402***	-0.402***
	(0.049)	(0.050)	(0.050)	(0.093)	(0.094)	(0.096)
Other	-0.108***	-0.103***	-0.132***	-0.271***	-0.272***	-0.315***
	(0.021)	(0.022)	(0.022)	(0.019)	(0.019)	(0.020)
Education - Diploma (base)						
Missing		-0.111	-0.108		-0.160	-0.154
		(0.196)	(0.199)		(0.148)	(0.147)
Baccalaureate		-0.036	-0.033		-0.207***	-0.211***
		(0.019)	(0.018)		(0.027)	(0.026)
Graduate Degree		-0.020	-0.028		-0.157	-0.167*
		(0.030)	(0.029)		(0.080)	(0.078)
Location First Education - Ontario (base)						
Missing		0.002	0.004		0.020	0.030
		(0.054)	(0.053)		(0.074)	(0.075)
Other Prov/Terr		-0.106***	-0.110***		-0.045	-0.049
		(0.026)	(0.026)		(0.050)	(0.049)
U.S.		-0.142*	-0.131*		-0.148	-0.131
		(0.062)	(0.062)		(0.137)	(0.135)
Outside Canada/U.S.		0.020	0.025		0.045	0.058*
		(0.021)	(0.021)		(0.028)	(0.028)
Age Category - Less than/equal to 35 Yrs (base)						
36-55 Yrs		-0.015	-0.012		0.038**	0.037**
		(0.015)	(0.015)		(0.014)	(0.014)
55+ Yrs		-0.127***	-0.110***		-0.066*	-0.072*
		(0.023)	(0.024)		(0.030)	(0.029)
Male		-0.001	-0.008		0.011	0.011
		(0.019)	(0.019)		(0.022)	(0.022)
Rural		-0.056	-0.056		-0.042	-0.042
		(0.031)	(0.030)		(0.027)	(0.027)
Employment Status - (Full-time base)						
Part-time			-0.072***			-0.009
			(0.013)			(0.017)
Casual			-0.309***			-0.253***
			(0.015)			(0.018)
Observations	22080	22080	22080	16850	16850	16850

Notes. Standard errors in parentheses, *p<0.05, **p<0.01, ***p<0.001, observations have been rounded to the nearest ten for confidentiality. Average marginal effects are used.

Appendix 2.2
Glossary of Healthcare Sectors

Hospitals: Healthcare facilities that offer various in-patient and out-patient healthcare. In the HPDB, this sector also includes, "specialty and complex continuing care hospitals not otherwise classified."

Long-term Care Homes: Facilities, also referred to as nursing homes, that provide 24- hour supervision and high levels of nursing care. These include for-profit, not-for-profit, and municipal long-term care homes.

Primary Care: Healthcare facilities that act as the point-of-entry to the healthcare system (e.g., walk-in clinics and physicians' offices), and are responsible for the day-to- day health of patients.

Home Care: Professional healthcare provided to an individual within their own home. While some care is palliative, the majority of home care is chronic. Furthermore, the majority of home care nurses are employed at home care agencies. Thus, the majority of postal codes listed will be that of the agency, and not individual patient's homes.

Supportive Housing/Retirement Homes: Retirement homes or supportive housing that provide a range of care to help individuals live independently. In the HPDB, these facilities include: group homes, retirement homes, community care homes, lodges, supportive housing, and congregate living settings.

Public Health: The official health unit responsible for disease prevention/education, and health promotion programs.

Other: Aggregates all other practice settings. Includes the following: rehabilitation facilities, mental health and addiction facilities, post-secondary educational institution, preschool/school system/board of education, children treatment centres (CTC),

association/government/regulatory organization/non-government organization, community pharmacy, other community-based pharmacist practice, cancer centre, independent health facility, mobile imaging unit, centralized diagnostic laboratory facility, centralized diagnostic laboratory facility, freestanding diagnostic laboratory, specimen collection centre, blood transfusion centre, dental laboratory, dental practice laboratory, other laboratory facility, TeleHealth Ontario and telephone health advisory services, spas, health related business/industry, other place of work, diabetes education centre, correctional facility, and "unknown."

Appendix 2.3

Supplementary Analysis by Age Group

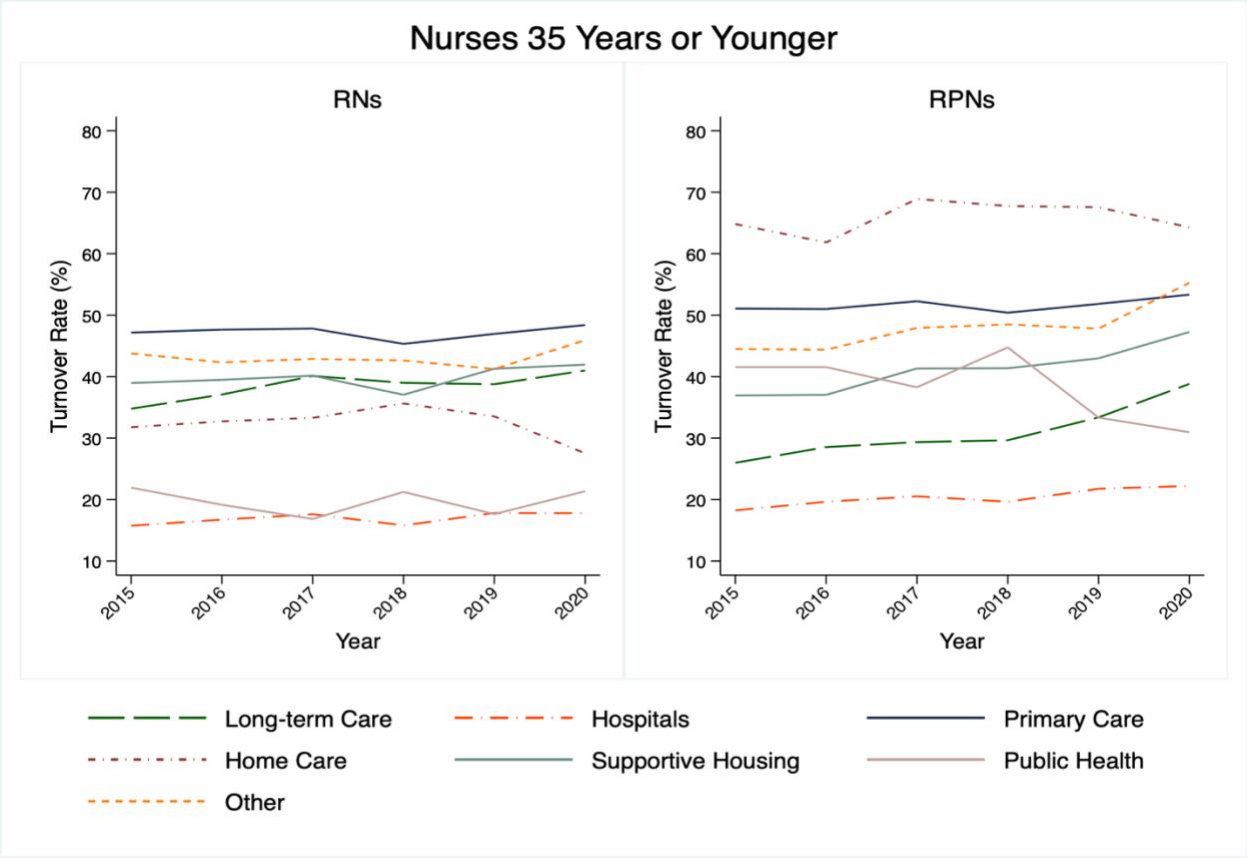
We perform the same analysis above for 3 age groups of nurses: nurses 35 or younger (Appendix 3 Table 1), nurses 36 to 55 (Appendix 3 Table 2), and nurses 56 or older (Appendix 3 Table 3). Compared to our analysis above, average turnover rates are higher for younger nurses, and lower for middle aged nurses across all sectors for RNs and RPNs. However, for older RNs and RPNs, the average turnover rate is higher or lower, depending on the sector.

We examine both between-sector and within-sector variations for each age group. In general, the between-sector turnover relationships for younger, middle-aged, and older RNs and RPNs remain the same (e.g.., the turnover rate among RNs in LTCH is higher than hospitals and public health, lower than primary care, supportive housing and "other", and similar to home care). Though the relationships remain the same in general, the magnitude of the cross-sector differences in turnover rates depends on the age group in question. Examining within-sector variations for the different age groups, turnover rates vary the most by age in LTCH and home care for RNs, and LTCH and public health for RPNs.

Lastly, we show trends and the pandemic (2020) turnover, retirement, leave, and working outside the profession/Ontario rates in (Appendix 3 Figures 1 to 8). Focusing on the sectors that experience the largest percentage point increase in turnover rates overall, we find 2020 turnover rates increased the most in middle-aged LTCH nurses, and older supportive housing nurses, for both RNs and RPNs (Appendix 4 Figures 1 to 3). Among RNs and RPNs, we find some differences in the change of leave rate across age groups, which varies by sector (refer to Appendix 4 Figures 4 to 6). For example, the leave rate in 2020 is slightly lower among younger

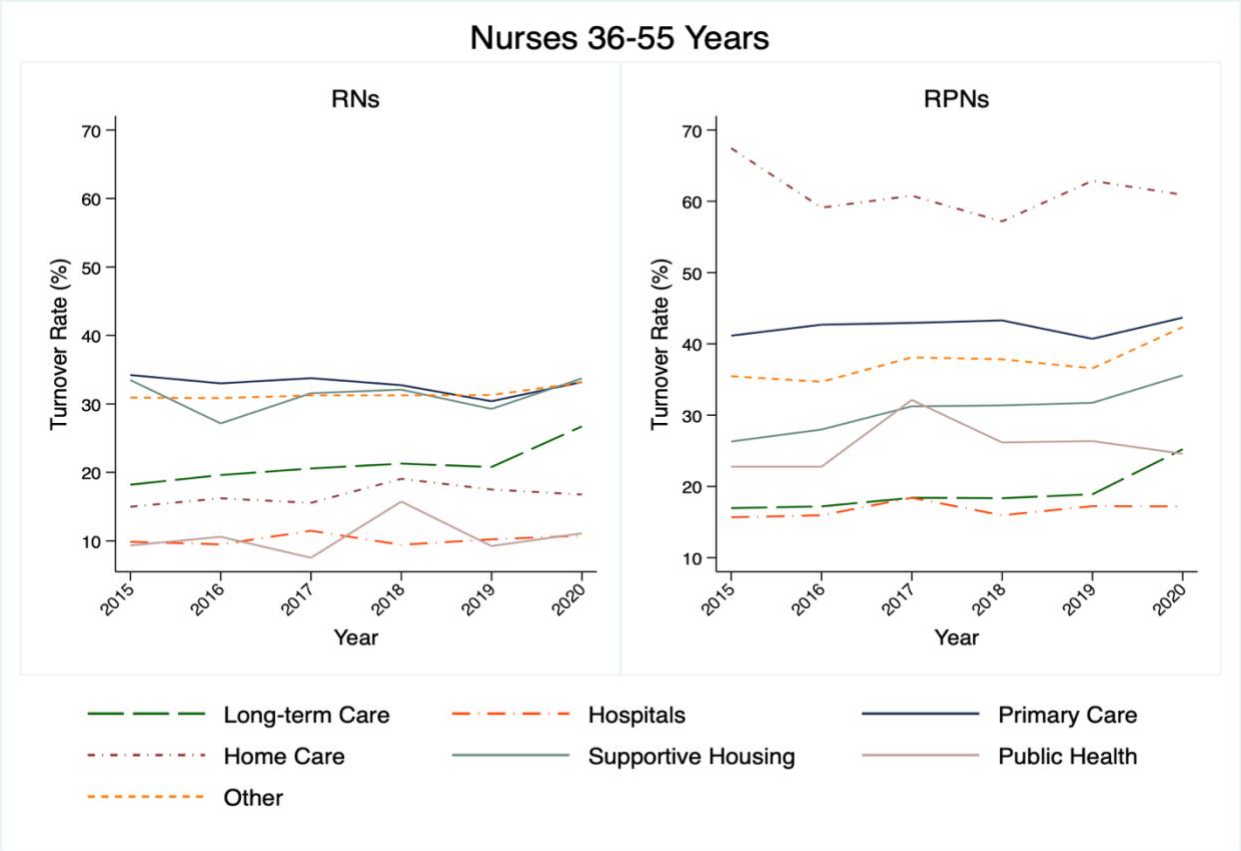
LTCH RNs by almost 4 percentage points, and higher among older LTCH RNs by 5.6 percentage points, compared to 2019. We only examine trends in retirement and working outside the profession/Ontario among older nurses (Appendix 4 Figure 7) and younger nurses respectively (Appendix 4 Figure 8). This was done as the retirement rate is not particularly high among younger and middle-aged nurses. Similarly, the rate of middle aged and older nurses that leave the profession/Ontario is somewhat unremarkable. In general, the results are quite similar to those found in our analysis of all nurses, though the magnitudes differ depending on the sector.

Appendix 2.3 Figure 1: Yearly Turnover Rates 2014-2020 (Nurses 35 Years or Younger)



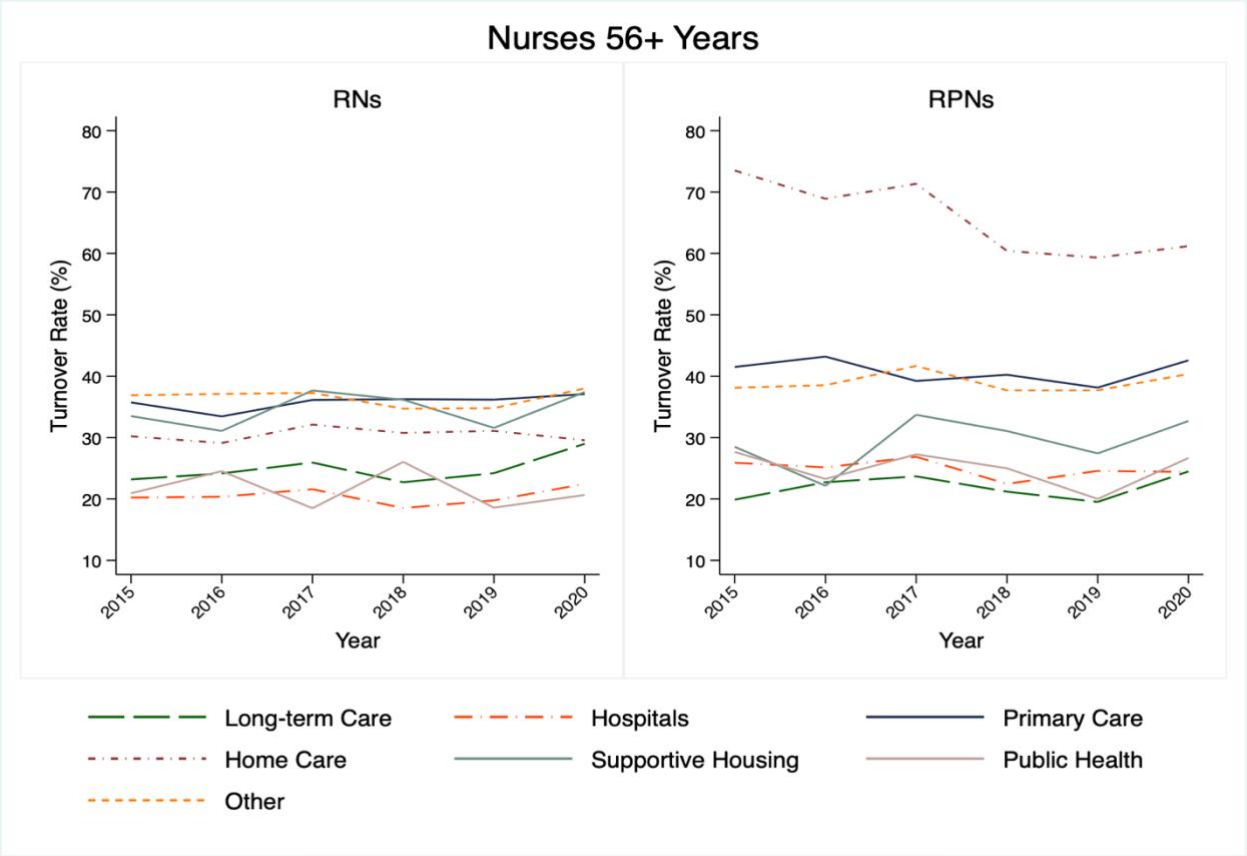
Notes: Turnover rates are at the job-level and include both jobs that end and are/are not replaced with an Ontario nursing job.

Appendix 2.3 Figure 2: Yearly Turnover Rates 2014-2020 (Nurses 36-55 Years)



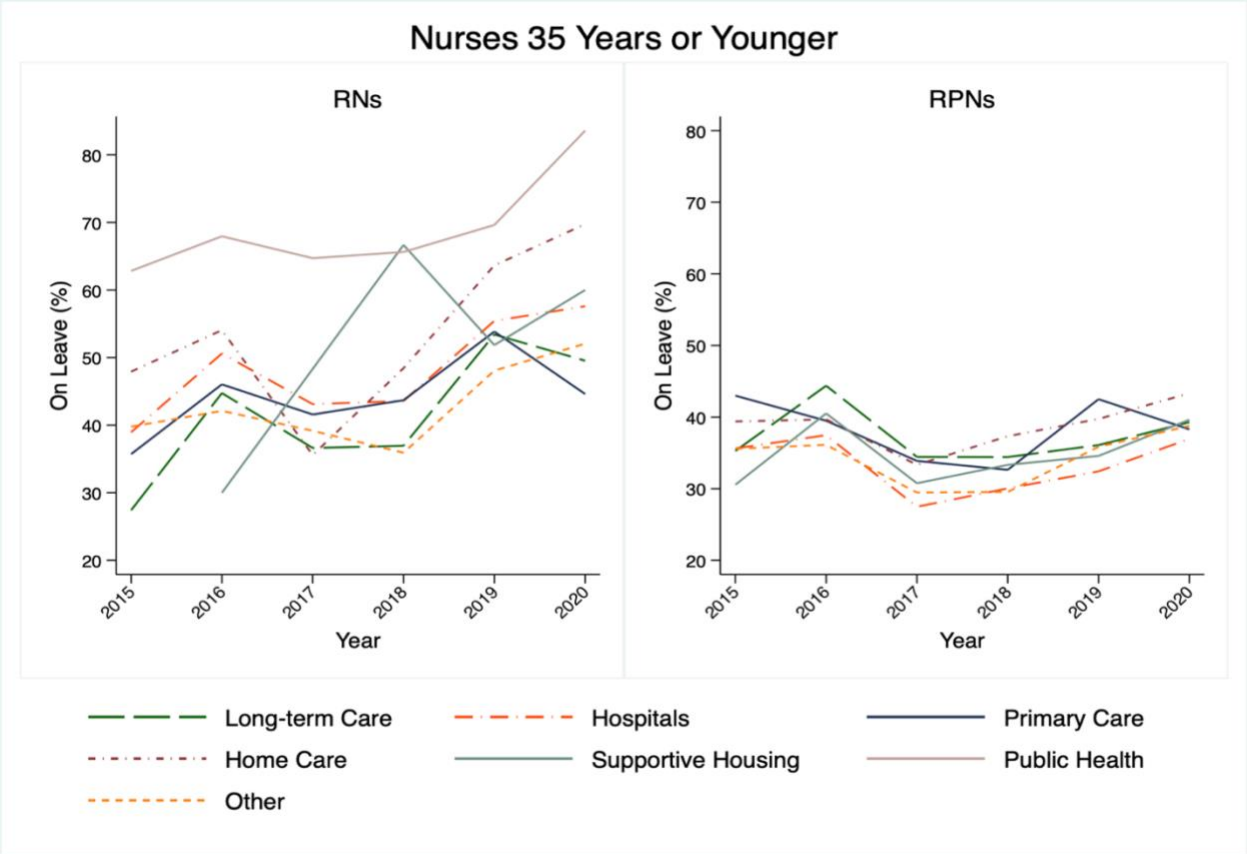
Notes: Turnover rates are at the job-level and include both jobs that end and are/are not replaced with an Ontario nursing job.

Appendix 2.3 Figure 3 Yearly Turnover Rates 2014-2020 (Nurses 56+ Years)



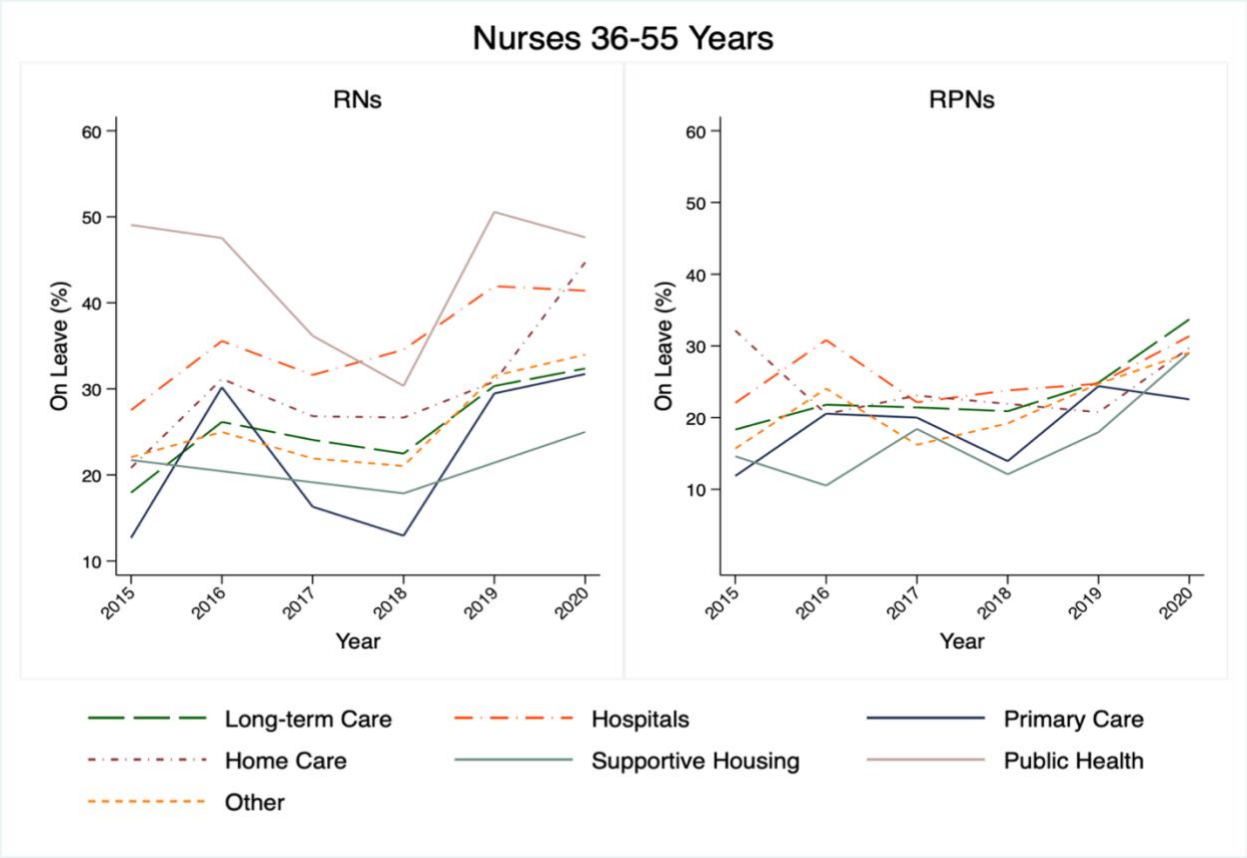
Notes: Turnover rates are at the job-level and include both jobs that end and are/are not replaced with an Ontario nursing job.

Appendix 2.3 Figure 4: Yearly Leave Rates as a Percentage of Jobs that End, 2014-2020 (Nurses 35 Years or Younger)



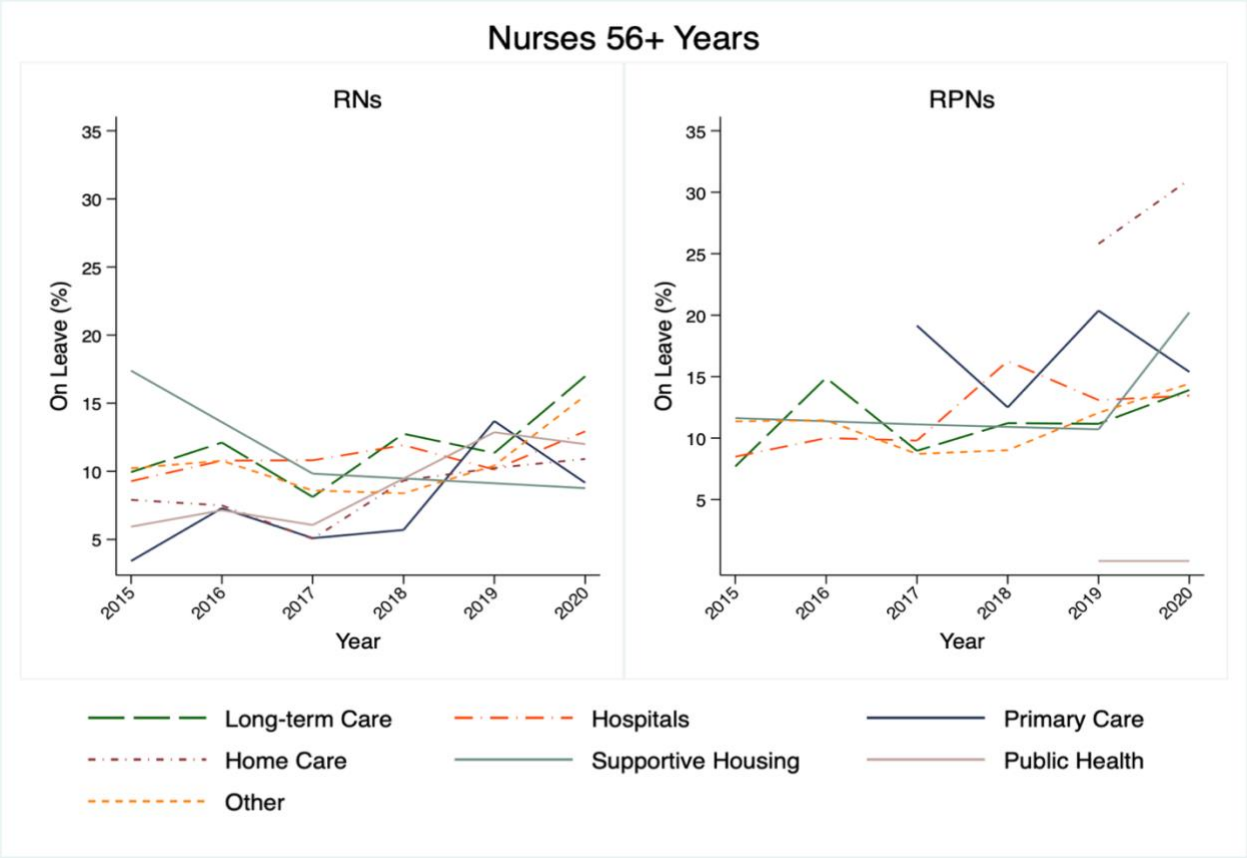
Note: Yearly leave rates are expressed as a percentage of jobs that end and are not replaced by an Ontario nursing job because the nurse employed in the job(s) went on leave.

Appendix 2.3 Figure 5: Yearly Leave Rates as a Percentage of Jobs that End 2014-2020 (Nurses 36-55 Years)



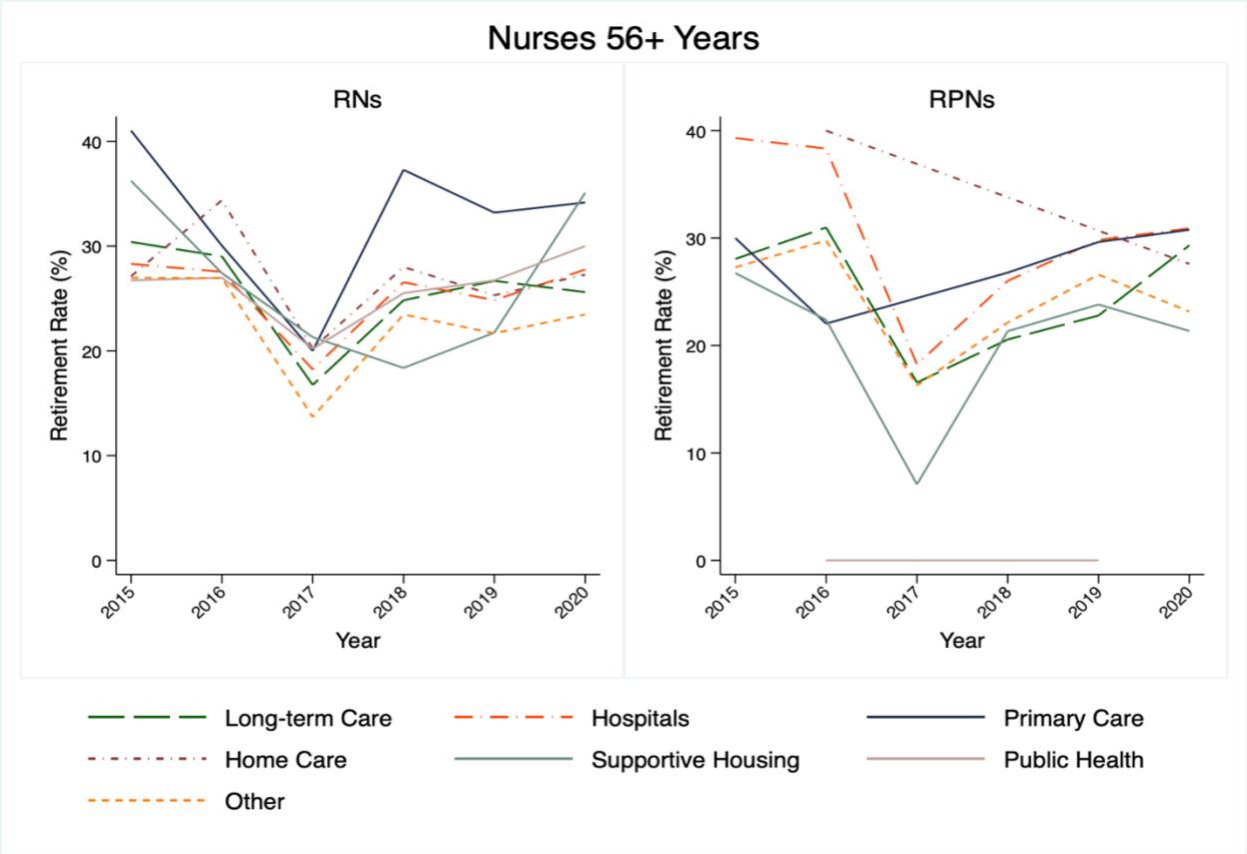
Note: Yearly leave rates are expressed as a percentage of jobs that end and are not replaced by an Ontario nursing job because the nurse employed in the job(s) went on leave.

Appendix 2.3 Figure 6: Yearly Leave Rates as a Percentage of Jobs that End, 2014-2020 (Nurses 56+ Years)



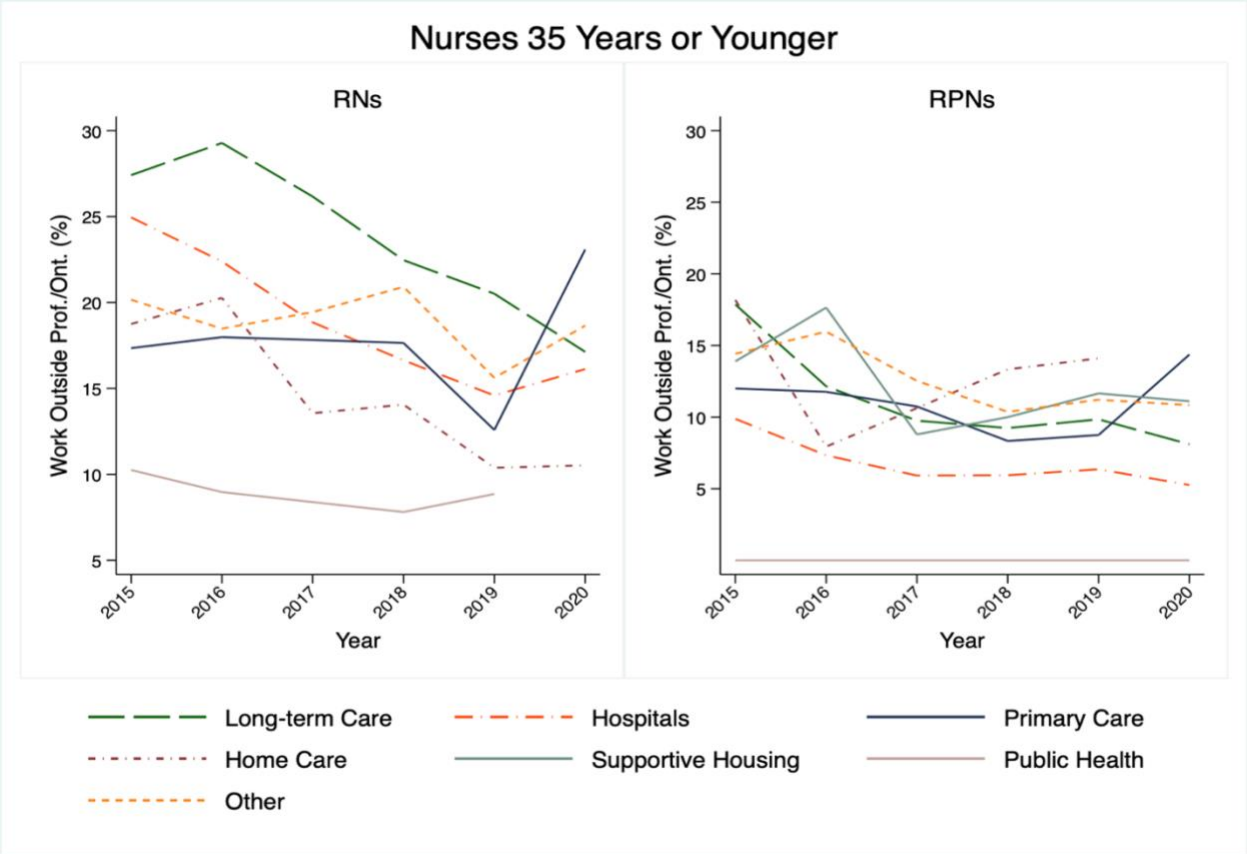
Note: Yearly leave rates are expressed as a percentage of jobs that end and are not replaced by an Ontario nursing job because the nurse employed in the job(s) went on leave. Some percentages have been supressed for confidentiality.

Appendix 2.3 Figure 7: Yearly Retirement Rates as a Percentage of Jobs that End, 2014-2020 (Nurses 56+ Years)



Note: Yearly retirement rates are expressed as a percentage of jobs that end and are not replaced by an Ontario nursing job because the nurse employed in the job(s) retired. Some percentages have been supressed for confidentiality.

Appendix 2.3 Figure 8: Yearly Exit Profession/Ontario Nursing Profession Rates as a Percentage of Jobs that End, 2014-2020 (Nurses 35 Years or Younger)



Note: Yearly exit rates are expressed as a percentage of jobs that end and are not replaced by an Ontario nursing job because the nurse employed in the job(s) left the Ontario nursing profession or the profession altogether. Some percentages have been suppressed for confidentiality.

Appendix 2.3 Table 1:Appendix 2.3 Table 1: Job Turnover Rates Across Healthcare 2014-2020 (Nurses 35 Years or Younger)

	RNs								RNs							
	Long-term Care	**Hospital**	**Primary Care**	**Home Care**	**Supp. Housing**	**Public Health**	**Other**	**Total**	**Long-term Care**	**Hospital**	**Primary Care**	**Home Care**	**Supp. Housing**	**Public Health**	**Other**	**Total**
	Panel A: Average Year to Year Job Turnover Rates (2014-2019)															
Job Continues	61.4	83.1	52.2	66.0	60.0	81.0	56.6	75.3	70.3	79.9	48.5	34.0	59.4	60.0	52.9	66.2
Turnover	37.9	16.7	46.9	34.0	40.0	19.0	42.6	24.3	29.4	20.0	51.5	66.0	39.9	40.0	46.6	33.4
A. Job Transitions (New Ont Job)	30.8	11.1	37.1	27.0	33.0	13.0	35.6	18.2	20.7	12.3	42.0	56.0	30.2	30.0	36.8	24.7
B. Job Ends (No Ont Job)	7.2	5.6	9.8	7.0	7.0	6.0	6.9	6.1	8.7	7.6	9.5	10.0	9.7	10.0	9.8	8.8
4 or More Jobs	0.7	0.2	0.9	0.0	0.0	0.0	0.8	0.3	0.3	0.1	0.0	0.0	0.6	0.0	0.5	0.3
N (Avg Jobs)	2450	23130	1240	990	270	1020	5850	34940	6270	7180	1420	630	2040	90	4820	22450
	Panel B: Job Turnover Rates (2020)															
Job Continues	58.2	82.0	50.6	72.3	57.5	78.5	53.2	73.8	61.0	77.7	46.3	35.2	52.0	69.0	44.3	60.4
Turnover	41.0	17.8	48.4	27.5	42.0	21.4	45.9	25.9	38.8	22.2	53.3	64.3	47.3	31.0	55.3	39.3
A. Job Transitions (New Ont Job)	33.3	11.7	38.7	20.3	33.3	14.1	39.1	19.3	27.6	12.5	42.8	51.7	36.2	27.4	44.1	28.7
B. Job Ends (No Ont Job)	7.7	6.1	9.7	7.2	8.6	7.3	6.8	6.5	11.3	9.7	10.5	12.6	11.0	3.6	11.2	10.7
4 or More Jobs	0.8	0.2	1.0	0.0	0.0	0.0	0.8	0.4	0.2	0.1	0.3	0.6	0.8	0.0	0.4	0.3
N (Jobs)	2470	27560	1310	1320	340	1880	6620	41500	5680	9570	1630	1060	2040	160	5060	25210

Notes: Observations have been rounded to the nearest ten for confidentiality. Job turnover consists of job transitions (jobs that end and are replaced with at least one Ontario nursing job) plus job ends (jobs that end and are not replaced with an Ontario nursing job). In some circumstances (<1%) we cannot determine if the job continues for those that have 4+ jobs.

Appendix 2.3 Table 2: Job Turnover Rates Across Healthcare 2014-2020 (Nurses 36-55 Years)

	RNs								RNs							
	Long-term Care	**Hospital**	**Primary Care**	**Home Care**	**Supp. Housing**	**Public Health**	**Other**	**Total**	**Long-term Care**	**Hospital**	**Primary Care**	**Home Care**	**Supp. Housing**	**Public Health**	**Other**	**Total**
	Panel A: Average Year to Year Job Turnover Rates (2014-2019)															
Job Continues	79.4	89.7	66.5	83.0	69.0	89.5	68.2	82.8	81.6	83.1	57.4	37.6	69.7	73.5	62.8	73.9
Turnover	20.1	10.1	32.8	17.0	31.0	10.5	31.1	16.8	18.0	16.6	42.2	61.5	29.7	26.5	36.5	25.7
A. Job Transitions (New Ont Job)	16.4	7.4	28.5	14.0	25.5	7.7	26.9	13.6	13.1	11.4	36.9	55.2	23.9	21.5	30.6	20.3
B. Job Ends (No Ont Job)	3.7	2.7	4.3	3.0	5.5	2.8	4.2	3.2	4.8	5.3	5.2	6.3	5.8	5.0	6.0	5.4
4 or More Jobs	0.5	0.2	0.7	0.0	0.0	0.0	0.7	0.3	0.4	0.2	0.4	0.9	0.5	0.0	0.7	0.4
N (Avg Jobs)	4540	30630	2300	2570	440	2180	1150	54160	7690	6750	1400	690	1940	110	6130	24700
	Panel B: Job Turnover Rates (2020)															
Job Continues	72.2	89.0	65.6	83.0	66.0	88.9	65.9	81.2	74.3	82.6	55.7	38.3	63.7	75.4	57.0	69.1
Turnover	26.7	10.8	33.2	17.0	34.0	11.1	33.1	18.3	25.2	17.2	43.7	60.9	35.6	22.1	42.4	30.5
A. Job Transitions (New Ont Job)	22.1	7.2	28.4	14.0	29.0	8.1	28.6	14.5	18.6	10.8	37.2	51.5	28.8	22.1	35.6	23.8
B. Job Ends (No Ont Job)	4.6	3.5	4.8	3.0	5.0	3.0	4.6	3.9	6.6	6.4	6.5	9.5	6.8	N/A	6.8	6.6
4 or More Jobs	1.1	0.2	1.3	0.0	0.0	0.0	1.0	0.5	0.4	0.2	0.6	0.8	0.7	N/A	0.7	0.5
N (Jobs)	3970	29320	2040	2830	390	2410	1076	051710	7480	7580	1600	1150	2060	170	6340	26360

Notes: Some observations have been suppressed for confidentiality. Observations have been rounded to the nearest ten for confidentiality. Job turnover consists of job transitions (jobs that end and are replaced with at least one Ontario nursing job) plus job ends (jobs that end and are not replaced with an Ontario nursing job). In some circumstances (<1%) we cannot determine if the job continues for those that have 4+ jobs.

Appendix 2.3: Table 3: Job Turnover Rates Across Healthcare 2014-2020 (Nurses 56+ Years)

	RNs								RNs							
	Long-term Care	**Hospital**	**Primary Care**	**Home Care**	**Supp. Housing**	**Public Health**	**Other**	**Total**	**Long-term Care**	**Hospital**	**Primary Care**	**Home Care**	**Supp. Housing**	**Public Health**	**Other**	**Total**
	Panel A: Average Year to Year Job Turnover Rates (2014-2019)															
Job Continues	75.7	79.8	64.1	69.0	66.0	78.0	63.3	73.0	78.0	75.0	59.0	33.0	71.0	75.4	60.9	69.8
Turnover	24.0	20.1	35.6	31.0	34.0	22.0	36.2	26.8	22.0	16.0	41.0	67.0	29.0	24.6	38.7	29.9
A. Job Transitions (New Ont Job)	10.6	6.7	20.9	16.0	18.0	7.0	22.4	13.1	12.0	16.0	13.0	13.5	14.0	N/A	13.6	13.7
B. Job Ends (No Ont Job)	13.4	13.3	14.6	15.0	16.0	15.0	13.7	13.7	10.0	0.0	28.0	53.5	15.0	N/A	25.1	16.3
4 or More Jobs	0.2	0.1	0.4	0.0	0.0	0.0	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.2
N (Avg Jobs)	2520	11200	1600	1090	350	720	6810	24290	2030	1790	410	180	600	40	1880	6930
	Panel B: Job Turnover Rates (2020)															
Job Continues	71.0	77.5	62.3	70.4	62.6	79.4	61.4	70.9	75.0	76.0	57.0	36.3	67.0	73.3	59.2	67.8
Turnover	29.0	22.4	37.1	29.6	37.4	20.6	38.0	28.8	25.0	24.0	43.0	61.2	33.0	26.7	40.4	31.8
A. Job Transitions (New Ont Job)	13.0	5.8	19.7	14.0	19.9	6.6	22.4	12.6	12.0	8.0	27.0	46.8	19.0	N/A	25.2	17.2
B. Job Ends (No Ont Job)	16.0	16.7	17.4	15.5	17.5	14.0	15.6	16.2	13.0	16.0	16.0	14.4	14.0	N/A	15.1	14.6
4 or More Jobs	0.0	0.1	0.6	0.0	0.0	0.0	0.6	0.3	0.0	0.0	0.0	2.5	0.0	0.0	0.5	0.4
N (Jobs)	2170	10970	1350	1140	310	840	6310	23100	1990	1680	430	260	610	40	1860	6860

Notes: Some observations have been suppressed for confidentiality. Observations have been rounded to the nearest ten for confidentiality. Job turnover consists of job transitions (jobs that end and are replaced with at least one Ontario nursing job) plus job ends (jobs that end and are not replaced with an Ontario nursing job). In some circumstances (<1%) we cannot determine if the job continues for those that have 4+ jobs.

Appendix 2.4

Appendix 2.4 Table 1: Transition Matrix and Sector Retention Among Single Jobholders Who Change Jobs 2014-2015 (%)

	RNs									RPNs								
	Sector Year t									Sector Year t								
	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Inactive	N	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Inactive	N
	Panel A: 2014-2015 Transitions (%)																	
Sector Year t-1																		
Long-term Care	27.3	15.2	N/A	2.9	2.8	N/A	14.1	35.1	850	21.3	13.9	2.7	N/A	8.1	N/A	15.8	36.1	1160
Hospital	2.1	29.8	3.8	2.1	0.5	0.4	21.0	40.3	4330	10.0	22.0	3.1	N/A	0.9	N/A	24.6	38.6	1310
Primary Care	N/A	11.1	31.6	3.4	N/A	1.9	27.2	23.2	1080	2.6	6.8	35.7	4.7	N/A	N/A	31.5	15.2	620
Home Care	3.8	8.2	4.9	13.7	N/A	N/A	41.2	26.5	550	4.6	1.6	6.8	10.1	3.3	0.0	64.2	9.3	370
Supp. Housing	16.6	8.9	4.7	5.9	10.7	0.0	19.5	33.7	170	21.1	4.7	3.8	2.8	18.5	0.0	20.4	28.7	420
Public Health	N/A	4.4	5.8	N/A	0.0	41.7	9.4	36.7	360	N/A	25.9	0.0	N/A	N/A	N/A	18.5	29.6	30
Other	2.8	20.7	7.0	7.1	1.1	0.9	40.6	19.9	3940	6.1	15.7	10.1	10.5	N/A	N/A	34.9	19.8	2030
Inactive	0.6	5.2	0.5	0.4	0.1	0.5	1.6	91.2	11420	5.4	4.9	1.4	0.5	1.0	0.0	3.7	82.9	2900
	Panel B: 2014 Sector Retention																	
Average Same Sector (%)	27.3	29.8	31.6	13.7	10.7	41.7	40.6	-	-	21.3	22.0	35.7	10.1	18.5	N/A	34.9	-	-
Average Share of Jobs (%)	8.5	57.0	4.7	4.1	0.9	3.6	21.2	-	-	31.1	29.0	5.8	2.4	8.2	0.4	23.1		
Pr(sector)/E(sector)	3.2	0.5	6.7	3.3	11.4	11.6	1.9	-	-	0.7	0.8	6.2	4.1	2.3	N/A	1.5	-	-

Notes: Observations are at the individual-level. Sample is based on nurses who are single jobholders in year t-1 and year t, and who change jobs in year t. Rows total 100% in Panel's A and B. N/A = supressed for confidentiality. Observations have been rounded to the nearest ten for confidentiality and the totals may therefore be affected by rounding.

Appendix 2.4 Table 2: Transition Matrix and Sector Retention Among Single Jobholders Who Change Jobs 2015-2016 (%)

	RNs									RPNs								
	Sector Year t									Sector Year t								
	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Inactive	N	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Inactive	N
	Panel A: 2015-2016 Transitions (%)																	
Sector Year t-1																		
Long-term Care	27.1	12.5	2.6	2.3	3.9	0.5	15.9	35.1	920	17.2	13.7	2.6	N/A	7.7	N/A	14.7	42.1	1360
Hospital	2.4	24.5	3.1	1.8	0.3	0.4	20.8	46.7	4310	7.8	16.8	2.5	N/A	1.1	N/A	24.7	46.4	1510
Primary Care	1.4	11.1	30.1	3.3	0.6	1.1	27.2	25.2	1040	2.9	6.8	37.3	4.2	1.9	0.9	30.7	15.4	690
Home Care	2.9	6.2	3.5	11.4	N/A	N/A	44.0	30.0	580	3.5	3.7	6.7	8.0	N/A	N/A	57.2	17.1	370
Supp. Housing	25.9	9.1	N/A	N/A	11.2	0.0	12.6	35.0	140	24.1	6.4	4.9	2.3	18.5	0.0	18.1	25.7	490
Public Health	N/A	1.3	2.9	N/A	N/A	46.1	8.0	40.2	370	0.0	N/A	N/A	N/A	0.0	N/A	45.5	22.7	20
Other	3.2	N/A	6.8	6.8	1.1	0.7	38.8	23.1	3950	6.1	14.8	9.0	11.2	4.5	0.4	31.1	22.9	2110
Inactive	1.7	19.5	2.2	1.9	0.2	2.6	7.6	64.2	2240	11.4	10.6	2.9	N/A	2.9	N/A	10.0	60.6	1040
	Panel B: 2015-2016 Sector Retention																	
Average Same Sector (%)	27.1	24.5	30.1	11.4	11.2	46.1	38.8	-	-	17.2	16.8	37.3	8.0	18.5	N/A	31.1	-	-
Average Share of Jobs (%)	8.5	57.1	4.6	4.2	0.9	3.5	21.2	-	-	30.1	28.7	5.9	2.8	8.5	0.5	23.5	-	-
Pr(sector)/E(sector)	3.2	0.4	6.5	2.7	11.8	13.1	1.8	-	-	0.6	0.6	6.3	2.9	2.2	N/A	1.3	-	-

Notes: Observations are at the individual-level. Sample is based on nurses who are single jobholders in year t-1 and year t, and who change jobs in year t. Rows total 100% in Panel's A and B. N/A = supressed for confidentiality. Observations have been rounded to the nearest ten for confidentiality and the totals may therefore be affected by rounding.

Appendix 2.4 Table 3:Transition Matrix and Sector Retention Among Single Jobholders Who Change Jobs 2016-2017 (%)

	RNs									RPNs								
	Sector Year t									Sector Year t								
	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Inactive	N	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Inactive	N
	Panel A: 2016-2017 Transitions (%)																	
Sector Year t-1																		
Long-term Care	26.1	13.9	1.7	2.4	3.1	0.5	16.8	35.6	970	16.1	14.2	3.5	N/A	8.7	N/A	16.4	39.5	1430
Hospital	2.1	35.0	2.7	1.4	0.2	0.5	20.3	37.8	4980	8.4	23.7	4.3	N/A	1.2	N/A	21.1	40.4	1680
Primary Care	1.6	11.7	26.9	4.2	N/A	N/A	30.5	23.5	970	3.4	5.8	35.9	6.6	2.4	0.7	29.9	15.3	710
Home Care	2.6	8.4	3.1	10.6	1.7	1.0	48.2	24.4	610	5.0	3.4	6.9	10.7	2.7	0.0	55.8	15.5	480
Supp. Housing	19.7	5.9	N/A	N/A	18.1	0.0	27.1	24.5	190	19.6	7.8	N/A	2.8	20.8	N/A	19.9	25.4	640
Public Health	N/A	3.9	5.4	3.1	N/A	27.2	17.1	40.9	260	N/A	N/A	N/A	N/A	0.0	20.6	26.5	41.2	30
Other	3.2	20.1	6.4	7.2	1.0	1.2	39.6	21.3	3900	6.0	15.2	9.1	10.7	4.0	0.4	34.2	20.4	2490
Inactive	1.7	15.1	1.6	1.3	0.2	1.2	4.7	74.2	4610	7.2	7.1	1.7	N/A	1.6	N/A	6.3	75.2	2360
	Panel B: 2016-2017 Sector Retention																	
Average Same Sector (%)	26.1	35.0	26.9	10.6	18.1	27.2	39.6	-	-	16.1	23.7	35.9	10.7	20.8	20.6	34.2	-	-
Average Share of Jobs (%)	8.3	57.3	4.5	4.2	0.9	3.5	21.4	-	-	29.0	28.9	6.1	3.0	8.6	0.5	24.0	-	-
Pr(sector)/E(sector)	3.1	0.6	6.0	2.5	19.8	7.9	1.8	-	-	0.6	0.8	5.9	3.5	2.4	45.3	1.4	-	-

Notes: Observations are at the individual-level. Sample is based on nurses who are single jobholders in year t-1 and year t, and who change jobs in year t. Rows total 100% in Panel's A and B. N/A = supressed for confidentiality. Observations have been rounded to the nearest ten for confidentiality and the totals may therefore be affected by rounding.

Appendix 2.4 Table 4: Transition Matrix and Sector Retention Among Single Jobholders Who Change Jobs 2017-2018 (%)

	RNs									RPNs								
	Sector Year t									Sector Year t								
	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Inactive	N	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Inactive	N
	Panel A: 2017-2018 Transitions (%)																	
Sector Year t-1																		
Long-term Care	31.8	16.1	N/A	2.3	2.5	N/A	15.7	29.0	960	16.5	14.7	2.7	N/A	7.7	N/A	17.4	40.1	1510
Hospital	2.6	25.6	2.9	2.2	0.3	0.7	21.9	43.8	4380	6.7	14.0	3.3	N/A	1.0	N/A	25.7	48.6	1560
Primary Care	1.4	11.9	30.1	3.8	0.5	2.1	25.5	24.6	980	2.4	6.6	36.6	4.9	N/A	N/A	33.5	14.1	790
Home Care	2.2	7.6	3.7	11.1	N/A	N/A	50.1	23.4	740	4.0	5.2	5.9	11.3	N/A	N/A	57.6	12.2	520
Supp. Housing	18.0	3.3	N/A	N/A	25.3	0.0	16.0	33.3	150	18.0	6.6	3.9	N/A	22.2	N/A	20.7	26.2	620
Public Health	N/A	2.2	3.0	1.2	N/A	59.3	10.5	23.1	510	N/A	N/A	N/A	0.0	0.0	25.0	28.6	28.6	30
Other	3.5	19.9	6.4	7.8	0.7	0.9	38.9	21.8	3960	6.7	15.6	7.8	10.0	4.1	0.4	33.1	22.2	2670
Inactive	1.4	10.2	0.8	0.8	0.1	0.6	3.8	82.4	4970	5.3	4.6	1.1	1.0	1.4	0.0	4.4	82.2	2900
	Panel B: 2017-2018 Sector Retention																	
Average Same Sector (%)	31.8	25.6	30.1	11.1	25.3	59.3	38.9	-	-	16.5	14.0	36.6	11.3	22.2	25.0	33.1	-	-
Average Share of Jobs (%)	8.3	57.6	4.3	4.1	0.9	3.3	21.4	-	-	28.5	29.0	6.1	3.1	8.7	0.4	24.2	-	-
Pr(sector)/E(sector)	3.8	0.4	6.9	2.7	27.4	17.8	1.8	-	-	0.6	0.5	6.0	3.6	2.5	60.3	1.4	-	-

Notes: Observations are at the individual-level. Sample is based on nurses who are single jobholders in year t-1 and year t, and who change jobs in year t. Rows total 100% in Panel's A and B. N/A = supressed for confidentiality. Observations have been rounded to the nearest ten for confidentiality and the totals may therefore be affected by rounding.

Appendix 2.4 Table 5: Transition Matrix and Sector Retention Among Single Jobholders Who Change Jobs 2018-2019 (%)

	RNs									RPNs								
	Sector Year t									Sector Year t								
	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Inactive	N	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Inactive	N
	Panel A: 2018-2019 Transitions (%)																	
Sector Year t-1																		
Long-term Care	28.9	13.6	N/A	2.0	1.8	N/A	15.7	36.3	1011	14.7	14.3	2.4	1.3	8.9	0.0	16.5	41.9	1610
Hospital	2.5	24.9	3.1	1.6	0.3	0.4	19.5	47.7	5138	5.7	14.8	3.4	N/A	1.8	N/A	22.3	51.6	1870
Primary Care	2.0	11.5	25.9	2.0	0.6	1.7	27.7	28.4	929	4.0	6.5	34.2	4.0	N/A	N/A	31.4	18.0	820
Home Care	2.3	7.4	4.6	9.1	N/A	N/A	44.9	30.5	659	3.8	2.1	8.0	5.1	4.2	0.0	61.7	15.2	570
Supp. Housing	15.3	11.7	N/A	N/A	14.6	0.0	21.9	27.0	137	17.5	7.8	4.4	N/A	20.2	N/A	18.7	28.6	710
Public Health	N/A	3.0	3.3	N/A	0.0	16.4	18.4	57.2	304	N/A	N/A	N/A	0.0	0.0	N/A	31.4	37.1	40
Other	3.0	20.5	6.4	9.1	1.0	0.9	33.7	25.5	3964	6.4	16.4	8.4	10.1	3.7	0.4	29.1	25.5	2750
Inactive	1.9	16.1	1.4	1.2	0.1	1.1	5.8	72.4	3433	8.0	7.8	1.8	N/A	2.5	N/A	7.4	71.5	2090
	Panel B: 2018-2019 Sector Retention																	
Average Same Sector (%)	28.9	24.9	25.9	9.1	14.6	16.4	33.7	-	-	14.7	14.8	34.2	5.1	20.2	N/A	29.1	-	-
Average Share of Jobs (%)	8.3	57.9	4.2	4.0	0.9	3.2	21.4	-	-	27.7	29.5	6.3	2.8	8.8	0.4	24.5	-	-
Pr(sector)/E(sector)	3.5	0.4	6.2	2.3	15.4	5.1	1.6	-	-	0.5	0.5	5.4	1.8	2.3	N/A	1.2	-	-

Notes: Observations are at the individual-level. Sample is based on nurses who are single jobholders in year t-1 and year t, and who change jobs in year t. Rows total 100% in Panel's A and B. N/A = supressed for confidentiality. Observations have been rounded to the nearest ten for confidentiality and the totals may therefore be affected by rounding.

Appendix 2.4 Table 6: Transitions for All Inactive Nurses (2014-2020)

	RNs					
	2014-15	**2015-16**	**2016-17**	**2017-18**	**2018-19**	**2019-20**
Remain Inactive	65.3	65.8	23.8	47.8	28.7	31.8
Leave HPDB	25.3	26.4	66.1	39.9	59.5	48.5
Active - Not Working	2.2	2.1	1.9	2.6	2.2	3.1
Active - Working	7.2	5.6	8.1	9.7	9.7	16.6
N	15960	16060	16820	10240	10940	10020
	RPNs					
	2014-15	**2015-16**	**2016-17**	**2017-18**	**2018-19**	**2019-20**
Remain Inactive	48.2	50.4	33.2	49.3	27.0	29.9
Leave HPDB	37.3	37.0	52.6	37.5	60.1	52.0
Active - Not Working	3.0	3.4	2.7	2.9	2.7	3.3
Active - Working	11.4	9.3	11.5	10.2	10.2	14.9
N	4990	5260	6130	5930	6980	6480

Notes: Observations are at the individual-level and have been rounded to the nearest ten for confidentiality. Totals may be affected by rounding.

Appendix 2.4 Table 7: Employment Status Transitions Among Involuntary Part-time, Casual, and Full-time Single Jobholders Who Change Jobs 2014-2015 (%)

	RNs								RPNs							
	Sector Year t-1								Sector Year t-1							
	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Total	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Total
Type of Nurse Year t-1 (N)																
Employment Status Year t (%)																
Involuntary Part-time/Casual	120	380	80	50	10	10	330	990	240	210	100	80	90	10	370	1090
Switch to Full-time	43.9	48.7	30.3	51.9	N/A	N/A	39.5	43.4	31.2	28.8	26.9	26.0	34.1	N/A	25.5	28.3
Stay Part-time/Casual	56.1	51.3	69.7	48.1	N/A	N/A	60.5	56.6	68.8	71.2	73.1	74.0	65.9	N/A	74.5	71.7
Voluntary Part-time/Casual	80	470	240	90	20	30	660	1590	140	150	80	80	50	10	270	760
Switch to Full-time	7.5	14.1	5.4	7.4	N/A	N/A	7.6	9.2	14.8	9.4	10.4	12.0	15.7	0.0	10.8	11.6
Stay Part-time/Casual	92.5	85.9	94.6	92.6	N/A	N/A	92.4	90.8	85.2	90.6	89.6	88.0	84.3	100.0	89.2	88.4
Involuntary Full-time	20	80	30	20	10	20	160	340	330	420	320	170	150	10	880	2280
Stay Full-time	70.8	54.9	59.3	52.9	N/A	55.0	62.3	59.9	75.7	87.3	88.7	84.5	73.5	N/A	89.5	85.5
Switch to Part-time/Casual	29.2	45.1	40.7	47.1	N/A	45.0	37.7	40.1	24.3	12.7	11.3	15.5	26.5	N/A	10.5	14.5
Voluntary Full-time	310	1590	450	220	70	170	1880	4690	10	20	20	10	10	0	50	110
Stay Full-time	79.2	85.1	87.8	90.4	81.4	94.2	92.0	88.2	N/A	52.9	66.7	50.0	N/A	0.0	73.6	63.6
Switch to Part-time/Casual	20.8	14.9	12.2	9.6	18.6	5.8	8.0	11.8	N/A	47.1	33.3	50.0	N/A	0.0	26.4	36.4

Notes: Observations are at the individual-level. Sample is based on nurses who are single jobholders in year t-1 and year t, and who change jobs in year t. Sector analysis is based on the sector in year t-1, thus the sector in which nurses transition to in year t may not be the same sector as listed in year t-1. N/A = supressed for confidentiality. Observations have been rounded to the nearest ten for confidentiality and the totals may therefore be affected by rounding.

Appendix 2.4 Table 8: Employment Status Transitions Among Involuntary Part-time, Casual, and Full-time Single Jobholders Who Change Jobs 2015-2016 (%)

	RNs								RPNs							
	Sector Year t-1								Sector Year t-1							
	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Total	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Total
Type of Nurse Year t-1 (N)																
Employment Status Year t (%)																
Involuntary Part-time/Casual	60	270	70	40	10	10	260	700	170	160	80	60	50	0	290	800
Switch to Full-time	39.3	45.3	22.4	27.8	N/A	N/A	30.5	36.7	40.1	27.2	40.0	31.0	34.6	0.0	30.0	33.2
Stay Part-time/Casual	60.7	54.7	77.6	72.2	N/A	N/A	69.5	63.3	59.9	72.8	60.0	69.0	65.4	0.0	70.0	66.8
Voluntary Part-time/Casual	70	360	180	70	20	30	530	1260	90	120	60	40	40	0	220	570
Switch to Full-time	24.6	13.3	13.1	13.9	N/A	N/A	8.9	11.9	15.1	10.8	13.3	N/A	12.8	0.0	11.6	12.1
Stay Part-time/Casual	75.4	86.7	86.9	86.1	N/A	N/A	91.1	88.1	84.9	89.2	86.7	N/A	87.2	0.0	88.4	87.9
Involuntary Full-time	20	90	40	10	10	20	130	310	10	20	20	10	10	0	50	110
Stay Full-time	66.7	62.2	62.2	N/A	N/A	N/A	82.4	72.3	N/A	60.0	72.7	N/A	N/A	0.0	72.5	69.4
Switch to Part-time/Casual	33.3	37.8	37.8	N/A	N/A	N/A	17.6	27.7	N/A	40.0	27.3	N/A	N/A	0.0	27.5	30.6
Voluntary Full-time	300	1250	380	210	40	150	1680	4000	290	360	310	130	130	10	720	1940
Stay Full-time	82.2	84.3	89.1	88.9	N/A	92.5	91.3	88.1	74.4	90.5	89.6	89.8	75.0	N/A	87.9	85.9
Switch to Part-time/Casual	17.8	15.7	10.9	11.1	N/A	7.5	8.7	11.9	25.6	9.5	10.4	10.2	25.0	N/A	12.1	14.1

Notes: Observations are at the individual-level. Sample is based on nurses who are single jobholders in year t-1 and year t, and who change jobs in year t. Sector analysis is based on the sector in year t-1, thus the sector in which nurses transition to in year t may not be the same sector as listed in year t-1. N/A = supressed for confidentiality. Observations have been rounded to the nearest ten for confidentiality and the totals may therefore be affected by rounding.

Appendix 2.4 Table 9: Employment Status Transitions Among Involuntary Part-time, Casual, and Full-time Single Jobholders Who Change Jobs 2016-2017 (%)

	RNs								RPNs							
	Sector Year t-1								Sector Year t-1							
	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Total	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Total
Type of Nurse Year t-1 (N)																
Employment Status Year t (%)																
Involuntary Part-time/Casual	160	520	80	40	20	10	330	1150	340	260	120	90	160	10	430	1400
Switch to Full-time	60.0	58.6	48.2	60.0	47.1	N/A	53.8	56.7	41.4	40.4	38.1	39.8	39.6	N/A	34.6	38.6
Stay Part-time/Casual	40.0	41.4	51.8	40.0	52.9	N/A	46.2	43.3	58.6	59.6	61.9	60.2	60.4	N/A	65.4	61.4
Voluntary Part-time/Casual	70	500	210	90	40	10	630	1550	140	200	80	80	80	0	320	910
Switch to Full-time	9.9	4.4	N/A	N/A	0.0	N/A	3.8	4.0	3.6	3.0	N/A	N/A	N/A	0.0	4.7	3.7
Stay Part-time/Casual	90.1	95.6	N/A	N/A	100.0	N/A	92.6	93.7	96.4	97.0	N/A	N/A	N/A	0.0	95.3	96.3
Involuntary Full-time	50	240	50	30	10	30	220	630	310	460	350	190	210	10	1050	2580
Stay Full-time	24.0	23.6	40.0	20.0	N/A	43.3	38.4	31.4	86.1	93.5	89.2	87.1	81.0	100.0	90.6	89.4
Switch to Part-time/Casual	76.0	76.4	60.0	80.0	N/A	56.7	61.6	68.6	13.9	6.5	10.8	12.9	19.0	0.0	9.4	10.6
Voluntary Full-time	330	1770	370	280	70	100	1740	4660	40	50	40	30	20	0	110	290
Stay Full-time	87.9	91.5	94.2	90.0	N/A	95.0	95.8	93.1	NA	24.5	18.9	28.0	N/A	0.0	38.9	26.6
Switch to Part-time/Casual	12.1	8.5	5.8	10.0	N/A	5.0	4.2	6.9	NA	75.5	81.1	72.0	N/A	0.0	61.1	73.4

Notes: Observations are at the individual-level. Sample is based on nurses who are single jobholders in year t-1 and year t, and who change jobs in year t. Sector analysis is based on the sector in year t-1, thus the sector in which nurses transition to in year t may not be the same sector as listed in year t-1. N/A = supressed for confidentiality. Observations have been rounded to the nearest ten for confidentiality and the totals may therefore be affected by rounding.

Appendix 2.4 Table 10: Employment Status Transitions Among Involuntary Part-time, Casual, and Full-time Single Jobholders Who Change Jobs 2017-2018 (%)

	RNs								RPNs							
	Sector Year t-1								Sector Year t-1							
	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Total	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Total
Type of Nurse Year t-1 (N)																
Employment Status Year t (%)																
Involuntary Part-time/Casual	140	400	60	40	10	0	280	940	300	210	130	110	120	10	420	1290
Switch to Full-time	45.8	53.0	49.2	47.6	NA	0.0	41.3	47.5	36.1	34.7	41.9	29.0	37.5	N/A	34.0	35.5
Stay Part-time/Casual	54.2	47.0	50.8	52.4	NA	0.0	58.7	52.5	63.9	65.3	58.1	71.0	62.5	N/A	66.0	64.5
Voluntary Part-time/Casual	110	440	220	110	20	40	670	1610	170	170	100	90	80	0	370	960
Switch to Full-time	22.1	21.5	13.0	10.0	0.0	N/A	10.4	14.3	12.7	19.3	13.1	12.8	17.5	0.0	11.5	13.8
Stay Part-time/Casual	77.9	78.5	87.0	90.0	100.0	N/A	89.6	85.7	87.3	80.7	86.9	87.2	82.5	0.0	88.5	86.2
Involuntary Full-time	20	100	20	30	0	20	130	330	10	20	10	10	10	0	50	110
Stay Full-time	61.9	59.4	75.0	53.6	0.0	65.2	72.9	65.8	N/A	53.3	N/A	N/A	N/A	0.0	65.4	58.2
Switch to Part-time/Casual	38.1	40.6	25.0	46.4	0.0	34.8	27.1	34.2	N/A	46.7	N/A	N/A	N/A	0.0	34.6	41.8
Voluntary Full-time	390	1460	420	370	60	320	1880	4900	380	380	420	240	230	10	1160	2820
Stay Full-time	82.6	81.0	87.3	89.2	89.5	95.0	92.7	87.8	77.6	86.2	88.9	89.9	71.5	N/A	86.1	84.5
Switch to Part-time/Casual	17.4	19.0	12.7	10.8	10.5	5.0	7.3	12.2	22.4	13.8	11.1	10.1	28.5	N/A	13.9	15.5

Notes: Observations are at the individual-level. Sample is based on nurses who are single jobholders in year t-1 and year t, and who change jobs in year t. Sector analysis is based on the sector in year t-1, thus the sector in which nurses transition to in year t may not be the same sector as listed in year t-1. N/A = supressed for confidentiality. Observations have been rounded to the nearest ten for confidentiality and the totals may therefore be affected by rounding.

Appendix 2.4 Table 11: Employment Status Transitions Among Involuntary Part-time, Casual, and Full-time Single Jobholders Who Change Jobs 2018-2019 (%)

	RNs								RPNs							
	Sector Year t-1								Sector Year t-1							
	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Total	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Total
Type of Nurse Year t-1 (N)																
Employment Status Year t (%)																
Involuntary Part-time/Casual	110	430	40	40	10	0	260	910	310	230	110	90	150	10	420	1320
Switch to Full-time	45.1	54.9	43.9	53.7	N/A	0.0	46.2	50.7	34.6	37.5	32.5	38.6	38.3	N/A	39.0	37.0
Stay Part-time/Casual	54.9	45.1	56.1	46.3	N/A	0.0	53.8	49.3	65.4	62.5	67.5	61.4	61.7	66.7	61.0	63.0
Voluntary Part-time/Casual	90	500	190	110	20	10	610	1520	190	200	110	90	70	10	360	1020
Switch to Full-time	21.6	22.0	8.6	8.3	0.0	N/A	10.1	14.2	23.1	22.9	20.8	11.0	19.7	0.0	14.6	18.4
Stay Part-time/Casual	78.4	78.0	91.4	91.7	100.0	N/A	89.9	85.8	76.9	77.1	79.2	89.0	80.3	100.0	85.4	81.6
Involuntary Full-time	20	90	30	10	0	10	130	290	10	20	20	10	10	0	40	120
Stay Full-time	66.7	46.1	54.8	N/A	0.0	N/A	77.1	63.5	N/A	N/A	61.9	N/A	N/A	0.0	69.0	68.6
Switch to Part-time/Casual	33.3	53.9	45.2	N/A	0.0	N/A	22.9	36.5	N/A	N/A	38.1	N/A	N/A	0.0	31.0	31.4
Voluntary Full-time	390	1590	380	280	60	110	1830	4640	370	420	420	280	260	10	1150	2900
Stay Full-time	86.2	80.6	86.7	88.5	86.2	93.7	93.6	87.6	70.5	82.0	84.9	89.2	73.2	N/A	86.9	82.8
Switch to Part-time/Casual	13.8	19.4	13.3	11.5	13.8	6.3	6.4	12.4	29.5	18.0	15.1	10.8	26.8	N/A	13.1	17.2

Notes: Observations are at the individual-level. Sample is based on nurses who are single jobholders in year t-1 and year t, and who change jobs in year t. Sector analysis is based on the sector in year t-1, thus the sector in which nurses transition to in year t may not be the same sector as listed in year t-1. N/A = supressed for confidentiality. Observations have been rounded to the nearest ten for confidentiality and the totals may therefore be affected by rounding.

Appendix 2.4 Table 12: Transitions Among Involuntary Part-time/Casual Multiple Jobholders Who Change Jobs 2014-2015 (%)

	RNs								RPNs							
	Sector Year t-1								Sector Year t-1							
	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Total	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Total
Year t																
Find Full-time	20.3	19.0	21.0	27.0	25.7	N/A	18.1	19.4	12.8	14.2	15.3	13.4	17.5	0.0	17.8	14.6
Stay Part-time/Casual	31.4	30.3	42.0	43.2	45.7	N/A	41.6	33.6	36.0	40.7	55.1	70.1	41.6	N/A	46.1	41.2
No Transition	48.3	50.8	37.0	29.7	28.6	46.7	40.3	47.0	51.2	45.2	29.7	16.4	40.9	N/A	36.1	44.2
N	460	1300	100	40	40	20	490	2440	1210	600	120	70	300	10	560	2870
Full-time Sector t:																
Same Sector	46.8	59.1	N/A	N/A	N/A	N/A	43.2	51.1	41.2	52.9	44.4	N/A	39.6	N/A	48.0	44.5
Different Sector	53.2	40.9	N/A	N/A	N/A	N/A	56.8	48.9	58.8	47.1	55.6	N/A	60.4	N/A	52.0	55.5

Notes: Observations are at the individual-level. Sample is based on multiple jobholders who change jobs. Nurses are assigned to the sector of their first job in each year. Nurses that obtain two full-time jobs in year t are assigned to the sector of the full-time job listed first. N/A = supressed for confidentiality. Observations have been rounded to the nearest ten for confidentiality and the totals may therefore be affected by rounding.

Appendix 2.4 Table 13: Transitions Among Involuntary Part-time/Casual Multiple Jobholders Who Change Jobs 2015-2016 (%)

	RNs								RPNs							
	Sector Year t-1								Sector Year t-1							
	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Total	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Total
Year t																
Find Full-time	20.9	15.7	8.9	28.2	N/A	N/A	19.9	17.4	11.5	11.9	16.7	27.0	14.6	N/A	15.6	13.3
Stay Part-time/Casual	32.2	32.6	43.3	33.3	24.0	N/A	38.7	34.0	35.6	38.5	47.4	47.6	40.0	N/A	45.1	39.4
No Transition	46.8	51.7	47.8	38.5	N/A	76.5	41.4	48.6	52.9	49.7	36.0	25.4	45.4	55.6	39.2	47.3
N	430	1330	90	40	30	20	490	2410	1050	580	110	60	260	10	530	2600
Full-time Sector t:																
Same Sector	38.2	70.2	N/A	N/A	N/A	N/A	43.9	55.8	47.1	65.2	42.1	N/A	44.7	N/A	40.2	47.0
Different Sector	61.8	29.8	N/A	N/A	N/A	N/A	56.1	44.2	52.9	34.8	57.9	N/A	55.3	N/A	59.8	53.0

Notes: Observations are at the individual-level. Sample is based on multiple jobholders who change jobs. Nurses are assigned to the sector of their first job in each year. Nurses that obtain two full-time jobs in year t are assigned to the sector of the full-time job listed first. N/A = supressed for confidentiality. Observations have been rounded to the nearest ten for confidentiality and the totals may therefore be affected by rounding.

Appendix 2.4 Table 14: Transitions Among Involuntary Part-time/Casual Multiple Jobholders Who Change Jobs 2016-2017 (%)

	RNs								RPNs							
	Sector Year t-1								Sector Year t-1							
	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Total	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Total
Year t																
Find Full-time	28.4	26.2	38.2	42.6	39.5	36.0	28.0	28.0	18.3	20.5	28.6	24.7	22.5	N/A	22.4	20.8
Stay Part-time/Casual	31.2	28.8	33.6	35.2	34.9	N/A	36.3	31.1	38.6	36.2	40.0	64.5	41.9	N/A	48.6	41.4
No Transition	40.5	45.0	28.2	22.2	25.6	N/A	35.6	40.9	43.1	43.3	31.4	10.8	35.6	N/A	29.0	37.8
N	500	1540	110	50	40	30	590	2870	1230	630	140	90	400	10	640	3140
Full-time Sector t:																
Same Sector	35.0	74.2	11.9	N/A	N/A	N/A	41.0	53.7	48.0	70.0	30.0	34.8	50.6	N/A	52.8	52.1
Different Sector	65.0	25.8	88.1	N/A	N/A	N/A	59.0	46.3	52.0	30.0	70.0	65.2	49.4	N/A	47.2	47.9

Notes: Observations are at the individual-level. Sample is based on multiple jobholders who change jobs. Nurses are assigned to the sector of their first job in each year. Nurses that obtain two full-time jobs in year t are assigned to the sector of the full-time job listed first. N/A = supressed for confidentiality. Observations have been rounded to the nearest ten for confidentiality and the totals may therefore be affected by rounding.

Appendix 2.4 Table 15: Transitions Among Involuntary Part-time/Casual Multiple Jobholders Who Change Jobs 2017-2018 (%)

	RNs								RPNs							
	Sector Year t-1								Sector Year t-1							
	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Total	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Total
Year t																
Find Full-time	29.8	22.9	25.7	51.9	23.1	45.8	22.2	24.3	14.5	17.2	23.4	29.5	21.0	N/A	24.1	18.7
Stay Part-time/Casual	31.7	29.3	38.6	N/A	38.5	N/A	37.2	31.2	38.0	36.6	47.5	47.4	42.3	N/A	40.9	39.2
No Transition	38.6	47.8	35.6	N/A	38.5	N/A	40.7	44.5	47.5	46.2	29.1	23.2	36.7	N/A	35.0	42.1
N	360	1610	100	30	30	20	490	2630	1090	1010	160	100	320	10	630	3310
Full-time Sector t:																
Same Sector	73.1	82.3	61.5	50.0	N/A	N/A	55.6	74.2	61.4	77.0	54.1	39.3	67.2	N/A	56.6	63.8
Different Sector	26.9	17.7	38.5	50.0	N/A	N/A	44.4	25.8	38.6	23.0	45.9	60.7	32.8	N/A	43.4	36.2

Notes: Observations are at the individual-level. Sample is based on multiple jobholders who change jobs. Nurses are assigned to the sector of their first job in each year. Nurses that obtain two full-time jobs in year t are assigned to the sector of the full-time job listed first. N/A = supressed for confidentiality. Observations have been rounded to the nearest ten for confidentiality and the totals may therefore be affected by rounding.

Appendix 2.4 Table 16: Transitions Among Involuntary Part-time/Casual Multiple Jobholders Who Change Jobs 2018-2019 (%)

	RNs								RPNs							
	Sector Year t-1								Sector Year t-1							
	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Total	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Total
Year t																
Find Full-time	21.6	23.1	28.7	17.9	45.5	25.0	22.6	23.2	15.4	15.8	31.5	27.3	23.8	N/A	16.6	17.7
Stay Part-time/Casual	30.8	30.0	30.7	46.2	31.8	25.0	36.4	31.5	36.0	37.8	39.5	49.5	41.9	N/A	45.7	39.5
No Transition	47.5	46.8	40.6	35.9	22.7	50.0	41.0	45.2	48.7	46.4	29.0	23.2	34.3	N/A	37.7	42.8
N	310	1500	100	40	20	20	430	2420	1070	1020	160	100	320	10	600	3270
Full-time Sector t:																
Same Sector	71.2	80.4	48.3	N/A	N/A	N/A	42.9	70.3	61.0	76.3	64.7	18.5	53.3	N/A	71.0	64.0
Different Sector	28.8	19.6	51.7	N/A	N/A	N/A	57.1	29.7	39.0	23.8	35.3	81.5	46.7	N/A	29.0	36.0

Notes: Observations are at the individual-level. Sample is based on multiple jobholders who change jobs. Nurses are assigned to the sector of their first job in each year. Nurses that obtain two full-time jobs in year t are assigned to the sector of the full-time job listed first. N/A = supressed for confidentiality. Observations have been rounded to the nearest ten for confidentiality and the totals may therefore be affected by rounding.

Appendix 2.4 Table 17: Jobs Held by New Entrants to the Profession, Sector Growth, and Full-time Employment in Ontario 2014-2020

	RNs								RPNs							
	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Total	Long-term Care	Hospital	Primary Care	Home Care	Supp. Housing	Public Health	Other	Total
Panel A: Jobs Held by New Entrants to Ontario (%)																
2014	14.5	62.8	2.8	1.8	1.3	1.6	15.2	4400	35.5	21.7	5.9	3.3	12.5	0.4	20.7	3530
Full-time	24.1	47.1	44.0	40.7	27.3	76.1	33.0		15.8	20.9	38.9	32.8	16.3	N/A	23.7	
2015	14.6	62.7	3.2	1.7	1.2	1.5	15.1	3610	34.7	22.1	5.3	4.3	13.8	0.3	19.5	3730
Full-time	23.0	42.4	37.7	33.9	18.2	68.5	30.0		14.7	21.6	39.1	25.0	18.0	N/A	20.5	
2016	15.0	61.5	2.7	2.5	1.0	1.5	15.8	4370	32.5	22.5	6.3	4.3	14.1	0.2	20.1	3440
Full-time	17.7	39.9	40.2	50.9	21.4	82.1	33.5		10.2	23.7	33.9	31.3	15.7	N/A	23.0	
2017	13.3	64.3	2.6	2.4	1.0	1.4	15.0	5110	31.0	23.8	5.2	N/A	13.1	N/A	22.4	4270
Full-time	15.5	33.6	44.4	42.3	15.1	82.9	35.6		9.2	13.4	37.2	33.3	17.7	16.7	26.5	
2018	15.1	64.1	2.6	1.6	1.3	1.0	14.3	5900	31.6	24.6	5.0	4.4	14.7	0.2	19.5	5010
Full-time	23.5	36.0	48.4	51.1	23.1	73.7	36.6		12.1	15.8	39.9	40.5	17.0	N/A	27.8	
2019	14.1	64.5	2.5	1.5	1.5	0.8	15.0	5790	31.7	26.1	5.3	N/A	13.6	N/A	20.0	3820
Full-time	20.0	37.9	41.5	51.2	18.2	63.3	34.5		14.2	21.0	43.3	41.8	19.5	50.0	31.2	
2020	10.1	65.7	2.6	2.1	1.0	5.5	12.9	5860	30.4	33.8	3.5	4.1	10.7	0.5	17.1	3220
Full-time	35.6	43.0	44.1	55.3	26.2	66.8	36.3		27.0	32.9	45.0	45.8	37.3	33.3	34.9	
Panel B: Sector Growth/Share of New Positions (%)																
2014-2015	20.9	113.5	-42.9	39.7	-4.6	-18.1	-8.5	280	23.3	22.9	7.1	N/A	13.2	N/A	29.1	2960
2015-2016	16.7	34.0	19.7	-8.4	-4.0	24.0	18.1	-370	3.5	22.6	8.8	11.3	18.3	0.8	34.7	1980
2016-2017	-5.8	73.1	-13.9	3.3	-2.2	-1.3	46.7	1200	9.6	31.5	9.9	7.3	9.0	0.5	32.2	2990
2017-2018	7.8	75.7	-1.4	-1.4	1.4	-2.8	20.7	2300	19.4	31.0	5.8	4.7	10.8	-0.3	28.5	3190
2018-2019	18.6	101.5	-20.1	1.0	5.6	-24.9	18.2	600	-5.5	49.6	14.5	-8.8	11.7	0.6	37.9	1430
2019-2020	-291.5	206.8	-49.2	166.7	-15.6	392.1	-309.3	370	91.4	-70.2	7.5	-47.2	34.8	-7.9	91.6	-1610
Panel C: Percentage of New and Existing Positions That Are Full-time by Sector																
2014	48.3	60.7	42.3	72.4	45.1	77.6	48.5	57.1	43.1	48.1	52.4	40.1	43.2	61.8	44.9	45.5
2015	47.4	60.4	42.8	72.4	43.0	78.0	48.2	56.8	41.9	47.4	53.3	40.9	41.5	63.3	44.3	44.7
2016	47.2	60.0	41.8	73.9	43.3	79.6	47.9	56.6	41.7	46.9	52.4	40.2	41.4	61.6	44.4	44.5
2017	46.8	59.9	42.4	73.6	43.2	80.6	48.2	56.7	41.6	46.1	52.4	41.9	41.5	58.3	44.5	44.3
2018	49.0	60.0	43.4	74.2	41.8	81.3	48.7	57.1	41.6	46.5	53.1	43.9	41.7	66.7	45.7	44.9
2019	48.3	60.7	42.3	72.4	45.1	77.6	48.5	57.1	48.3	60.7	42.3	72.4	45.1	77.6	48.5	57.1
2020	55.6	61.4	46.0	74.9	47.0	74.3	49.8	59.0	49.9	49.8	56.5	54.6	53.2	56.9	50.0	50.8

Notes: Some observations have been suppressed for confidentiality. Observations are at the job-level and have been rounded to the nearest ten for confidentiality. Totals may be affected by rounding.

Chapter 3

The Trajectory of Agency-Employed Nurses in Ontario, Canada
A Longitudinal Analysis (2011-2021)

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Abstract

In Canada, reports of nursing staff shortages, job vacancies and the use of private agency nurses, especially in hospitals, have increased since the start of the COVID-19 pandemic. Media reports suggest the pandemic exacerbated nursing shortages among other issues, and nurses are leaving their traditional positions to work at such agencies. Public spending on agency nurses has increased appreciably. Using 2011-2021 regulatory college data on all registered nurses (RNs) and registered practical nurses (RPNs) in the province of Ontario, Canada, we investigated trends in the count and share of nurses working for employment agencies. We also examined the rate at which previously non-agency employed nurses transition to employment in at least one agency job. We found the prevalence of RNs and RPNs reporting agency employment was relatively stable from 2011-2019, and decreased slightly in 2020 and 2021. However, there was a small increase in transitions from non-agency employment to working at an agency job. We also found the mean hours of practice in all jobs reported by agency and non-agency nurses increased during the pandemic. Based on these findings, an increase in hours and/or prices for agency nurses may explain the increase in public funding for agency nurses, but it was not driven by an increasing share of nurses working for employment agencies. To fully understand employment agency activity, policymakers may need to monitor hours of work and hourly costs rather than only costs. Further research is required to investigate any long-term effects the pandemic may have had on agency-employment.

3.1 Introduction

Globally, healthcare professionals, especially nurses, have reported that they feel higher levels of stress and severe burnout due to increased demands during the COVID-19 pandemic (e.g., Arnetz et al., 2020; Galanis et al., 2021; Martin et al., 2023; Murat et al., 2021). Ben-Ahmed and Bourgeault (2022) highlighted that thousands of nurses across Canada have been facing complex intersecting issues – such as heavy workloads, mandatory overtime, and inadequate staffing – that were exacerbated by the pandemic. Ben-Ahmed and Bourgeault (2022), and several media outlets (e.g., Mudhar, 2022; Grant, 2023) have reported that these issues, among others that pre-date the pandemic, have led nurses to leave the profession, change jobs, or turn toward employment at private staffing agencies.

Under Canada's constitution, healthcare is a provincial responsibility. However, the federal government contributes funding to the provinces in return for provincial governments meeting the criteria of the Canada Health Act (Government of Canada, 2023). The result is Canada's single payer Medicare system where provinces provide hospital and physician services at no cost to permanent residents and citizens. This model implies that virtually all nurses' remuneration is ultimately funded by the province governments.

Additionally, each provincial government delegates nursing regulation to a professional College, in the case of Ontario to the College of Nurses of Ontario (CNO). Simultaneously, a very high percentage of nurses are unionized and bargain collectively (Daniels et al., 2012; Sweetman, 2022). Relevant for this study, shortly before the onset of COVID-19, in June 2019, the Ontario government passed Bill 124 limiting salary increases to 1.0 percent per year for three-years for public sector employees, including nurses (Legislative Assembly of Ontario, 2019). Nursing unions and associations fought against Bill 124; they are concerned about nurse

retention and shortages (e.g., Registered Nurses Association of Ontario [RNAO], 2021; Ontario Nurses Association [ONA], 2019). The Bill has since been deemed unconstitutional by the Ontario Superior Court, though the Ontario government is appealing (ONA, n.d.). Appendix 1 provides further institutional background.

There is little empirical research on the rate of nurse retention, job turnover, and agency employment either prior to or during the COVID-19 pandemic in Canada. However, several surveys have reported an increase in the intention to change jobs or leave the profession. For example, a poll conducted on behalf of two unions (Canadian Union of Public Employees [CUPE] and SEIU [Service Employees International Union] Health care) found that 60 percent of surveyed Ontario registered practical nurses (RPNs) are considering leaving the profession (SEIU Health care, 2023). Similarly, the Canadian Federation of Nurses Unions (CFNU, 2022) found about 30 percent of surveyed Canadian nurses were considering changing their jobs, and 20 percent were considering leaving the profession. These surveys mainly used convenience sampling methods, and only measured the intention to leave the profession or change jobs. Drost and Sweetman (2023) examined job turnover, as distinct from occupational turnover or exits, using Ministry of Health data from the Canadian province of Ontario and found an average annual job turnover rate of 21.3 percent among registered nurses (RNs) and 29.4 percent among RPNs from 2014 to 2019. Contrary to expectations, they observed that the job turnover rate increased only slightly, to 23.0 percent among RNs and 34.5 percent among RPNs, in 2020 when COVID-19 was most severe.

Research on the prevalence of agency nurses in Canada is limited, and often anecdotal. The only report of which we are aware containing information on Ontario agency employment is the CNO's annual *Registration Renewal Statistics Report*, the most recent being CNO (2023).

This CNO report contains the count and share of agency nursing jobs from 2016-2023 (Table 6.2). The CNO found the proportion and count of agency jobs was smaller in pandemic years (2021-2023) than any other year in the data range. However, the CNO does not report transition rates into agency employment, or hours of practice among agency nurses.

Nursing employment agencies provide short-term staffing to institutions and individuals. During the pandemic, the popular media reported many nurses were leaving their public sector jobs to work at agencies in search of better working conditions (e.g., higher pay and greater flexibility). In 2022, for example, the Toronto Star reported instances of Ontario RNs earning $50 to $100 an hour working for agencies, compared to around $35 to $45 an hour (plus benefits, pensions, and job security) working for public sector employers (Yalnizyan, 2022). Similarly, the Canadian Broadcasting Corporation (CBC) reported agency nurses in Nova Scotia are paid at least twice the hourly wage rate, and have more flexible working arrangements, compared to non-agency nurses (Luck, 2023). Besides higher wages (though not necessarily higher total remuneration) and more control over working hours, a pandemic restriction that limited multiple jobholding across homes in the LTCH and supportive housing sectors did not apply to agency nurses (Drost et al., 2023). Thus, some nurses previously working multiple part-time jobs in these sectors may have transitioned to agency employment to make up for any loss in hours.

Media reports on the rate of nurses leaving their positions to work at agencies are usually qualitative. However, there was solid quantitative evidence from journalists (usually provided by public sector financial records) reporting that the dollar amount spent on agency fees had increased markedly. Ontario hospitals more than quadrupled the amount of money paid to agencies since the onset of COVID-19 (Grant, 2023). Public funds spent on agency nurses in British Columbia (BC) increased from $8.7 million in 2018-2019, to $64 million in 2021-2022

(Daflos, 2022). Nova Scotia Health reportedly spent $8.9 million on all agency nurses in the 2021-2022 fiscal year, compared to $16.3 million on agency RNs just from April to December, 2022 (Latimer, 2023). Manitoba, some Ontario long-term care homes, and a Toronto hospital network, have also reportedly spent a significantly larger amount on agency nurses in 2021-2022 compared to previous years (Greenslade, 2022; Laucius, 2022; Yang and Mojtehedzadeh, 2022). However, the degree to which this is due to an increase in the number of nurses practicing in employment agencies, hours worked per agency nurse, and/or agency fees charged, is unclear. Many stakeholders have suggested private agencies have significantly increased their fees, with some agencies being accused of price gouging (Casey 2023; Jones 2023; Laucius 2022).

Using 2011-2021 provincial Ministry of Health data, we seek to clarify the proportion of agency nurses, the transition rate into agency employment, and hours of practice among agency and non-agency employed nurses in the Canadian province of Ontario.

3.2 Data and Methods

3.2.1 Study Design and Data Sources

We use the 2011-2021 Health Professions Database (HPDB), obtained from the Ontario Ministry of Health (Hamilton Integrated Research Ethics Board Project 10947), to determine the proportion of RNs and RPNs that report agency employment each year. A key statistic is the annual agency employment transition rate; the share of nurses who transition from having no agency employment in one year to employment in at least one agency job in the next. We compare pre-COVID-19 trends (2011-2019) with the most recent years of COVID-19 data available (2020-2021) to investigate potential effects the pandemic may have on agency employment. Finally, we document individual and employment characteristics of agency and non-agency employed nurses, especially reported hours of practice.

The HPDB derives from CNO registration records primarily collected in December each year. The data contain employment, education, and sociodemographic information (but no information on wages) for all nurses licensed to practice in the province (Ontario Ministry of Health and Long-term Care, 2018). Though the data are self-reported, nurses are legally obligated to register and provide this information under the *Regulated Health Professions Act, 1991*. Each nurse has a unique anonymized identifier, allowing us to perform a longitudinal analysis, and examine transitions into agency employment.

3.2.2 Variables

Our main variable of interest is agency employment. In the HPDB, agency employment is reported on an individual basis, as opposed to a per-job basis; thus, our definition of agency employed nurses comprises multiple-jobholding nurses with at least one agency job. While most employment information in the HPDB is collected on up to three jobs per nurse, nurses are not asked whether each job is with an agency. Rather, they are asked an overarching question, "Do you work for a nurse staffing agency?" We define any nurse who answers "Yes," as an agency nurse. Because multiple jobholders may combine agency and non-agency jobs, they are analyzed separately from single jobholders in most of the paper.

Secondary variables of interest include: age, employment preference (full-time, part-time, or casual), hours of practice, employment status and category, and healthcare sector. We define five age categories: under 29, 30-39, 40-49, 50-59, and 60 and over. Similar to agency employment, hours of practice are not collected on a per-job basis, it is the aggregate hours across all jobs. Information on employment status (full-time, part-time, or casual), employment category (permanent, temporary, casual, or self-employed; note that the HPDB uses the word "casual" in the employment "status" and "category" contexts with different definitions), and the

healthcare sector (LTCHs, hospitals, primary care, home care, supportive housing, and an aggregate "other") are collected on up to three jobs. We report all job-related statistics, except employment preference, separately for multiple jobholders.

3.2.3 Data Analysis

The sample is restricted to those with an active registration employed in at least one nursing job in Ontario. We count dual RNs and RPNs only once and they are classified as RNs. Our resulting sample includes 1,062,280 RN observations and 472,500 RPN observations over the entire period of analysis. Each year, the sample of RNs with at least one Ontario nursing job ranges from 92,570 (2011) to 100,230 (2021). For RPNs, this range is 31,970 (2011) to 51,470 (2021). Lastly, across the years of our study, 58.8 to 68.5 percent of agency RNs, and 61.6 to 68.2 percent of agency RPNs, are single jobholders. The proportion of single jobholders is slightly higher among non-agency nurses: 83.4 vs. 85.8 percent for RNs, and 80.6 vs. 84.8 percent for RPNs.

The annual share of nurses (single and multiple jobholders combined) who report working in at least one agency job (as a percentage of all nurses with at least one Ontario nursing) job is reported. However, we cannot say with certainty if all agency work is in Ontario since the location of agency employment is not reported. Nonetheless, we know the share of all jobs outside Ontario, and it is quite small, ranging from about 1.9 to 5.4 percent among RNs and 0.8 to 1.3 percent among RPNs over the 2011-2021 period. Next, we examine the percentage of nurses working solely in non-agency positions in an initial year (year t-1) who transition to work in at least one agency job in the subsequent year (year t) as a percentage of all nurses (with at least one Ontario nursing job) in year t-1. Finally, we compare the employment and individual characteristics of agency and non-agency nurses for both single and multiple jobholders.

Though our data derive from CNO registration data, our agency nurse counts and proportions are both greater than those reported in the CNO report (CNO, 2023), although the trends are similar. Knowledge of the methodological differences is useful in comparing the two. First, we classify our data years based on the year of collection, which normally occurs in December with questions being retrospective, whereas the CNO classifies their data based on the subsequent registration year (e.g., our 2021 is classified as CNO's 2022). Second, the CNO's results include dual RNs/RPNs twice (once as an RN and once as an RPN), while we include individuals only once given our policy question. The number of dual RNs/RPNs was 510 in 2011, peaked at 810 in 2020 and declined to 780 in 2021. Next, the employment setting portion of the CNO annual overview is on a per job basis, (e.g., those with two jobs are counted twice); in contrast, our analysis is on a per nurse basis. The data available to us and to Ontario's Ministry of Health does not allow a per job analysis of agency employment.

Our understanding is that the CNO report uses supplementary information available to them which we do not have, mainly, the sector of each agency job. The CNO groups agency nurses who work exclusively in specific sectors (e.g., LTCHs) into that sector as opposed to the nurse staffing agency sector. While we have information on the sector of each job, we do not know which jobs of multiple jobholders is an agency job so we cannot allocate such jobs/workers to sectors. However, our trends over time from 2015 to 2021 look similar to that in the CNO report. Thus, we do not suspect any reporting changes or errors during the pandemic that would underestimate agency nurses compared to previous years.

3.3 Results

3.3.1 Agency-Employed Nurses and Transition Rates to Agency Employment (2011-2021)

Figure 1 (RNs) and Figure 2 (RPNs) display the percentage and count of Ontario nurses

employed in at least one agency job from 2011-2021. The percentage of agency RNs (as a percentage of RNs employed in at least one Ontario job) exhibited a slow decline from 2011-2019, reducing from 3.4 to 2.8 percent (Figure 1). From just prior to COVID-19's onset to near the end of its first year (2019-2020), the percentage of agency RNs declined by 0.4 percentage points (or 360 RNs), which was the largest decline in our time series. Subsequently, in 2021, agency employment among RNs increased slightly from 2.4 to 2.6 percent – the only increase in our time series, representing 220 RNs. The share of agency employment in 2021 was the second lowest observed from 2011-2021.

Across all years, a higher percentage of RPNs than RNs are employed in at least one agency job. On average, across 2011-2021, 6.6 percent of RPNs reported working at an agency, compared to 3.0 percent of RNs (Figure 2). Moreover, the time pattern of agency employment among RPNs differs from that of RNs. As seen in Figure 2, agency employment increased in the first two or three years of the data period, then stabilized for the six or seven years prior to COVID-19 at about 7.0 percent. Similar to RNs, agency employment decreased from 2019-2020, and increased very slightly from 2020-2021. However, the change from 2019-2020 was slightly larger in magnitude for RPNs; agency employment decreased by 1.5 percentage points (or 670 RPNs).

While we do not know the total number of agency jobs, we can calculate bounds on proportions (and, though not displayed, on the counts) of jobs with employment agencies by assuming that at most one (all) jobs of multiple jobholding nurses is (are) with an employment agency (refer to Appendix 2 Figure 1). In 2021, the upper bound of agency jobs was 3960, and the lower bound was 2570 for RNs. Similar bounds for RPNs were 2920 and 4350.

In Figure 3 (RNs) and 4 (RPNs) we display yearly transition rates to agency employment

from 2012-2021. Among nurses who report no agency employment in an initial year (t-1), it measures the percentage who are employed in at least one agency job in the following year (t), as a percentage of all nurses employed in at least one Ontario nursing position in year t-1. For RPNs, and especially for RNs, agency transition rates are reasonably stable from 2012-2019. They range from 0.9 to 1.0 percent for RNs, and 2.0 to 2.5 percent for RPNs.

For RNs (Figure 3), the agency employment transition rate declined from 0.9 percent in 2018-2019, immediately pre-pandemic, to 0.7 percent in 2019-2020, the first year of the pandemic. The latter is the lowest in all the years observed. However, in t = 2021, the transition rate increased to 1.1 percent, 0.1 percentage points higher than the previous high in 2012. The increase from the pre-pandemic 2019's 0.9 percent to 2021's 1.1 percent represents approximately 200 RNs out of a population of 100,230 RNs in 2021. Among RPNs (Figure 4), fluctuations in agency transitions during the pandemic were larger, decreasing from just under 2.5 percent in 2018-2019 to 1.9 percent in 2019-2020, before increasing back to the pre-pandemic rate of just under 2.5 percent in 2020-2021. Overall, we do not find evidence of large increases in nurses transitioning to agency employment in the first two years of the pandemic compared to previous years, though there is evidence of a spike down in the first year of the pandemic.

3.3.2 Mean Hours of Practice Among Agency and Non-Agency Single and Multiple Jobholders

Although there is not a large change in the agency transition rate, agency nurses' full-time status and/or hours of practice may have increased during the pandemic. Figures 5 and 6 (RNs), and Figures 7 and 8 (RPNs) take an initial look at this issue by examining the count and share of single jobholders among agency and non-agency nurses. Clearly, agency nurses are much more likely to be multiple jobholders. Though we do not know if one or more of the jobs held by

multiple jobholders are with employment agencies, it seems reasonable that many nurses hold an agency position that supplements non-agency employment. In 2020 there was a noticeable spike in single jobholding among both agency and non-agency RPN's, and a smaller spike among non-agency RNs. In 2021 the percentage of single jobholders in both categories of RPN's returned to something close to the 2019 level, but there was a marked decline in single jobholding relative to the trend for RNs, especially those working for agencies.

To simultaneously address changes in work hours and the share of agency nurses, in Figures 9 (RNs) and 11 (RPNs) we display the sum (aggregate) of the practice hours of each of single- and multiple-jobholding nurses; we do this separately for agency and non-agency nurses. That is, trends in total weekly hours of work for all nurses in each category are presented. In contrast, Figures 10 (RNs) and 12 (RPNs) display mean weekly practice hours at the individual level. This allows us to study trends in work time, taking into account both changes in the size of each group and individual hours of work, side-by-side. In Figures 9 and 11, the scale for non-agency nurses (on the left) differs from that for agency nurses (on the right).

Figure 9 shows that, for RNs with one job, aggregate weekly practice hours with agencies trended down from 2011-2021, with the rate of decline slightly larger in 2020 than the immediately preceding years, though the effect is small enough that one could say that there is no pandemic effect of policy significance. In contrast, while the total hours worked among multiple jobholding agency nurses dipped very slightly in 2020, it increased markedly in 2021. The aggregate increase in agency work among RNs seems to be entirely among multiple jobholders, although as seen in Figure 5, the share of single jobholding agency RNs declined markedly in 2021 as such nurses took on multiple jobs. Figure 11 shows a similar set of results for RPNs. Aggregate hours decreased among agency RPNs with one job, while aggregate hours increased

for non-agency single jobholders. Moreover, aggregate hours significantly dropped from 2019-2020, before returning to near pre-pandemic levels in 2021 among agency multiple jobholders.

At the individual level in Figures 10 (RNs) and 12 (RPNs), for all the nurse categories displayed, average reported hours of work increased in 2020 and, especially, 2021. Multiple jobholding agency RNs exceeded, on average, the 40 hour per week threshold. For each of single and multiple jobholders, agency and non-agency nurses (as individuals) work comparable hours, with the exception of multiple jobholding agency nurses who, in most years, work about one extra hour per week than their non-agency peers. While average hours of work of individual multiple jobholding RNs and RPNs is higher than that for single jobholders, aggregate hours exhibit the opposite pattern since most nurses are single jobholders.

Our results suggest that the increase in hours among agency nurses may explain a modest share of the increase in public spending on agency nurses. Though agency transition rates did not significantly increase, across all four groups of nurses the mean individual hours of practice increased in 2020 and 2021 compared to pre-pandemic years. However, aggregate mean hours decreased among agency nurses with one job, driven by the reduction in single jobholding agency nurses in 2020 and 2021. Among agency RNs and RPNs with multiple jobs, aggregate mean hours decreased from 2019-2020 before increasing from 2020-2021, with aggregate hours in 2021 above that of pre-pandemic norms. Nurses with multiple jobs, especially those employed in both non-agency and agency positions, may be devoting more hours of work to agency jobs. However, due to data limitations, we are unable to determine if this occurred. To perform a proper analysis, we would require information on hours of work and agency employment on a per-job basis.

3.3.3 Individual and Other Job Characteristics Among Agency and Non-Agency Nurses

Table 1 displays descriptive statistics (averaged over 2011-2021) on selected individual and job-level characteristics of agency and non-agency nurses. The first two panels of Table 1 (age group and employment preference) include both multiple and single jobholders. However, we restrict the analysis on employment status and category, and healthcare sector (the bottom three panels), to single jobholders as we cannot determine which job is at an agency among multiple jobholders (though difficult to interpret, see Appendix 2 Table 1 for results on multiple jobholders).

In general, agency RNs (the left-hand side of Table 1) are somewhat older than non-agency RNs, with mean ages of 46.3 and 44.4 years respectively. This may suggest nurses with more experience choose to work in agencies compared to novice nurses. Agency RPNs, on the other hand, are only slightly older (0.9 years) than their non-agency peers with a mean age of 41.8. Next, the second panel of Table 1 displays the majority of agency and non-agency nurses prefer full-time hours. However, a larger proportion of agency RNs, 11.2 percent, prefer casual employment hours compared to non-agency RNs (6.1 percent). The same result is found for RPNs, though the difference in preferences is not as large (6.0 percent vs. 4.0 percent). The next panel shows the actual employment status (based on approximate weekly hours) among nurses with one job. For both sets of nurses, most jobs are also full-time for agency and non-agency nurses. Among agency RNs and RPNs, there is a higher share of casual hours compared to their non-agency counterparts. For example, and perhaps surprisingly for some readers, only 18.4 percent of agency RN positions were casual, compared to 7.2 percent among non-agency RNs. Agencies are traditionally thought of as being used to cover temporary staff shortages with a casual workforce. However, home care in Ontario is often provided through agencies. Agencies may also offer full-time jobs as a recruitment tool.

The fourth panel of Table 1 displays the employment category of single jobholders. Here, casual does not refer to employment hours, but the status with the employer (i.e., the employment contract). For agency RNs and RPNs there is a higher proportion of casual employment contracts. For example, 18.9 percent of agency RPNs were employed on a casual basis, compared to only 8.3 percent of non-agency RPNs. For RNs, these figures are 19.1 percent, and 6.5 percent respectively. Finally, the reported healthcare sector of single jobholders appears in the last panel of Table 1. Most agency RNs (84.0 percent) and RPNs (82.5 percent) report their practice setting as "other." Home care is the second largest reported sector among agency nurses.

3.4 Discussion

Our research used an Ontario Ministry of Health dataset that derives from regulatory college records to study the prevalence of agency nurses, the rate at which nurses transition to agency employment, hours of practice, and individual and employment characteristics of agency and non-agency nurses. Overall, we do not find evidence of a large shift to agency employment among RNs and RPNs in Ontario from 2020-2021. From 2011-2021, less than 3.5 percent of RNs, and 6.1 to 7.1 percent of RPNs, reported at least one agency job each year. In 2020 agency employment decreased, and then it increased slightly the following year (2021) for both sets of nurses, while continuing to trend below pre-pandemic norms (2011-2019). Moreover, agency employment transition rates did not change appreciably during 2020 and 2021. Among RNs, the 2021 transition rate was 1.1 percent, 0.1 percentage points higher than the highest rate observed. In 2021, the transition rate among RPNs increased from 1.9 to 2.5 percent (i.e., it reverted to the same rate observed in 2018 and 2019).

We also investigate if an increase in hours of practice among agency nurses may explain

the increase in public spending on agency nurses. We split our analysis into four groups: agency and non-agency single jobholders, and agency and non-agency multiple jobholders. Aggregate hours decreased in 2020, and subsequently increased in 2021 among multiple jobholding agency nurses, though we cannot distinguish agency and non-agency hours for this group. Among single jobholding agency nurses, aggregate hours decreased in 2020, and remained similar in 2021, likely due to the reduction of single jobholding agency nurses in 2020 and 2021. This is evident as we find the individual mean hours of practice increased across all four groups of nurses among both RNs and RPNs. Thus, the increase in hours of practice may explain a small part of the increased spending on agency nurses.

Finally, we compare individual and employment characteristics among agency and non-agency nurses. Agency RNs and RPNs tend to be slightly older, prefer casual employment hours, and be employed in positions with casual hours, compared to their non-agency counterparts. Agency nurses are also more likely to have casual employment relationships, as opposed to permanent or temporary employment contracts. Lastly, agency nurses are more likely to be employed in home care, or "other" sectors, though the latter is likely a reflection of agency nurses not identifying a particular sector as they may work in multiple settings.

Though we do not find evidence of an increase in the share of agency nurses, or the agency employment transition rate, there are some data limitations. Agency employment is reported on an individual basis as opposed to a per-job basis, and we are therefore unable to determine which jobs are at an agency among multiple jobholders. While we know the number of nurses with at least one agency job, we can only bound the total number of agency jobs. Despite this limitation, we do observe that any increase in the number of agency jobs is modest at the upper bound. Though legally mandated, our data are self-reported; it is possible that not all

nurses employed at an agency answer "yes" to the agency nurse question in the HPDB. Lastly, the most recent year of data available is 2021, and future analysis will be required to determine what long-term effects the pandemic may have on agency employment, although the CNO's reporting shows a decline in the count and share of agency jobs in 2022 (2023 in the report).

While the increasing cost of nursing agencies may pose challenges to the healthcare system, some healthcare organizations rely on nursing agencies to temporarily manage staffing shortages, and temporary absences such as sick leave and vacation (Aiken et al., 2013; May et al., 2006; Mudhar, 2022). However, it is important for policymakers to understand the reasons why nurses may favour agency employment over their traditional positions. For example, Ben-Ahmed and Bourgeault (2023) highlight complex intersecting issues including heavy workloads, poor work conditions, mandatory overtime, and inadequate staffing in traditional nursing jobs in Canada. Understanding these issues can aid in the development of effective long-term retention strategies in the overall nursing labour market. Moreover, if policymakers, managers, key nursing stakeholders and the public wish to monitor agency nursing and reconcile reports of increased costs in the media (e.g., Grant, 2023) with actual nursing activity to gauge, for example, value for money in a public healthcare system, then data on hours of work need to be reported and not only information on costs

3.5 Conclusion

Overall, we find the count and share of agency employed registered nurses (RNs) and registered practical nurses (RPNs) did not increase significantly during the first two year of the COVID-19 pandemic. Over the entire data period (2011-2021), 2.4 to 3.4 percent of RNs, and 6.1 to 7.1 percent of RPNs, reported at least one agency job each year. The share of agency-employed nurses decreased slightly from 2019-2020 (0.4 and 1.4 percentage points among RNs and RPNs),

and subsequently increased from 2020-2021 (0.2 percentage points among both RNs and RPNs). Lastly, the rate of previously non-agency employed nurses who transition into agency employment (at least one agency job) ranged from 0.7 to 1.1 percent among RNs, and 1.9 to 2.5 percent among RPNs. Similarly, this transition rate decreased slightly from 2019-2020, and returned to pre-pandemic rates from 2020-2021.

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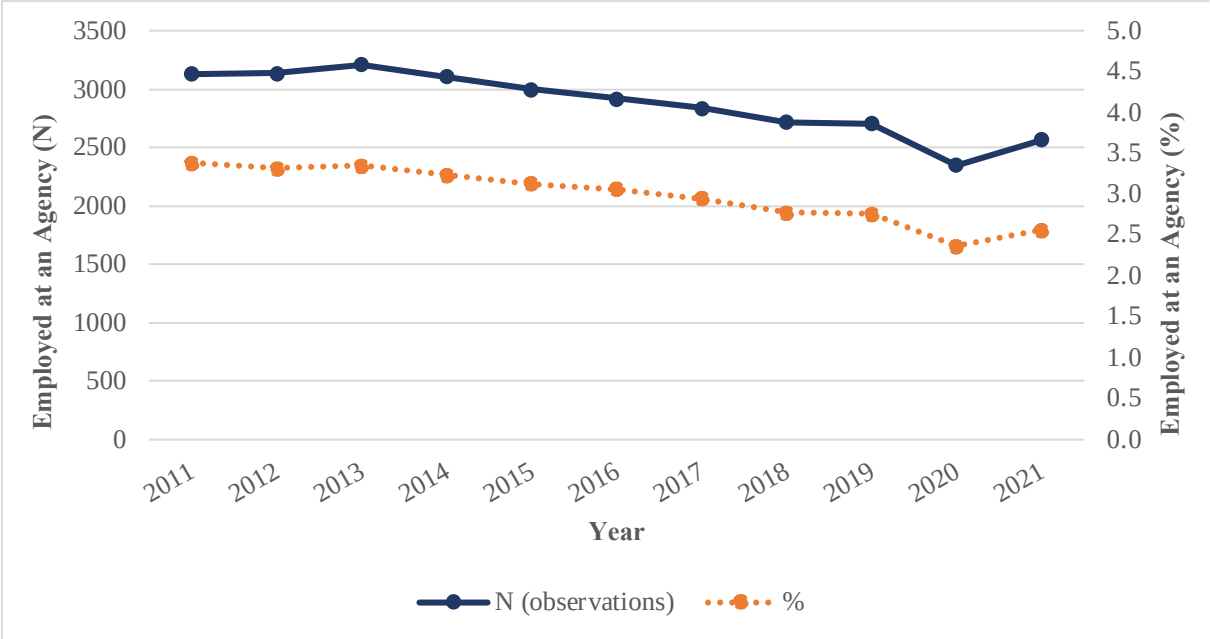
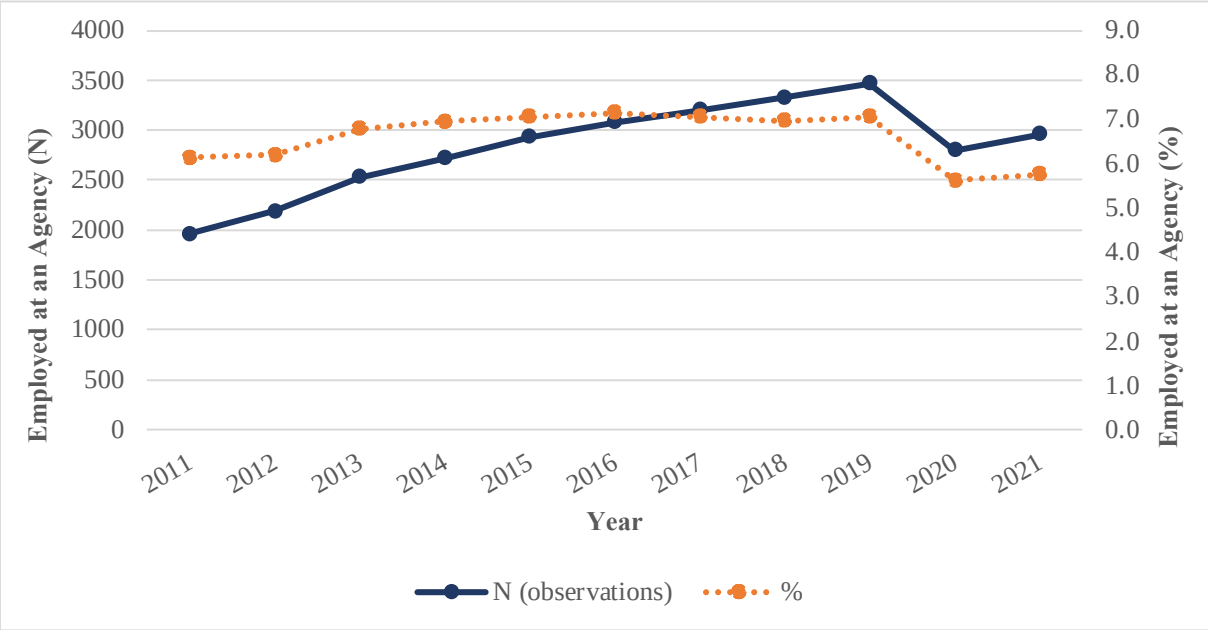
Figure 3.2: Registered Nurses (RNs) in Ontario With At Least One Job With an Employment Agency (2011-2021)



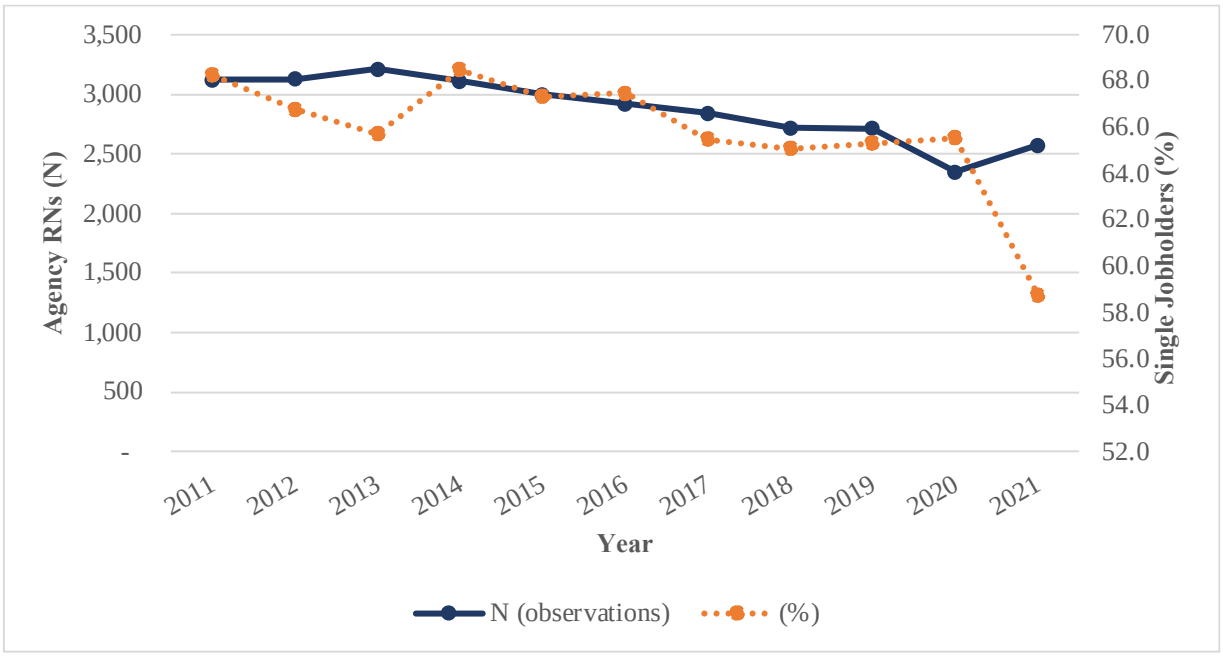
Notes: Employment with an agency implies a nurse is employed in at least one nursing agency/staffing job in Ontario. Sample includes nurses employed in at least one nursing job in Ontario.

Figure 3.3: Registered Practical Nurses (RPNs) in Ontario With At Least One Job With an Employment Agency (2011-2021)



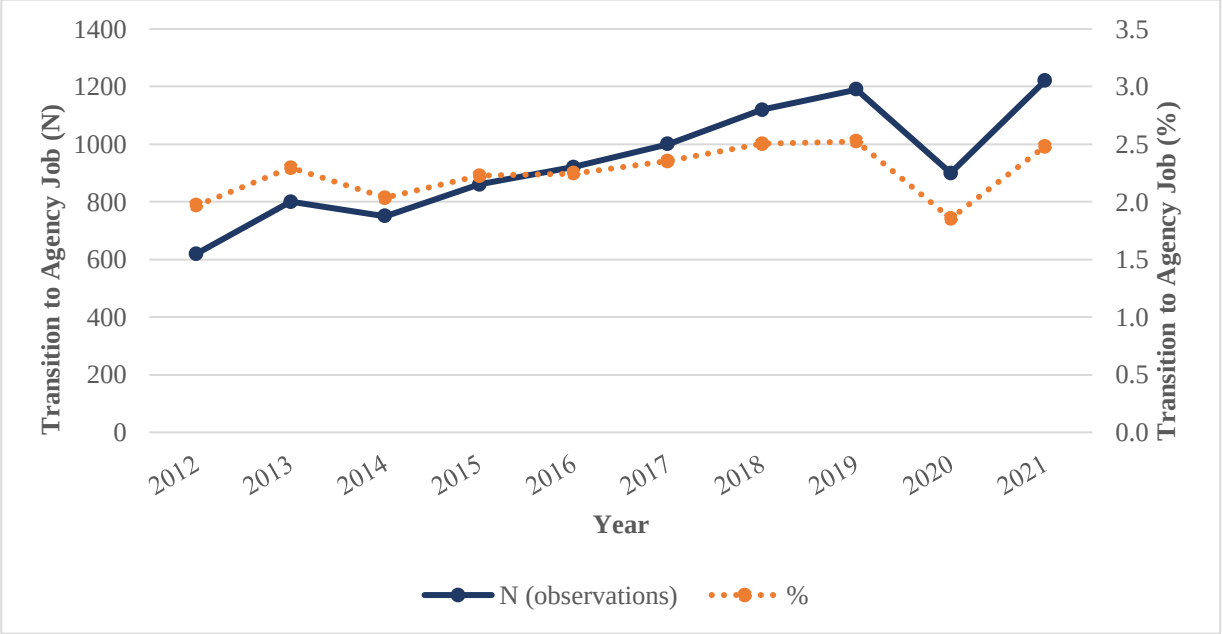
Notes: Employment with an agency implies a nurse is employed in at least one nursing agency/staffing job in Ontario. Sample includes nurses employed in at least one nursing job in Ontario.

Figure 3.4: Ontario Registered Nurses (RNs) who Transition to Agency Employment (2011-2021)



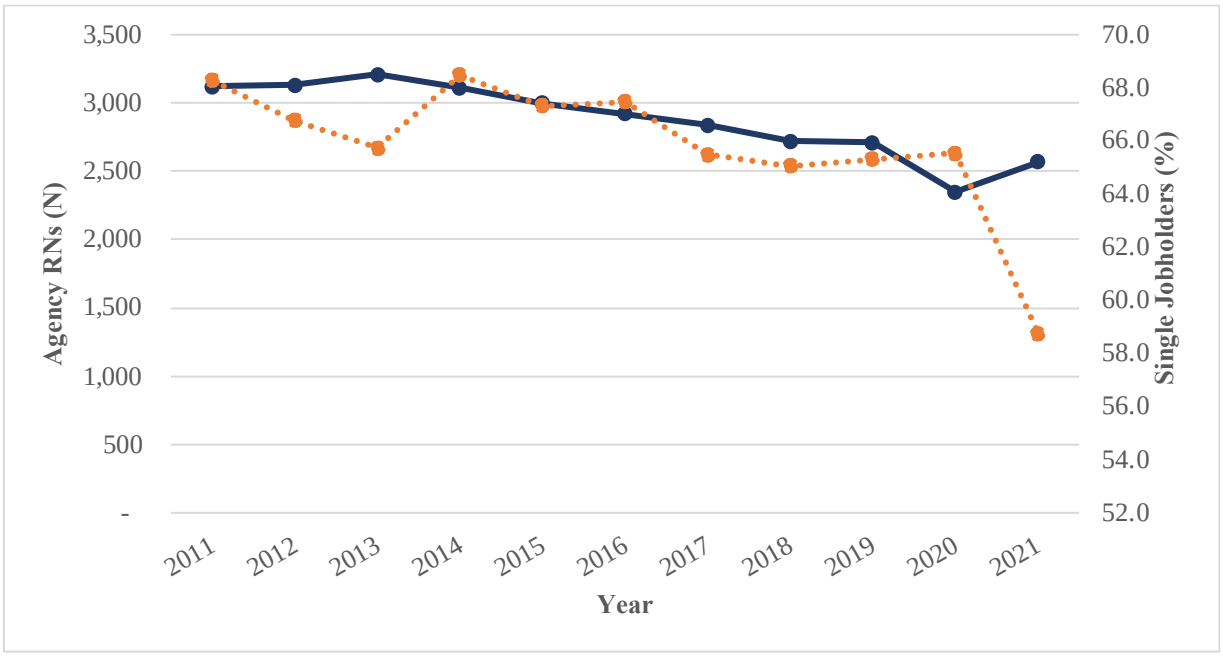
Notes: Employment with an agency implies a nurse is employed in at least one agency/staffing job in Ontario. Sample includes nurses working in at least one nursing job in Ontario. Transition rate calculated as the number of nurses working in at least one Ontario non-agency nursing job in year t, that transition to employment in at least one Ontario nursing agency job in year t+1 as a percentage of all Ontario practicing nurses (agency + non-agency) in year t.

Figure 3.5: Ontario Registered Practical Nurses (RPNs) who Transition to Agency Employment (2011-2021)



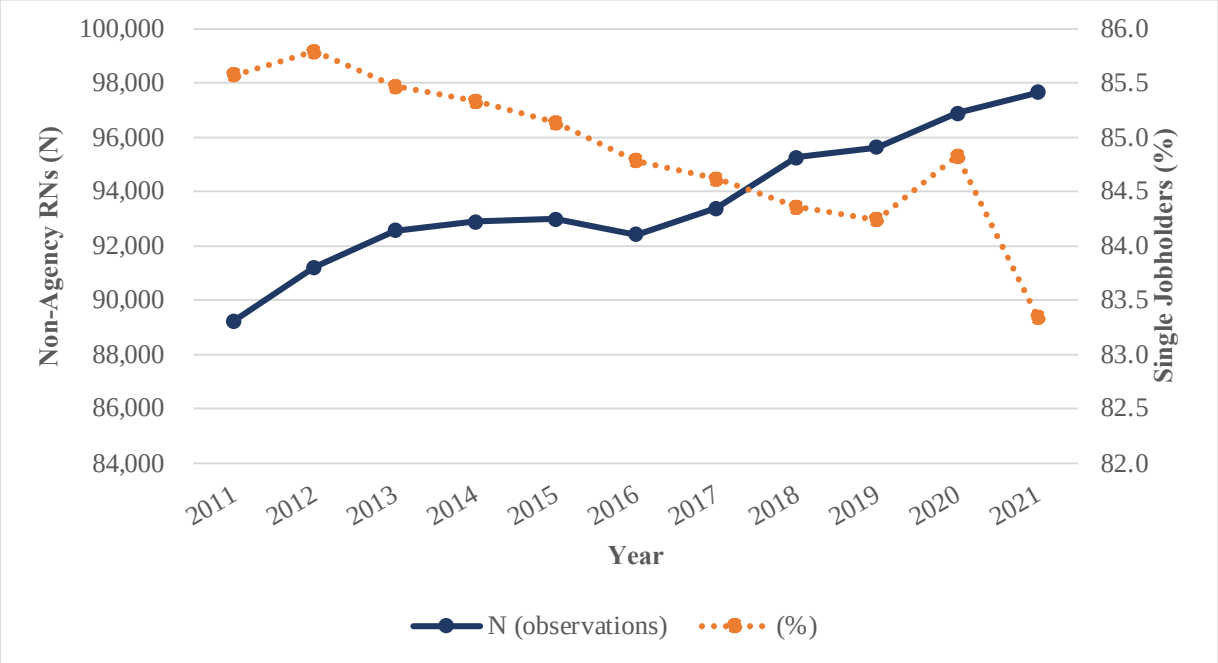
Notes: Employment with an agency implies a nurse is employed in at least one agency/staffing job in Ontario. Sample includes nurses working in at least one nursing job in Ontario. Transition rate calculated as the number of nurses working in at least one Ontario non-agency nursing job in year t, that transition to employment in at least one Ontario nursing agency job in year t+1 as a percentage of all Ontario practicing nurses (agency + non-agency) in year t.

Figure 3.6: Agency RNs: Number and Percent Single Jobholders (2011-2021)



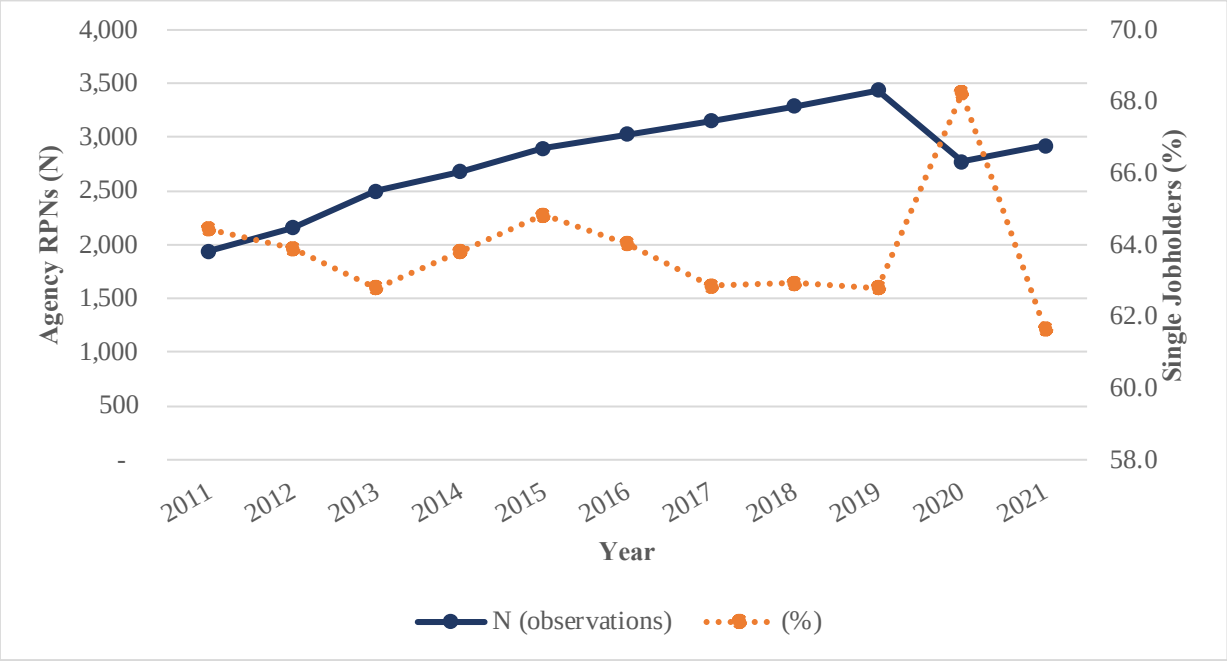
Notes: Employment with an agency implies a nurse is employed in at least one nursing agency/staffing job in Ontario. Sample includes nurses working in at least one nursing job in Ontario. % Multiple jobholders = 100 - % Single Jobholders (i.e., nurses with more than one job). For agency nurses with multiple jobs, we are unable to determine which job is with a nursing agency. All observations have been rounded to the nearest 10.

Figure 3.7: Non-Agency RNs: Number and Percent Single Jobholders (2011-2021)



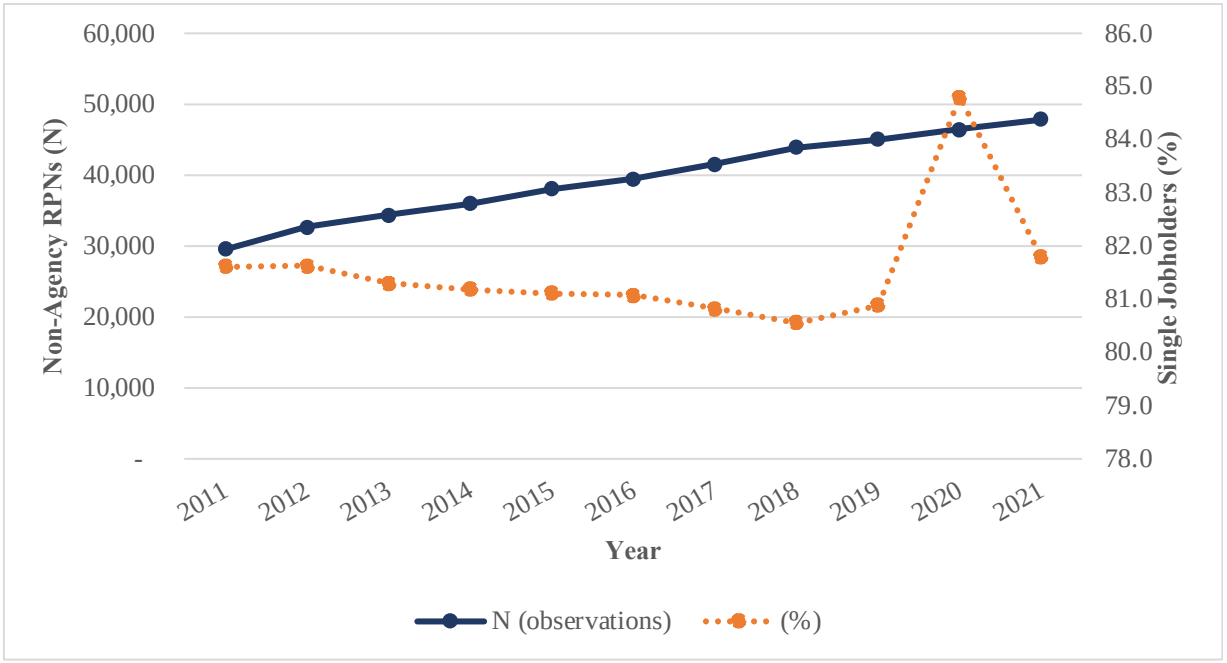
Notes: Employment with an agency implies a nurse is employed in at least one nursing agency/staffing job in Ontario. Sample includes nurses working in at least one nursing job in Ontario. % Multiple jobholders = 100 - % Single Jobholders (i.e., nurses with more than one job). For agency nurses with multiple jobs, we are unable to determine which job is with a nursing agency. All observations have been rounded to the nearest 10.

Figure 3.8: Agency RPNs: Number and Percent Single Jobholders (2011-2021)



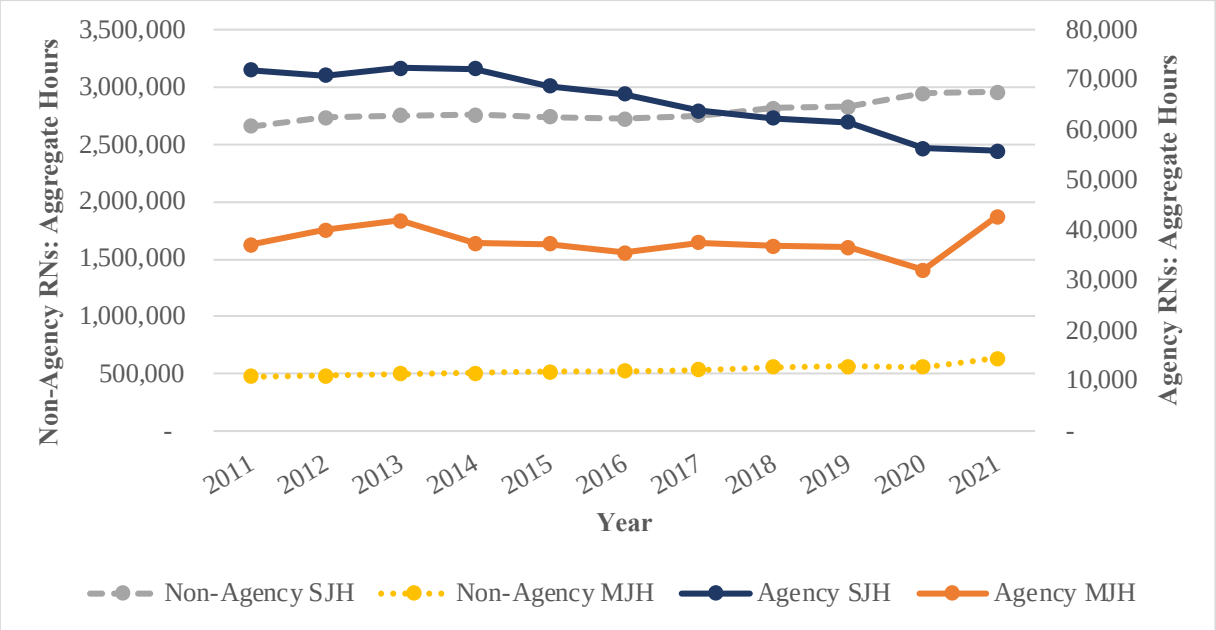
Notes: Employment with an agency implies a nurse is employed in at least one nursing agency/staffing job in Ontario. Sample includes nurses working in at least one nursing job in Ontario. % Multiple jobholders = 100 - % Single Jobholders (i.e., nurses with more than one job). For agency nurses with multiple jobs, we are unable to determine which job is with a nursing agency. All observations have been rounded to the nearest 10.

Figure 3.9: Non-Agency RPNs: Number and Percent Single Jobholders (2011-2021)



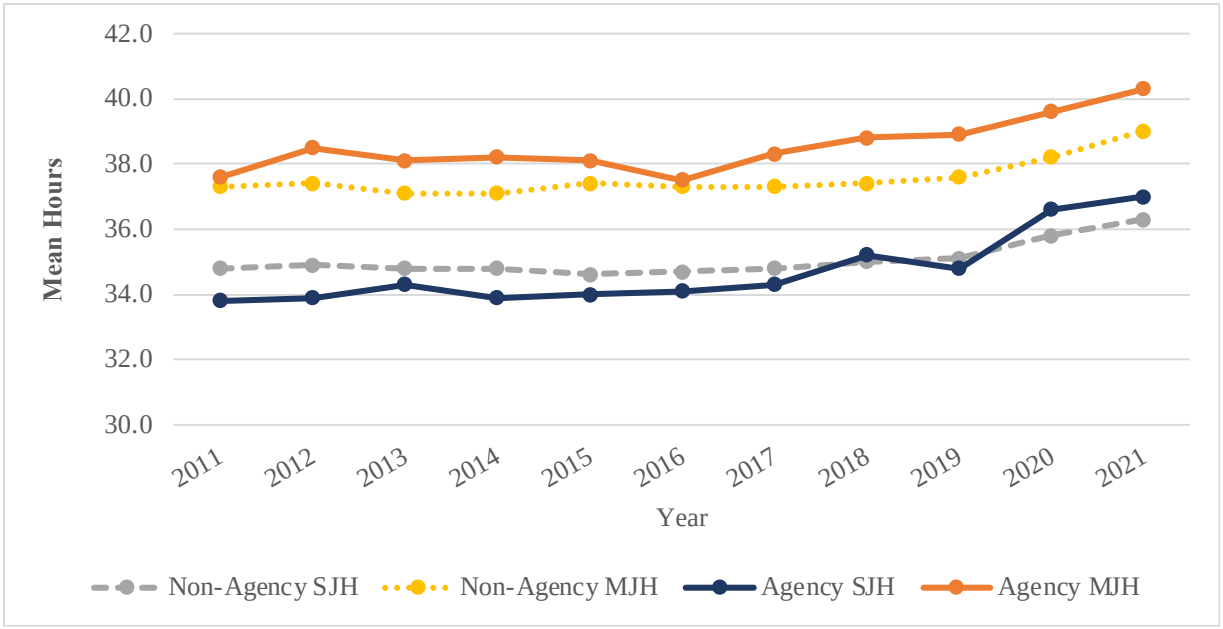
Notes: Employment with an agency implies a nurse is employed in at least one nursing agency/staffing job in Ontario. Sample includes nurses working in at least one nursing job in Ontario. % Multiple jobholders = 100 - % Single Jobholders (i.e., nurses with more than one job). For agency nurses with multiple jobs, we are unable to determine which job is with a nursing agency. All observations have been rounded to the nearest 10.

Figure 3.10: Aggregate Hours of Agency and Non-Agency Employed Ontario Registered Nurses (RNs) 2011-2021



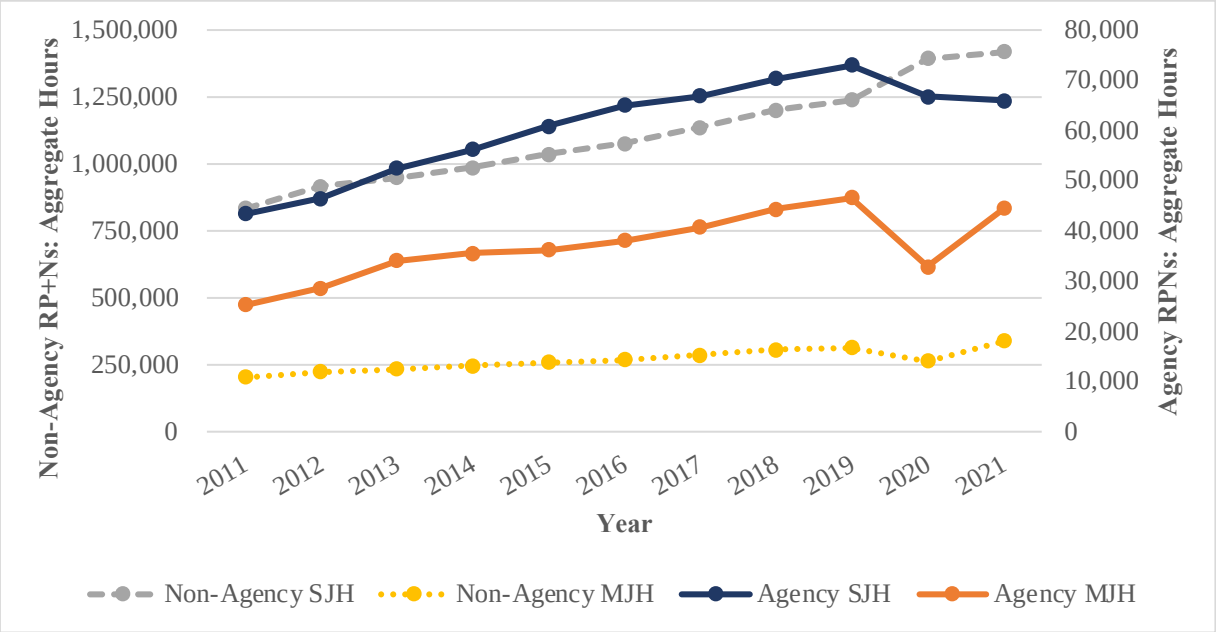
Notes: Employment with an agency implies a nurse is employed in at least one agency/staffing job in Ontario. SJH = single jobholder, MJH = multiple jobholder. Sample includes nurses working in at least one nursing job in Ontario. Mean aggregate hours calculated as the number of nurses multiplied by the mean hours of practice for each of the four groups of nurses. Among agency multiple jobholders, we are unable to determine how many and which jobs are with a nursing agency.

Figure 3.11:Mean Hours of Agency and Non-Agency Employed Ontario Registered Nurses (RNs) 2011-2021



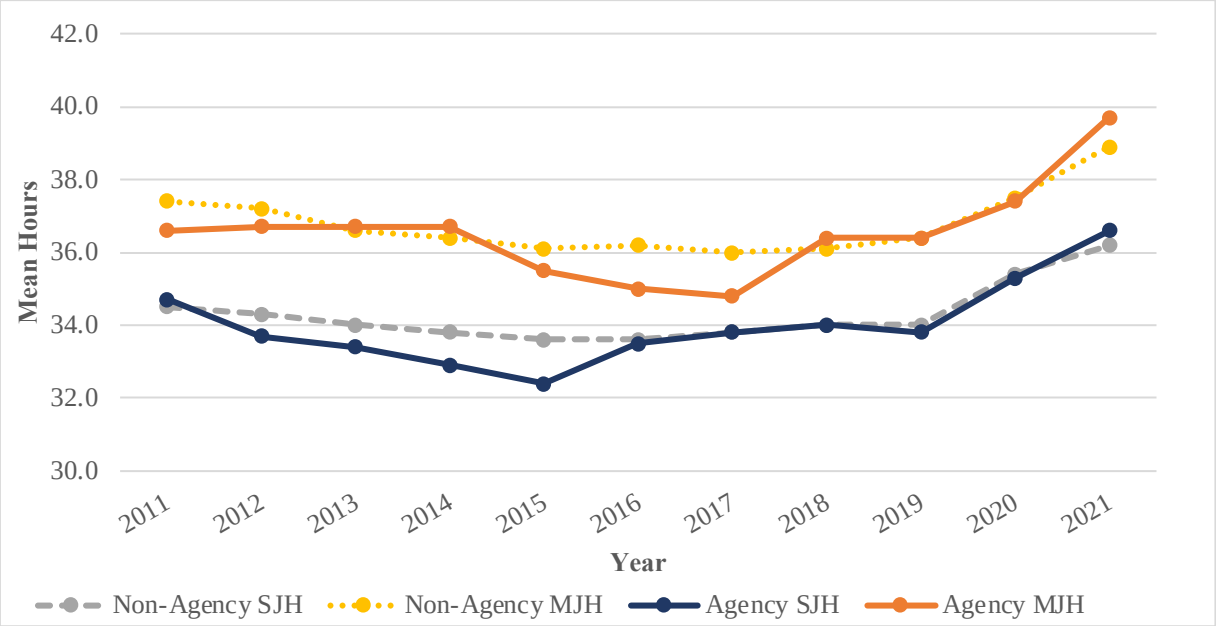
Notes: Employment with an agency implies a nurse is employed in at least one agency/staffing job in Ontario. SJH = single jobholder, MJH = multiple jobholder. Sample includes nurses working in at least one nursing job in Ontario. Mean aggregate hours calculated as the number of nurses multiplied by the mean hours of practice for each of the four groups of nurses. Among agency multiple jobholders, we are unable to determine how many and which jobs are with a nursing agency.

Figure 3.12:Aggregate Hours of Agency and Non-Agency Employed Ontario Registered Practical Nurses (RPNs) 2011-2021



Notes: Employment with an agency implies a nurse is employed in at least one agency/staffing job in Ontario. SJH = single jobholder, MJH = multiple jobholder. Sample includes nurses working in at least one nursing job in Ontario. Mean aggregate hours calculated as the number of nurses multiplied by the mean hours of practice for each of the four groups of nurses. Among agency multiple jobholders, we are unable to determine how many and which jobs are with a nursing agency.

Figure 3.13:Mean Hours of Agency and Non-Agency Employed Ontario Registered Practical Nurses (RPNs) 2011-2021



Notes: Employment with an agency implies a nurse is employed in at least one agency/staffing job in Ontario. SJH = single jobholder, MJH = multiple jobholder. Sample includes nurses working in at least one nursing job in Ontario. Mean aggregate hours calculated as the number of nurses multiplied by the mean hours of practice for each of the four groups of nurses. Among agency multiple jobholders, we are unable to determine how many and which jobs are with a nursing agency.

Table 3.20: Descriptive Statistics of Agency and Non-Agency Registered Nurses (RNs) and Registered Practical Nurses (RPNs) 2011-2021

	RNs		RPNs	
	Agency	**Non-Agency**	**Agency**	**Non-Agency**
	2011 - 2021 Average			
	Age Group (%)			
<29	12.5	16.0	17.8	22.0
30-39	19.2	21.8	27.5	27.4
40-49	25.5	23.8	27.2	23.6
50-59	26.1	25.6	19.6	19.4
60+	16.9	12.8	8.1	7.7
Mean Age (Yrs)	46.3	44.4	41.8	40.9
	Employment Status Preference (%)			
Full-time	68.6	73.4	76.0	75.7
Part-time	20.2	20.5	17.9	20.2
Casual	11.2	6.1	6.0	4.0
Unknown	0.0	0.0	0.1	0.0
	Employment Status (Based on Weekly Hours) - Single Jobholders (%)			
Full-time	59.3	68.9	57.1	59.3
Part-time	22.2	23.9	25.5	32.2
Casual	18.4	7.2	17.5	8.5
	Employment Category - Single Jobholders (%)			
Permanent	79.0	88.8	78.1	85.7
Temporary	1.9	3.3	3.0	4.5
Casual	19.1	6.5	18.9	8.3
Self-employed	0.0	0.0	0.0	0.0
	Healthcare Sector - Single Jobholders (%)			
Long-term Care	1.6	7.5	3.4	30.1
Hospital	4.5	62.1	1.2	34.5
Primary Care	1.3	4.3	1.1	6.1
Home Care	8.4	4.5	10.5	2.1
Supp. Housing	0.5	0.8	1.4	7.8
Other	84.0	20.8	82.5	19.3
N (Single Jobholders)	1,900	79,464	1,785	32,248
N (All RNs)	2,880	93,654	2,798	39,537

Notes: Average across 2011-2021 is presented for all variables, except employment status preference, which is averaged across 2017-2021 as this variable was recorded differently in 2011-2016. Employment with an agency implies a nurse is employed in at least one agency/staffing job in Ontario. Sample includes nurses working in at least one nursing job in Ontario. Job-level statistics are based on jobs in Ontario only. Full-time = 30 hours or more per week; part-time = less than 30 hours per week, and casual = working on an as-needed basis (i.e., working without a guaranteed number of hours per week). Casual employment status does not necessarily imply a casual employment category. The employment category represents the status with the employer, while employment status represents hours worked per week. Job characteristics (employment status, employment category, and healthcare sector) are only reported for single jobholders, results for the first job of multiple jobholders is reported in Appendix 2 Table 1. All observations have been rounded to the nearest 10, and percentages may therefore not add to 100 percent.

3.7 Appendix 1

In Canada, medically necessary hospital and physician services are publicly funded under the Canada Health Act (CHA) (Government of Canada, 2023). As opposed to a single national Medicare plan, Canada has 13 provincial and territorial health insurance plans and each has constitutional responsibility for their respective plan, though each plan must meet the standards outlined in the CHA to obtain federal funding (Government of Canada, 2023). The regulation of healthcare workers also falls under provincial/territorial jurisdiction. In Ontario, regulated health professions are self-regulating (per the Regulated Health Professions Act, 1991 [RHPA]), meaning the provincial government delegates this authority to the profession itself through regulatory authorities, referred to as colleges in Ontario (Zelisko et al., 2014; Sweetman, McDonald and Hawthorne, 2015).

The College of Nurses of Ontario (CNO) is responsible for "establishing requirements for entry to practice, articulating and promoting practice standards, administering its Quality Assurance Program, and enforcing standards of practice and conduct," (CNO, 2016, p. 1). Each year, nurses must register with the CNO to legally practice in Ontario. There are three nursing categories: registered practical nurses (RPNs) (known as licensed practical nurses [LPNs] in the rest of Canada), registered nurses (RNs) and nurse practitioners (NPs). The categories have different scopes of practice and foundational education (CNO, 2023). For example, at minimum, RPNs require an approved college diploma, while RNs require an approved baccalaureate degree in nursing (CNO, 2020).

Nurses work in hospitals, long-term care homes, primary care (e.g., physicians' offices), home care, and other settings. The Ontario government is indirectly the dominant employer of nurses, as they provide funding to nurses' direct employers (Sweetman, 2022; Daniels et al., 2012). At the same time, about 90 % of nurses are unionized (Sweetman, 2022; CFNU, 2023).

Thus, nurses' salaries are determined by collective bargaining processes. However, prior to the pandemic (June 2019), the Ontario government passed Bill 124, limiting salary increases to 1.0% per year over a three-year moderation period for public sector employees including nurses (Legislative Assembly of Ontario, 2019). Many nursing unions and associations have fought against Bill 124; they are concerned about the effect of the Bill on nurse retention and have warned of a worsening nurse staffing crises (e.g., Registered Nurses Association of Ontario [RNAO], 2021; Ontario Nurses Association [ONA], 2019). The Bill has since been deemed unconstitutional by the Ontario Superior Court, though the Ontario government is appealing the ruling (ONA, n.d.).

Nursing shortages have been reported since well before the 1990s in Canada (Baumann and Crea-Arsenio, 2023 provide a review of historical nursing supply issues). Nursing stakeholders reported that chronic shortages were exacerbated by the pandemic and creating new challenges, including excessive overtime and workload due to limited surge capacity (CFNU, 2022; Ben-Ahmed and Bourgeault, 2023). Statistics Canada also reported that nurses who worked over-time increased their hours by up to five from 2019 to 2020, though the proportion working over-time remained stable (Carrière et al., 2020).

3.7.1 Appendix 1 References

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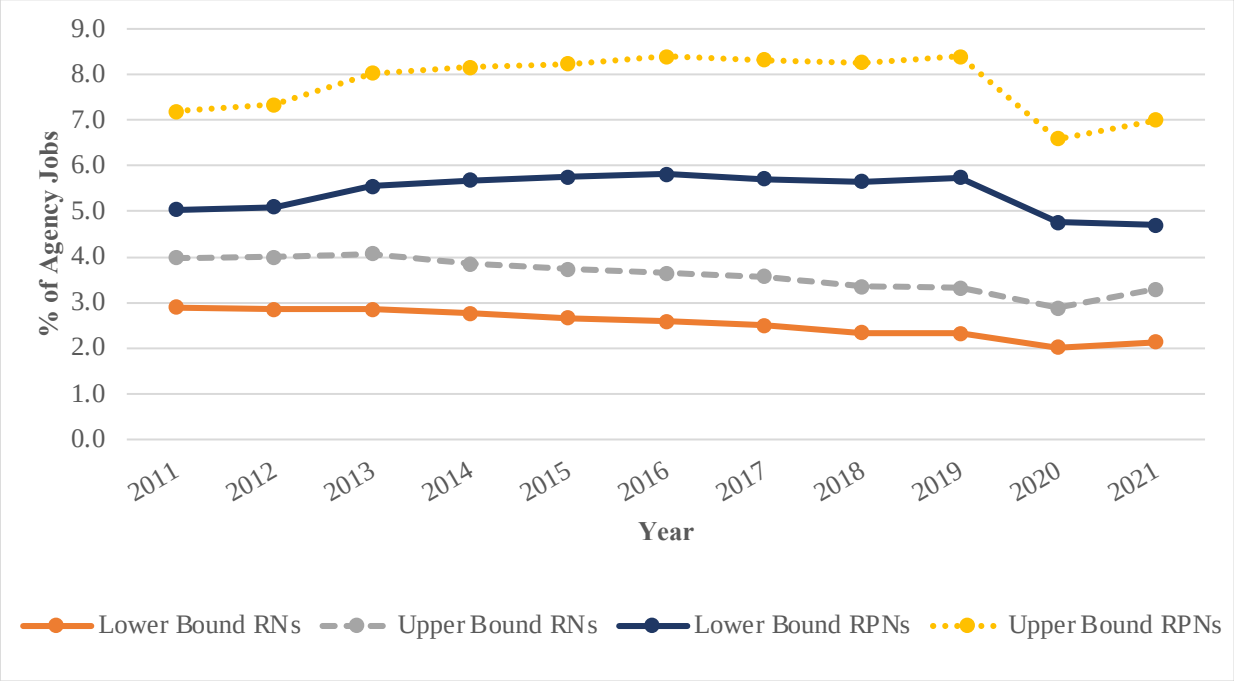
3.8 Appendix 2

Appendix 3.2 Figure 1: Upper and Lower Bound Proportion of Agency Jobs Among Ontario RNs and RPNs (2011-2021)



Notes: The upper bound proportion of agency jobs assumes all jobs among agency nurses who are multiple jobholders are with an agency (e.g., those who identify as an agency nurse and report two jobs are assumed to have two agency jobs). The lower bound of agency jobs assumes only one job among agency nurses who are multiple jobholders is with an agency (e.g., those who identify as an agency nurse with 3 jobs are assumed to have one agency job). This analysis only includes jobs in Ontario.

Appendix 3.2 Table 1:Descriptive Statistics of Agency and Non-Agency Registered Nurses (RNs) and Registered Practical Nurses (RPNs) 2011-2021

	RNs		RPNs	
	Agency	**Non-Agency**	**Agency**	**Non-Agency**
	2011-2021 Average			
	Employment Status Job 1 (Based on Weekly Hours) - Multiple Jobholders (%)			
Full-time	46.0	46.8	35.3	36.0
Part-time	25.2	30.5	36.0	41.9
Casual	28.9	22.7	29.0	22.1
	Employment Category Job 1 - Multiple Jobholders (%)			
Permanent	68.0	73.7	64.9	72.3
Temporary	3.7	4.5	5.7	5.7
Casual	27.3	19.7	28.6	20.5
Self-employed	1.3	2.2	1.3	1.6
	Healthcare Sector Job 1 - Multiple Jobholders (%)			
Long-term Care	7.4	9.4	19.9	33.9
Hospital	37.7	61.3	16.5	31.3
Primary Care	3.1	4.2	3.3	5.4
Home Care	6.1	2.4	6.8	2.3
Supp. Housing	1.2	0.9	7.4	8.3
Other	44.7	21.8	46.3	18.8
N (Multiple Jobholders)	980	14,190	1,014	7,289

Notes: Employment with an agency implies a nurse is employed in at least one agency/staffing job in Ontario. Sample includes nurses working in at least one nursing job in Ontario. Job-level statistics are based on jobs in Ontario only. Multiple jobholders = nurses with more than one job. For agency nurses with multiple jobs, we are unable to determine which job is with a nursing agency, we only report statistics on the first job. Full-time = 30 hours or more per week; part-time = less than 30 hours per week, and casual = working on an as-needed basis (i.e., working without a guaranteed number of hours per week). Casual employment status does not necessarily imply a casual employment category. The employment category represents the status with the employer, while employment status represents hours worked per week. All observations have been rounded to the nearest 10, and percentages may therefore not add to 100 percent.

Chapter 4

Immediate Impacts of the COVID-19 Pandemic on Nurse Attrition: An Analysis of Nurse Attrition Rates in Ontario (2014-2021)

Alyssa Drost
Department of Economics, McMaster University

Abstract

Reports of a major nursing exodus have increased across Canada, especially Ontario, throughout the COVID-19 pandemic. In this paper we use regulatory college registration data to investigate annual occupational nurse attrition rates, the rate at which nurses leave the profession, among registered nurses (RNs) and registered practical nurses (RPNs) in Ontario. We compare pre-pandemic attrition rates (2014-2019) with those observed during the first two years of the pandemic (2020 and 2021). I distinguish between permanent and temporary exits: (1) nurses who register as active with regulatory body, but are without Ontario nursing employment, and (2) nurses who register inactive or do not register. Overall, from 2019-2021 we find a modest increase in attrition by about 0.8 (RNs) and 1.1 (RPNs) percentage points. Prior to the pandemic (2014-2019) the attrition rate ranged from about 6.10 to 7.20 percent (RNs) and 6.60 to 7.50 percent (RPNs). Across all years, and especially during 2020 and 2021, attrition primarily derives from nurses who register active without employment, and such nurses are significantly more likely to return to the profession compared to nurses who register inactive or do not register. However, our data were up until 2021, and policymakers should continue to monitor nurse attrition rates as the pandemic may have a lagged effect on the nursing labour market.

4.1 Introduction

Nurses comprise the largest share of healthcare workers worldwide, with an estimated 28 million nurses, or 36.9 per 10,000 of the global population in 2018 (World Health Organization [WHO], 2020). Due to advances in health technology, an aging population, and increasing wealth, the demand for nurses (and healthcare) grows faster than the supply of nursing labour across many countries, resulting in a perceived shortage of nurses. Healthcare policymakers are therefore interested in the retention and recruitment of nurses. Reports of nurse shortages are common in many OECD countries where, prior to the COVID-19 pandemic, Scheffler and Arnold (2019) projected a shortage of almost 2.5 million nurses across 23 countries by 2030, assuming that trends at the time of the study continued into the future. In Canada, the projected shortage was estimated at over 117,000 nurses (Scheffler and Arnold, 2019). Ontario, one of the largest provinces in Canada, is projected to be short 33,000 nurses by 2028, according to that province's Financial Accountability Office (FAO) (Casey and Jones, 2023).

Some current observers view nurse shortages as an ongoing issue since the 1990s in Ontario and the rest of Canada, where an economic recession led to the restructuring of healthcare and a "casualization" of the nurse workforce (Daniels et al., 2012a). Policymakers have since undertaken various initiatives aimed at increasing the number of new entrants to the profession (recruitment), and increasing the rate at which nurses remain in the profession (retention). Baumann and Crea-Arsenio (2023) provide a historical overview of nursing supply issues in Canada and policy responses. However, interpreting nursing shortages may be difficult due to the structure of the nursing labour market (Drost and Sweetman, 2023). In Canada, it can be characterized as a bilateral monopoly, as opposed to a standard competitive market (Sweetman, 2022). That is, provincial governments are (indirectly) the dominant (almost

exclusive) buyer of nursing labour, and at the same time, the nursing sector is highly unionized (Sweetman, 2022; CFNU, 2023). Salaries are thus determined by the collective bargaining process, and do not fluctuate in response to changes in labour demand or supply as they would in the textbook competitive labour market. The nursing profession is also highly regulated, preventing individuals from entering the profession unless they meet specific requirements outlined by each jurisdiction's nursing regulatory body. Taking a broader perspective, Yett (1970, 1975), characterized the nursing labour market as a monopsony (with a dominant buyer of labour), and viewed this market structure as an explanation for the shortages found in many jurisdictions and characterized as chronic from as early as the 1930s.

Though nursing shortages may in part be explained by the underlying market structure in Canada and have been documented long before the COVID-19 pandemic, many stakeholders have expressed concern the pandemic will exacerbate existing shortages and have a long-lasting impact on the nursing labour market. Nursing associations and unions have referred to this shortage as a nursing crisis (Registered Nurses Association of Ontario [RNAO], 2021a; Ontario Nurses Association [ONA], 2022). Throughout the pandemic, healthcare systems across the globe experienced challenges and increased health human resource deficiencies. In Ontario, the surge in COVID-19 patients combined with COVID-19 infections among healthcare workers led to the closure of hospital wards, especially in Northern and rural areas (e.g., see Dyer, 2022; Wallace, 2023 and Jones, 2023). Nurses in particular experienced increased levels of stress and burnout. The Survey on Health Care Workers' Experiences During the Pandemic (SHCWEP) revealed 92.0 percent of nurses reported feeling more stressed at work, which was about 8.0 to 9.0 percentage points higher than any other health occupation surveyed, including physicians and personal support workers (Statistics Canada, 2022). Another survey from the Canadian

Federation of Nurses Unions (CFNU, 2022) found that 45.0 percent of nurses experienced severe burnout, and over 30.0 percent were considering changing jobs (i.e., job turnover).

In addition to increased rates of burnout and job turnover, reports also warned of a major exodus from the nursing profession (i.e., occupational turnover or attrition). A survey administered by the Registered Practical Nurses Association of Ontario in May 2023, found over 60.0 percent of registered practical nurses (RPNs) were considering leaving the profession (O'Brien, 2023). In a similar survey from 2021, the RNAO (2021b) found 15.6 percent of surveyed Ontario registered nurses (RNs) were very likely to leave the profession post-pandemic, compared to an actual loss rate of 4.8 percent the year prior. Though, such survey results often use convenience sampling methods, and only provide information on intentions. To our knowledge, there are no studies that investigate observed nurse attrition rates before and during the pandemic in Ontario, or any jurisdiction.

In this paper, we examine whether occupational attrition rates (i.e., the rate at which nurses leave the profession) increased during the first two years of the pandemic (2020 and 2021) compared to pre-COVID trends from 2013-2019 in Ontario. We employ an Ontario Ministry of Health dataset, the Health Professions Database (HPDB), which contains information on all regulated health professions in the province. We focus on two regulated nursing professions in Ontario: RNs, and RPNs who are known as licensed practical nurses (LPNs) in the rest of Canada. In most of the analysis, we define two attrition categories to capture differences between two types of "temporary" (e.g., maternity leave) exits, and "permanent" exits. Second, to account for trends in employment status preferences, we investigate changes in full-time equivalent positions (FTE) by job location, and changes in aggregate hours of practice. Next, we examine reported reasons for leaving the profession, and if the probability of leaving the profession differs

by age group. We then investigate employment dynamics, and determine if nurses who left the profession eventually return, and the number of years until return. We also report net gains (losses) in both registrants and employed Ontario nurses. Finally, we perform logistic regression analysis to compare yearly trends, controlling for age, gender, and endogenous individual nurse and employment characteristics that may be associated with a greater likelihood of leaving the profession.

4.2 Literature Review

The research literature on nurse retention focuses on the supply of nursing labour, and nurses' labour supply responses to wage changes (i.e., wage elasticities). In general, most studies find evidence of an inelastic supply curve, and that substantial wage changes are required to induce noticeable changes in the hours of work supplied. Skatun et al. (2005) use the Quarterly Labour Force Survey (QLFS) to estimate a classical model of labour supply for married UK National Health Service (NHS) nurses and midwives. Using the Heckman procedure, the authors find labour participation and hours worked are essentially inelastic (i.e., an elasticity of less than 1 in the economics literature) with respect to own wage, with estimated income elasticities of 0.55 and 0.34 respectively. Holmas (2002) performs duration analysis on nurse exits from Norway's public sector, and finds not accounting for wages from shift work results in a downward biased estimate of the wage elasticity by over 50.0 percent. Using data on Norwegian RNs in 2000, Di Tomasso, Strøm and Sæther (2009) estimate a multi-sector-job-type random utility model of labour supply where four possible job categories exist (i.e., shift work and day-time work for each of the primary care and hospital sectors). The authors find a 10.0 percent increase in nurse wages results in an estimated increase in the overall labour supply of only 3.3 percent. However, job specific wage changes, such as that in hospital shift-work, may provide

an incentive to increase labour supply within that sector and job type (shift or day work).

In subsequent work, Andreassen, Di Tomasso, and Strøm (2017) use a dynamic discrete choice model to account for habit or job persistence and find a smaller wage elasticity compared to the single year cross-sectional analysis in Di Tomasso, Strøm and Sæther (2009). On the other hand, a US study by Tellez et al. (2009) found evidence of a backward bending labour supply curve (where an increase in wages results in a decrease in hours of labour supplied) among California RNs in 2004. Many of these studies do not consider the effect wages may have on recruiting new entrants into the profession, and the use of various empirical methodologies may result in different conclusions on wage elasticities. For a more detailed literature review on nurses' labour supply, and the econometric challenges associated with measuring wage elasticities refer to Shields (2004) and Antonazzo et al. (2003).

Despite the interest in improving retention to combat nurse shortages, empirical research on jurisdictional retention rates is limited (especially in Canada), and varying definitions of attrition make comparability across regions difficult. For example, in a literature review Castro Lopes et al. (2017) find annual total attrition rates ranging from 3.0 to 44.0 percent. The Canadian Institute for Health Information (CIHI) examined retention among RNs using annual registration renewal rates from 2000-2004 across Canada. In Ontario and Quebec, the rate averaged over four years was 97.2, compared to a range of 77.2 to 96.7 percent in the remaining provinces and territories (CIHI, 2006). Also, CIHI's definition did not require employment in nursing; nurses need only be registered with their regulatory authority.

Daniels et al. (2012b) use registration data from the College of Nurses of Ontario (CNO) to determine the effect of Ontario's "70% Full-time Commitment" retention strategy, which aimed at increasing full-time employment opportunities. The authors reported RN exit rates by

employment categories (full-time, part-time, and casual) from 2001 to 2009, and found the exit rate to be slightly higher among nurses employed in casual positions (ranging from around 5.5 to 9.5 percent) across all time periods. However, nurses with less attachment to the labour force may have self-selected into casual positions. Frijters, Shield and Price (2007) investigate the quitting behaviour of UK nurses in the National Health Service (NHS) using single and competing risks duration analysis. The authors find that approximately 10.0 percent of NHS nurses leave the NHS each year, and younger nurses have a lower probability of leaving.

Using similar data to Daniels et al. (2012b), Drost and Sweetman (2023) document the job turnover rate (as opposed to profession exit rates) among RNs and RPNs in Ontario by healthcare sector. They find an overall job turnover rate (averaged over 2014-2029) of 21.3 percent among RNs and 29.4 percent among RPNs. In the first year of the pandemic (2020), and contrary to the aforementioned survey measures of intentions, turnover rates only increased modestly among RNs and RPNs, by 1.7 and 5.1 percentage points respectively (Drost and Sweetman, 2023). Moreover, this decrease in job retention derives primarily from the long-term care home (LTCH) and supportive housing sectors, which were the only sectors impacted by a single site restriction limiting multiple jobholding.

Lastly, one portion of the retention literature focuses on the determinants of job satisfaction, and effective strategies for reducing nurse job turnover and/or occupational attrition. Many of the wage elasticity studies conclude increasing wages may not be an effective strategy in reducing nurse attrition, though there are exceptions (e.g., Holmas, 2002). Holmas (2002) also found poor working conditions, such as a large number of hospital beds per nurse, increase the probability of leaving the profession. Shield and Ward (2001) find lack of promotion and training opportunities are more important than workload and wages in determining job satisfaction

among nurses, and those who are dissatisfied with their work are 65.0 percent more likely to quit. Lastly, Brook et al. (2019) provides a systematic review of successful retention strategies among young, or early career nurses.

4.3 Data and Methods

In this paper we employ the 2013-2021 Health Professions Database (HPDB), an Ontario Ministry of Health dataset on regulated healthcare professions used to inform health workforce planning. The HPDB contains demographic, employment, geographic, and educational information on all regulated healthcare professions in the province, except medicine, and derives from regulatory college registration data. Each year, usually at the end of each calendar year for nurses, regulated healthcare professions are required to register with their respective regulatory authority (referred to as "Colleges" in Ontario) in order to practice in their profession. Each nurse has a unique identifier; thus, we are able to construct a panel dataset to track nurses over time. Our panel data are unbalanced, since nurses who do not register disappear from the data (though they may re-register/re-appear). Most nurses register as "inactive" prior to leaving the dataset. In most of our analysis, we compare pre-COVID-19 (2013-2019) and the most recent COVID-19 data available to us (2020-2021) to ascertain any potential immediate effects the pandemic may have had on the nursing workforce.

We focus on RNs and RPNs. In some instances, nurses may hold dual registrations; we classify dual registrants as RNs. The number of dual RNs and RPNs ranged from 600 (2013) to 810 (2021). Our data include a total of 1,397,940 observations on RNs and 599,350 observations on RPNs over 2013-2021, including those registered as active or inactive. This amounts to 255,010 unique nurses (173,570 RNs and 88,230 RPNs). Note that our total number of unique nurses does not add up to the sum of unique RNs and RPNs as there are nurse occupation

transitions (e.g., RPNs who become RNs), and very rarely, "switching" (e.g., RNs who were RPNs at one point, choose to register inactive as an RN, and active as an "RPN"). These individuals are counted twice only in the above and not in our analysis). Transitioning from RPN to RN is more common than the reverse, with counts ranging from 430 in 2013-2014 to 1,370 in 2020-2021. An RPN who becomes an RN is not considered an exit as long as they continue to have employment in at least one Ontario nursing job.

We calculate the total annual occupational attrition rate as: the sum of (1) nurses who do not register or register as inactive, and (2) nurses who register active without Ontario nursing employment, in year t divided by the number of employed Ontario nurses in year t-1 (Equation 1). Of course, the first category is more likely to represent a permanent transition, whereas the second is more likely temporary.

$$(1)\ Attrition\ Rate\ (\%) = \left(\frac{do\ not\ register\ or\ register\ inactive + register\ active\ without\ Ontario\ nursing\ employment\ (year\ t)}{nurses\ with\ employment\ in\ Ontario\ (year\ t-1)}\right) \times 100$$

Nurses who do not register, or register inactive are unable to practice in the nursing profession in Ontario in any capacity, while active nurses without employment in Ontario can practice. Nurses may be actively registered without Ontario employment for several reasons. For example, nurses may be searching for employment (i.e., they are unemployed), or nurses living on the border of Ontario and Quebec may be concurrently registered in both provinces, but are currently without employment in Ontario. Moreover, nurses who retire may keep their registration to facilitate a transition out of retirement should that become desirable. It is more difficult to return to the profession once a nurse does not register or registers inactive. Thus, we further divide active nurses without employment (i.e., group (2) above) into two subgroups: (a) those on leave, unemployed, or report an unknown practice status, and (b) those out of the labour force, or

employed outside of Ontario or the profession. Thus, in total, we have two attrition categories [(1) not registered/registered inactive; (2a) on leave/unemployed; and (2b) out of the labour force/working outside of Ontario). For most of the analysis we investigate each attrition category separately as we suspect there are differences between each group of "leavers". In fact, as discussed in the results, nurses who register inactive are significantly less likely to return to the profession compared to nurses who register active without nursing employment.

4.4 Results

4.4.1 Annual Occupational Attrition Rates (2011-2021)

Annual occupational attrition rates appear in Figure 1A for RNs and 1B for RPNs. Each figures displays a total plus two underlying attrition rates: (1) that for nurses do not register or register inactive in year t, (2) that for those registering active without employment in at least one Ontario nursing job. Additionally, the yellow solid line indicates the number of nurses with employment in at least one Ontario nursing job in the year prior (i.e., year t-1). In subsequent analyses, we subdivide the second attrition rate into the two subcategories described above. Prior to COVID-19 (2014-2019), the annual total attrition rate ranged from about 6.1 to 7.2 percent for RNs, and 6.6 to 7.5 percent for RPNs. During this same period, the first component of the attrition rate (those who do not register or register inactive) ranged from about 2.4 to 2.6 percent among RNs and 2.3 to 2.7 percent for RPNs. The second component, those who register but are not working in at least one Ontario nursing job, is higher and ranged from 3.7 to 4.6 percent for RNs, and about 4.2 to 5.0 percent for RPNs from 2014-2019.

In 2020, the total attrition rate increased slightly. by about 0.5 percentage points, for RNs and RPNs. In 2021, the total attrition rate again modestly increased, by 0.3 percentage points for RNs, and 0.5 percentage points for RPNs. Comparing the year immediately before COVID-19

(2019) and most recent COVID-19 year of data available (2021), the total attrition rate increased by about 12.0 and 15.0 percent for RNs and RPNs respectively. However, the number of RNs and RPNs employed in Ontario also increased by about 1.3 and 4.2 percent from 2019 to 2021. Applying the 2021 attrition rate to the population of nurses in 2018 (i.e., the denominator used to calculate the 2019 attrition rate), an additional 850 RNs and 540 RPNs leave the profession in 2021.

While there is a modest increase in the attrition rate, we find no evidence of a major exodus from the profession in the first two years of the pandemic. Moreover, any increase in the total attrition rate is primarily driven by nurses who register active without Ontario nursing employment. For example, among RNs, almost 76.0 percent of the increase in the total attrition rate from 2019 to 2020 is due to nurses registering without nursing employment. In section 4.4.3 we will show that nurses who register active without Ontario nursing employment are much more likely to return to the profession.

4.4.2 Full-time Equivalent Positions

Using headcounts to measure retention may not detect a decrease in the supply of nurses if, instead of more nurses leaving the profession, nurses increasingly choose part-time or casual employment. In Figures 2A (RNs) and 2B (RPNs) we display the full-time equivalent (FTE) number of jobs by job location (Ontario, other Province/Territory, US, and outside Canada/the US). Nurses registered with the CNO may also be registered to practice in another jurisdiction (concurrent registration). In both figures, the scale for FTE jobs outside Ontario (right-hand side) differs from that for Ontario and total FTE jobs (left-hand side). The ratios employed in our definition of FTE positions are calculated using the mean hours of practice reported for each employment status category (full-time, part-time, and casual).

There is an upward trend in total FTE positions since 2017 among RNs, and since the beginning of our data window (2013) for RPNs. Though, for RPNs, in the first year of COVID-19 data (2020), there is a small decline (-1.2 percent) in total FTEs. In each year, except 2020, total FTE positions have grown at a faster rate for RPNs compared to RNs. For both groups of nurses, the largest growth rate in Ontario FTEs occurs in 2021, at 5.1 percent for RNs, and 12.9 percent for RPNs. Prior to 2021, the growth rate in Ontario FTEs ranged from -0.85 (i.e., a decline) to 4.4 percent among RNs, and from -1.2 to 11.9 percent among RPNs.

Among RPNs, very few FTE positions are located outside Canada, with little to no growth from 2013-2021. This is also true among RNs, except for US FTE positions, which steadily increase since 2016. For both RNs and RPNs, there is a slight upward trend in FTE positions in provinces or territories outside of Ontario. Despite some growth in FTEs outside of Ontario, the distribution of FTEs by job location remains quite consistent. From 2013-2021, 96.7 to 98.2 percent of FTE positions are located in Ontario among RNs. This range is slightly higher among RPNs (98.7 to 99.2 percent). Thus, we do not find evidence of nurses registered in Ontario increasingly supplying more labour elsewhere during the first two years of the pandemic. This may be a result of pandemic border restrictions, and future analysis may be required to determine if nurses are supplying more labour outside the province.

In Appendix 1 Figures 1A (RNs) and 1B (RPNs) we display the mean and aggregate hours of practice. Similar to FTEs, aggregate hours exhibit growth, mainly since 2018 among RNs, and throughout the entire period of analysis among RPNs.

4.4.3 Categories of Occupational Attrition and Returns to the Profession

We explore occupational attrition from, and potential subsequent returns to, the nursing profession in Table 1. In panels (1), (2), and (3) we display the number of nurses employed in at

least one Ontario nursing job in year t-1, and the proportion who do and do not continue working (i.e., the retention and total attrition rate) the following year t respectively. Section (2) is the total attrition rate described in section 4.4.1, though section 4.4.1 does not consider those who subsequently return to the profession.

Nurses in the HPDB who maintain their registration as active classify their practice status. For those who have no Ontario nursing employment, this variable measures the following mutually exclusive reasons: (i) employment leave (e.g., maternity or family leave), (ii) unemployment (i.e., not working, and seeking work in the profession), (iii) an unknown practice status (i.e., a blank practice status value), (iv) leaving the profession, (v) leaving Ontario, and (vi) leaving the labour force (i.e., not working and not seeking work in the profession). In Table 1, we aggregate (i)-(iii) into attrition category (4), and (iv)-(vi) into attrition category (5). In each case, in the rows (A), (B), (C), (D), and (E), we display the proportions who do and do not return to the profession (i.e., employment in at least one Ontario nursing job) within 3 years, and the proportions who return by 2021. Attrition rates (4) and (5) sum to attrition rate (2) in section 4.4.1 (for results using attrition categories in section 4.4.1, see Appendix 1 Table 1).

Nurses in the HPDB must also select a reason for registering inactive, choosing among these mutually exclusive reasons: (i) retiring, (ii) leaving Ontario, Canada, or the profession, (iii) leave, and (iv) other. In Table 1, we aggregate in category (6) all those who register as inactive along with those who do not register. We display disaggregated inactive registration and practice status attrition categories in Appendix 1 Table 2.

The percentage of RNs and RPNs on leave, unemployed, or with an unknown practice status increased slightly in the first two years of the pandemic. For example, 4.4 percent of the Ontario employed RPNs in 2019 (48,490 nurses) register without employment in 2020,

compared to an average rate of 3.5 percent pre-pandemic. Attrition category (5) shows an even more modest increase in the proportion of RNs and RPNs who left the nursing profession, Ontario, or the labour force in the first two years of the pandemic. Changes in the proportion of RNs and RPNs who register inactive or do not register (category (6) in Table 1) in the first two years of COVID-19 are also very small in magnitude.

As discussed in section 4.4.1, the increase in total attrition is primarily driven by nurses who register active without employment. Table 1 further investigates this group of nurses, and shows this increase, especially among RPNs, is mostly due to nurses who go on leave, become unemployed, or report an unknown practice status. We find such nurses are much more likely to return to the profession within 3 years, compared to nurses who leave the profession, Ontario, or the labour force. Averaged over 2013-2019, 52.7 percent of RNs who went on leave, became unemployed, or had an unknown practice status return to the profession the next year. This figure is only 20.6 percent among RNs who leave the profession, Ontario, or the labour force, and 0.8 percent among RNs who do not register or register inactive. The probability of returning to the profession conditional on not registering or registering inactive is almost zero.

For each attrition category, the probability of returning to the profession decreased with time, with perhaps the exception of nurses who register inactive or do not register which, oddly, both increased and decreased with time. For example, among RNs who register inactive from 2013-2017, the proportion who return to the profession in year t+2 is slightly greater than that of year t+1. Overall, across all years and most categories of attrition, RPNs are more likely to return to the profession compared to RNs.

In Appendix 1 Tables 3 (RNs) and 4 (RPNs), we display transition matrices, which explore transitions from unemployment to employment. Additionally, Appendix 1 Table 5,

displays the levels of the practice status and inactive reason categories each year from 2013-2021 (as opposed to transition rates). Row 1, for example, displays the percentage of nurses employed in at least one Ontario nursing job, out of the stock of nurses registered with the CNO. In 2020 and 2021, this rate decreased slightly among RNs, and is almost identical among RPNs compared to pre-COVID-19 years.

4.4.4 Probability of Attrition by Age Group

In this section we examine the probability of leaving the profession for each attrition category introduced in section 4.4.3 by age group (under 29, 30-39, 40-49, 50-59, and over 60 years of age). Our previous analysis demonstrates registering inactive or not registering can be thought of as a (close to) "permanent" exit from the profession compared to the other two attrition categories. Thus, we are particularly interested in any changes in the probability of registering inactive or not registering among the under age 60 groups. In Appendix 1 Figures 2A and 2B, we display the age distribution of nurses with at least one Ontario nursing job. Though stakeholders have expressed concerns about an aging workforce, we find a younger workforce distribution in more recent years (2018-2021). The percentage of nurses under age 39 (especially those in the 30 to 39 age group) is steadily increasing each year.

Figures 3A (RNs) and 3B (RPNs) display the probability of registering inactive or not registering by age category. The probability of registering inactive, or not registering is highest among those 60 years of age and older. Prior to COVID-19, this probability ranged from 10.4 to 11.7 percent among RNs, and 11.9 to 13.9 percent among RPNs. The probability of not registering or registering inactive is lowest among middle aged nurses, those in the 30-39 and 40-49 age group. In the first year of COVID-19, 2020, we find a small increase (1.3 percentage points) in RNs aged 60 and over registering inactive or not registering, followed by a decrease

(2.5 percentage points) compared to 2019. Among RPNs, this probability is almost identical in 2020, following a decrease in 2021 by 1.5 percentage points. Across the other age categories, this probability remains consistent. Presumably, most individuals over the age of 60 register inactive or do not register because they retire. Among RNs, the moderate increase in 2020, followed by a decrease in 2021 may indicate some nurses chose to retire slightly earlier due to the pandemic. Overall, we do not find evidence of a "Great Resignation" during the first two years of the pandemic.

Figures 4A and 4B display the probability of registering active without employment due to leave, unemployment, or an unknown practice status by age group. This probability rate is highest among the under 29, 30-39, and over 60 age groups (e.g., an average of 4.56, 4.08, and 3.9 percent respectively among RPNs in these age categories between 2014-2019). In general, there are modest changes in this probability across all age groups for both sets of nurses during the first two years of the pandemic. The largest change among RNs occurs in the 60 and over age group, where in 2020, there was an increase in the probability by 1.1 percentage points compared to the year prior (2019). Among RPNs, the largest changes occur in the 40-49, and over 60 age groups, where the probability increased by 1.1 percentage points for both groups during the pandemic (in 2020 for the first group, and 2021 for the latter) compared to 2019.

Lastly, Figures 5A and 5B show the probability of registering active without employment due to leaving Ontario, the profession, or the labour force. Overall, we do not find evidence of a significant change in this probability during the first two years of the pandemic, compared to pre-COVID-19 trends. This probability rate is highest among the 60 and over age group among both RNs and RPNs across all years. This is likely because many who identify as "out of the labour force" are retired, but continue to register with the CNO. In Appendix 1 Figures 3A and B to

Figures 9A and 9B, we explore this, by further disaggregating the above attrition categories. Caution is required in interpreting these results, as for example, not all nurses who retire will select "retired" as their inactive reason, and some nurses who retire keep their registration (i.e., register active without nursing employment). The probability of leaving the labour force (Appendix 1 Figures 9A and 9B) is highest among those 60 years of age and older, and the probability of leaving the profession or Ontario is highest among those under 29 years of age (Appendix 1 Figures 8A and 8B). The probabilities in each disaggregate category, along with any changes in these rates during the pandemic, are quite small in magnitude.

4.4.5 Employment Dynamics

In Figures 6 and 7 (RNs) and Figures 8 and 9 (RPNs), we further analyze employment dynamics, and examine multiple spells of employment transitions. We define three states: (I) employed in at least one Ontario nursing job (denoted by "W" in Figures 6 to 9), (II) registered active without employment ("NW"), and (III) not registered or registered inactive ("NR"). Based on the results found in section 4.4.3, we define state (III) as an absorption state (i.e., once a nurse does not register or registers inactive, we assume they do not return to the profession). We display employment dynamics up to 2017 in Figures 6 to 9, and a selection of employment dynamics from 2018-2021 in Appendix 2 Figures 1 to 3 (for RNs) and Appendix 2 Figures 4 to 6 (for RPNs).

In each box we display the number of observations in each state (the middle row), and the corresponding percentage (the last row). We begin with nurses who are employed in at least one nursing job in 2013. For example, among RNs in the 2013 HPDB (note this includes those who register active or inactive), 95,780 (or 81.0 percent) are employed in one or more Ontario nursing positions. Conditional on being employed in Ontario nursing in 2013, the probability of

continuing to work each year up to 2017 (i.e., working continuously in any Ontario nursing job for four years) is 76.8 percent among RNs, and 75.6 percent among RPNs. From Appendix 2 Figure 1, the probability of working continuously for eight years up until 2021 (conditional on being employed in 2013) is 57.5 percent among RNs and 56.9 percent among RPNs (Appendix 2 Figure 3). Just under half of the nursing profession employed in 2013 spent at least one year out of Ontario nursing employment during our data window.

The longer the spell without Ontario nursing employment (while maintaining registration), the more unlikely it is for nurses to return to the profession. For example, among RNs not working in 2014-2015 (conditional on working in 2013), only 18.5 percent return to employment in 2016. Moreover, among RNs not working in 2014-2018 (conditional on working in 2013), only 9.5 percent returned to nursing employment (Appendix 2 Figure 3). In general, RPNs are more likely to return to the profession; these figures for RPNs were 27.2 and 18.0 percent respectively (Figure 9 and Appendix 2 Figure 6). Many nurses who are not employed, even for a long period of time, keep their registration (i.e., register active without employment). Among RNs and RPNs not working in 2014-2015, 48.4 and 45.6 percent, respectively, register active without employment. Examining a longer period of time out of employment, among RPNs (RNs) not working in 2014-2018, 52.0 (72.0) percent continue to register without employment, while only 30.0 percent (18.5 percent) register inactive or do not register in 2019 (Appendix 2 Figure 3 and 6).

4.4.6 Net Gains and Losses

Table 2 Panel A displays the net gain (loss) in registrants from 2014-2021. The net gain (loss) in registrants in year t is calculated by subtracting (1) new registrants in year t, from (2) those who register inactive or did not register in year t-1. New registrants in year t, are those who register

active in year t, and did not register (active or inactive) in year t-1. Among both RNs and RPNs, there is a net gain in registrants each year. This aligns with results from CNO's *Registration Renewal Statistics Report 2023* (CNO, 2023), from which our data are derived. Aggregating RNs and RPNs, in 2021 (classified as "2022" in Section 3.2 of CNO's report), we find a similar net gain in registrants by 4,090 (our results slightly differ due to rounding). A significant number of new registrants are RPNs (an average of 2,220 from 2013-2019), as opposed to RNs (an average of 710 from 2013-2019). The net gains in registrants in the first two years of the pandemic (along with 2018) were quite high compared to previous years among both RNs and RPNs.

Table 2 Panel B displays the net gain (loss) in nurses employed in at least one Ontario nursing job, as not all nurses who register with CNO work in Ontario nursing. We calculate the net gain (loss) in employed nurses by subtracting (1) the number of nurses who left Ontario nursing employment in year t-1 (i.e., they had at least one nursing job in Ontario in year t-2), from (2) those who gained Ontario nursing employment in year t (i.e., they did not have an Ontario nursing job in year t-1). For example, (2) consists of those on leave returning to employment, and new entrants to the profession. The net gain (loss) in nurses employed in Ontario fluctuates among RNs, and is consistently positive among RPNs. During the first two years of the pandemic there is a net gain in Ontario employed RPNs of 1,780 and 2,940, which is comparable to pre-pandemic trends, with an average net gain of 2,230 RPNs between 2014-2019. However, among RNs, essentially just enough nurses enter (or re-enter) employment in Ontario to cover employment losses during the first two years of the pandemic.

4.4.7 Likelihood of Leaving the Profession

Finally, we determine if the likelihood of leaving the profession, and subsequently not returning has changed over time. Table 3 presents the logistic regression analysis for the likelihood of

registering inactive or not registering. In Tables 4 and 5, the dependent variables are registering active without nursing employment due to: leave, unemployment, or an unknown practice status (Table 4), and exiting the profession, Ontario, or labour force (Table 5). The main independent variables (of interest) are dummy variables indicating each year in the period 2014-2021 (2014 being the reference). In Tables 6-8, our dependent dummy variable is not returning to the profession within three years for each of the above attrition categories. We drop years 2019-2021, as returning to the profession within three years is truncated. We chose a period of three years to examine "true" exits from the profession. Models 1-4 in Tables 3-8 display logistic regressions controlling for age, gender, and the interaction between age and gender. Models 5-8 in Tables 3-8 include endogenous controls such as the healthcare sector of employment, location of first education, employment status and category, a dummy variable for having another nursing registration outside Ontario, etc. Appendix 1 Tables 6 and 7 display identical regression models where we aggregate all those who register active without Ontario nursing employment. In all regression tables we display both odds ratios and marginal effects.

After controlling for age and gender (models 1-4 in Table 3), we see a small steady increase in the likelihood of registering inactive or not registering from 2019-2021 among RNs, and in 2021 among RPNs compared to the base year (2014). Though the odds ratios are above one, the marginal effects on the year coefficients demonstrate there is not much policy significance in any change of the rate of nurses who register inactive or do not register in these years compared to 2014. For example, in 2020, the likelihood of registering inactive or not registering increased by only 0.5 percentage points compared to 2014. After including endogenous controls, the year coefficients (2019-2021) remain statistically significant and increase slightly in magnitude among RNs (models 5 and 6). Among RPNs, the year coefficients

for 2019 and 2020 are now statistically significant at the 5.0 percent level, and the year coefficient for 2021 increased modestly (models 7 and 8). Overall, we do not find any large differences in the likelihood of registering inactive or not registering compared to the base year.

Models 1-8 in Table 3 display that among male RNs and RPNs only, older nurses (50-59 and over 60 years of age) are more likely, and nurses 30-39 and 40-49 years of age are less likely, to register inactive or not register compared to nurses under 29 years of age. Male nurses over 60 years of age (likely retirees) are especially more likely to register inactive or not register. This result is also true for female nurses; older nurses are more likely, while middle aged nurses are less likely to register inactive or not register compared to younger nurses. For example, female RNs 40-49 years of age have 0.34 times higher odds, while female RNs over age 60 have 7.68 times higher odds of registering inactive or not registering compared to RNs under 29 years of age. Comparing male and female RNs and RPNs, female nurses are less likely to register inactive or not register compared to their male counterparts in each age group, except in the over 60 age group, where the likelihood is quite similar.

In Table 3, most endogenous control variables (models 5-8) have their expected sign, are statistically insignificant, or are small in magnitude. For example, we do not find large differences in the likelihood of registering inactive or not registering across healthcare sectors compared to LTCHs. Interestingly, the marginal effect coefficients on on-call hours and average practice weeks in the last year (included as a proxy for working conditions) are essentially zero for both RNs and RPNs. Though, the coefficients on the "missing" dummy variables for practice weeks and on-call hours are statistically significant and slightly above zero, indicating there may be non-randomness in reporting blank values. Moreover, there may be standard on-call hours and practice weeks in the nursing profession that do not vary much between nurses. Similar to results

found by Daniels et al. (2012b), casual nurses are slightly more likely to leave compared to those who are employed full-time. This (or any result in our regressions) should not be interpreted as causal since those less attached to the labour force may choose casual positions.

Table 4 shows the likelihood of registering active with employment (due to leave, unemployment, or an unknown practice status) also exhibits a modest increasing trend from 2019-2021 for both sets of nurses compared to the base year in all models. Contrary to the results in Table 3, younger female RNs and RPNs (under 29 and 30-39 years of age) are more likely than male nurses in these age groups to register active without employment, likely a reflection of maternity or family leave. Older female nurses are also more likely than their male counterparts to register active without employment due to leave, unemployment, or an unknown status. Comparing male nurses only, the likelihood of this type of attrition is higher among nurses in the 50-59 and over 60 age group compared to younger male nurses (20-29 years of age). These results remain consistent when the endogenous controls are included. Similar to Table 3, the results on the endogenous coefficients are either small in magnitude or exhibit the expected relationship.

Table 5 displays the likelihood of registering active without employment due to leaving the profession, province, or labour force. Distinct from the previous two attrition categories, there is a small decline in the likelihood of leaving the profession, province, or labour force in models 1-8. Again, the marginal effects demonstrate this decline is modest. In general, the results for gender and age are similar to those found in the first attrition category (registering inactive or not registering). For example, among females, nurses in to 30-39 and 40-49 age group are less likely, and nurses in the 50-59 and over 60 age groups are more likely than younger nurses to leave the province, profession, or labour force. Additionally, female RNs 20-29 years of age are

less likely than their male counterparts to leave the province, profession, or labour force. The similarity of these results in Table 3 and 5 are likely a reflection of nurses retiring (i.e., out of the labour force).

Tables 6-8 display the likelihood of not returning to the profession within three years for each attrition category. Overall, we do not find a large change in the likelihood of not returning to the profession after registering inactive or not registering over the 2014-2018 period (Table 6). Similarly, in Table 7, we do not find any significant changes over time in the likelihood of not returning to the profession after going on leave, becoming unemployed, or reporting an unknown practice status. However, in Table 8, the likelihood of not returning after leaving the profession, province or labour force exhibits an increasing trend from 2015-2018 among both sets of nurses. For example, the likelihood of not returning to the profession is approximately 5.6 and 11.1 percentage points higher in 2015 compared to 2014 for both RNs and RPNs respectively.

Though there are exceptions, in general, we find a pattern of results among male and female nurses for each attrition category in Tables 6-8. Mainly, for both female and male RNs and RPNs, older nurses (50-59 and over 60 years of age) are more likely to not return to the profession within three years compared to those under 29 years of age. Conversely, female and male nurses 30-39 years of age are less likely to not return to the profession. Comparing male and female nurses in each age category, female nurses are less likely to not return to the profession, except among nurses 50-59 and over 60 years of age, though there are exceptions (e.g., RPNs 50-59 years of age in Table 7). For example, female RPNs 20-29 years of age who went on leave, become unemployed, or recorded an unknown practice status, are 7.8 percentage points less likely to not return to the profession (Table 7, model 4).

4.5 Discussion

This paper contributes to existing literature in health human resources, and provides new evidence of retention in the Ontario nursing labour market before, and during the first two years of the COVID-19 pandemic. A large majority of the nurse retention literature focuses on intention to leave, and determinants of retention. To our knowledge, research on nurse retention rates during the pandemic in Ontario, or any jurisdiction in Canada, is limited. Several media outlets and stakeholders have warned of a major exodus from the nursing profession. Perhaps surprisingly given these reports, we find a modest decrease in the retention rate among RNs and RPNs in 2020 and 2021 compared to 2014-2019. From 2019-2021, the total attrition rate increased by about 12.0 and 15.0 percent (or 0.8 and 1.1 percentage points) for RNs and RPNs respectively. We account for nurses potentially reducing hours of labour supply instead of leaving the profession (not captured in our retention rate), by determining full-time equivalent positions across job locations, and aggregate hours over time. In general, FTEs in Ontario and aggregate hours have been steadily increasing throughout our period of analysis, especially in 2021 where Ontario FTE positions increased by 5.2 among RNs and 12.9 percent among RPNs.

We distinguish between temporary and permanent exits from the profession by defining two attrition categories. We find most increases in the attrition rate during the pandemic arise from nurses registering without employment (more specifically due to employment leave, unemployment, or an unknown practice status), as opposed to not registering or registering inactive. We also find the former group is much more likely to return to the profession compared to the latter. While those 60 years of age and over are most likely to register inactive or not register, it appears many in this age group also keep their registration after leaving employment. On the other hand, younger nurses are more likely to go on leave, become unemployed or record an unknown practice status. In 2020, there is a slight increase in the probability of those 60 years

of age and over registering inactive or not registering, followed by a decrease in 2021. This may indicate some nurses retired slightly earlier than they would have due to the pandemic. We do not find evidence of a large increase in younger nurses leaving the profession across all attrition categories.

Further examining employment dynamics, across all attrition categories, we find the likelihood of returning to the profession decreased as time spent out of nursing increased. Very few nurses return to the profession after spending three or more years out of the profession. The cumulative probability of working continuously without employment breaks from 2013-2021 (conditional on working in 2013) is just under 60.0 percent for both sets of nurses. While this may seem low, the nursing profession is highly female-dominated, and are thus more likely to have periods out of employment (e.g., maternity or family leave).

Overall, in our regression analysis, controlling for age and gender, we find a modest increasing trend in registering inactive, not registering, and registering active without employment due to leave, unemployment, or an unknown practice status (compared to 2014). We find a small decreasing trend in the likelihood of registering active and leaving the profession, province, or labour force compared to 2014. Unsurprisingly, younger female nurses are more likely to register active without employment due to leave, unemployment, or an unknown practice status, and subsequently less likely to not return to their profession, compared to their male counterparts.

Our data were limited to the first two years of the pandemic, and future research will be required to determine long-term effects of the pandemic. It is possible the pandemic may have a lagged effect on retention rates. Though we find the supply of nurses has not decreased, we do not account for changes in the demand for healthcare and nurses. Importantly, we do not account

for changes in Ontario's population, which has experienced accelerated growth in recent years (Government of Ontario, 2023). Lastly, as our data does not contain information on wages, we are unable to determine how wages may affect nurses' labour supply, and nurse retention. Targeted retention strategies, as opposed to a one-size fits all approach, may be required to improve nurse retention. For example, Daniels et al. (2012b) found a retention strategy from the Ontario Ministry of Health and Long-term Care aimed at increasing full-time positions did not significantly increase retention among part-time and casual nurses. This is likely because many part-time and casual nurses may self-select into these roles. In fact, in previous work, we show heterogeneity in employment preferences, mainly primary care nurses are significantly more likely to prefer part-time employment compared to other healthcare sectors such as long-term care (Drost et al., 2023).

4.6 Conclusion

We use the Health Professions Database (HPDB), an Ontario Ministry of health data set on all registered nurses (RNs) and registered practical nurses (RPNs) in Ontario to compare pre-COVID-19 (2014-2019) and COVID-19 (2020-2021) retention rates. Prior to the pandemic, from 2014-2019, the total attrition rate ranged from about 6.1 to 7.2 percent among RNs and 6.6 to 7.5 percent among RPNs. The total attrition rate was approximately 8.1 percent for RNs and 8.6 percent for RPNs in 2021. The majority of this increase in attrition derives from nurses registering active without Ontario nursing employment, as opposed to nurses not registering or registering inactive. We find that nurses who register active without employment are much more likely to return to the Ontario nursing profession, compared to the latter.

Overall, we do not find an alarming change in nurse retention rates in Ontario during the first two years of the pandemic. However, among RNs, just enough nurses entered or returned to

Ontario nursing employment in 2021 to cover the number of nurses who left Ontario nursing employment in 2020, despite a small net gain in registrants. We recommend policymakers continue to monitor post-pandemic retention rates, and the net gain (loss) in Ontario of employed nurses, as the pandemic may have a lagged effect on retention rates and the nursing labour market.

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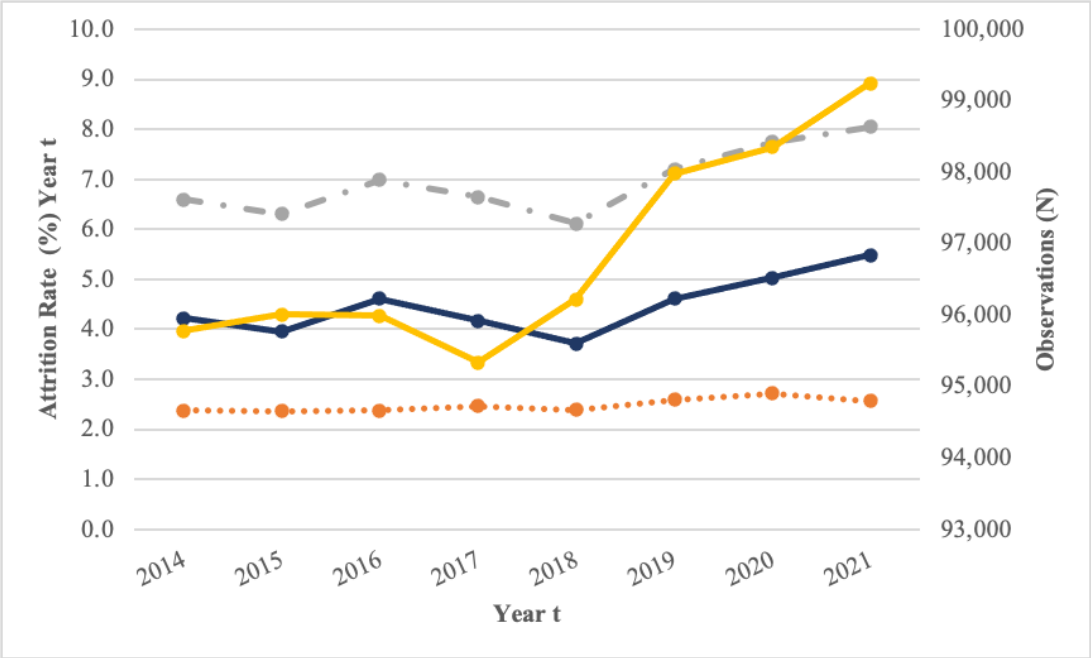
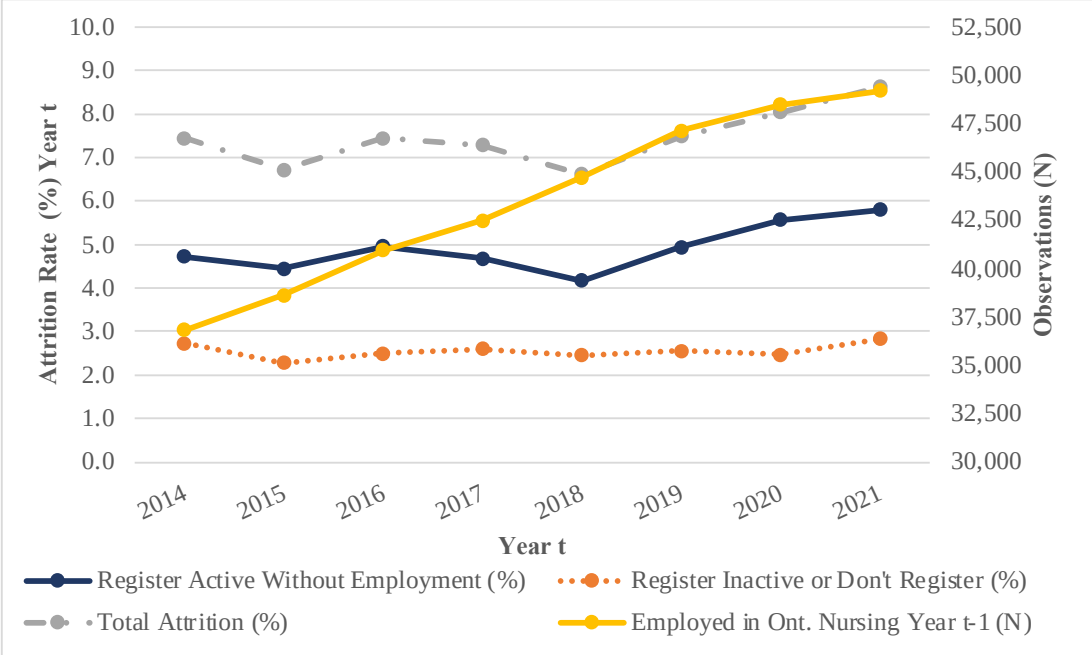
Figure 4.14: Annual Ontario Nurse Attrition Rates 2014-2021

(A) Registered Nurses (RNs)



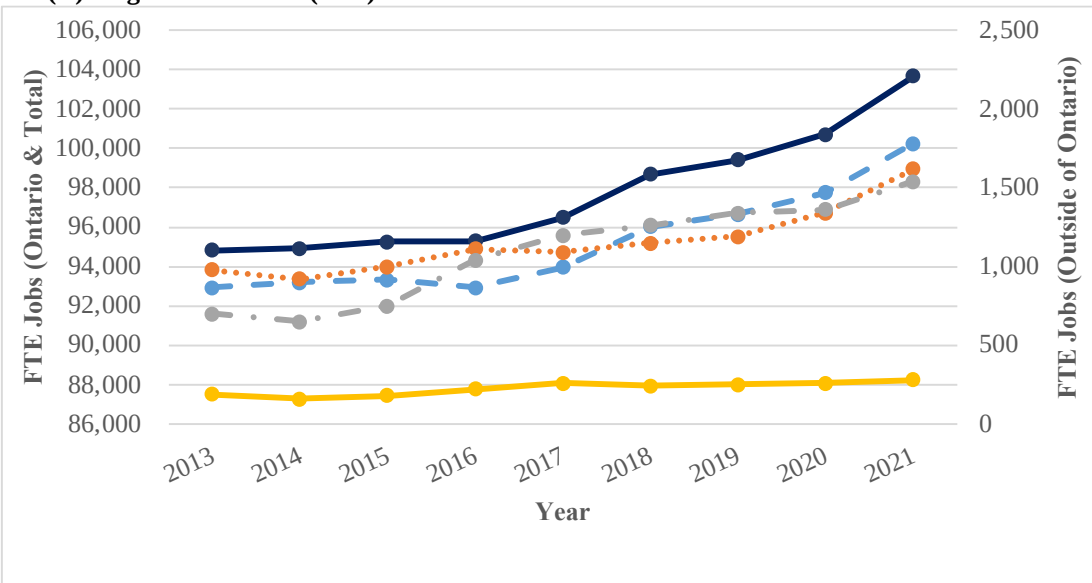
(B) Registered Practical Nurses (RPNs)



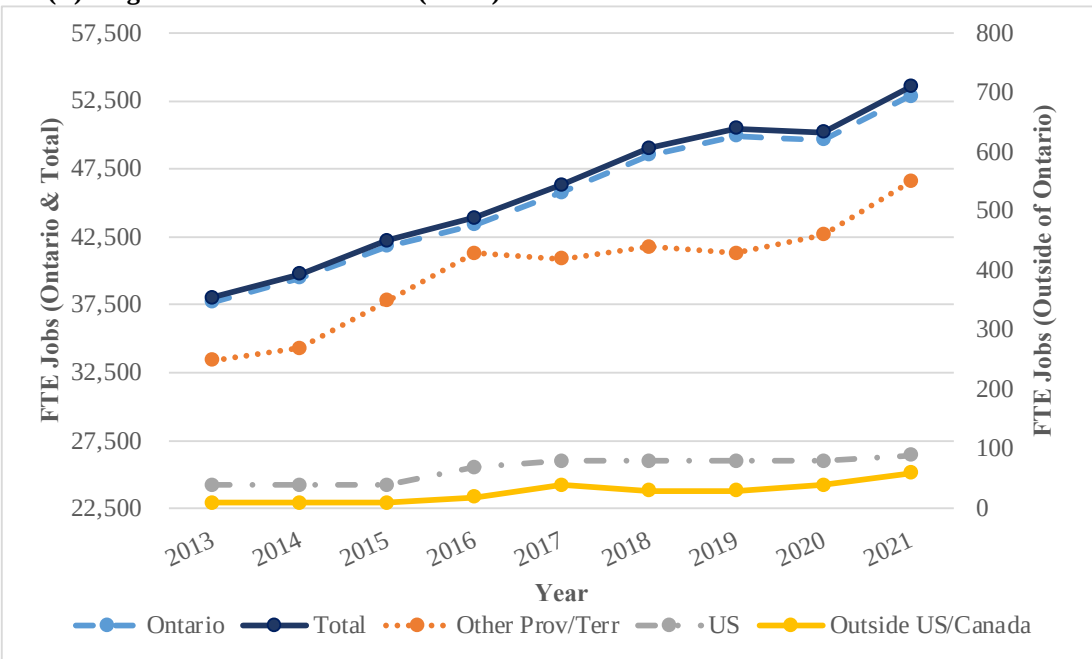
Notes: The total attrition rates is calculated at the sum of: (1) nurses who register inactive or do not register, and (2) those who register active without Ontario nursing employment in year t, divided by the number of nurses working in at least one Ontario nursing in year t-1. We display the rate of registering inactive or not registering in year t (the orange small dotted line), the rate of registering active without Ontario nursing employment in year t (the solid dark blue line), the sum of these rates, the total attrition rate, in year t (the grey dotted line), and the number of nurses working in Ontario in year t-1. The scale for all three attrition rates appears on the left-hand side of the graph, and differs from that for the number of nurses employed in Ontario nursing (on the right-hand side of the graph). The number of observations (nurses) are rounded to the nearest ten for confidentiality.

Figure 4.15: Full-time Equivalents (FTEs) by Job Location 2013-2021

(A) Registered Nurses (RNs)



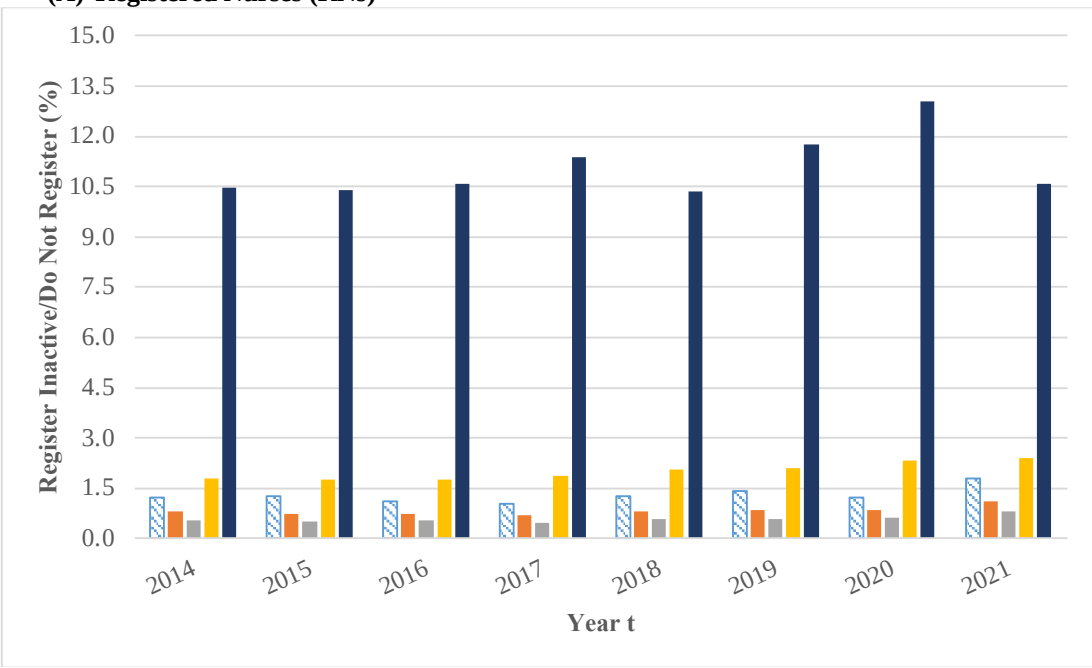
(B) Registered Practical Nurses (RPNs)



Notes: For RNs FTE ratios are: full-time = 1 job, part-time = 5/7 job, and casual = 1/2 job. For RPNs FTE ratios are: full-time = 1 job, part-time = 3/4 job, and casual = 3/5 job. FTE ratios are calculated using the mean hours reported each year and averaged over 2013-2021 among single jobholders for each reported employment status (full-time, part-time, or casual). While the employment status (full-time, part-time, or casual) is reported for up to three jobs, the mean hours of practice per week is reported on an individual basis, as opposed to a per job basis. Thus, the mean hours of practice among single jobholders for each employment category are used to calculate FTE ratios. The scale for Ontario and total FTE jobs appears on the left-hand side of the graph. The scale for jobs outside Ontario (another province or territory, the US, and outside Canada or the US) differ and appear on the right-hand side of the graph. All jobs have been rounded to the nearest ten for confidentiality. The scale for RNs (Figure 2A) and RPNs (Figure 2B) differ.

Figure 4.16: Probability of Registering Inactive/Not Registering by Age Group 2014-2021

(A) Registered Nurses (RNs)



(B) Registered Nurses (RNs)

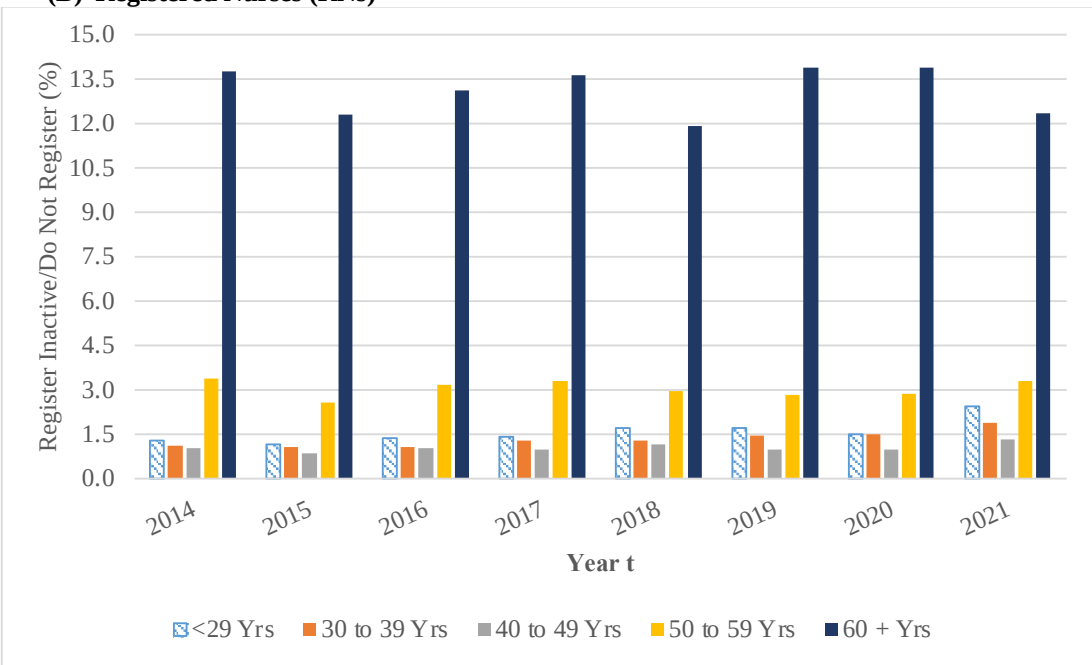
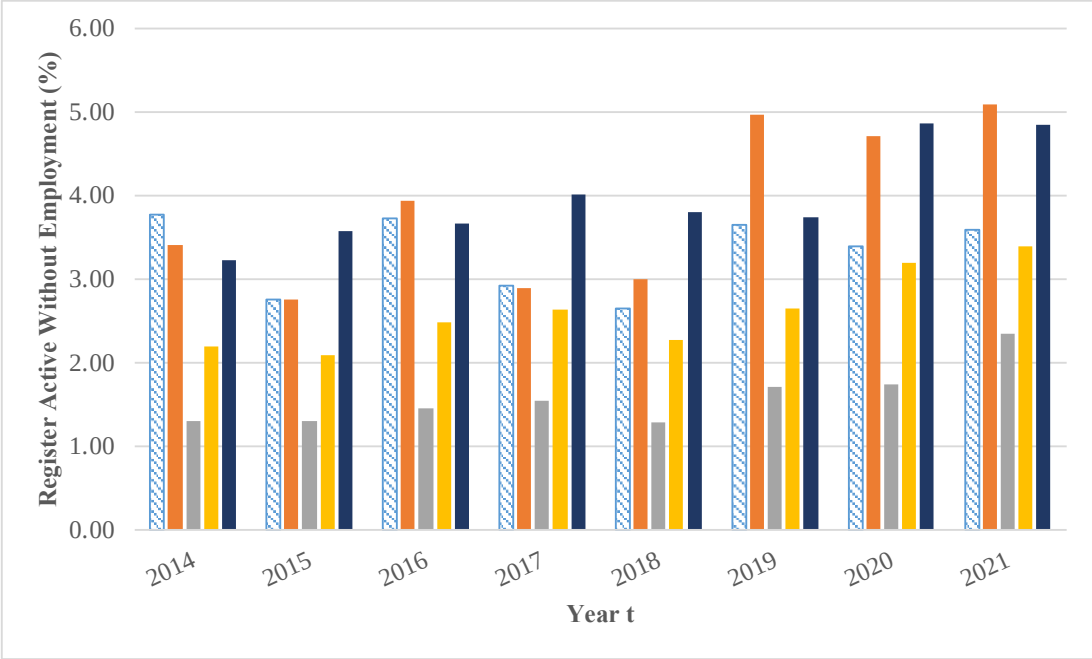


Figure 4.17: Probability of Registering Without Ontario Nursing Employment (On Leave, Unemployed, or Unknown Status) by Age Group 2014-2021

(A) Registered Nurses



(B) Registered Practical Nurses (RPNs)

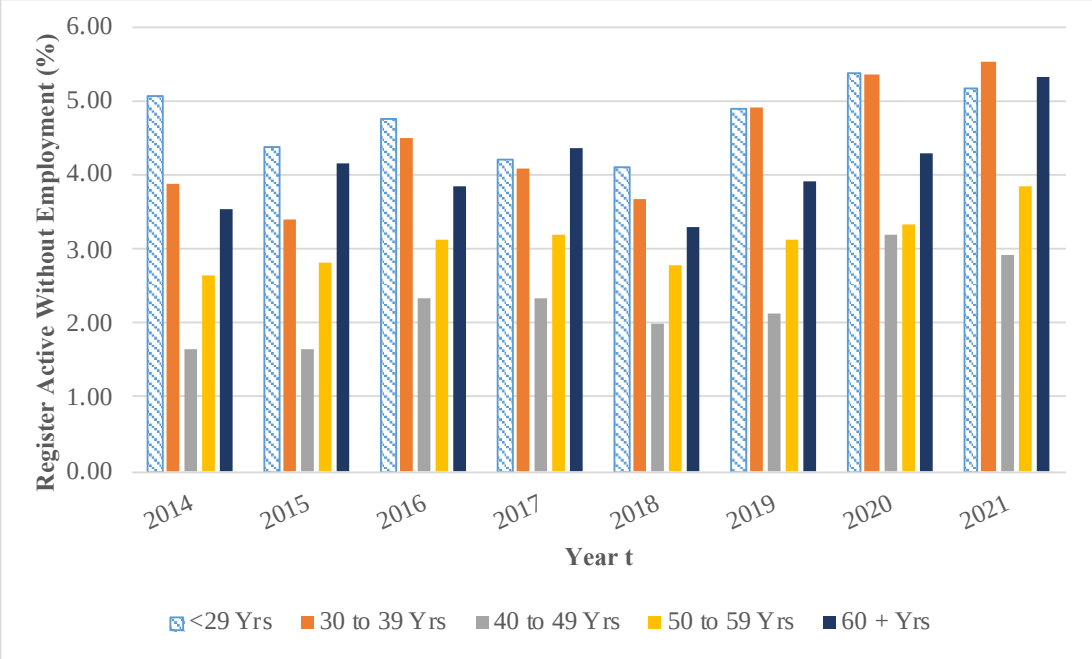
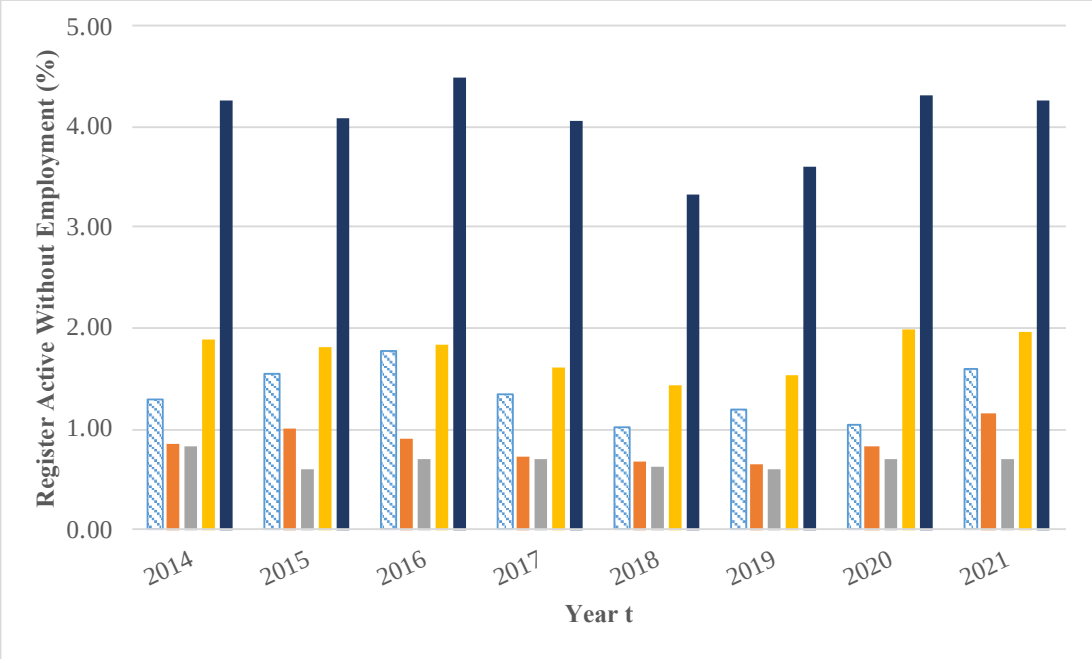


Figure 4.18: Probability of Registering Without Ontario Nursing Employment (Out of the Labour Force, or Working Outside the Profession/Province) by Age Group 2014-2021

(A) Registered Nurses (RNs)



(B) Registered Practical Nurses (RPNs)

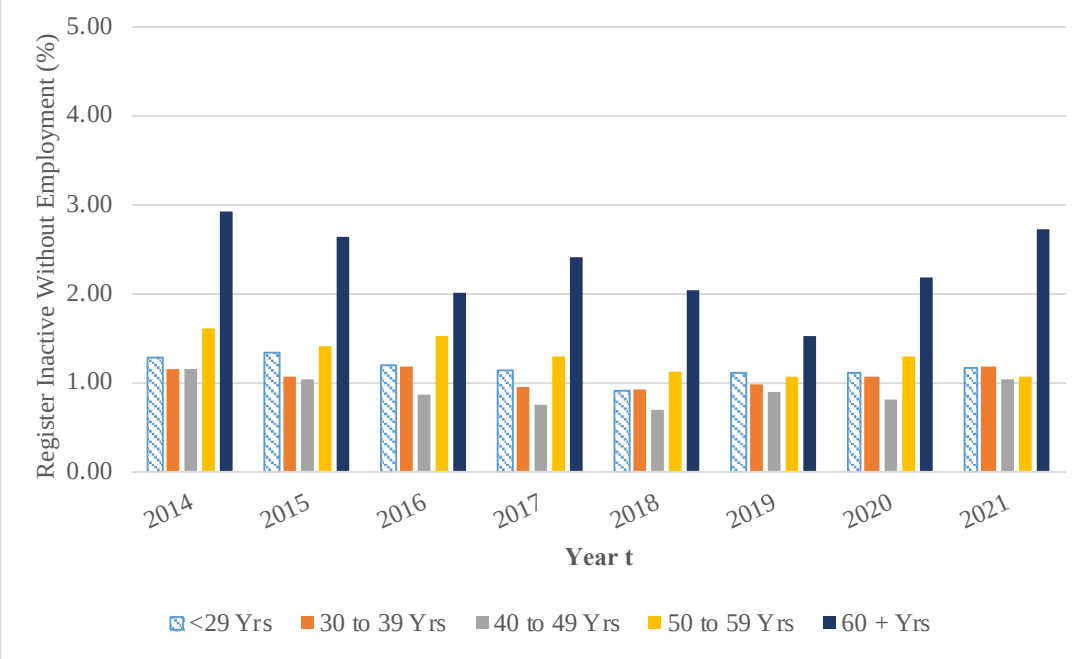
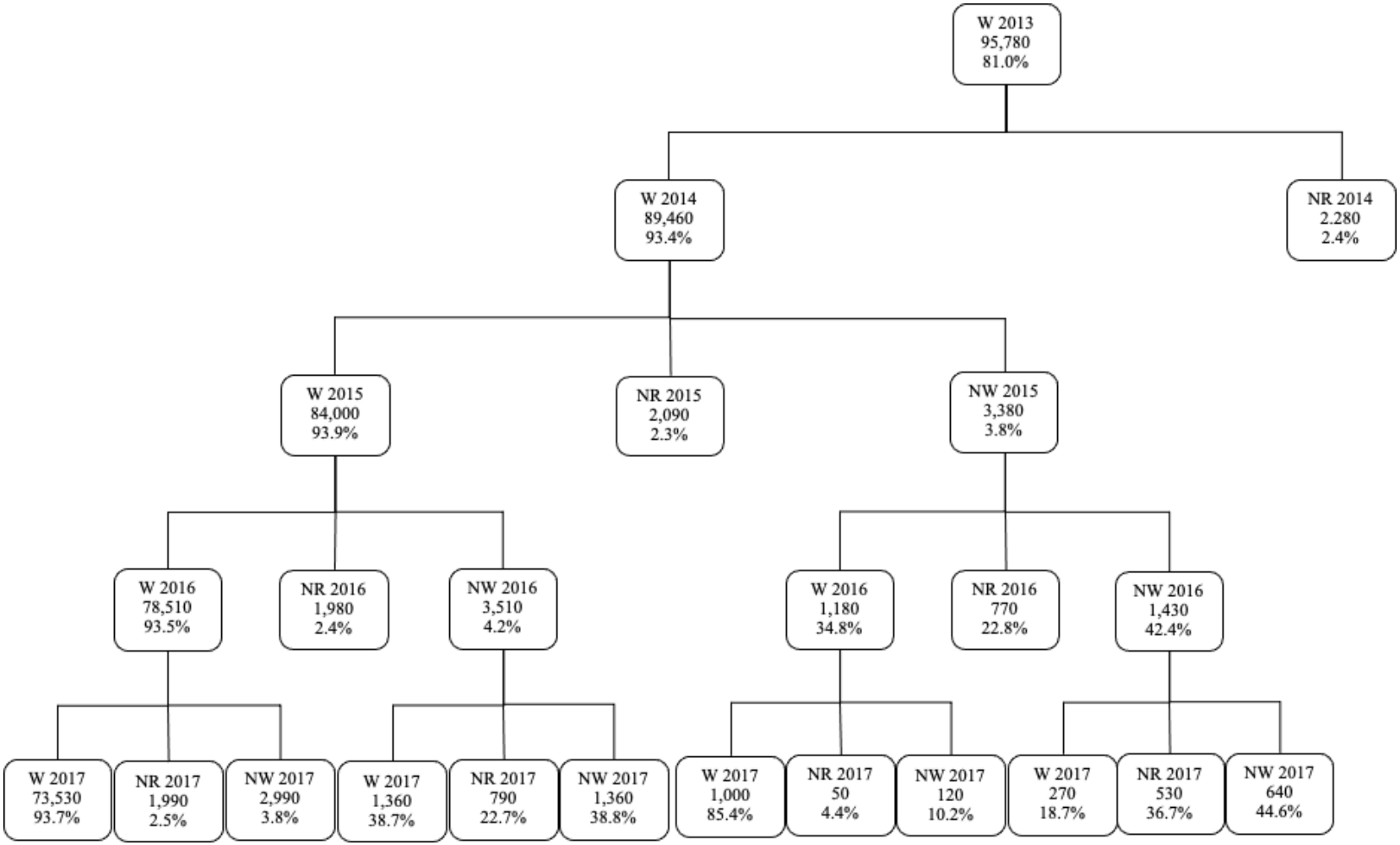
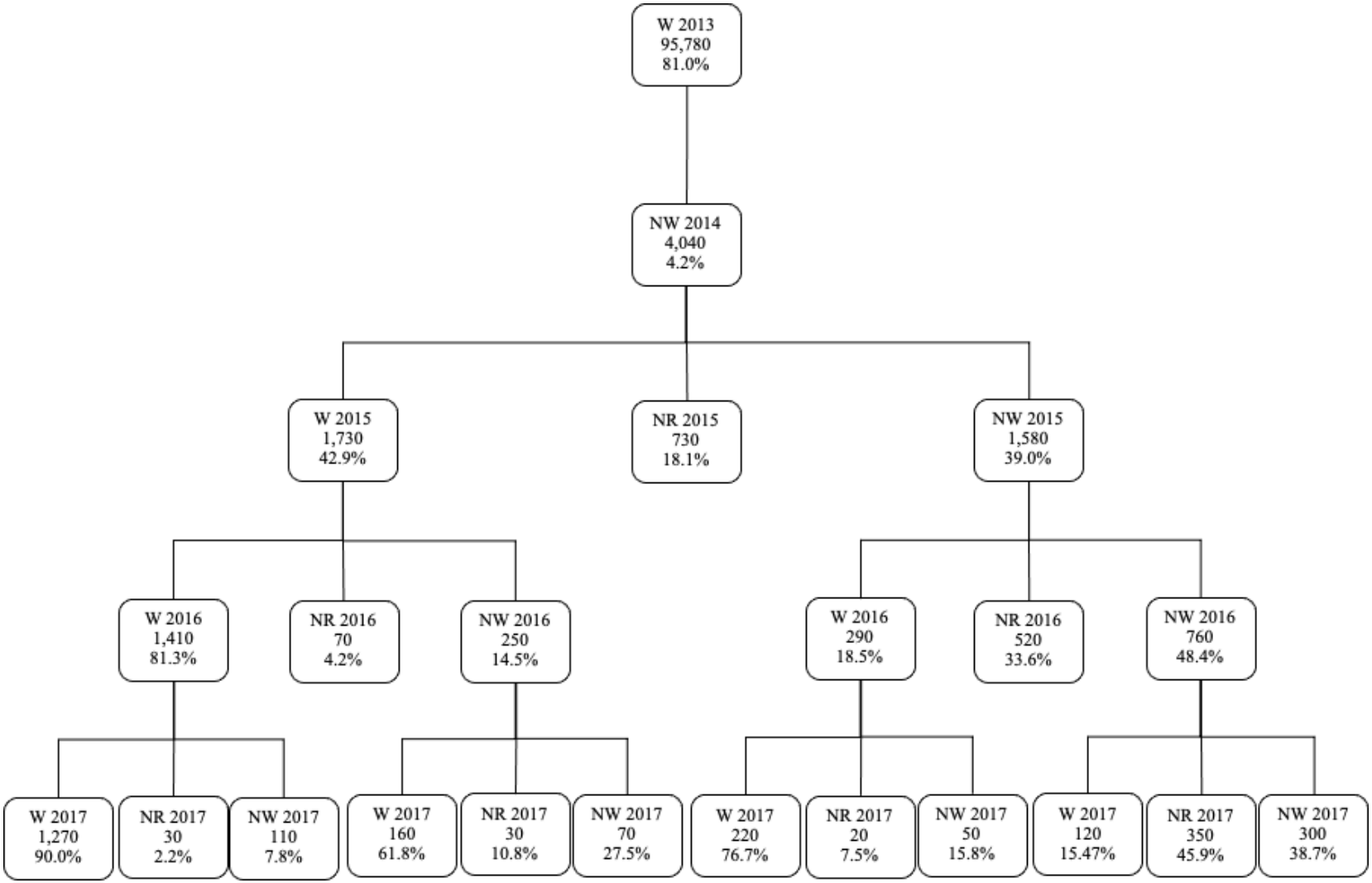


Figure 4.19: 2013 Employment Dynamics - Ontario Registered Nurses (RNs) Panel 1



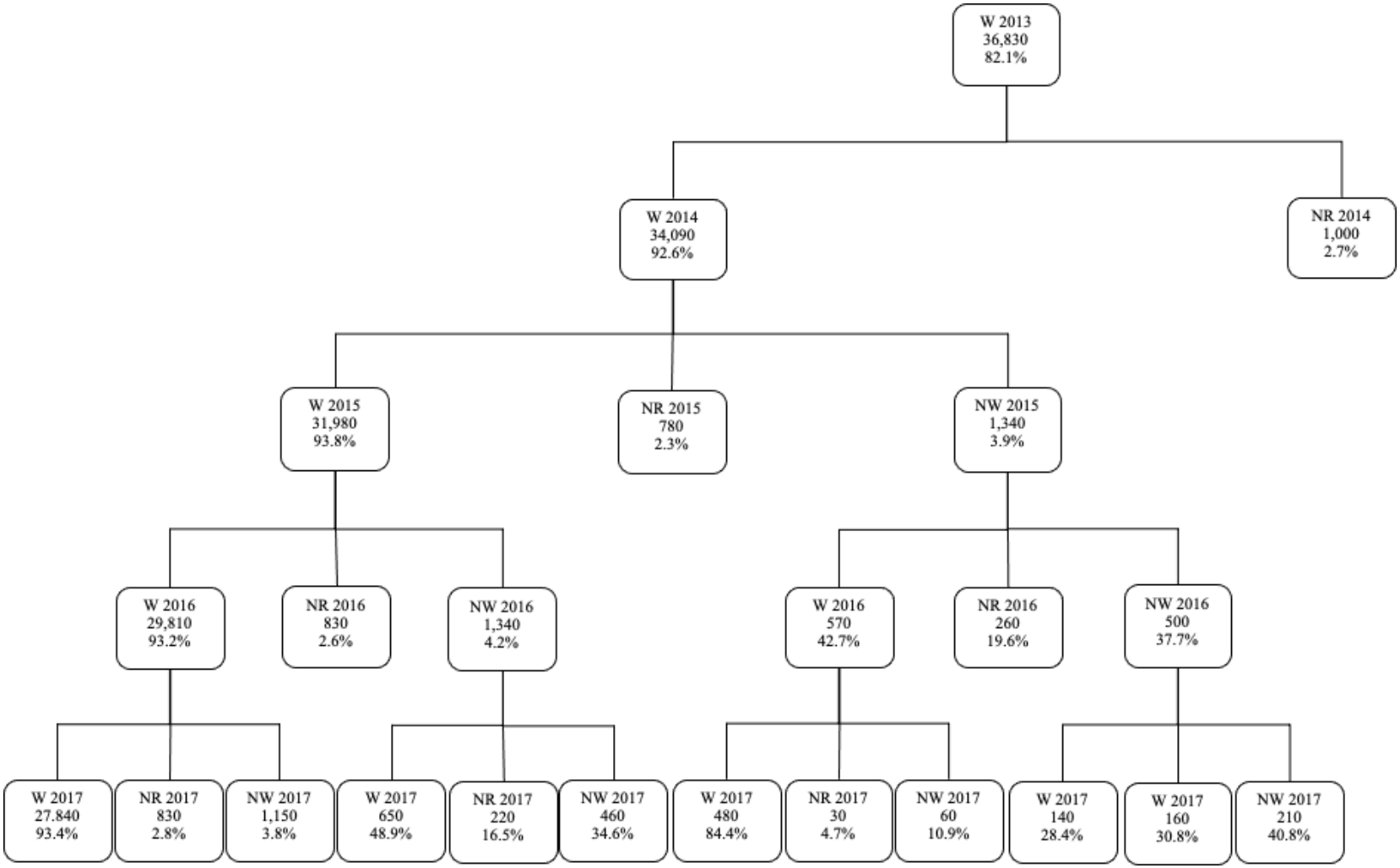
Notes: "W" = employed in at least one Ontario nursing job, "NW" = registered active without employment, and "NR" = not registered or registered inactive. Not registered or registered inactive is an absorption state; once a nurse does not register or registers inactive, we assume they do not return to the profession. The first number is the number of observations, and the second number is the corresponding percentage. All observations have been rounded to the nearest ten for confidentiality. N/A = "not available" and is suppressed due to confidentiality.

Figure 4.20: 2013 Employment Dynamics - Ontario Registered Nurses (RNs) Panel 2



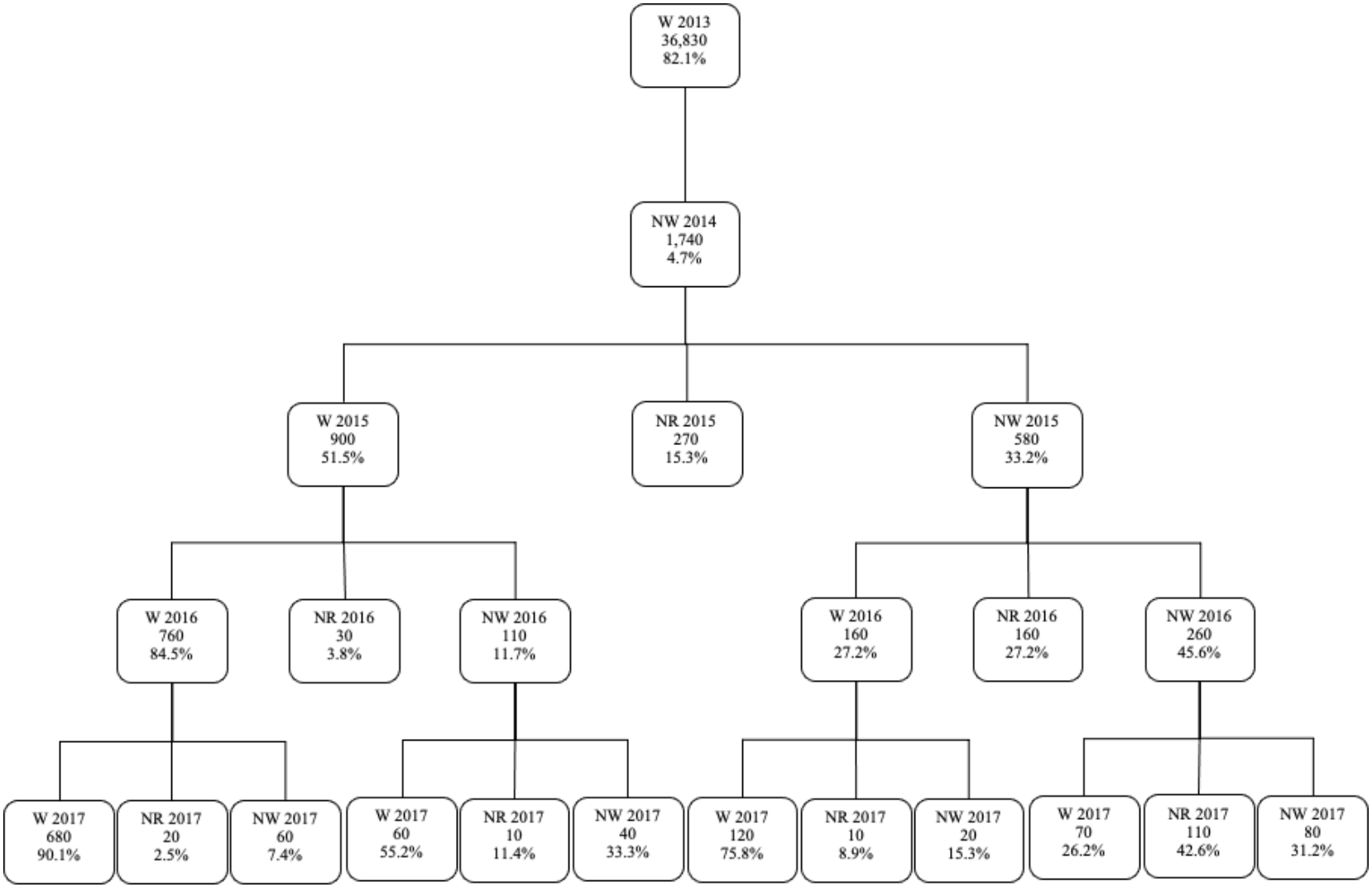
Notes: "W" = employed in at least one Ontario nursing job, "NW" = registered active without employment, and "NR" = not registered or registered inactive. Not registered or registered inactive is an absorption state; once a nurse does not register or registers inactive, we assume they do not return to the profession. The first number is the number of observations, and the second number is the corresponding percentage. All observations have been rounded to the nearest ten for confidentiality. N/A = "not available" and is suppressed due to confidentiality.

Figure 4.21: 2013 Employment Dynamics - Ontario Registered Practical Nurses (RPNs) Panel 1



Notes: "W" = employed in at least one Ontario nursing job, "NW" = registered active without employment, and "NR" = not registered or registered inactive. Not registered or registered inactive is an absorption state; once a nurse does not register or registers inactive, we assume they do not return to the profession. The first number is the number of observations, and the second number is the corresponding percentage. All observations have been rounded to the nearest ten for confidentiality. N/A = "not available" and is suppressed due to confidentiality.

Figure 4.22: 2013 Employment Dynamics - Ontario Registered Practical Nurses (RPNs) Panel 2



Notes: "W" = employed in at least one Ontario nursing job, "NW" = registered active without employment, and "NR" = not registered or registered inactive. Not registered or registered inactive is an absorption state; once a nurse does not register or registers inactive, we assume they do not return to the profession. The first number is the number of observations, and the second number is the corresponding percentage. All observations have been rounded to the nearest ten for confidentiality. N/A = "not available" and is suppressed due to confidentiality.

Table 4.21: Employment Dynamics - Ontario Registered Nurses (RNs) and Registered Practical Nurses (RPNs) 2014-2021

	Year t															
	RNs								RPNs							
	2014	2015	2016	2017	2018	2019	2020	2021	2014	2015	2016	2017	2018	2019	2020	2021
(1) Employed in Ontario nursing (N) in year t-1	**95,780**	**96,010**	**95,990**	**95,340**	**96,220**	**97,980**	**98,350**	**99,240**	**36,830**	**38,620**	**40,950**	**42,510**	**44,720**	**47,160**	**48,490**	**49,210**
(2) Continue working in year t	**93.4**	**93.7**	**93.0**	**93.4**	**93.9**	**92.8**	**92.3**	**91.9**	**92.6**	**93.3**	**92.5**	**92.7**	**93.4**	**92.5**	**92.0**	**91.4**
(3) Don't Continue working in year t	**6.6**	**6.3**	**7.0**	**6.6**	**6.1**	**7.2**	**7.7**	**8.1**	**7.4**	**6.7**	**7.5**	**7.3**	**6.6**	**7.5**	**8.0**	**8.6**
(4) Maintain registration in year t - go on leave, become unemployed, or unknown practice status	**2.6**	**2.3**	**2.9**	**2.7**	**2.5**	**3.3**	**3.5**	**3.8**	**3.3**	**3.1**	**3.7**	**3.6**	**3.2**	**3.9**	**4.4**	**4.6**
(A) Return in year t+1	54.2	47.0	54.3	54.0	49.7	55.4	54.6	--	55.8	48.9	55.5	56.3	55.7	56.5	59.9	--
(B) Return in year t+2	8.4	10.2	7.6	8.3	9.7	11.6	--	--	9.6	12.6	10.3	9.8	11.9	13.9	--	--
(C) Return in year t+3	3.1	3.0	2.6	2.4	4.3	--	--	--	4.2	4.3	4.0	3.9	3.6	--	--	--
(D) No return (within three years)	34.3	39.7	35.5	35.3	36.3	--	--	--	30.4	34.2	30.3	30.0	28.8	--	--	--
(E) Return by 2021	67.9	62.2	66.8	65.7	63.7	67.0	54.6	--	71.7	68.9	71.4	72.2	71.2	66.8	59.9	--
(5) Maintain registration in year t - leave profession, Ontario, or labour force	**1.7**	**1.6**	**1.7**	**1.5**	**1.3**	**1.3**	**1.5**	**1.7**	**1.4**	**1.3**	**1.2**	**1.1**	**1.0**	**1.0**	**1.1**	**1.2**
(A) Return in year t+1	25.3	19.1	19.2	18.6	17.4	20.1	22.0	--	41.7	30.5	38.0	30.8	32.8	39.5	38.1	--
(B) Return in year t+2	5.5	6.6	6.3	6.0	9.3	8.1	--	--	8.3	9.6	9.3	9.8	13.4	12.3	--	--
(C) Return in year t+3	3.0	2.8	3.1	3.5	4.5	--	--	--	4.2	3.9	4.3	5.9	5.2	--	--	--
(D) No return (within three years)	66.1	71.5	71.4	71.9	68.7	--	--	--	45.8	56.0	48.4	53.6	48.5	--	--	--
(E) Return by 2021	37.6	31.4	32.2	30.1	31.3	28.3	22.0	--	56.8	47.5	54.9	48.5	51.5	51.8	38.1	--
(6) Register inactive or do not register in year t	**2.4**	**2.4**	**2.4**	**2.5**	**2.4**	**2.6**	**2.7**	**2.6**	**2.7**	**2.3**	**2.5**	**2.6**	**2.4**	**2.5**	**2.5**	**2.8**
(A) Return in year t+1	0.4	0.7	0.4	0.6	0.7	1.9	1.1	--	2.4	1.9	3.0	4.1	4.2	5.2	6.3	--
(B) Return in year t+2	0.8	1.1	1.1	1.2	2.3	1.8	--	--	2.3	2.2	1.2	3.0	5.0	2.9	--	--
(C) Return in year t+3	0.8	0.7	1.0	1.2	1.0	--	--	--	1.1	0.6	1.3	1.6	1.6	--	--	--
(D) No return (within three years)	97.9	97.5	97.5	97.1	96.0	--	--	--	94.2	95.3	94.5	91.3	89.2	--	--	--
(E) Return by 2021	4.1	3.7	3.3	3.5	4.0	3.7	1.1	--	7.8	6.6	6.3	9.0	10.8	8.1	6.3	--

Notes: Section (2) and (3) sum to 100 percent. Section (3) is the total attrition rate and is the sum of section (4), (5), and (6). For each of section (4)-(6), the corresponding (A)-(D) sum to 100 percent. In 2019-2021 we are unable to observe if nurses return within three years as data beyond 2021 were not available. Unemployed is defined as not working (in or out of the profession) and seeking employment in the profession in our data. Out of the labour force is defined as not working (in or out of the profession) and not seeking employment in the profession. The number of observations (nurses) in (1) are rounded to the nearest ten for confidentiality.

Table 4.22: Net Gain (Loss) in Registrants and Employed Nurses in Ontario 2014-2021

	RNs								RPNs							
	Year t															
	2014	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
	Panel A: Net Gain (Loss) in Registrants															
Registered Inactive or Not Registered in Year t (Registered Active in Year t-1)	4,570	4,200	4,200	4,520	4,400	4,460	4,450	4,440	1,840	1,740	1,910	2,030	2,040	2,100	2,020	2,250
New Active Registrants in Year t	5,130	4,480	4,800	5,280	5,770	5,160	5,360	5,290	3,560	4,010	3,670	4,080	5,410	4,280	4,060	5,490
Net Gain (Loss) in Registrants in Year t	560	280	600	760	1,370	700	910	850	1,710	2,270	1,760	2,050	3,360	2,170	2,040	3,250
	Panel B: Net Gain (Loss) in Nurses Employed In Ontario (at least one job)															
Leave Employment in Ont. Nursing in Year t (Registered and Employed in Ont. Nursing in Year t-1)	6,320	6,060	6,710	6,330	5,880	7,060	7,620	7,990	2,740	2,600	3,050	3,100	2,960	3,530	3,900	4,250
Gain Employment in Ont. Nursing in Year t (Registered without employment, or registered inactive in Year t-1)	2,980	3,190	2,620	3,120	2,910	2,870	3,620	3,880	2,080	2,300	2,280	2,560	2,380	2,780	2,880	3,070
Gain Employment in Ont. Nursing in Year t (Not Registered in Year t-1)	3,760	3,090	3,510	4,020	4,330	3,940	4,050	4,110	2,330	2,560	2,440	3,020	3,660	2,950	2,800	4,120
Net Gain (Loss) in Nurses Reporting Employment in Ont. Nursing in Year t	420	230	(570)	810	1,360	(240)	60	(10)	1,670	2,260	1,670	2,490	3,090	2,200	1,780	2,940

Notes: The net gain (loss) in registrants in year t is calculated by subtracting (1) new registrants in year t, from (2) those who register inactive or did not register in year t-1. New registrants in year t, are those who register active in year t, and did not register (active or inactive) in year t-1. The net gain (loss) in employed nurses is calculated by subtracting (1) the number of nurses who left Ontario nursing employment in year t (i.e., they had at least one nursing job in Ontario in year t-1), from (2) those who gained Ontario nursing employment in year t (i.e., they did not have an Ontario nursing job in year t-1). (2) Consists of the following: (a) those on who were registered without employment or registered inactive and then return to employment (e.g., those on leave or who retired in year t-1 and return to employment in year t), and (b) those who were not registered in year t-1 and gain employment in year t (e.g., new nursing school graduates, and new nurses to the Ontario nursing profession). The number of observations (nurses) have been rounded to the nearest ten for confidentiality.

Table 4.23: Likelihood of Registering Inactive or Not Registering 2014-2021

	RNs		RPNs		RNs		RPNs	
	OR	ME	OR	ME	OR	ME	OR	ME
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Year Left the Profession: 2014 (base)								
2015	0.986	-0.000	0.850***	-0.004***	0.996	-0.000	0.851***	-0.003***
	(0.030)	(0.001)	(0.040)	(0.001)	(0.031)	(0.001)	(0.041)	(0.001)
2016	0.991	-0.000	0.955	-0.001	1.013	0.000	0.968	-0.001
	(0.030)	(0.001)	(0.044)	(0.001)	(0.031)	(0.001)	(0.045)	(0.001)
2017	1.042	0.001	1.009	0.000	1.070*	0.001*	1.030	0.001
	(0.032)	(0.001)	(0.045)	(0.001)	(0.033)	(0.001)	(0.047)	(0.001)
2018	1.035	0.001	0.971	-0.001	1.113***	0.002***	1.090	0.002
	(0.032)	(0.001)	(0.044)	(0.001)	(0.036)	(0.001)	(0.051)	(0.001)
2019	1.143***	0.003***	1.027	0.001	1.241***	0.005***	1.150**	0.003**
	(0.034)	(0.001)	(0.045)	(0.001)	(0.039)	(0.001)	(0.053)	(0.001)
2020	1.231***	0.005***	1.007	0.000	1.351***	0.007***	1.143**	0.003**
	(0.036)	(0.001)	(0.045)	(0.001)	(0.042)	(0.001)	(0.053)	(0.001)
2021	1.200***	0.004***	1.177***	0.004***	1.293***	0.006***	1.333***	0.007***
	(0.036)	(0.001)	(0.051)	(0.001)	(0.041)	(0.001)	(0.060)	(0.001)
Age: Under 29 Yrs (base)								
30-39 Yrs	0.731**	-0.004**	0.900	-0.002	0.857	-0.002	1.090	0.002
	(0.075)	(0.001)	(0.097)	(0.002)	(0.089)	(0.001)	(0.118)	(0.002)
40-49 Yrs	0.565***	-0.007***	0.618***	-0.008***	0.687***	-0.004***	0.775*	-0.004*
	(0.064)	(0.001)	(0.077)	(0.002)	(0.078)	(0.001)	(0.097)	(0.002)
50-59 Yrs	1.438***	0.007***	1.613***	0.013***	1.700***	0.010***	2.087***	0.020***
	(0.140)	(0.002)	(0.174)	(0.003)	(0.167)	(0.002)	(0.227)	(0.003)
>60 Yrs	6.199***	0.077***	6.161***	0.101***	5.893***	0.064***	7.321***	0.103***
	(0.567)	(0.005)	(0.704)	(0.009)	(0.546)	(0.004)	(0.849)	(0.009)
Female	0.776***	-0.000	0.692***	-0.005***	0.748***	-0.003***	0.688***	-0.006***
	(0.060)	(0.001)	(0.059)	(0.001)	(0.058)	(0.001)	(0.059)	(0.001)
Age*Gender: Under 29 Yrs, Male (base)								
30-39 Yrs*Female	0.850	-0.005***	0.937	-0.002***	0.741**	-0.004***	0.851	-0.001
	(0.094)	(0.000)	(0.108)	(0.001)	(0.082)	(0.000)	(0.099)	(0.001)
40-49 Yrs*Female	0.765*	-0.007***	1.063	-0.005***	0.752*	-0.006***	1.085	-0.002***
	(0.092)	(0.000)	(0.141)	(0.001)	(0.091)	(0.000)	(0.144)	(0.001)
50-59 Yrs*Female	1.104	0.007***	1.222	0.015***	1.087	0.010***	1.211	0.020***
	(0.113)	(0.000)	(0.140)	(0.001)	(0.112)	(0.000)	(0.139)	(0.001)
>60 Yrs*Female	1.596***	0.099***	1.564***	0.117***	1.466***	0.080***	1.505***	0.115***
	(0.153)	(0.001)	(0.187)	(0.002)	(0.142)	(0.001)	(0.182)	(0.002)
Concurrent Registration					1.435***	0.009***	1.739***	0.017***
					(0.050)	(0.001)	(0.154)	(0.003)
Location of First Education: Ontario (base)								
Other Prov/Terr					1.940***	0.019***	1.671***	0.015***
					(0.048)	(0.001)	(0.096)	(0.002)
US					1.026	0.001	1.060	0.001
					(0.075)	(0.002)	(0.178)	(0.004)
Outside Can/US					0.975	-0.001	0.743***	-0.006***
					(0.024)	(0.001)	(0.034)	(0.001)
Missing					1.599***	0.012***	1.616***	0.014***
					(0.108)	(0.002)	(0.137)	(0.003)

Table 4.3 Continued: Likelihood of Registering Inactive or Not Registering 2014-2021

	RNs		RPNs		RNs		RPNs	
	OR	ME	OR	ME	OR	ME	OR	ME
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Any Education Outside of Profession					0.859***	-0.003***	0.788***	-0.005***
					(0.018)	(0.000)	(0.022)	(0.001)
Any Rural Ontario Job					0.987	-0.000	1.041	0.001
					(0.033)	(0.001)	(0.041)	(0.001)
Practice Setting (First Reported Ontario Job): Long-term Care (base)								
Hospital					0.857***	-0.004***	1.102**	0.002**
					(0.024)	(0.001)	(0.033)	(0.001)
Primary Care					1.059	0.001	1.095	0.002
					(0.040)	(0.001)	(0.056)	(0.001)
Home Care					0.998	-0.000	1.293***	0.006***
					(0.043)	(0.001)	(0.086)	(0.002)
Supp. Housing					1.067	0.002	1.129**	0.003**
					(0.071)	(0.002)	(0.050)	(0.001)
Other					0.929*	-0.002*	1.265***	0.006***
					(0.027)	(0.001)	(0.039)	(0.001)
Average On Call Hrs					0.996***	-0.000***	0.996***	-0.000***
					(0.001)	(0.000)	(0.001)	(0.000)
Missing Average On Call Hrs					1.998***	0.021***	1.854***	0.019***
					(0.123)	(0.002)	(0.140)	(0.003)
Practice Weeks in Past 12 Months					0.978***	-0.001***	0.979***	-0.001***
					(0.001)	(0.000)	(0.001)	(0.000)
Missing Practice Weeks in Past 12 Months					0.245***	-0.018***	0.246***	-0.019***
					(0.048)	(0.001)	(0.063)	(0.002)
Employment Category (First Reported Ontario Job): Permanent (base)								
Temporary					1.109*	0.002*	0.968	-0.001
					(0.045)	(0.001)	(0.057)	(0.001)
Casual					1.222***	0.005***	1.150**	0.003*
					(0.046)	(0.001)	(0.061)	(0.001)
Self-employed					1.109*	0.002*	0.907	-0.002
					(0.047)	(0.001)	(0.062)	(0.001)
Employment Status (First Reported Ontario Job): Full-time (base)								
Part-time					1.398***	0.007***	1.179***	0.004***
					(0.027)	(0.000)	(0.031)	(0.001)
Casual					1.736***	0.013***	1.499***	0.010***
					(0.067)	(0.001)	(0.082)	(0.002)
Observations	774,900	774,900	348,490	348,490	774,900	774,900	348,490	348,490

Notes: Standard errors are in parentheses, *p<0.05, **p<0.01, ***p<0.001. The healthcare sector, employment status, and employment category are that of the first Ontario reported job. Rural is a dummy variable where rural is equal to one if any Ontario jobs are in a rural location (based on the job postal code). Concurrent registration is a dummy variable equal to one if a nurse is concurrently registered in another province, territory or country. Education outside of the profession is a dummy variable equal to one if the nurse has any education outside of the nursing profession. Missing dummy variables are included for average practice week in the past twelve months, and average on-call hours, which equals one if a nurse did not record values for each respective variable. The number of observations (nurses) are rounded to the nearest ten for confidentiality. Ten observations were dropped due to missing a employment category or employment status. Average marginal effects are used.

Table 4.24: Likelihood of Registering Active Without Employment (On Leave, Unemployed, or Unknown Practice Status) 2014-2021

	RNs		RPNs		RNs		RPNs	
	OR	ME	OR	ME	OR	ME	OR	ME
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Year Left the Profession: 2014 (base)								
2015	0.900***	-0.003***	0.946	-0.002	0.895***	-0.003***	0.940	-0.002
	(0.027)	(0.001)	(0.039)	(0.001)	(0.027)	(0.001)	(0.039)	(0.001)
2016	1.115***	0.003***	1.125**	0.004**	1.122***	0.003***	1.118**	0.004**
	(0.031)	(0.001)	(0.044)	(0.001)	(0.032)	(0.001)	(0.044)	(0.001)
2017	1.024	0.001	1.071	0.002	1.029	0.001	1.068	0.002
	(0.029)	(0.001)	(0.042)	(0.001)	(0.030)	(0.001)	(0.042)	(0.001)
2018	0.941*	-0.002*	0.950	-0.002	0.902***	-0.003***	0.956	-0.001
	(0.027)	(0.001)	(0.038)	(0.001)	(0.027)	(0.001)	(0.039)	(0.001)
2019	1.257***	0.006***	1.166***	0.005***	1.204***	0.005***	1.164***	0.005***
	(0.034)	(0.001)	(0.044)	(0.001)	(0.034)	(0.001)	(0.045)	(0.001)
2020	1.332***	0.008***	1.336***	0.011***	1.283***	0.007***	1.347***	0.011***
	(0.036)	(0.001)	(0.049)	(0.001)	(0.036)	(0.001)	(0.051)	(0.001)
2021	1.453***	0.011***	1.376***	0.012***	1.376***	0.010***	1.378***	0.012***
	(0.038)	(0.001)	(0.050)	(0.001)	(0.038)	(0.001)	(0.052)	(0.001)
Age: Under 29 Yrs (base)								
30-39 Yrs	0.993	-0.000	0.867	-0.003	1.083	0.001	0.961	-0.001
	(0.102)	(0.001)	(0.089)	(0.002)	(0.111)	(0.001)	(0.099)	(0.002)
40-49 Yrs	1.037	0.001	0.841	-0.004	1.148	0.002	0.947	-0.001
	(0.107)	(0.001)	(0.091)	(0.002)	(0.119)	(0.001)	(0.103)	(0.002)
50-59 Yrs	1.677***	0.009***	1.159	0.004	1.793***	0.010***	1.302*	0.007*
	(0.169)	(0.002)	(0.128)	(0.003)	(0.181)	(0.002)	(0.145)	(0.003)
>60 Yrs	2.705***	0.023***	1.358	0.009	2.783***	0.023***	1.448*	0.010
	(0.312)	(0.003)	(0.228)	(0.005)	(0.323)	(0.003)	(0.244)	(0.005)
Female	2.538***	0.011***	2.076***	0.015***	2.507***	0.010***	2.064***	0.014***
	(0.199)	(0.001)	(0.161)	(0.001)	(0.197)	(0.001)	(0.160)	(0.001)
Age*Gender: Under 29 Yrs*Male (base)								
30-39 Yrs*Female	1.205	0.007***	1.094	-0.002*	1.106	0.006***	1.027	-0.001
	(0.126)	(0.001)	(0.115)	(0.001)	(0.116)	(0.001)	(0.108)	(0.001)
40-49 Yrs*Female	0.434***	-0.019***	0.542***	-0.026***	0.435***	-0.016***	0.539***	-0.022***
	(0.046)	(0.001)	(0.061)	(0.001)	(0.046)	(0.001)	(0.061)	(0.001)
50-59 Yrs*Female	0.448***	-0.008***	0.536***	-0.018***	0.457***	-0.006***	0.541***	-0.013***
	(0.046)	(0.001)	(0.061)	(0.001)	(0.047)	(0.001)	(0.062)	(0.001)
>60 Yrs*Female	0.427***	0.005***	0.611**	-0.008***	0.421***	0.005***	0.614**	-0.005**
	(0.050)	(0.001)	(0.105)	(0.002)	(0.050)	(0.001)	(0.106)	(0.002)
Concurrent Registration					1.149***	0.004***	0.913	-0.003
					(0.037)	(0.001)	(0.080)	(0.003)
Location of First Education: Ontario (base)								
Other Prov/Terr					1.014	0.000	1.080	0.003
					(0.030)	(0.001)	(0.071)	(0.003)
US					1.235**	0.007**	1.212	0.008
					(0.081)	(0.002)	(0.200)	(0.007)
Outside Can/US					0.784***	-0.006***	0.910**	-0.003**
					(0.020)	(0.001)	(0.029)	(0.001)
Missing					0.916	-0.002	1.002	0.000
					(0.064)	(0.002)	(0.083)	(0.003)

Table 4.4 Continued: Likelihood of Registering Active Without Employment (On Leave, Unemployed, or Unknown Practice Status) 2014-2021

	RNs		RPNs		RNs		RPNs	
	OR (1)	ME (2)	OR (3)	ME (4)	OR (5)	ME (6)	OR (7)	ME (8)
Any Education Outside of Profession					1.081***	0.002***	0.985	-0.001
					(0.019)	(0.001)	(0.021)	(0.001)
Any Rural Ontario Job					1.025	0.001	1.033	0.001
					(0.032)	(0.001)	(0.034)	(0.001)
Practice Setting (First Reported Ontario Job): Long-term Care (base)								
Hospital					0.685***	-0.012***	0.791***	-0.008***
					(0.017)	(0.001)	(0.019)	(0.001)
Primary Care					0.893**	-0.004**	1.186***	0.007***
					(0.033)	(0.001)	(0.045)	(0.002)
Home Care					0.786***	-0.008***	1.264***	0.009***
					(0.031)	(0.001)	(0.065)	(0.002)
Supp. Housing					1.050	0.002	1.279***	0.010***
					(0.070)	(0.003)	(0.042)	(0.001)
Other					0.850***	-0.005***	1.084**	0.003**
					(0.023)	(0.001)	(0.027)	(0.001)
Average On Call Hrs					1.001*	0.000*	1.000	0.000
					(0.001)	(0.000)	(0.001)	(0.000)
Missing Average On Call Hrs					1.310***	0.009***	1.288***	0.010***
					(0.069)	(0.002)	(0.083)	(0.003)
Practice Weeks in Past 12 Months					0.979***	-0.001***	0.982***	-0.001***
					(0.001)	(0.000)	(0.001)	(0.000)
Missing Practice Weeks in Past 12 Months					0.387***	-0.018***	0.395***	-0.022***
					(0.072)	(0.002)	(0.084)	(0.003)
Employment Category (First Reported Ontario Job): Permanent (base)								
Temporary					0.998	-0.000	1.091*	0.003*
					(0.034)	(0.001)	(0.043)	(0.002)
Casual					0.864**	-0.004***	1.062	0.002
					(0.040)	(0.001)	(0.049)	(0.002)
Self-employed					0.578***	-0.012***	0.735***	-0.010***
					(0.038)	(0.001)	(0.061)	(0.002)
Employment Status (First Reported Ontario Job): Full-time (base)								
Part-time					0.893***	-0.003***	0.942**	-0.002**
					(0.015)	(0.000)	(0.019)	(0.001)
Casual					0.961	-0.001	1.012	0.000
					(0.042)	(0.001)	(0.047)	(0.002)
Observations	774900	774,900	348,490	348,490	774,900	7749,00	348,490	348,490

Notes: Standard errors are in parentheses, *p<0.05, **p<0.01, ***p<0.001. Unemployed is defined as not working (in or out of the profession) and looking for work in the profession in the data. The healthcare sector, employment status, and employment category are that of the first Ontario reported job. Rural is a dummy variable where rural is equal to one if any Ontario jobs are in a rural location (based on the job postal code). Concurrent registration is a dummy variable equal to one if a nurse is concurrently registered in another province, territory or country. Education outside of the profession is a dummy variable equal to one if the nurse has any education outside of the nursing profession. Missing dummy variables are included for average practice week in the past twelve months, and average on-call hours, which equals one if a nurse did not record values for each respective variable. The number of observations (nurses) are rounded to the nearest ten for confidentiality. Ten observations were dropped due to missing a employment category or employment status. Average marginal effects are used.

Table 4.25: Likelihood of Registering Active Without Employment (On Leave, Unemployed, or Unknown Practice Status) 2014-2021

	RNs		RPNs		RNs		RPNs	
	OR (1)	ME (2)	OR (3)	ME (4)	OR (5)	ME (6)	OR (7)	ME (8)
Year Left the Profession: 2014 (base)								
2015	0.973	-0.000	0.919	-0.001	0.977	-0.000	0.909	-0.001
	(0.035)	(0.001)	(0.057)	(0.001)	(0.035)	(0.001)	(0.057)	(0.001)
2016	1.043	0.001	0.868*	-0.002*	1.058	0.001	0.858*	-0.002*
	(0.037)	(0.001)	(0.054)	(0.001)	(0.038)	(0.001)	(0.054)	(0.001)
2017	0.907**	-0.001**	0.788***	-0.003***	0.915*	-0.001*	0.785***	-0.003***
	(0.033)	(0.001)	(0.050)	(0.001)	(0.034)	(0.001)	(0.050)	(0.001)
2018	0.764***	-0.004***	0.691***	-0.004***	0.741***	-0.004***	0.681***	-0.004***
	(0.029)	(0.001)	(0.045)	(0.001)	(0.030)	(0.001)	(0.046)	(0.001)
2019	0.817***	-0.003***	0.739***	-0.004***	0.793***	-0.003***	0.731***	-0.004***
	(0.031)	(0.001)	(0.047)	(0.001)	(0.031)	(0.001)	(0.048)	(0.001)
2020	0.961	-0.001	0.801***	-0.003***	0.936	-0.001	0.806***	-0.003***
	(0.035)	(0.001)	(0.049)	(0.001)	(0.035)	(0.001)	(0.052)	(0.001)
2021	1.072	0.001	0.875*	-0.002*	1.030	0.000	0.882*	-0.002*
	(0.038)	(0.001)	(0.052)	(0.001)	(0.038)	(0.001)	(0.055)	(0.001)
Age: Under 29 Yrs (base)								
30-39 Yrs	0.630***	-0.006***	0.773	-0.003	0.710***	-0.005**	0.916	-0.001
	(0.065)	(0.001)	(0.103)	(0.002)	(0.074)	(0.001)	(0.123)	(0.002)
40-49 Yrs	0.546***	-0.008***	0.689**	-0.005*	0.645***	-0.006***	0.901	-0.001
	(0.060)	(0.001)	(0.099)	(0.002)	(0.071)	(0.001)	(0.131)	(0.002)
50-59 Yrs	0.758*	-0.004*	0.799	-0.003	0.877	-0.002	1.133	0.002
	(0.083)	(0.002)	(0.123)	(0.002)	(0.097)	(0.002)	(0.176)	(0.002)
>60 Yrs	1.235	0.004	1.275	0.004	1.324*	0.005*	1.587*	0.007
	(0.163)	(0.003)	(0.276)	(0.004)	(0.176)	(0.003)	(0.346)	(0.004)
Female	0.733***	0.002**	0.708***	-0.002*	0.731***	0.001**	0.728**	-0.002*
	(0.054)	(0.001)	(0.072)	(0.001)	(0.054)	(0.001)	(0.075)	(0.001)
Age*Gender: Under 29 Yrs, Male (base)								
30-39 Yrs*Female	0.996	-0.005***	1.222	-0.001	0.925	-0.004***	1.113	0.000
	(0.110)	(0.000)	(0.174)	(0.001)	(0.102)	(0.000)	(0.159)	(0.000)
40-49 Yrs*Female	0.918	-0.006***	1.147	-0.002***	0.926	-0.005***	1.136	0.000
	(0.107)	(0.000)	(0.176)	(0.001)	(0.108)	(0.000)	(0.175)	(0.001)
50-59 Yrs*Female	1.807***	0.005***	1.463*	0.002**	1.876***	0.007***	1.441*	0.006***
	(0.207)	(0.000)	(0.237)	(0.001)	(0.215)	(0.000)	(0.235)	(0.001)
>60 Yrs*Female	2.640***	0.028***	1.649*	0.012***	2.555***	0.027***	1.582*	0.014***
	(0.358)	(0.001)	(0.368)	(0.001)	(0.348)	(0.001)	(0.356)	(0.001)
Concurrent Registration					3.848***	0.037***	2.589***	0.018***
					(0.118)	(0.001)	(0.265)	(0.003)
Location of First Education: Ontario (base)								
Other Prov/Terr					1.078*	0.001*	1.240*	0.003*
					(0.039)	(0.001)	(0.121)	(0.001)
US					0.801**	-0.003**	0.905	-0.001
					(0.066)	(0.001)	(0.240)	(0.003)
Outside Can/US					0.547***	-0.007***	1.184***	0.002**
					(0.020)	(0.000)	(0.060)	(0.001)
Missing					0.963	-0.001	1.331*	0.004*
					(0.089)	(0.001)	(0.166)	(0.002)

Table 4.5 Continued: Likelihood of Registering Active Without Employment (Left the Profession, Province, or Labour Force) 2014-2021

	RNs		RPNs		RNs		RPNs	
	OR	ME	OR	ME	OR	ME	OR	ME
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Any Education Outside of Profession					0.984	-0.000	0.991	-0.000
					(0.026)	(0.000)	(0.039)	(0.000)
Any Rural Ontario Job					1.039	0.001	0.974	-0.000
					(0.043)	(0.001)	(0.058)	(0.001)
Practice Setting (First Reported Ontario Job): Long-term Care (base)								
Hospital					0.935	-0.001	0.840***	-0.002***
					(0.033)	(0.001)	(0.037)	(0.000)
Primary Care					0.968	-0.000	1.330***	0.004***
					(0.049)	(0.001)	(0.088)	(0.001)
Home Care					1.098	0.002	1.027	0.000
					(0.060)	(0.001)	(0.101)	(0.001)
Supp. Housing					0.978	-0.000	1.089	0.001
					(0.091)	(0.001)	(0.065)	(0.001)
Other					1.013	0.000	1.162***	0.002***
					(0.038)	(0.001)	(0.049)	(0.001)
Average On Call Hrs					1.001*	0.000*	0.999	-0.000
					(0.001)	(0.000)	(0.001)	(0.000)
Missing Average On Call Hrs					1.079	0.001	1.131	0.002
					(0.100)	(0.001)	(0.116)	(0.001)
Practice Weeks in Past 12 Months					0.982***	-0.000***	0.972***	-0.000***
					(0.001)	(0.000)	(0.001)	(0.000)
Missing Practice Weeks in Past 12 Months					0.428**	-0.009***	0.525*	-0.006**
					(0.126)	(0.002)	(0.157)	(0.002)
Employment Category (First Reported Ontario Job): Permanent (base)								
Temporary					1.445***	0.007***	1.181*	0.002*
					(0.062)	(0.001)	(0.081)	(0.001)
Casual					1.026	0.000	1.044	0.001
					(0.053)	(0.001)	(0.075)	(0.001)
Self-employed					0.663***	-0.005***	0.728*	-0.003**
					(0.046)	(0.001)	(0.091)	(0.001)
Employment Status (First Reported Ontario Job): Full-time (base)								
Part-time					1.223***	0.003***	1.212***	0.002***
					(0.028)	(0.000)	(0.046)	(0.000)
Casual					1.518***	0.007***	1.792***	0.008***
					(0.077)	(0.001)	(0.132)	(0.001)
Observations	774,900	774,900	348,490	348,490	774,900	774,900	348,490	348,490

Notes: Standard errors are in parentheses, *p<0.05, **p<0.01, ***p<0.001. Exiting the labour force is defined as not working (in or out of the profession), and not seeking work in the profession in the data. The healthcare sector, employment status, and employment category are that of the first Ontario reported job. Rural is a dummy variable where rural is equal to one if any Ontario jobs are in a rural location (based on the job postal code). Concurrent registration is a dummy variable equal to one if a nurse is concurrently registered in another province, territory or country. Education outside of the profession is a dummy variable equal to one if the nurse has any education outside of the nursing profession. Missing dummy variables are included for average practice week in the past twelve months, and average on-call hours, which equals one if a nurse did not record values for each respective variable. The number of observations (nurses) are rounded to the nearest ten for confidentiality. Ten observations were dropped due to missing a employment category or employment status. Average marginal effects are used.

Table 4.26: Likelihood of Registering Active Without Employment (On Leave, Unemployed, or Unknown Practice Status) 2014-2021

	RNs		RPNs		RNs		RPNs	
	OR (1)	ME (2)	OR (3)	ME (4)	OR (5)	ME (6)	OR (7)	ME (8)
Year Left the Profession: 2014 (base)								
2015	0.806	-0.005	1.406	0.011	0.776	-0.006	1.347	0.015
	(0.165)	(0.004)	(0.311)	(0.010)	(0.160)	(0.004)	(0.302)	(0.011)
2016	0.788	-0.004	1.215	0.003	0.790	-0.005	1.219	0.010
	(0.161)	(0.004)	(0.248)	(0.010)	(0.162)	(0.004)	(0.253)	(0.011)
2017	0.626*	-0.009	0.739	-0.029**	0.629*	-0.011*	0.773	-0.015
	(0.123)	(0.005)	(0.137)	(0.011)	(0.125)	(0.005)	(0.146)	(0.011)
2018	0.536***	-0.019***	0.696*	-0.050***	0.542**	-0.016**	0.747	-0.018
	(0.100)	(0.005)	(0.124)	(0.012)	(0.110)	(0.005)	(0.147)	(0.012)
Age: Under 29 Yrs (base)								
30-39 Yrs	0.972	-0.003	1.368	0.046	0.859	-0.015	1.398	0.049
	(0.462)	(0.046)	(0.524)	(0.057)	(0.414)	(0.049)	(0.546)	(0.058)
40-49 Yrs	4.410	0.081*	3.431*	0.136*	4.167	0.080*	3.395*	0.137*
	(3.493)	(0.037)	(1.842)	(0.053)	(3.320)	(0.038)	(1.849)	(0.055)
50-59 Yrs	1.918	0.048	7.398***	0.172***	2.252	0.057	8.081***	0.180***
	(0.952)	(0.038)	(4.258)	(0.047)	(1.131)	(0.037)	(4.732)	(0.048)
>60 Yrs	25.456***	0.000	24.483**	0.196***	28.484***	0.000	27.549**	0.203***
	(5.118)	(.)	(25.480)	(0.045)	(5.973)	(.)	(28.797)	(0.046)
Female	0.865	0.000	0.768	-0.007	0.814	0.000	0.797	-0.005
	(0.307)	(.)	(0.219)	(0.010)	(0.291)	(.)	(0.234)	(0.010)
Age*Gender: Under 29 Yrs, Male (base)								
30-39 Yrs*Female	1.026	-0.000	1.089	0.067**	1.125	-0.004	1.062	0.067**
	(0.517)	(0.017)	(0.447)	(0.025)	(0.575)	(0.019)	(0.444)	(0.025)
40-49 Yrs*Female	0.441	0.054***	0.767	0.137***	0.497	0.062***	0.778	0.140***
	(0.361)	(0.016)	(0.434)	(0.024)	(0.409)	(0.017)	(0.445)	(0.025)
50-59 Yrs*Female	2.930*	0.096***	2.512	0.233***	2.958*	0.108***	2.561	0.242***
	(1.546)	(0.012)	(1.572)	(0.019)	(1.574)	(0.014)	(1.617)	(0.020)
>60 Yrs*Female	1.000	0.114***	2.473	0.245***	1.000	0.125***	2.407	0.254***
	(.)	(0.012)	(2.691)	(0.018)	(.)	(0.013)	(2.627)	(0.020)
Concurrent Registration					1.750*	0.012**	1.293	0.014
					(0.454)	(0.005)	(0.663)	(0.025)
Location of First Education: Ontario (base)								
Other Prov/Terr					1.595**	0.011**	1.458	0.020
					(0.278)	(0.004)	(0.440)	(0.014)
US					2.087	0.016	0.565	-0.039
					(1.532)	(0.011)	(0.384)	(0.054)
Outside Can/US					1.412	0.009	1.101	0.005
					(0.367)	(0.006)	(0.236)	(0.012)
Missing					5.656*	0.026***	1.669	0.026
					(4.078)	(0.005)	(0.621)	(0.016)

Table 4.6 Continued: Likelihood of Registering Inactive or Not Registering & Not Returning Within Three Years 2014-2020

	RNs		RPNs		RNs		RPNs	
	OR	ME	OR	ME	OR	ME	OR	ME
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Any Education Outside of Profession					0.920	-0.002	0.882	-0.007
					(0.171)	(0.005)	(0.152)	(0.010)
Any Rural Ontario Job					0.869	-0.004	1.201	0.010
					(0.211)	(0.007)	(0.293)	(0.013)
Practice Setting (First Reported Ontario Job): Long-term Care (base)								
Hospital					1.381	0.009	0.691*	-0.022*
					(0.294)	(0.006)	(0.115)	(0.010)
Primary Care					1.317	0.008	0.720	-0.019
					(0.412)	(0.009)	(0.177)	(0.015)
Home Care					1.627	0.013	0.834	-0.010
					(0.628)	(0.009)	(0.270)	(0.019)
Supp. Housing					1.438	0.010	1.066	0.003
					(0.802)	(0.014)	(0.251)	(0.012)
Other					1.165	0.005	0.975	-0.001
					(0.262)	(0.007)	(0.161)	(0.009)
Average On Call Hrs					0.995	-0.000	1.000	0.000
					(0.004)	(0.000)	(0.004)	(0.000)
Missing Average On Call Hrs					1.414	0.008	1.509	0.021
					(0.778)	(0.011)	(0.836)	(0.024)
Practice Weeks in Past 12 Months					0.996	-0.000	0.985***	-0.001***
					(0.005)	(0.000)	(0.004)	(0.000)
Missing Practice Weeks in Past 12 Months					1.167	0.004	0.377	-0.073
					(1.366)	(0.027)	(0.328)	(0.079)
Employment Category (First Reported Ontario Job): Permanent (base)								
Temporary					1.842*	0.013**	1.174	0.009
					(0.541)	(0.005)	(0.301)	(0.014)
Casual					1.089	0.002	1.591	0.025
					(0.336)	(0.008)	(0.412)	(0.013)
Self-employed					1.286	0.006	2.069	0.036
					(0.539)	(0.009)	(1.136)	(0.021)
Employment Status (First Reported Ontario Job): Full-time (base)								
Part-time					1.143	0.003	0.934	-0.004
					(0.161)	(0.004)	(0.129)	(0.007)
Casual					1.162	0.004	0.586*	-0.033
					(0.348)	(0.007)	(0.152)	(0.017)
Observations	11,290	11,290	5,110	5,110	11,290	11,290	5,110	5,110

Notes: Standard errors are in parentheses, *p<0.05, **p<0.01, ***p<0.001. The healthcare sector, employment status, and employment category are that of the first Ontario reported job. Rural is a dummy variable where rural is equal to one if any Ontario jobs are in a rural location (based on the job postal code). Concurrent registration is a dummy variable equal to one if a nurse is concurrently registered in another province, territory or country. Education outside of the profession is a dummy variable equal to one if the nurse has any education outside of the nursing profession. Missing dummy variables are included for average practice week in the past twelve months, and average on-call hours, which equals one if a nurse did not record values for each respective variable. The number of observations (nurses) are rounded to the nearest ten for confidentiality. Ten observations were dropped due to missing a employment category or employment status. 2019-2021 were dropped as we cannot observe if nurses return within three years. In models 1,2,5 and 6, 190 observations were dropped due to perfect multicollinearity; all 190 males over the age of 60 who registered inactive or did not register did not return within three years. Average marginal effects are used.

Table 4.27: Likelihood of Registering Active Without Employment (On Leave, Unemployed, or Unknown Practice Status) 2014-2021

	RNs		RPNs		RNs		RPNs	
	OR	ME	OR	ME	OR	ME	OR	ME
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Year Left the Profession: 2014 (base)								
2015	1.156*	0.026*	1.138	0.024	1.132	0.022	1.120	0.020
	(0.080)	(0.012)	(0.109)	(0.017)	(0.079)	(0.012)	(0.108)	(0.017)
2016	1.075	0.013	1.008	0.001	1.067	0.011	0.995	-0.001
	(0.071)	(0.012)	(0.092)	(0.016)	(0.072)	(0.012)	(0.092)	(0.016)
2017	0.895	-0.020	0.937	-0.012	0.898	-0.019	0.937	-0.011
	(0.060)	(0.012)	(0.086)	(0.016)	(0.061)	(0.012)	(0.087)	(0.016)
2018	1.027	0.005	0.971	-0.005	1.046	0.008	1.052	0.009
	(0.070)	(0.012)	(0.091)	(0.017)	(0.081)	(0.013)	(0.108)	(0.018)
Age: Under 29 Yrs (base)								
30-39 Yrs	0.946	-0.011	0.960	-0.008	0.954	-0.009	1.044	0.009
	(0.298)	(0.063)	(0.302)	(0.065)	(0.304)	(0.062)	(0.332)	(0.065)
40-49 Yrs	0.881	-0.025	1.186	0.037	0.906	-0.019	1.188	0.036
	(0.265)	(0.060)	(0.384)	(0.070)	(0.276)	(0.059)	(0.390)	(0.068)
50-59 Yrs	2.156**	0.177**	3.248***	0.281***	2.250**	0.182**	3.497***	0.292***
	(0.619)	(0.064)	(1.040)	(0.072)	(0.656)	(0.063)	(1.136)	(0.071)
>60 Yrs	6.434***	0.434***	4.077**	0.335***	6.913***	0.440***	4.616***	0.356***
	(2.295)	(0.072)	(1.816)	(0.101)	(2.496)	(0.071)	(2.072)	(0.098)
Female	0.369***	-0.045*	0.441***	-0.078**	0.349***	-0.057**	0.431***	-0.085***
	(0.086)	(0.022)	(0.107)	(0.025)	(0.082)	(0.022)	(0.106)	(0.025)
Age*Gender: Under 29 Yrs, Male (base)								
30-39 Yrs*Female	1.133	0.008	1.245	0.025*	1.096	0.005	1.179	0.029*
	(0.369)	(0.009)	(0.406)	(0.012)	(0.361)	(0.009)	(0.389)	(0.012)
40-49 Yrs*Female	3.563***	0.187***	2.290*	0.179***	3.493***	0.184***	2.385*	0.183***
	(1.115)	(0.014)	(0.773)	(0.018)	(1.105)	(0.014)	(0.815)	(0.018)
50-59 Yrs*Female	3.409***	0.390***	1.728	0.354***	3.459***	0.393***	1.668	0.354***
	(1.011)	(0.012)	(0.574)	(0.017)	(1.039)	(0.012)	(0.560)	(0.018)
>60 Yrs*Female	2.617**	0.583***	3.353**	0.561***	2.623**	0.585***	3.175*	0.563***
	(0.956)	(0.012)	(1.540)	(0.020)	(0.968)	(0.012)	(1.467)	(0.020)
Concurrent Registration					1.602***	0.085***	1.330	0.052
					(0.184)	(0.021)	(0.454)	(0.065)
Location of First Education: Ontario (base)								
Other Prov/Terr					1.225*	0.036*	1.126	0.021
					(0.110)	(0.016)	(0.205)	(0.033)
US					0.856	-0.027	1.537	0.081
					(0.168)	(0.033)	(0.630)	(0.081)
Outside Can/US					1.007	0.001	0.732**	-0.053**
					(0.080)	(0.014)	(0.084)	(0.018)
Missing					1.668*	0.092*	0.865	-0.025
					(0.332)	(0.037)	(0.216)	(0.042)

Table 4.7 Continued: Likelihood of Registering Active Without Employment (On Leave, Unemployed, or Unknown Practice Status) & Not Returning Within Three Years 2014-2021

	RNs		RPNs		RNs		RPNs	
	OR	ME	OR	ME	OR	ME	OR	ME
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Any Education Outside of Profession					0.816*	-0.035*	0.816*	-0.035*
					(0.070)	(0.015)	(0.080)	(0.016)
Any Rural Ontario Job					0.754**	-0.048**	1.205	0.033
					(0.076)	(0.017)	(0.122)	(0.019)
Practice Setting (First Reported Ontario Job): Long-term Care (base)								
Hospital					1.160	0.026*	1.027	0.005
					(0.089)	(0.013)	(0.081)	(0.014)
Primary Care					0.960	-0.007	0.921	-0.014
					(0.110)	(0.020)	(0.112)	(0.021)
Home Care					1.143	0.023	0.847	-0.028
					(0.147)	(0.022)	(0.158)	(0.031)
Supp. Housing					0.774	-0.043	1.113	0.019
					(0.144)	(0.030)	(0.115)	(0.019)
Other					1.139	0.023	0.982	-0.003
					(0.093)	(0.014)	(0.078)	(0.014)
Average On Call Hrs					0.998	-0.000	0.994**	-0.001**
					(0.001)	(0.000)	(0.002)	(0.000)
Missing Average On Call Hrs					1.572*	0.081*	1.126	0.021
					(0.294)	(0.034)	(0.230)	(0.037)
Practice Weeks in Past 12 Months					0.983***	-0.003***	0.984***	-0.003***
					(0.002)	(0.000)	(0.002)	(0.000)
Missing Practice Weeks in Past 12 Months					0.568	-0.093	0.291*	-0.172**
					(0.267)	(0.073)	(0.178)	(0.063)
Employment Category (First Reported Ontario Job): Permanent (base)								
Temporary					0.718**	-0.056**	0.723*	-0.055*
					(0.081)	(0.019)	(0.098)	(0.022)
Casual					0.881	-0.022	0.968	-0.006
					(0.121)	(0.023)	(0.134)	(0.024)
Self-employed					0.535***	-0.103***	1.208	0.034
					(0.097)	(0.028)	(0.300)	(0.046)
Employment Status (First Reported Ontario Job): Full-time (base)								
Part-time					1.236***	0.037***	1.074	0.013
					(0.065)	(0.009)	(0.072)	(0.012)
Casual					1.281	0.044	1.037	0.006
					(0.170)	(0.024)	(0.148)	(0.025)
Observations	12370	12370	6870	6870	12370	12370	6870	6870

Notes: Standard errors are in parentheses, *p<0.05, **p<0.01, ***p<0.001. Unemployed is defined as not working (in or out of the profession) and looking for work in the profession in the data. The healthcare sector, employment status, and employment category are that of the first Ontario reported job. Rural is a dummy variable where rural is equal to one if any Ontario jobs are in a rural location (based on the job postal code). Concurrent registration is a dummy variable equal to one if a nurse is concurrently registered in another province, territory or country. Education outside of the profession is a dummy variable equal to one if the nurse has any education outside of the nursing profession. Missing dummy variables are included for average practice week in the past twelve months, and average on-call hours, which equals one if a nurse did not record values for each respective variable. The number of observations (nurses) are rounded to the nearest ten for confidentiality. Ten observations were dropped due to missing a employment category or employment status. 2019-2021 were dropped as we cannot observe if nurses return within three years. Average marginal effects are used.

Table 4.28: Likelihood of Registering Active Without Employment (On Leave, Unemployed, or Unknown Practice Status) 2014-2021

	RNs		RPNs		RNs		RPNs	
	OR (1)	ME (2)	OR (3)	ME (4)	OR (5)	ME (6)	OR (7)	ME (8)
Year Left the Profession: 2014 (base)								
2015	1.341***	0.056***	1.643***	0.111***	1.328***	0.052***	1.665***	0.112***
	(0.110)	(0.016)	(0.218)	(0.029)	(0.111)	(0.015)	(0.224)	(0.029)
2016	1.324***	0.054***	1.208	0.042	1.287**	0.047**	1.208	0.041
	(0.107)	(0.015)	(0.159)	(0.029)	(0.106)	(0.015)	(0.162)	(0.029)
2017	1.342***	0.056***	1.445**	0.082**	1.279**	0.046**	1.510**	0.090**
	(0.113)	(0.016)	(0.194)	(0.030)	(0.109)	(0.016)	(0.207)	(0.030)
2018	1.173	0.031	1.203	0.041	1.218*	0.037*	1.248	0.048
	(0.102)	(0.017)	(0.165)	(0.031)	(0.119)	(0.018)	(0.196)	(0.034)
Age: Under 29 Yrs (base)								
30-39 Yrs	0.628	-0.109	0.873	-0.034	0.697	-0.082	0.892	-0.027
	(0.189)	(0.071)	(0.323)	(0.091)	(0.215)	(0.070)	(0.334)	(0.090)
40-49 Yrs	0.461**	-0.187**	0.509	-0.165	0.495*	-0.163*	0.488	-0.172
	(0.134)	(0.069)	(0.196)	(0.092)	(0.149)	(0.069)	(0.191)	(0.092)
50-59 Yrs	0.837	-0.041	1.472	0.092	1.027	0.006	1.406	0.080
	(0.242)	(0.066)	(0.635)	(0.101)	(0.305)	(0.065)	(0.619)	(0.102)
>60 Yrs	2.134	0.143*	4.080*	0.281**	2.711*	0.182**	3.830	0.267*
	(0.894)	(0.071)	(2.803)	(0.108)	(1.152)	(0.069)	(2.668)	(0.112)
Female	0.577**	0.028	0.511*	-0.083*	0.552**	0.023	0.471**	-0.095**
	(0.118)	(0.028)	(0.139)	(0.034)	(0.116)	(0.028)	(0.131)	(0.034)
Age*Gender: Under 29 Yrs, Male (base)								
30-39 Yrs*Female	1.288	-0.053*	1.151	0.001	1.284	-0.027	1.131	0.002
	(0.408)	(0.025)	(0.452)	(0.031)	(0.417)	(0.025)	(0.450)	(0.031)
40-49 Yrs*Female	1.673	-0.065**	1.714	-0.032	1.819	-0.025	1.777	-0.032
	(0.515)	(0.025)	(0.703)	(0.033)	(0.577)	(0.025)	(0.743)	(0.034)
50-59 Yrs*Female	3.138***	0.215***	1.636	0.215***	3.214***	0.262***	1.723	0.211***
	(0.945)	(0.019)	(0.738)	(0.031)	(0.991)	(0.020)	(0.791)	(0.032)
>60 Yrs*Female	2.340*	0.316***	1.564	0.412***	2.369*	0.362***	1.642	0.403***
	(1.001)	(0.018)	(1.103)	(0.031)	(1.027)	(0.019)	(1.174)	(0.032)
Concurrent Registration					2.310***	0.134***	3.166**	0.237**
					(0.229)	(0.014)	(1.368)	(0.077)
Location of First Education: Ontario (base)								
Other Prov/Terr					0.894	-0.020	0.987	-0.003
					(0.093)	(0.019)	(0.272)	(0.061)
US					0.496**	-0.138**	5.776	0.328*
					(0.109)	(0.046)	(6.323)	(0.142)
Outside Can/US					0.690***	-0.070***	0.797	-0.050
					(0.070)	(0.020)	(0.111)	(0.030)
Missing					0.943	-0.011	1.554	0.096
					(0.219)	(0.042)	(0.477)	(0.065)

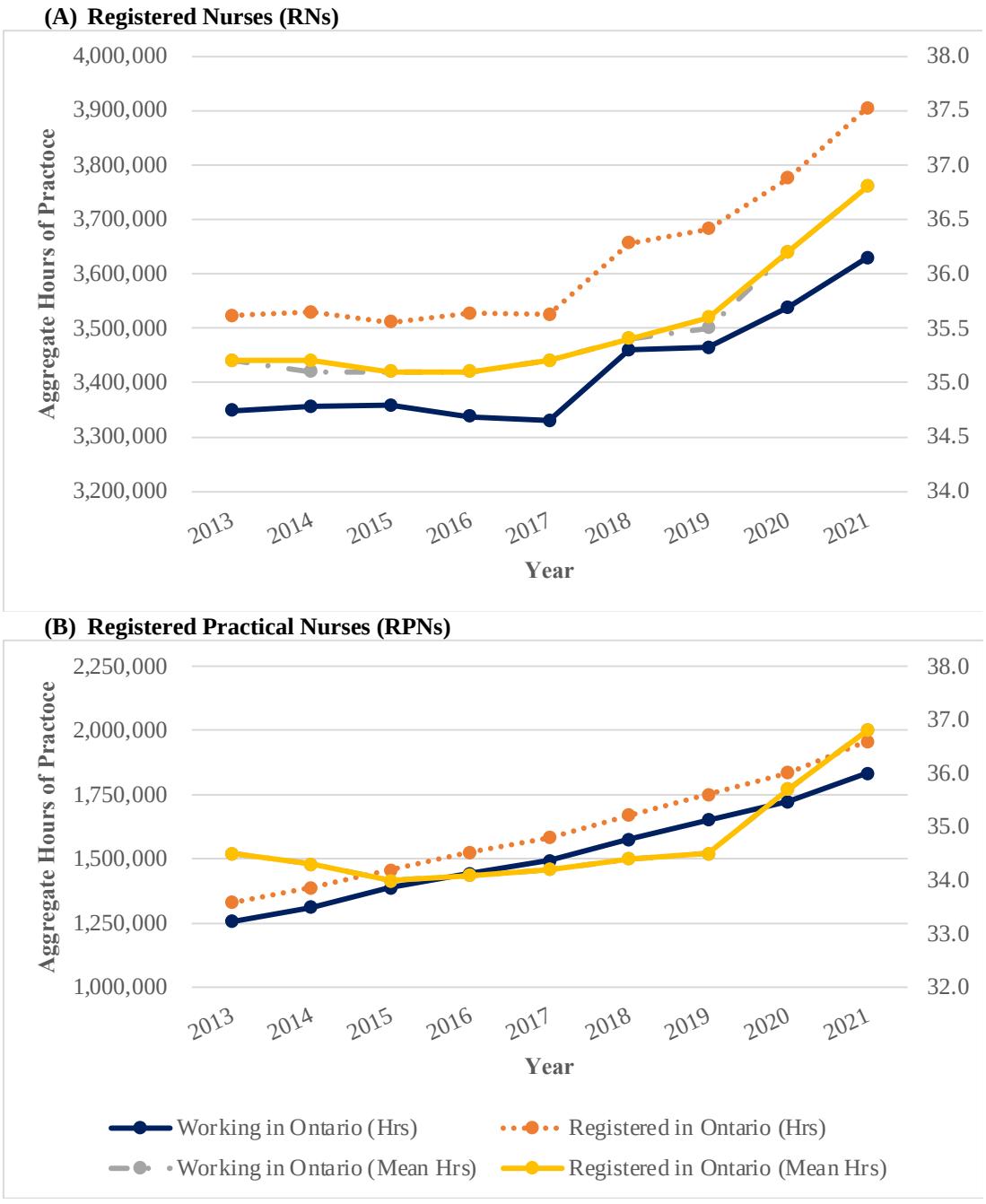
Table 4.8 Continued: Likelihood of Registering Active Without Employment (Left the Profession, Province, or Labour Force) & Not Returning to the Profession Within Three Years 2014-2021

	RNs		RPNs		RNs		RPNs	
	OR	ME	OR	ME	OR	ME	OR	ME
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Any Education Outside of Profession					0.686***	-0.072***	0.799	-0.049
					(0.073)	(0.021)	(0.116)	(0.032)
Any Rural Ontario Job					1.201	0.032	1.186	0.037
					(0.149)	(0.021)	(0.199)	(0.037)
Practice Setting (First Reported Ontario Job): Long-term Care (base)								
Hospital					1.178	0.029	1.403**	0.074**
					(0.123)	(0.019)	(0.170)	(0.027)
Primary Care					0.900	-0.020	1.184	0.037
					(0.133)	(0.028)	(0.216)	(0.040)
Home Care					1.463*	0.066*	1.484	0.087
					(0.245)	(0.028)	(0.406)	(0.060)
Supp. Housing					0.631	-0.090	1.509*	0.090*
					(0.168)	(0.054)	(0.245)	(0.035)
Other					0.875	-0.025	1.100	0.021
					(0.096)	(0.021)	(0.129)	(0.026)
Average On Call Hrs					0.994**	-0.001**	0.991**	-0.002**
					(0.002)	(0.000)	(0.003)	(0.001)
Missing Average On Call Hrs					0.740	-0.057	0.992	-0.002
					(0.189)	(0.050)	(0.267)	(0.059)
Practice Weeks in Past 12 Months					0.999	-0.000	0.998	-0.001
					(0.002)	(0.000)	(0.003)	(0.001)
Missing Practice Weeks in Past 12 Months					2.019	0.112	1.149	0.030
					(1.376)	(0.093)	(0.792)	(0.151)
Employment Category (First Reported Ontario Job): Permanent (base)								
Temporary					0.855	-0.029	0.669*	-0.087*
					(0.103)	(0.022)	(0.130)	(0.042)
Casual					0.842	-0.031	0.932	-0.015
					(0.125)	(0.027)	(0.177)	(0.042)
Self-employed					0.579**	-0.105**	0.492	-0.151*
					(0.113)	(0.039)	(0.186)	(0.076)
Employment Status (First Reported Ontario Job): Full-time (base)								
Part-time					1.303***	0.049***	1.145	0.030
					(0.087)	(0.012)	(0.119)	(0.022)
Casual					1.591**	0.083***	1.198	0.039
					(0.233)	(0.025)	(0.238)	(0.043)
Observations	7450	7450	2460	2460	7450	7450	2460	2460

Notes: Standard errors are in parentheses, *p<0.05, **p<0.01, ***p<0.001. Exiting the labour force is defined as not working (in or out of the profession), and not seeking work in the profession in the data. The healthcare sector, employment status, and employment category are that of the first Ontario reported job. Rural is a dummy variable where rural is equal to one if any Ontario jobs are in a rural location (based on the job postal code). Concurrent registration is a dummy variable equal to one if a nurse is concurrently registered in another province, territory or country. Education outside of the profession is a dummy variable equal to one if the nurse has any education outside of the nursing profession. Missing dummy variables are included for average practice week in the past twelve months, and average on-call hours, which equals one if a nurse did not record values for each respective variable. The number of observations (nurses) are rounded to the nearest ten for confidentiality. The year 2021 was dropped as we are unable to observe if nurses return. Ten observations were dropped due to missing a employment category or employment status. 2019-2021 were dropped as we cannot observe if nurses return within three years. Average marginal effects are used.

4.8 Appendix 1

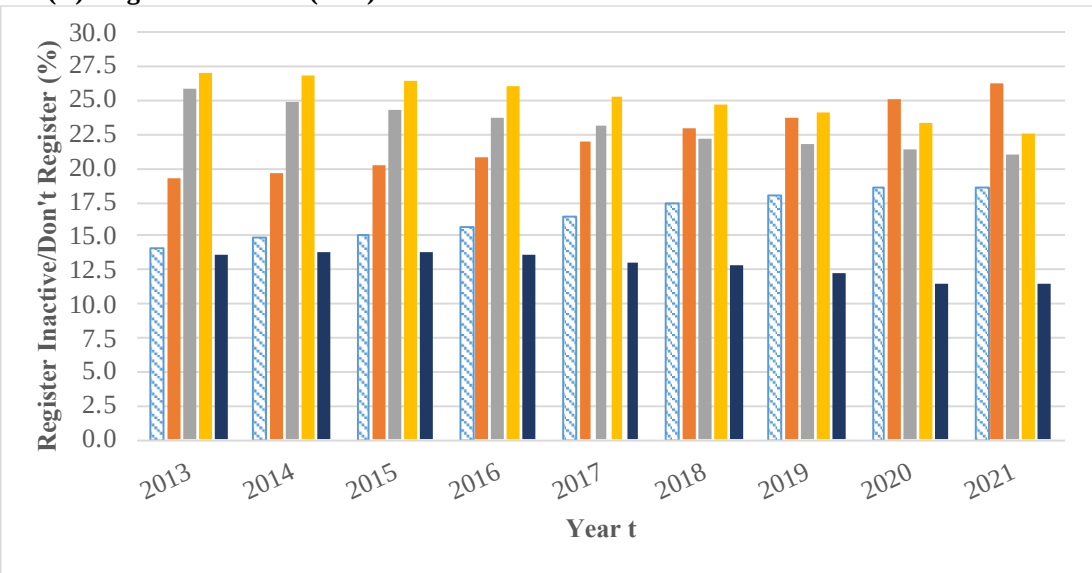
Appendix 4.1 Figure 1: Aggregate Hours 2013-2021



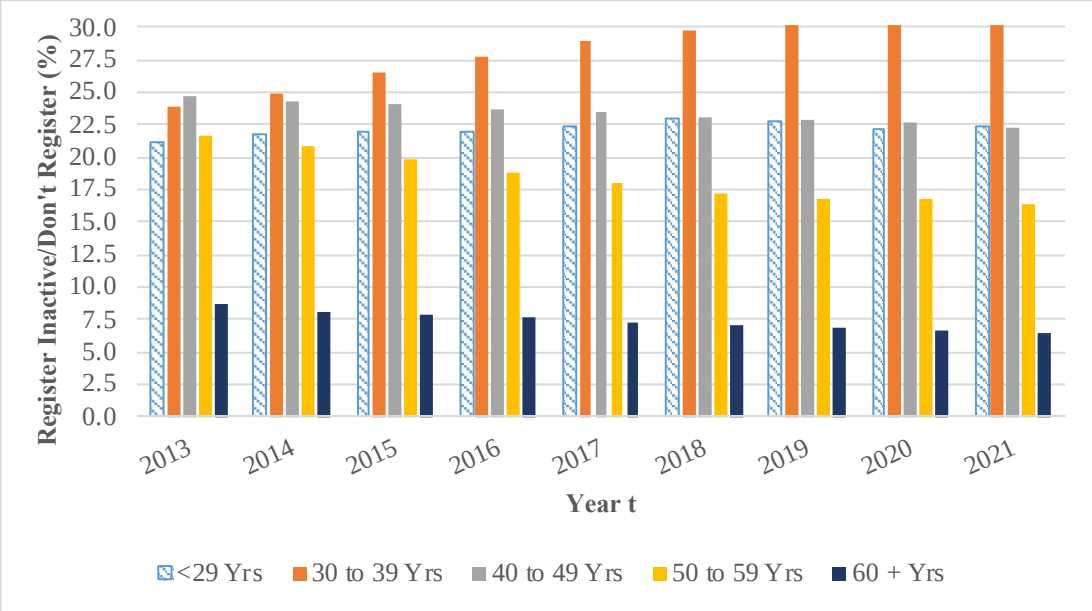
Note: Aggregate hours among those registered in Ontario (the orange dotted line) may include hours worked outside of Ontario, as those registered in Ontario includes those who are employed and not employed in at least one Ontario nursing job. Aggregate hours among those working in Ontario (at least one job in Ontario) may also include hours of practice outside of Ontario. Hours of practice are reported on an individual basis, as opposed to a per-job basis, thus we are unable to distinguish hours of practice by location. The scale for aggregate hours (on the left-hand side) differs from that for mean hours (on the right-hand side). For RPNs the mean hours worked is the same for nurses with an active registration (and not necessarily working in Ontario), and nurses with an active registration who are employed in at least one Ontario nursing job.

Appendix 4.1 Figure 2: Age Distribution - Employed Ontario Nurses 2013-2021

(A) Registered Nurses (RNs)

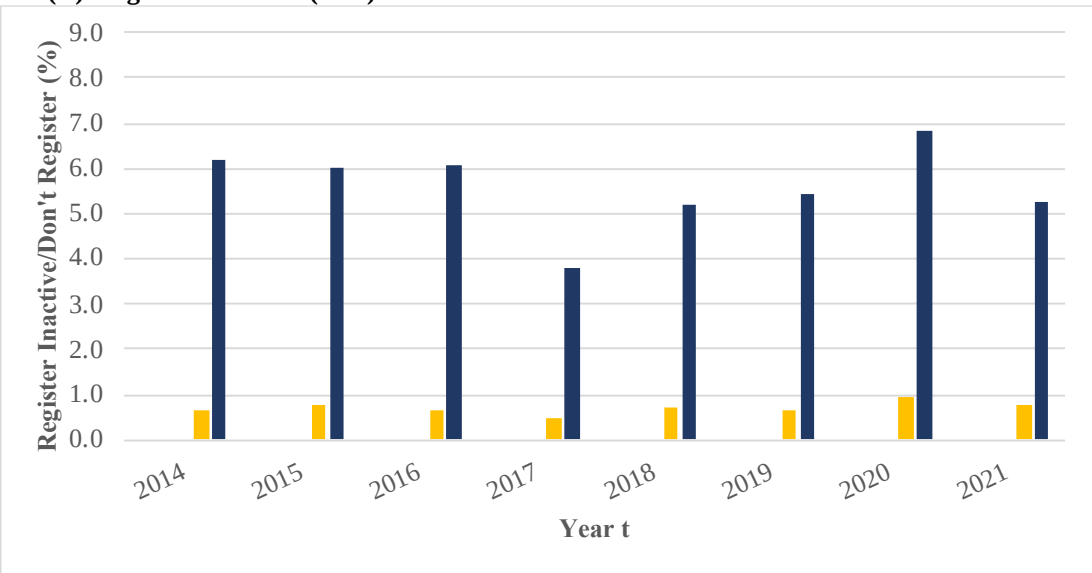


(B) Registered Practical Nurses (RPNs)

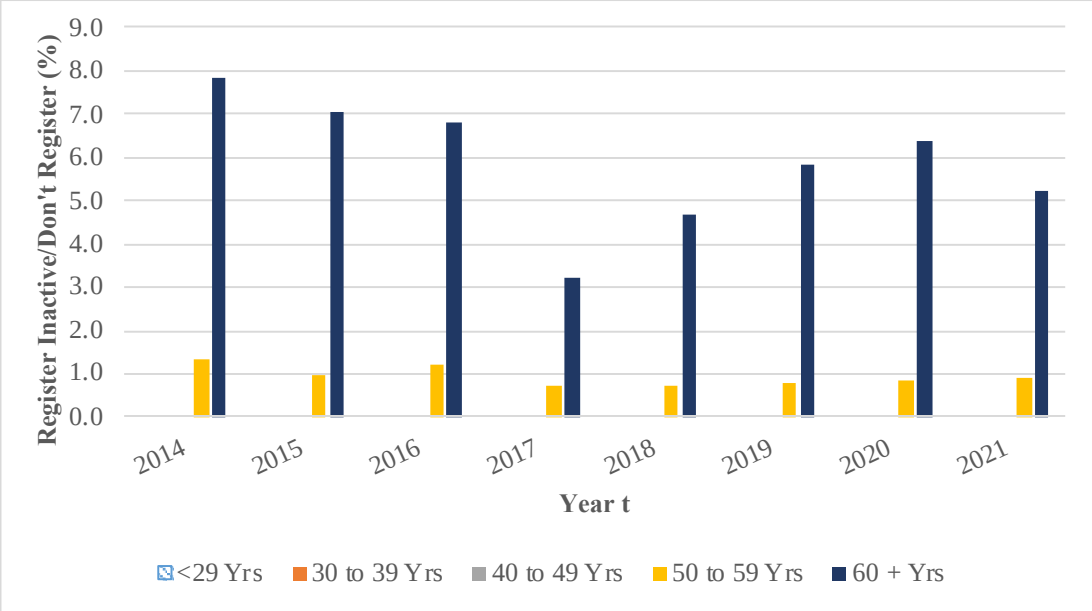


Appendix 4.1 Figure 3: Probability of Registering Inactive or Not Registering (Retire) 2014-2021

(A) Registered Nurses (RNs)

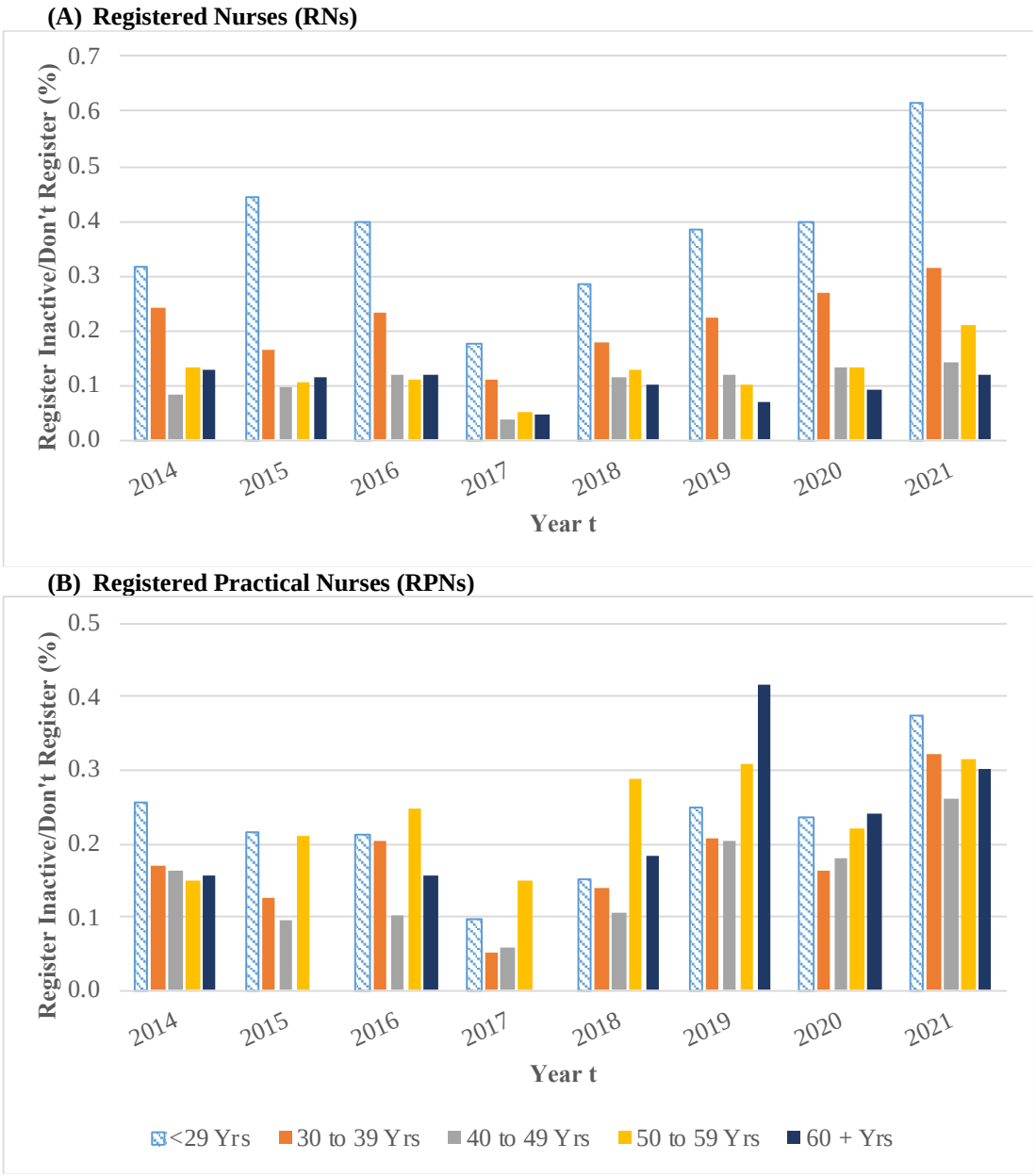


(B) Registered Practical Nurses (RPNs)



Notes: This probability does not include all those who "retire." Not all who retire will select "retired" as the reason for registering inactive. For example, some who actually are retired may select "other" as their inactive reason. Moreover, some who retire choose to register active without Ontario nursing employment (e.g., "out of the labour force")

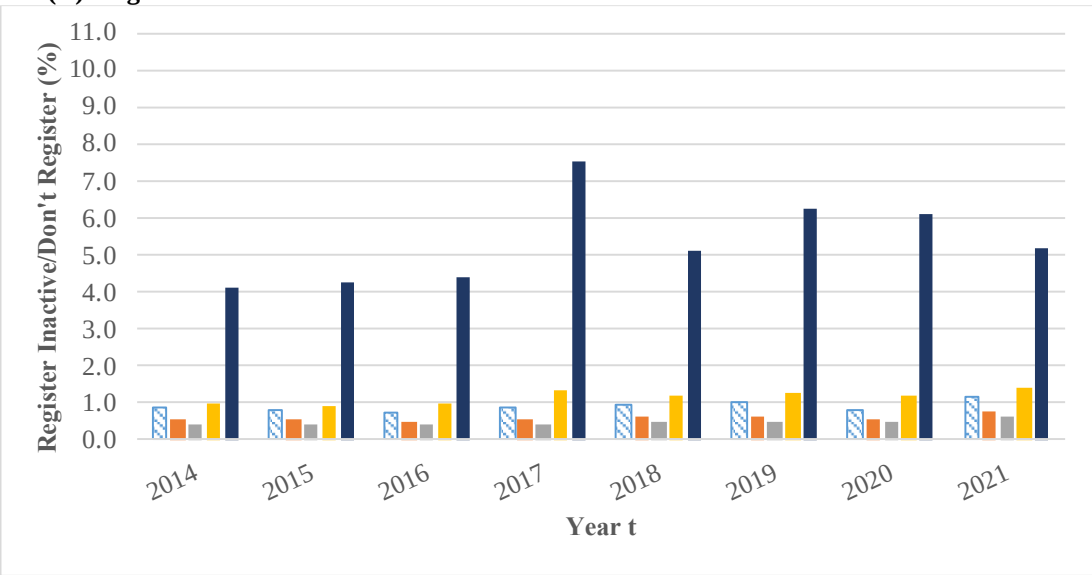
Appendix 4.1 Figure 4: Probability of Registering Inactive (Left Ontario, or the Profession) 2014-2021



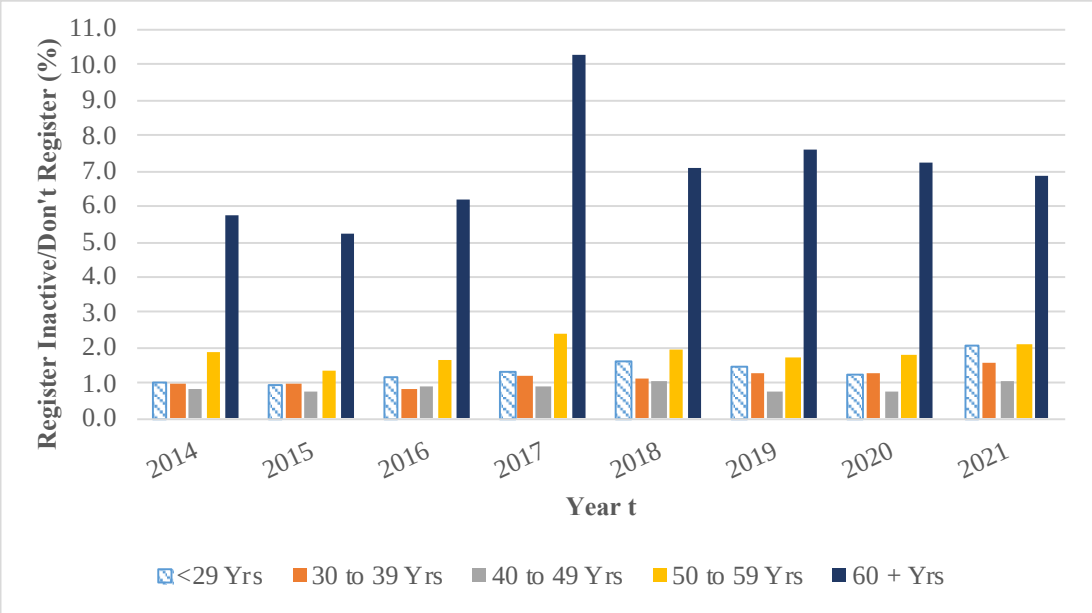
Notes: This probability does not include all those who "left the country, province, or profession." Not all who leave Ontario or the profession will select "left the country, province or profession" as the reason for registering inactive. For example, some who actually left nursing for another profession may select "other" as their inactive reason. Moreover, some who leave Ontario, or the profession choose to register active without Ontario nursing employment.

Appendix 4.1 Figure 5:Probability of Registering Inactive (Leave or Other) 2014-2021

(A) Registered Nurses



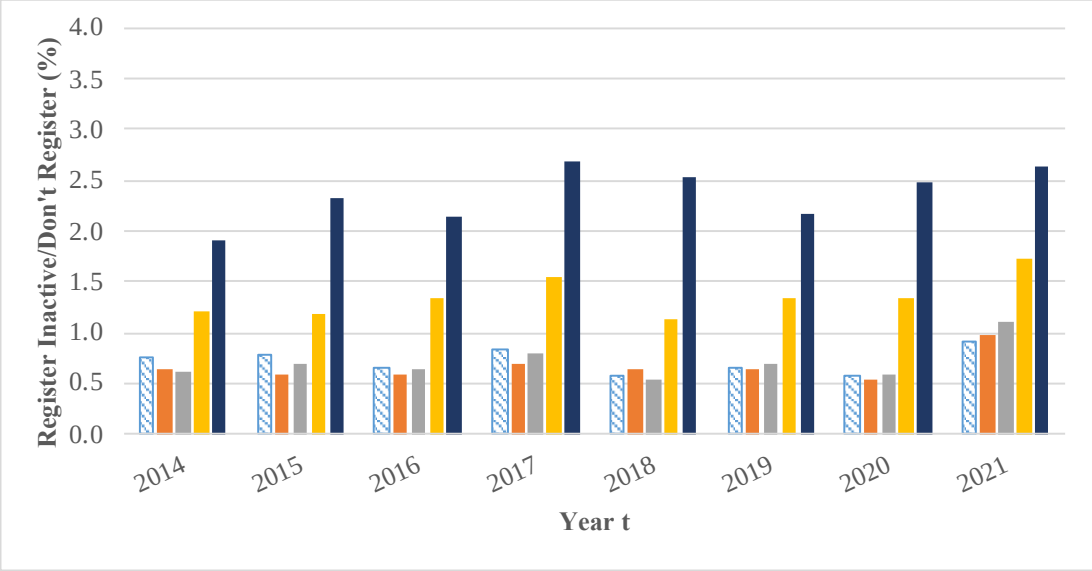
(B) Registered Practical Nurses (RPNs)



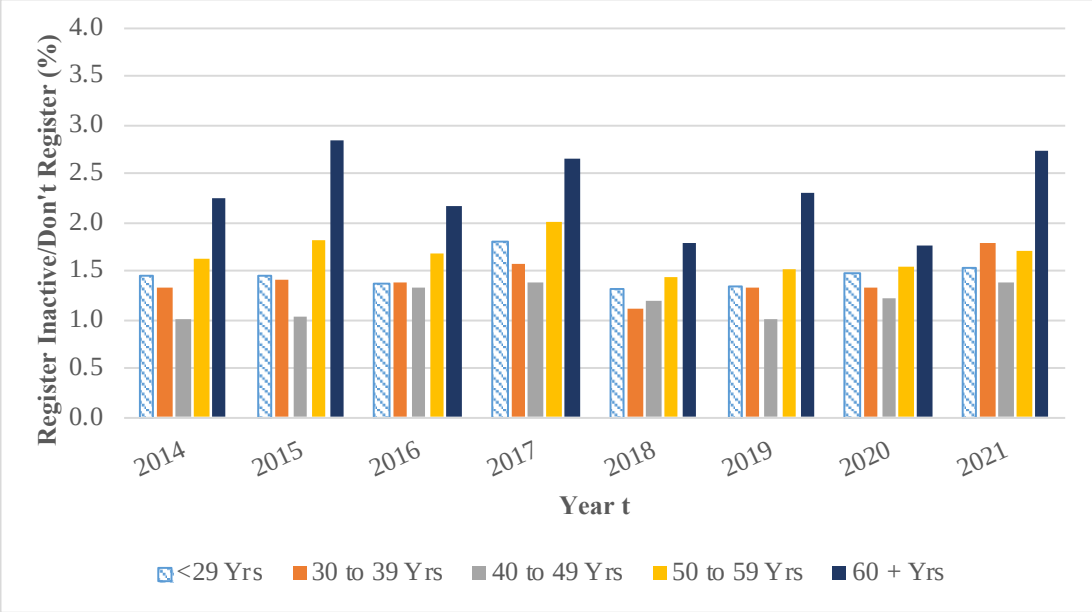
Notes: Some who go on leave choose to keep their registration (i.e., they register active without Ontario employment). We suspect registering inactive and selecting "on leave" is a more "permanent" or "long-term" leave.

Appendix 4.1 Figure 6:Probability of Registering Active Without Employment (Unemployment or Unknown Status) 2014-2021

(A) Registered Nurses



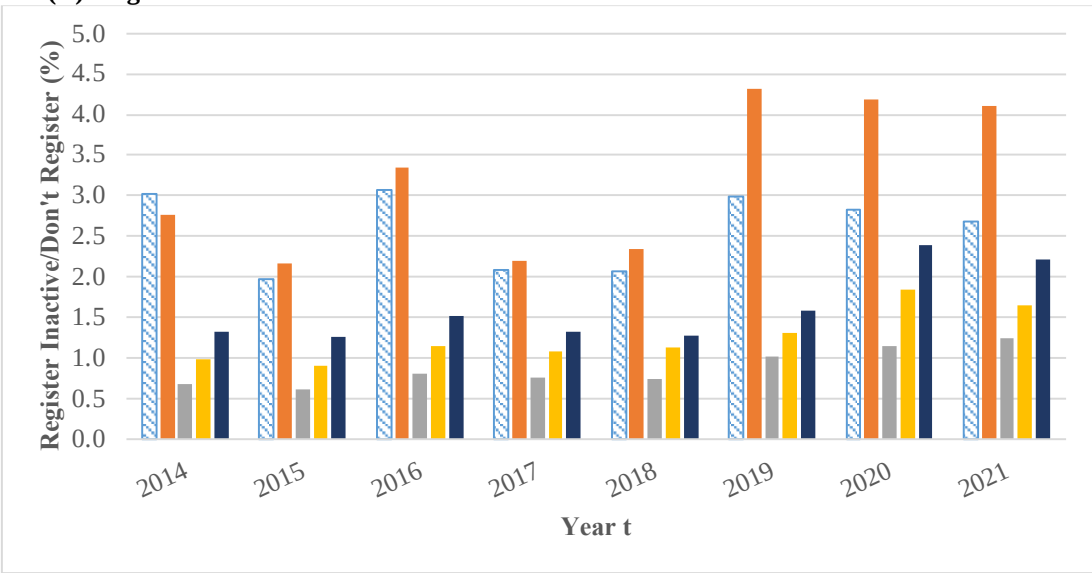
(B) Registered Practical Nurses (RPNs)



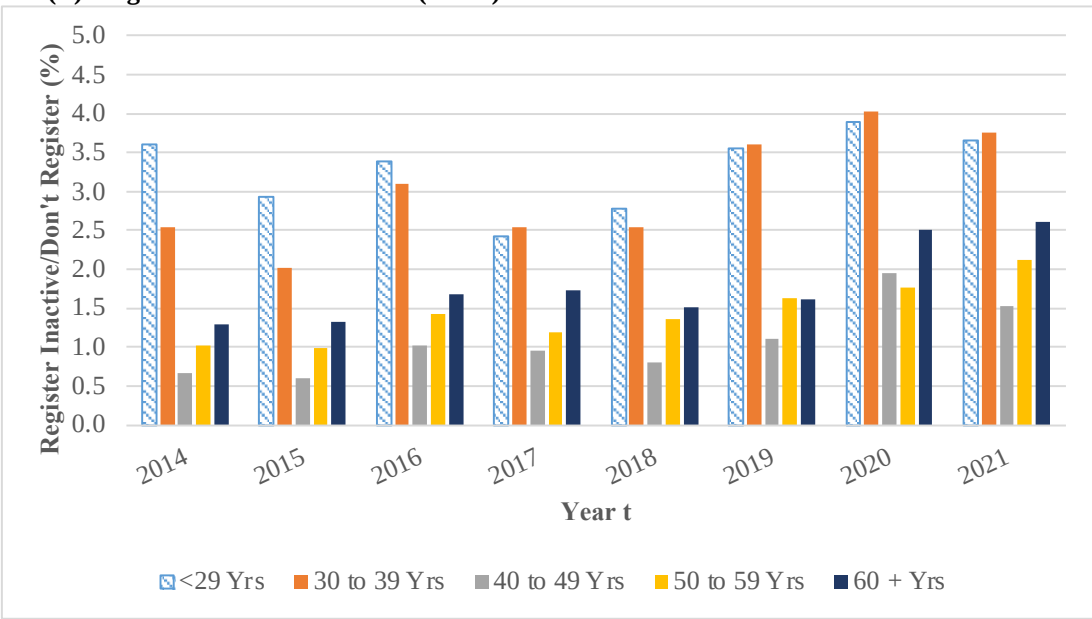
Note: The practice status variable from which this probability rate is derived is self-reported. Some who are actually unemployed (not working and looking for work in the profession) may not select "unemployed", and vice versa.

Appendix 4.1 Figure 7: Probability of Registering Active Without Employment (Leave) 2014-2021

(A) Registered Nurses



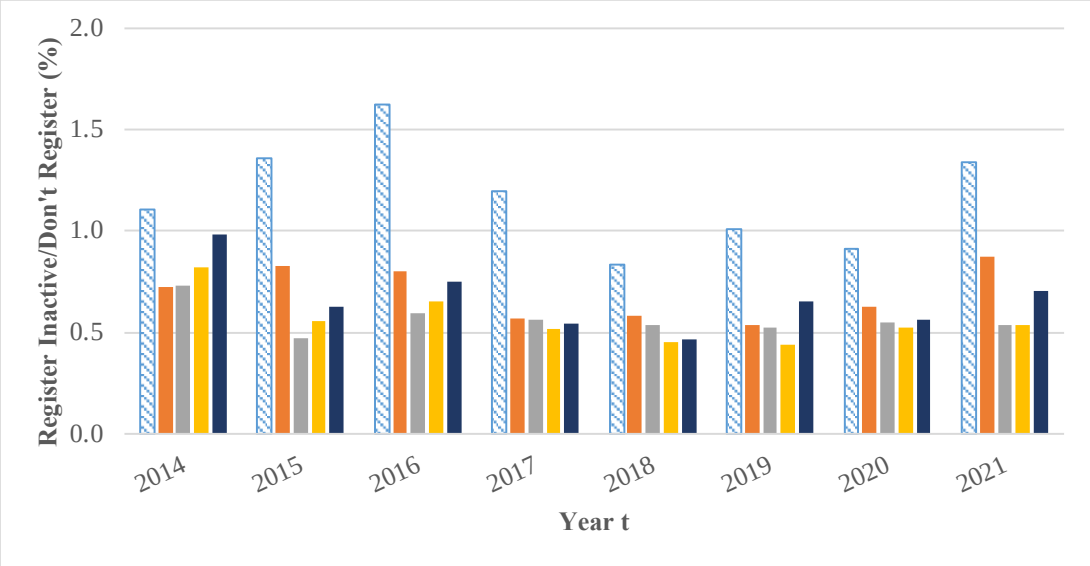
(B) Registered Practical Nurses (RPNs)



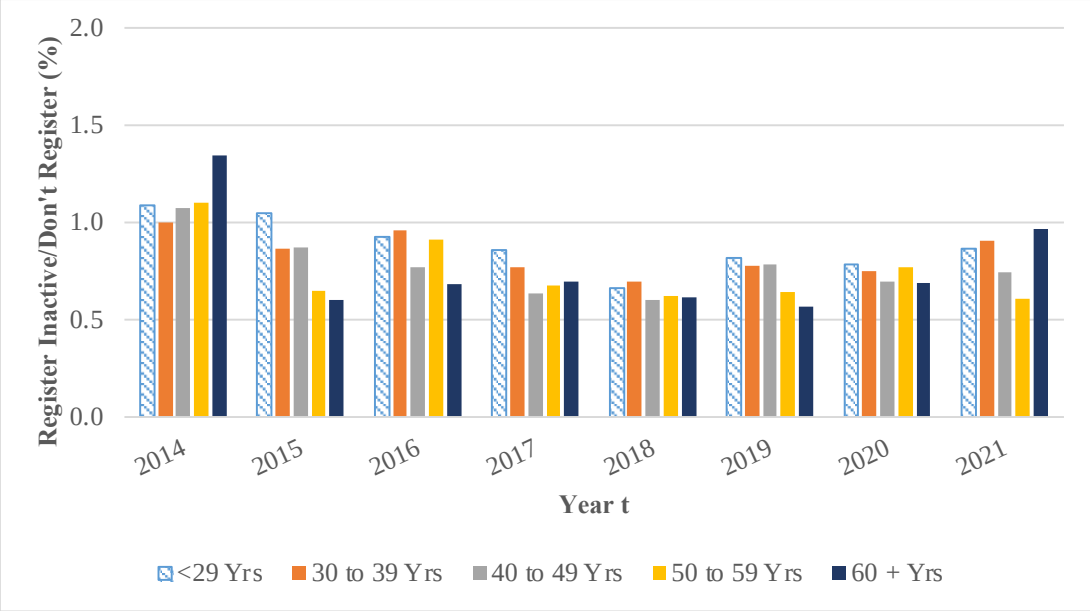
Note: The practice status variable from which this probability rate is derived is self-reported. Some who are on leave may not select "on leave", and vice versa. This definition of on leave differs from those who register inactive and select "on leave" as their inactive reason, mainly the nurses here keep their registration. This "on leave" can thus be viewed as more "short-term."

Appendix 4.1 Figure 8: : Probability of Registering Active Without Employment (Leave Ontario, or Profession) 2014-2021

(A) Registered Nurses



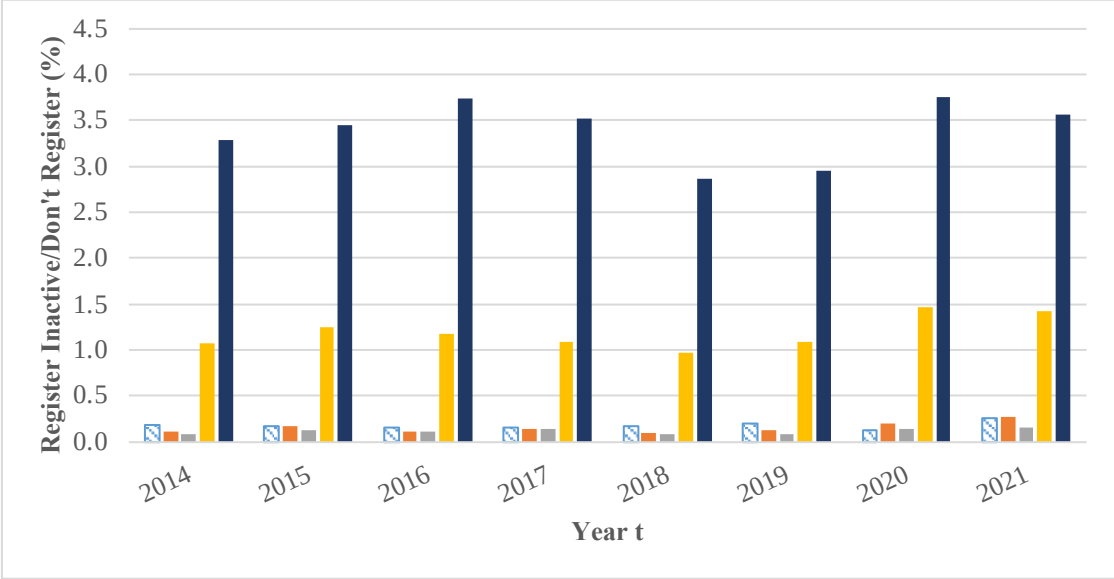
(B) Registered Practical Nurses (RPNs)



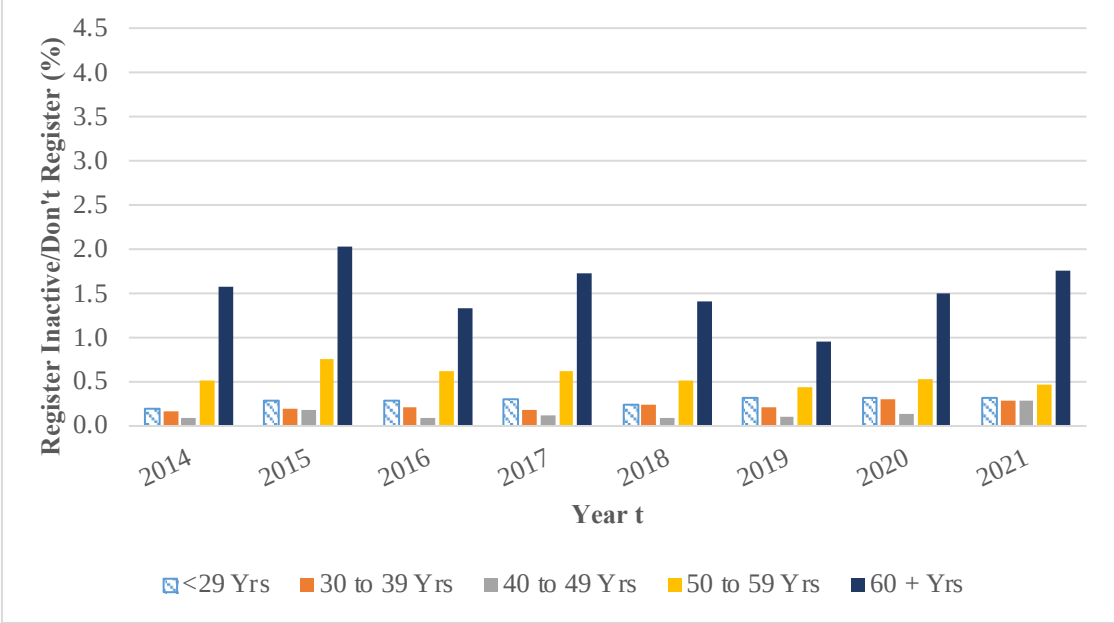
Note: The practice status variable from which this probability rate is derived is self-reported. Some who actually left the province or profession may not select "left the province" or "left the profession", and vice versa.

Appendix 4.1 Figure 9: Probability of Registering Active Without Employment (Leave Labour Force) 2021-2021

(A) Registered Nurses



(B) Registered Practical Nurses (RPNs)



Note: The practice status variable from which this probability rate is derived is self-reported. Some who are actually out of the labour force (not working and not looking for work in the profession) may not select "out of the labour force", and vice versa.

Appendix 4.1 Table 1: Employment Dynamics - Ontario Registered Nurses (RNs) and Registered Practical Nurses (RPNs) 2014-2021

	Year t-1															
	RNs								RPNs							
	2014	2015	2016	2017	2018	2019	2020	2021	2014	2015	2016	2017	2018	2019	2020	2021
(1) Employed in Ontario nursing (N) in year t-1	**95,780**	**96,010**	**95,990**	**95,340**	**96,220**	**97,980**	**98,350**	**99,240**	**36,830**	**38,620**	**40,950**	**42,510**	**44,720**	**47,160**	**48,490**	**49,210**
(2) Continue working in year t	**93.4**	**93.7**	**93.0**	**93.4**	**93.9**	**92.8**	**92.3**	**91.9**	**92.6**	**93.3**	**92.5**	**92.7**	**93.4**	**92.5**	**92.0**	**91.4**
(3) Don't Continue working in year t	**6.6**	**6.3**	**7.0**	**6.6**	**6.1**	**7.2**	**7.7**	**8.1**	**7.4**	**6.7**	**7.5**	**7.3**	**6.6**	**7.5**	**8.0**	**8.6**
(4) Maintain registration in year t - not working in Ontario nursing	**4.2**	**3.9**	**4.6**	**4.2**	**3.7**	**4.6**	**5.0**	**5.5**	**4.7**	**4.4**	**5.0**	**4.7**	**4.2**	**4.9**	**5.6**	**5.8**
(A) Return in year t+1	42.9	35.6	41.1	41.2	38.8	45.2	44.5	--	51.5	43.4	51.1	50.2	50.3	52.9	55.5	--
(B) Return in year t+2	7.3	8.8	7.1	7.5	9.6	10.6	--	--	9.2	11.7	10.0	9.8	12.2	13.6	--	--
(C) Return in year t+3	3.0	2.9	2.8	2.8	4.4	--	--	--	4.2	4.2	4.1	4.4	4.0	--	--	--
(D) No return (within three years)	46.8	52.8	49.0	48.5	47.3	--	--	--	35.1	40.6	34.8	35.6	33.5	--	--	--
(E) Return by 2021	56.0	49.6	53.8	52.8	52.7	55.8	44.5	--	67.2	62.6	67.3	66.5	66.5	66.5	55.5	--
(5) Register inactive or do not register in year t	**2.4**	**2.4**	**2.4**	**2.5**	**2.4**	**2.6**	**2.7**	**2.6**	**2.7**	**2.3**	**2.5**	**2.6**	**2.4**	**2.5**	**2.5**	**2.8**
(A) Return in year t+1	0.4	0.7	0.4	0.6	0.7	1.9	1.1	--	2.4	1.9	3.0	4.1	4.2	5.2	6.3	--
(B) Return in year t+2	0.8	1.1	1.1	1.2	2.3	1.8	--	--	2.3	2.2	1.2	3.0	5.0	2.9	--	--
(C) Return in year t+3	0.8	0.7	1.0	1.2	1.0	--	--	--	1.1	0.6	1.3	1.6	1.6	--	--	--
(D) No return (within three years)	97.9	97.5	97.5	97.1	96.0	--	--	--	94.2	95.3	94.5	91.3	89.2	--	--	--
(E) Return by 2021	4.1	3.7	3.3	3.5	4.0	3.7	1.1	--	7.8	6.6	6.3	9.0	10.8	8.1	6.3	--

Notes: Section (2) and (3) sum to 100 percent. Section (3) is the total attrition rate and is the sum of section (4) and (5). For each of section (4)-(5), the corresponding (A)-(D) sum to 100 percent. In 2019-2021 we are unable to observe if nurses return within three years as data beyond 2021 were not available. The number of observations (nurses) in (1) are rounded to the nearest ten for confidentiality.

Appendix 4.1 Table 2: Transition Categories - Ontario Registered Nurses (RNs) and Registered Practical Nurses (RPNs) 2014-2021

	RNs								RPNs							
	Year t															
	2014	2015	2016	2017	2018	2019	2020	2021	2014	2015	2016	2017	2018	2019	2020	2021
	Panel A: From Employment to Registering Active Without Ontario Nursing Employment															
Unemployed or unknown practice status	1.0	1.0	1.0	1.2	1.0	1.0	1.0	1.4	1.4	1.5	1.5	1.7	1.3	1.4	1.4	1.7
On leave	1.6	1.3	1.9	1.4	1.5	2.3	2.5	2.4	1.9	1.6	2.2	1.8	1.9	2.5	3.0	2.9
Left Ontario or the profession	0.8	0.7	0.8	0.7	0.6	0.6	0.6	0.8	1.1	0.8	0.9	0.7	0.6	0.7	0.7	0.8
Left the labour force	0.8	0.9	0.9	0.9	0.7	0.7	0.9	0.9	0.3	0.5	0.4	0.4	0.3	0.3	0.4	0.4
	Panel B: From Employment to Not Registering or Registering Inactive															
Retire or do not register	1.0	1.0	1.0	0.6	0.9	0.9	1.1	0.8	1.0	0.8	0.8	0.4	0.5	0.6	0.6	0.5
Left Ontario or the profession	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.3
On leave or other reason	1.2	1.2	1.2	1.7	1.4	1.5	1.4	1.5	1.6	1.3	1.5	2.1	1.8	1.7	1.7	2.0
Employed in Ontario Nursing Year t-1	95,780	96,010	95,990	95,340	96,220	97,980	98,350	99,240	36,830	38,620	40,950	42,510	44,720	47,160	48,490	49,210

Notes: Unemployed is defined as not working (in or out of the profession) and seeking employment in the profession in our data. Out of the labour force is defined as not working (in or out of the profession) and not seeking employment in the profession. The number of observations (nurses) are rounded to the nearest ten for confidentiality.

Appendix 4.1 Table 3:Employment and Registration Transition Matrix - Ontario Registered Nurses (RNs) 2013-2021

Transition Rates Year t-1 = 2013					
	Year t				
Year t-1	Employed in Ontario Nursing (1+ jobs)	Registered: Unemployed, on leave, or unknown	Registered: Left prof., Ont., or labour force	Registered inactive, or not registered	Total (N)
Employed in Ontario Nursing (1+ jobs)	93.4	2.6	1.7	2.4	95,780
Registered: Unemployed, on leave, or unknown	46.0	24.8	10.5	18.7	4,480
Registered: Left prof., Ont., or labour force	20.4	6.5	37.0	36.1	4,020
Registered inactive	0.4	0.2	0.2	99.3	24,580
Not registered	75.2	14.4	9.3	1.1	5,000
Transition Rates Year t-1 = 2014					
Year t-1	**Year t**				
Employed in Ontario Nursing (1+ jobs)	93.7	2.3	1.6	2.4	96,010
Registered: Unemployed, on leave, or unknown	49.1	25.5	9.8	15.6	4,440
Registered: Left prof., Ont., or labour force	22.7	6.3	39.6	31.5	3,940
Registered inactive	0.4	0.2	0.2	99.3	29,060
Not registered	71.3	13.3	13.7	1.7	4,340
Transition Rates Year t-1 = 2015					
Year t-1	**Year t**				
Employed in Ontario Nursing (1+ jobs)	93.0	2.9	1.7	2.4	95,990
Registered: Unemployed, on leave, or unknown	43.0	26.6	12.4	18.0	4,100
Registered: Left prof., Ont., or labour force	18.1	6.6	45.9	29.4	4,040
Registered inactive	0.4	0.2	0.2	99.3	33,120
Not registered	75.8	11.2	11.4	1.5	4,630

Appendix 4.1 Table 3 Continued: Employment and Registration Transition Matrix - Ontario Registered Nurses (RNs) 2013-2021

Transition Rates Year t-1 = 2016					
	Year t				
Year t-1	Employed in Ontario Nursing (1+ jobs)	Registered: Unemployed, on leave, or unknown	Registered: Left prof., Ont., or labour force	Registered inactive, or not registered	Total (N)
Employed in Ontario Nursing (1+ jobs)	93.4	2.7	1.5	2.5	95,340
Registered: Unemployed, on leave, or unknown	48.0	25.4	8.8	17.9	4,630
Registered: Left prof., Ont., or labour force	17.1	7.5	45.8	29.6	4,500
Registered inactive	0.4	0.1	0.2	99.3	37,180
Not registered	75.8	10.1	8.8	5.3	5,300
Transition Rates Year t-1 = 2017					
Year t-1	**Year t**				
Employed in Ontario Nursing (1+ jobs)	93.9	2.5	1.3	2.4	96,220
Registered: Unemployed, on leave, or unknown	46.2	26.7	8.4	18.7	4,530
Registered: Left prof., Ont., or labour force	15.5	5.6	50.2	28.7	4,350
Registered inactive	0.4	0.1	0.2	99.4	41,650
Not registered	76.5	11.6	9.2	2.8	5,670
Transition Rates Year t-1 = 2018					
Year t-1	**Year t**				
Employed in Ontario Nursing (1+ jobs)	92.8	3.3	1.3	2.6	97,980
Registered: Unemployed, on leave, or unknown	45.2	26.8	9.1	18.9	4,470
Registered: Left prof., Ont., or labour force	15.8	5.7	53.2	25.3	4,270
Registered inactive	0.4	0.1	0.1	99.4	45,970
Not registered	78.3	10.3	8.2	3.1	5,030

Appendix 4.1 Table 3 Continued: Employment and Registration Transition Matrix - Ontario Registered Nurses (RNs) 2013-2021

Transition Rates Year t-1 = 2019					
	Year t				
Year t-1	Employed in Ontario Nursing (1+ jobs)	Registered: Unemployed, on leave, or unknown	Registered: Left prof., Ont., or labour force	Registered inactive, or not registered	Total (N)
Employed in Ontario Nursing (1+ jobs)	92.3	3.5	1.5	2.7	98,350
Registered: Unemployed, on leave, or unknown	50.3	26.6	7.7	15.4	5,200
Registered: Left prof., Ont., or labour force	16.1	6.4	55.3	22.1	4,420
Registered inactive	0.6	0.2	0.3	99.0	50,330
Not registered	81.6	9.4	6.4	2.6	4,970
Transition Rates Year t-1 = 2020					
Year t-1	**Year t**				
Employed in Ontario Nursing (1+ jobs)	91.9	3.8	1.7	2.6	99,240
Registered: Unemployed, on leave, or unknown	50.3	27.2	7.9	14.6	5,690
Registered: Left prof., Ont., or labour force	16.0	7.1	55.0	22.0	4,840
Registered inactive	0.4	0.1	0.2	99.2	54,420
Not registered	81.2	7.8	7.4	3.6	5,060

Notes: We define four nursing states: (1) employed in Ontario nursing (with at least one job), (2) registered active without employment (unemployed, on leave, or an unknown practice status), (3) registered active without employment (left the profession, Ontario, or labour force). Unemployed is defined as not working (in or out of the profession) and seeking employment in the profession in our data. Out of the labour force is defined as not working (in or out of the profession) and not seeking employment in the profession. The number of observations (nurses) are rounded to the nearest ten for confidentiality.

Appendix 4.1 Table 4: Employment and Registration Transition Matrix - Ontario Registered Practical Nurses (RPNs) 2013-2021

Transition Rates Year t-1 = 2013					
	Year t				
Year t-1	Employed in Ontario Nursing (1+ jobs)	Registered: Unemployed, on leave, or unknown	Registered: Left prof., Ont., or labour force	Registered inactive, or not registered	Total (N)
Employed in Ontario Nursing (1+ jobs)	92.6	3.3	1.4	2.7	36830
Registered: Unemployed, on leave, or unknown	50.1	26.8	7.9	15.2	2780
Registered: Left prof., Ont., or labour force	36.0	8.7	32.0	23.3	1780
Registered inactive	0.6	0.3	0.1	99.0	7500
Not registered	66.5	19.3	13.4	0.7	3510
Transition Rates Year t-1 = 2014					
Year t-1	**Year t**				
Employed in Ontario Nursing (1+ jobs)	93.3	3.1	1.3	2.3	38,620
Registered: Unemployed, on leave, or unknown	50.2	26.5	9.0	14.3	2,970
Registered: Left prof., Ont., or labour force	38.7	7.8	30.9	22.7	1,920
Registered inactive	0.7	0.2	0.1	98.9	9,280
Not registered	64.8	17.7	16.4	1.1	3,950
Transition Rates Year t-1 = 2015					
Year t-1	**Year t**				
Employed in Ontario Nursing (1+ jobs)	92.5	3.7	1.2	2.5	40,950
Registered: Unemployed, on leave, or unknown	47.1	29.2	9.7	14.0	3,000
Registered: Left prof., Ont., or labour force	36.4	8.2	34.3	21.1	2,200
Registered inactive	0.6	0.2	0.1	99.0	10,970
Not registered	67.3	15.5	15.4	1.8	3,620

Appendix 4.1 Table 4 Continued: Employment and Registration Transition Matrix - Ontario Registered Practical Nurses (RPNs) 2013-2021

Transition Rates Year t-1 = 2016					
	Year t				
Year t-1	Employed in Ontario Nursing (1+ jobs)	Registered: Unemployed, on leave, or unknown	Registered: Left prof., Ont., or labour force	Registered inactive, or not registered	Total (N)
Employed in Ontario Nursing (1+ jobs)	92.7	3.6	1.1	2.6	42,510
Registered: Unemployed, on leave, or unknown	50.1	27.8	7.9	14.2	3,240
Registered: Left prof., Ont., or labour force	37.5	8.7	33.2	20.6	2,240
Registered inactive	0.8	0.2	0.2	98.9	12,820
Not registered	71.5	12.6	9.1	6.8	4,230
Transition Rates Year t-1 = 2017					
Year t-1	**Year t**				
Employed in Ontario Nursing (1+ jobs)	93.4	3.2	1.0	2.4	44,720
Registered: Unemployed, on leave, or unknown	49.7	27.0	7.6	15.7	3,260
Registered: Left prof., Ont., or labour force	32.4	7.7	37.7	22.1	1,970
Registered inactive	0.8	0.2	0.2	98.8	14,970
Not registered	68.0	17.2	11.9	2.9	5,380
Transition Rates Year t-1 = 2018					
Year t-1	**Year t**				
Employed in Ontario Nursing (1+ jobs)	92.5	3.9	1.0	2.5	47,160
Registered: Unemployed, on leave, or unknown	52.2	26.2	7.7	13.8	3,470
Registered: Left prof., Ont., or labour force	37.2	8.5	34.8	19.4	2,180
Registered inactive	0.9	0.2	0.1	98.8	16,960
Not registered	69.8	14.1	12.3	3.7	4,230

Appendix 4.1 Table 4 Continued: Employment and Registration Transition Matrix - Ontario Registered Practical Nurses (RPNs) 2013-2021

Transition Rates Year t-1 = 2019					
	Year t				
Year t-1	Employed in Ontario Nursing (1+ jobs)	Registered: Unemployed, on leave, or unknown	Registered: Left prof., Ont., or labour force	Registered inactive, or not registered	Total (N)
Employed in Ontario Nursing (1+ jobs)	92.0	4.4	1.1	2.5	48,490
Registered: Unemployed, on leave, or unknown	53.4	27.4	6.7	12.4	3,550
Registered: Left prof., Ont., or labour force	36.4	8.9	36.9	17.8	2,100
Registered inactive	1.2	0.2	0.2	98.4	18,980
Not registered	72.5	13.3	11.3	3.0	3,860
Transition Rates Year t-1 = 2020					
Year t-1	**Year t**				
Employed in Ontario Nursing (1+ jobs)	91.4	4.6	1.2	2.8	49,210
Registered: Unemployed, on leave, or unknown	55.7	25.9	6.1	12.2	3,830
Registered: Left prof., Ont., or labour force	35.9	9.3	35.9	19.0	2,020
Registered inactive	1.0	0.2	0.2	98.6	20,770
Not registered	76.7	11.7	8.5	3.1	5,370

Notes: We define four nursing states: (1) employed in Ontario nursing (with at least one job), (2) registered active without employment (unemployed, on leave, or an unknown practice status), (3) registered active without employment (left the profession, Ontario, or labour force). Unemployed is defined as not working (in or out of the profession) and seeking employment in the profession in our data. Out of the labour force is defined as not working (in or out of the profession) and not seeking employment in the profession. The number of observations (nurses) are rounded to the nearest ten for confidentiality.

Appendix 4.1 Table 5:Status of Active and Inactive Registered Nurses (RNs) and Registered Practical Nurses (RPNs) in Ontario 2013-2021

	RNs									RPNs								
	2013	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
	Panel A: Work/Practice Status of Active Registrants (%)																	
Employed in Ontario Nursing (at least 1 job)	91.9	92.0	92.2	91.3	91.6	91.8	91.1	90.4	89.7	89.0	88.8	88.7	88.6	89.5	89.3	89.6	89.4	89.4
	Among Those Not Employed in Ontario Nursing (with an Active Registration)																	
Unemployed or unknown practice status	2.1	2.2	2.1	2.1	2.3	2.2	2.1	2.1	2.4	4.4	4.6	4.5	4.2	4.1	4.1	3.5	3.2	3.4
On leave	2.2	2.1	1.8	2.3	2.0	2.0	2.7	3.1	3.1	2.3	2.2	2.0	2.6	2.4	2.5	3.1	3.8	3.7
Left Ontario or the profession	2.4	2.3	2.3	2.6	2.6	2.7	2.8	2.9	3.2	3.5	3.7	3.9	3.9	3.2	3.5	3.2	2.9	2.7
Left the labour force	1.5	1.5	1.6	1.7	1.5	1.3	1.3	1.5	1.6	0.8	0.7	0.9	0.7	0.7	0.7	0.7	0.8	0.8
Active Registration (N)	104,280	104,390	104,130	104,460	105,100	106,710	107,970	109,770	111,720	41,400	43,510	46,150	47,990	49,940	52,800	54,140	55,060	56,850
	Panel B: Status of Inactive Registrants																	
Retired	13.8	14.2	13.9	14.5	13.5	25.9	28.1	31.4	28.2	16.4	14.7	12.8	13.7	6.4	12.2	14.1	15.3	14.5
Left Ontario or profession	3.3	2.3	2.5	2.7	2.1	4.8	7.1	8.0	9.8	5.5	3.7	3.9	4.8	2.3	6.0	8.3	8.7	9.9
On leave or other	83.0	83.5	83.6	82.8	84.4	69.2	64.8	60.6	62.0	78.1	81.6	83.3	81.6	91.3	81.8	77.5	76.0	75.6
Inactive Registration (N)	13,970	13,550	13,900	14,090	7,870	8,500	6,820	6,720	6,890	3,480	3,530	3,850	4,260	3,840	4,070	3,510	3,320	3,550

Notes: From 2013-2016, we suspect there was a data clean up, where nureses who were registered inactive for a period of time were eventually removed from the data. The number of observations (nurses) are rounded to the nearest ten for confidentiality.

Appendix 4.1 Table 6: Likelihood of Registering Active Without Employment 2014-2021

	RNs		RPNs		RNs		RPNs	
	OR	ME	OR	ME	OR	ME	OR	ME
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Year Left the Profession: 2014 (base)								
2015	0.927**	-0.003**	0.936	-0.003	0.925***	-0.003***	0.929*	-0.003*
	(0.021)	(0.001)	(0.033)	(0.002)	(0.021)	(0.001)	(0.033)	(0.002)
2016	1.088***	0.004***	1.046	0.002	1.099***	0.004***	1.038	0.002
	(0.024)	(0.001)	(0.035)	(0.002)	(0.025)	(0.001)	(0.035)	(0.002)
2017	0.977	-0.001	0.983	-0.001	0.983	-0.001	0.978	-0.001
	(0.022)	(0.001)	(0.033)	(0.002)	(0.023)	(0.001)	(0.033)	(0.002)
2018	0.868***	-0.005***	0.868***	-0.006***	0.835***	-0.007***	0.869***	-0.006***
	(0.020)	(0.001)	(0.030)	(0.001)	(0.020)	(0.001)	(0.031)	(0.001)
2019	1.087***	0.004***	1.035	0.002	1.046	0.002*	1.031	0.001
	(0.024)	(0.001)	(0.034)	(0.001)	(0.024)	(0.001)	(0.035)	(0.002)
2020	1.192***	0.008***	1.175***	0.008***	1.152***	0.006***	1.185***	0.008***
	(0.026)	(0.001)	(0.037)	(0.002)	(0.026)	(0.001)	(0.039)	(0.002)
2021	1.314***	0.012***	1.226***	0.010***	1.248***	0.010***	1.233***	0.010***
	(0.028)	(0.001)	(0.038)	(0.002)	(0.028)	(0.001)	(0.040)	(0.002)
Age: Under 29 Yrs (base)								
30-39 Yrs	0.790**	-0.007**	0.827*	-0.007*	0.874	-0.004	0.936	-0.002
	(0.057)	(0.002)	(0.068)	(0.003)	(0.064)	(0.002)	(0.077)	(0.003)
40-49 Yrs	0.763***	-0.007***	0.781**	-0.009**	0.872	-0.004	0.916	-0.003
	(0.057)	(0.002)	(0.068)	(0.003)	(0.066)	(0.002)	(0.081)	(0.003)
50-59 Yrs	1.171*	0.005*	1.021	0.001	1.297***	0.008***	1.219*	0.008*
	(0.086)	(0.002)	(0.092)	(0.004)	(0.096)	(0.002)	(0.111)	(0.004)
>60 Yrs	1.917***	0.027***	1.335*	0.013*	2.010***	0.028***	1.483**	0.016**
	(0.166)	(0.004)	(0.179)	(0.006)	(0.175)	(0.004)	(0.200)	(0.006)
Female	1.543***	0.012***	1.552***	0.013***	1.531***	0.012***	1.558***	0.013***
	(0.083)	(0.001)	(0.096)	(0.001)	(0.082)	(0.001)	(0.097)	(0.001)
Age*Gender: Under 29 Yrs, Male (base)								
30-39 Yrs*Female	1.316***	0.002*	1.145	-0.003*	1.211*	0.002**	1.066	-0.000
	(0.099)	(0.001)	(0.097)	(0.001)	(0.091)	(0.001)	(0.091)	(0.001)
40-49 Yrs*Female	0.601***	-0.025***	0.656***	-0.029***	0.604***	-0.021***	0.650***	-0.022***
	(0.047)	(0.001)	(0.060)	(0.001)	(0.047)	(0.001)	(0.060)	(0.001)
50-59 Yrs*Female	0.785**	-0.004***	0.704***	-0.016***	0.806**	0.002*	0.705***	-0.007***
	(0.059)	(0.001)	(0.066)	(0.001)	(0.061)	(0.001)	(0.067)	(0.001)
>60 Yrs*Female	0.920	0.033***	0.801	0.004*	0.897	0.033***	0.794	0.009***
	(0.081)	(0.001)	(0.110)	(0.002)	(0.080)	(0.001)	(0.110)	(0.002)
Concurrent Registration					1.974***	0.038***	1.292***	0.013***
					(0.044)	(0.002)	(0.088)	(0.004)
Location of First Education: Ontario (base)								
Other Prov/Terr					1.035	0.002	1.127*	0.006*
					(0.024)	(0.001)	(0.062)	(0.003)
US					1.027	0.001	1.124	0.006
					(0.054)	(0.002)	(0.160)	(0.007)
Outside Can/US					0.672***	-0.015***	0.974	-0.001
					(0.014)	(0.001)	(0.027)	(0.001)
Missing					0.925	-0.003	1.084	0.004
					(0.052)	(0.002)	(0.076)	(0.003)

Appendix 4.1 Table 6 Continued: Likelihood of Registering Active Without Employment 2014-2021

	RNs		RPNs		RNs		RPNs	
	OR (1)	ME (2)	OR (3)	ME (4)	OR (5)	ME (6)	OR (7)	ME (8)
Any Education Outside of Profession					1.049**	0.002**	0.986	-0.001
					(0.016)	(0.001)	(0.019)	(0.001)
Any Rural Ontario Job					1.032	0.001	1.020	0.001
					(0.026)	(0.001)	(0.030)	(0.001)
Practice Setting (First Reported Ontario Job): Long-term Care (base)								
Hospital					0.760***	-0.012***	0.802***	-0.009***
					(0.016)	(0.001)	(0.017)	(0.001)
Primary Care					0.917**	-0.004**	1.234***	0.011***
					(0.028)	(0.001)	(0.041)	(0.002)
Home Care					0.884***	-0.006***	1.216***	0.010***
					(0.029)	(0.002)	(0.056)	(0.002)
Supp. Housing					1.024	0.001	1.241***	0.011***
					(0.057)	(0.003)	(0.036)	(0.002)
Other					0.904***	-0.005***	1.111***	0.005***
					(0.020)	(0.001)	(0.024)	(0.001)
Average On Call Hrs					1.001**	0.000**	1.000	-0.000
					(0.000)	(0.000)	(0.001)	(0.000)
Missing Average On Call Hrs					1.275***	0.011***	1.266***	0.012***
					(0.060)	(0.002)	(0.071)	(0.003)
Practice Weeks in Past 12 Months					0.979***	-0.001***	0.979***	-0.001***
					(0.000)	(0.000)	(0.001)	(0.000)
Missing Practice Weeks in Past 12 Months					0.376***	-0.027***	0.418***	-0.028***
					(0.060)	(0.003)	(0.074)	(0.004)
Employment Category (First Reported Ontario Job): Permanent (base)								
Temporary					1.150***	0.006***	1.117**	0.005**
					(0.031)	(0.001)	(0.039)	(0.002)
Casual					0.936	-0.003	1.065	0.003
					(0.032)	(0.001)	(0.042)	(0.002)
Self-employed					0.606***	-0.017***	0.734***	-0.012***
					(0.029)	(0.001)	(0.052)	(0.002)
Employment Status (First Reported Ontario Job): Full-time (base)								
Part-time					0.991	-0.000	0.998	-0.000
					(0.013)	(0.001)	(0.018)	(0.001)
Casual					1.146***	0.006***	1.187***	0.008***
					(0.039)	(0.002)	(0.047)	(0.002)
Observations	774,900	774,900	348,490	348,490	774,900	774,900	348,490	348,490

Notes: Standard errors are in parentheses, *p<0.05, **p<0.01, ***p<0.001. The healthcare sector, employment status, and employment category are that of the first Ontario reported job. Rural is a dummy variable where rural is equal to one if any Ontario jobs are in a rural location (based on the job postal code). Concurrent registration is a dummy variable equal to one if a nurse is concurrently registered in another province, territory or country. Education outside of the profession is a dummy variable equal to one if the nurse has any education outside of the nursing profession. Missing dummy variables are included for average practice week in the past twelve months, and average on-call hours, which equals one if a nurse did not record values for each respective variable. The number of observations (nurses) are rounded to the nearest ten for confidentiality. Ten observations were dropped due to missing a employment category or employment status. 2019-2021 were dropped as we cannot observe if nurses return within three years. Average marginal effects are used.

Appendix 4.1 Table 7: Likelihood of Registering Active Without Employment & Not Returning Within 3 Years 2014-2021

	RNs		RPNs		RNs		RPNs	
	OR (1)	ME (2)	OR (3)	ME (4)	OR (5)	ME (6)	OR (7)	ME (8)
Year Left the Profession: 2014 (base)								
2015	1.265***	0.046***	1.287***	0.050***	1.254***	0.043***	1.276**	0.048**
	(0.064)	(0.010)	(0.098)	(0.015)	(0.065)	(0.010)	(0.098)	(0.015)
2016	1.153**	0.028**	1.053	0.010	1.149**	0.026**	1.047	0.009
	(0.057)	(0.010)	(0.078)	(0.014)	(0.057)	(0.010)	(0.078)	(0.014)
2017	1.133*	0.025*	1.238**	0.042**	1.125*	0.023*	1.250**	0.044**
	(0.057)	(0.010)	(0.091)	(0.015)	(0.058)	(0.010)	(0.093)	(0.015)
2018	1.032	0.006	1.015	0.003	1.051	0.009	1.080	0.015
	(0.053)	(0.010)	(0.077)	(0.015)	(0.061)	(0.011)	(0.091)	(0.016)
Age: Under 29 Yrs (base)								
30-39 Yrs	0.631*	-0.114*	0.796	-0.055	0.691	-0.086	0.863	-0.035
	(0.128)	(0.050)	(0.183)	(0.055)	(0.145)	(0.049)	(0.201)	(0.055)
40-49 Yrs	0.510***	-0.163***	0.784	-0.058	0.532**	-0.145**	0.807	-0.050
	(0.100)	(0.047)	(0.188)	(0.057)	(0.108)	(0.046)	(0.196)	(0.057)
50-59 Yrs	1.078	0.019	1.990**	0.170**	1.292	0.061	2.161**	0.186**
	(0.207)	(0.048)	(0.493)	(0.060)	(0.254)	(0.047)	(0.543)	(0.059)
>60 Yrs	2.924***	0.241***	3.176**	0.275***	3.534***	0.273***	3.481***	0.291***
	(0.758)	(0.053)	(1.141)	(0.078)	(0.934)	(0.051)	(1.262)	(0.077)
Female	0.314***	-0.048**	0.364***	-0.105***	0.312***	-0.050**	0.358***	-0.112***
	(0.044)	(0.017)	(0.063)	(0.020)	(0.045)	(0.017)	(0.063)	(0.020)
Age*Gender: Under 29 Yrs, Male (base)								
30-39 Yrs*Female	1.236	-0.044***	1.393	0.018	1.172	-0.035***	1.314	0.021
	(0.262)	(0.010)	(0.335)	(0.012)	(0.254)	(0.010)	(0.319)	(0.012)
40-49 Yrs*Female	3.529***	0.125***	2.541***	0.137***	3.652***	0.134***	2.571***	0.143***
	(0.727)	(0.013)	(0.641)	(0.016)	(0.775)	(0.013)	(0.656)	(0.016)
50-59 Yrs*Female	4.553***	0.370***	2.215**	0.331***	4.490***	0.392***	2.164**	0.337***
	(0.903)	(0.010)	(0.571)	(0.015)	(0.912)	(0.010)	(0.563)	(0.015)
>60 Yrs*Female	3.849***	0.539***	3.497***	0.536***	3.799***	0.556***	3.462***	0.543***
	(1.019)	(0.010)	(1.295)	(0.016)	(1.024)	(0.010)	(1.292)	(0.016)
Concurrent Registration					3.018***	0.205***	1.917*	0.134*
					(0.215)	(0.012)	(0.488)	(0.054)
Location of First Education: Ontario (base)								
Other Prov/Terr					1.100	0.018	1.079	0.015
					(0.074)	(0.013)	(0.162)	(0.030)
US					0.569***	-0.106***	1.982	0.142
					(0.081)	(0.026)	(0.719)	(0.078)
Outside Can/US					0.856*	-0.030*	0.820*	-0.038*
					(0.053)	(0.012)	(0.070)	(0.016)
Missing					1.410*	0.065*	1.189	0.035
					(0.212)	(0.028)	(0.221)	(0.038)

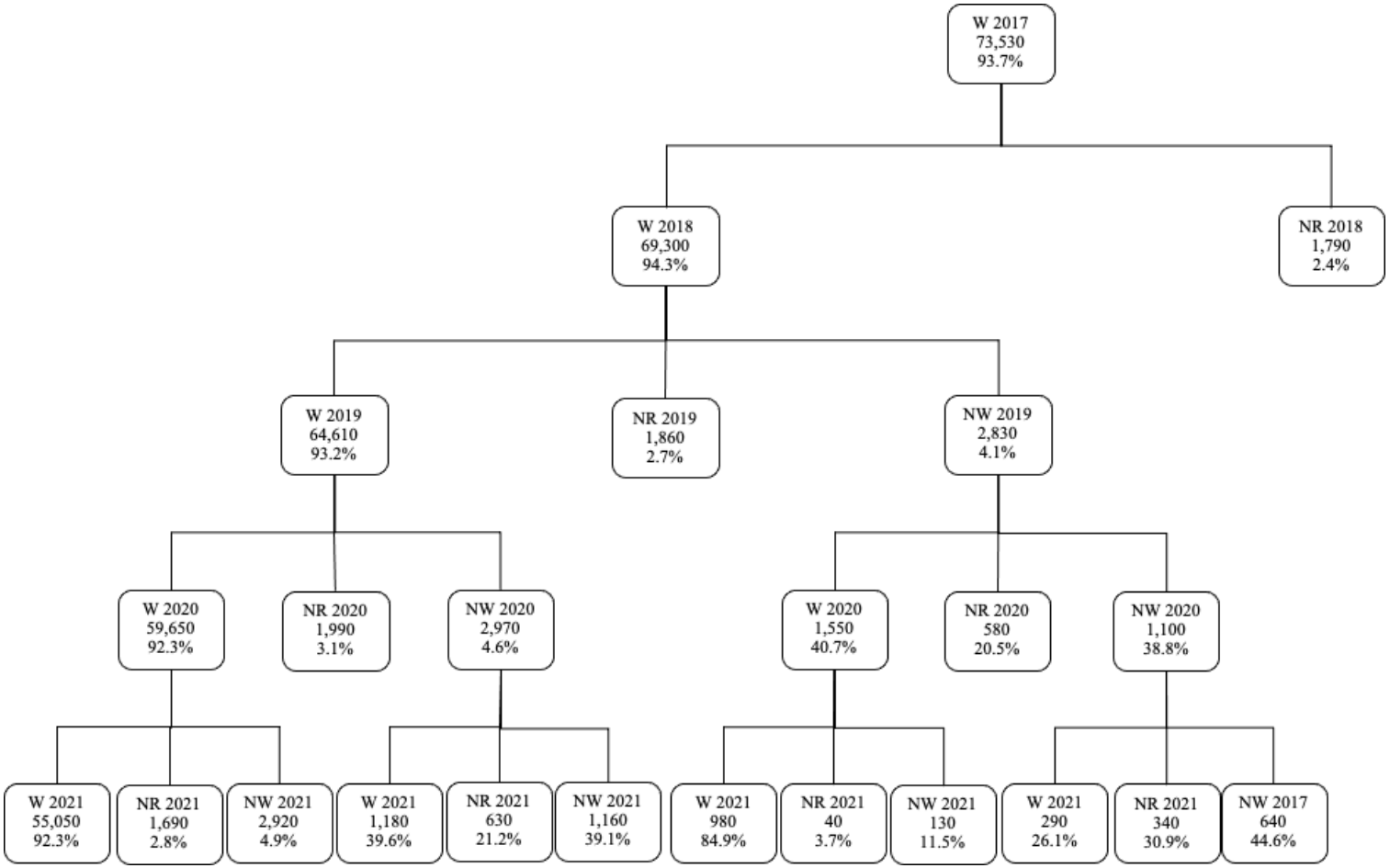
Appendix 4.1 Table 7 Continued: Likelihood of Registering Active Without Employment & Not Returning Within 3 Years 2014-2021

	RNs		RPNs		RNs		RPNs	
	OR	ME	OR	ME	OR	ME	OR	ME
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Any Education Outside of Profession					0.775***	-0.048***	0.820*	-0.038*
					(0.051)	(0.012)	(0.065)	(0.015)
Any Rural Ontario Job					0.938	-0.012	1.152	0.028
					(0.069)	(0.014)	(0.098)	(0.017)
Practice Setting (First Reported Ontario Job): Long-term Care (base)								
Hospital					1.228***	0.039***	1.117	0.022
					(0.073)	(0.011)	(0.072)	(0.013)
Primary Care					0.971	-0.006	1.051	0.010
					(0.085)	(0.017)	(0.104)	(0.019)
Home Care					1.380***	0.061***	1.054	0.010
					(0.133)	(0.018)	(0.154)	(0.028)
Supp. Housing					0.699*	-0.067*	1.210*	0.038*
					(0.104)	(0.028)	(0.103)	(0.017)
Other					1.061	0.011	1.054	0.010
					(0.067)	(0.012)	(0.068)	(0.013)
Average On Call Hrs					0.997**	-0.001**	0.993***	-0.001***
					(0.001)	(0.000)	(0.002)	(0.000)
Missing Average On Call Hrs					1.262	0.044	1.025	0.005
					(0.191)	(0.029)	(0.166)	(0.032)
Practice Weeks in Past 12 Months					0.990***	-0.002***	0.986***	-0.003***
					(0.001)	(0.000)	(0.002)	(0.000)
Missing Practice Weeks in Past 12 Months					0.928	-0.014	0.505	-0.121
					(0.351)	(0.072)	(0.222)	(0.069)
Employment Category (First Reported Ontario Job): Permanent (base)								
Temporary					0.861	-0.028	0.741**	-0.057**
					(0.069)	(0.015)	(0.079)	(0.020)
Casual					0.914	-0.017	0.961	-0.008
					(0.089)	(0.018)	(0.105)	(0.021)
Self-employed					0.553***	-0.111***	0.943	-0.012
					(0.073)	(0.024)	(0.194)	(0.040)
Employment Status (First Reported Ontario Job): Full-time (base)								
Part-time					1.352***	0.058***	1.129*	0.024*
					(0.053)	(0.008)	(0.062)	(0.011)
Casual					1.590***	0.089***	1.148	0.027
					(0.151)	(0.018)	(0.129)	(0.022)
Observations	19820	19820	9330	9330	19820	19820	9330	9330

Notes: Standard errors are in parentheses, *p<0.05, **p<0.01, ***p<0.001. The healthcare sector, employment status, and employment category are that of the first Ontario reported job. Rural is a dummy variable where rural is equal to one if any Ontario jobs are in a rural location (based on the job postal code). Concurrent registration is a dummy variable equal to one if a nurse is concurrently registered in another province, territory or country. Education outside of the profession is a dummy variable equal to one if the nurse has any education outside of the nursing profession. Missing dummy variables are included for average practice week in the past twelve months, and average on-call hours, which equals one if a nurse did not record values for each respective variable. The number of observations (nurses) are rounded to the nearest ten for confidentiality. Ten observations were dropped due to missing a employment category or employment status. 2019-2021 were dropped as we cannot observe if nurses return within three years. Average marginal effects are used.

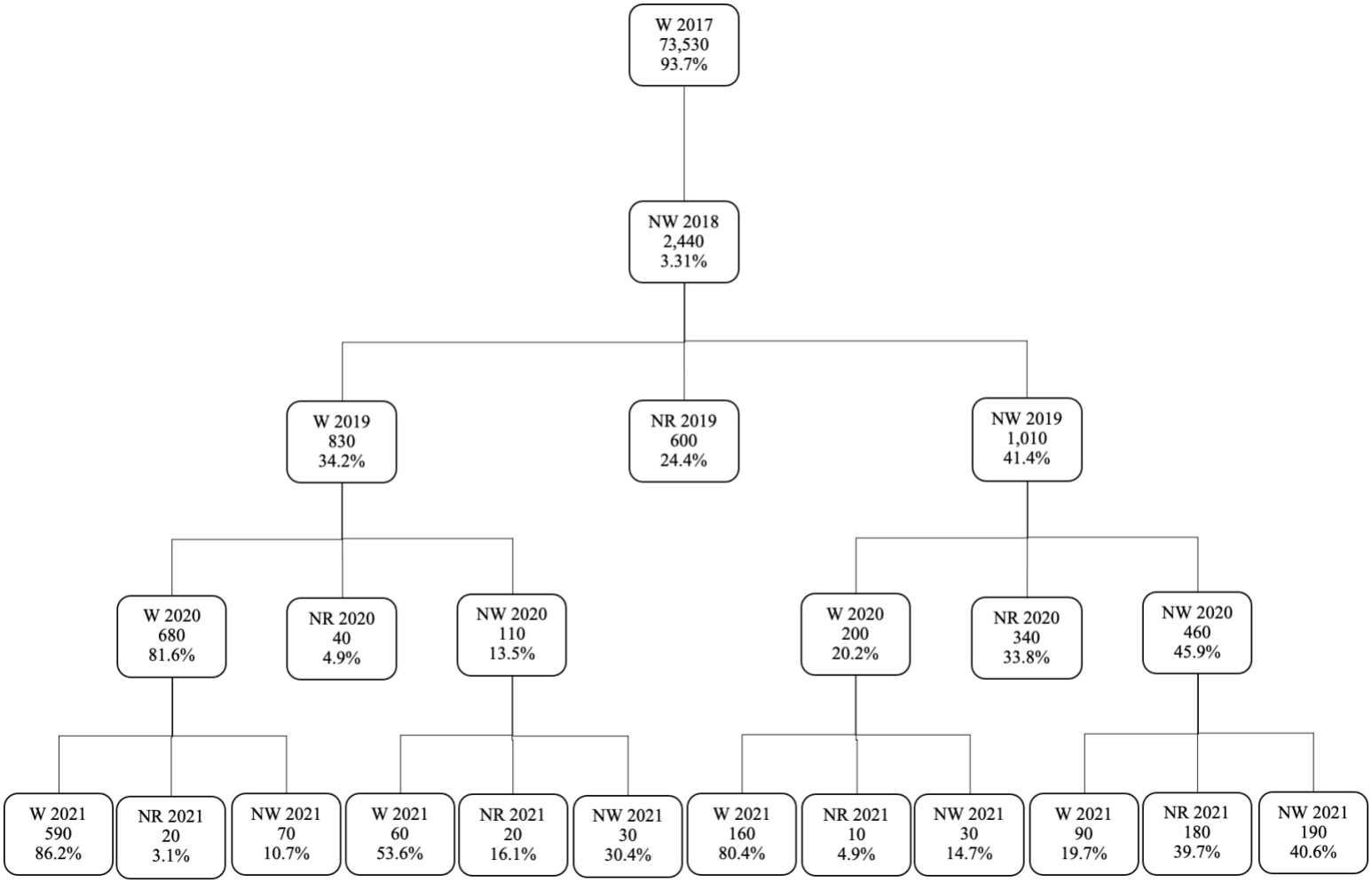
4.9 Appendix 2

Appendix 4.2 Figure 1: 2013 Employment Dynamics Among Registered Nurses (RNs) in Ontario Part 1 - (W 2013, W 2014, W 2015, W 2016, W 2017)



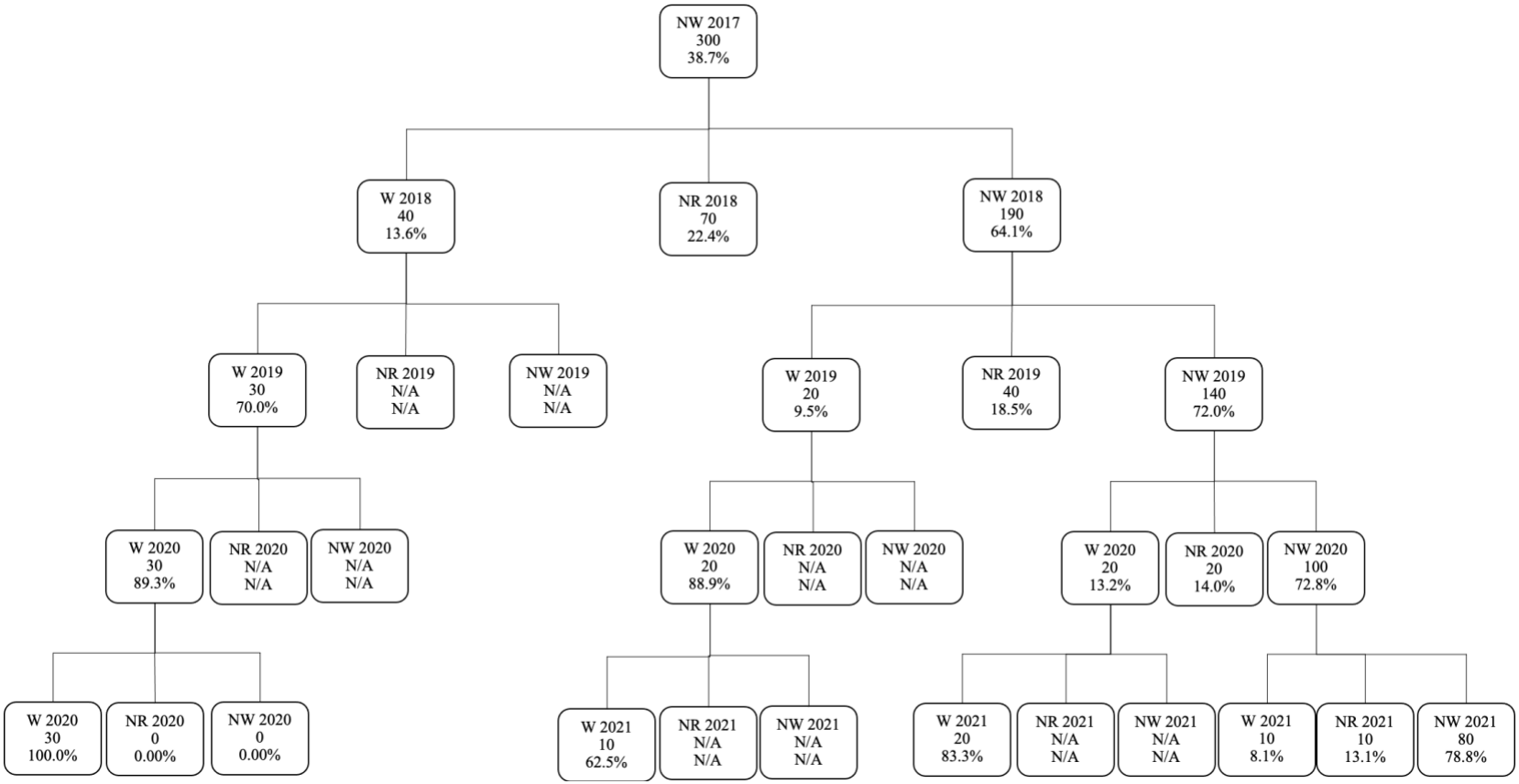
Notes: "W" = employed in at least one Ontario nursing job, "NW" = registered active without employment, and "NR" = not registered or registered inactive. Not registered or registered inactive is an absorption state; once a nurse does not register or registers inactive, we assume they do not return to the profession. The first number is the number of observations, and the second number is the corresponding percentage. All observations have been rounded to the nearest ten for confidentiality. N/A = "not available" and is suppressed due to confidentiality.

Appendix 4.2 Figure 2: 2013 Employment Dynamics Among Registered Nurses (RNs) in Ontario Part 2 - (W 2013, W 2014, W 2015, W 2016, W 2017)



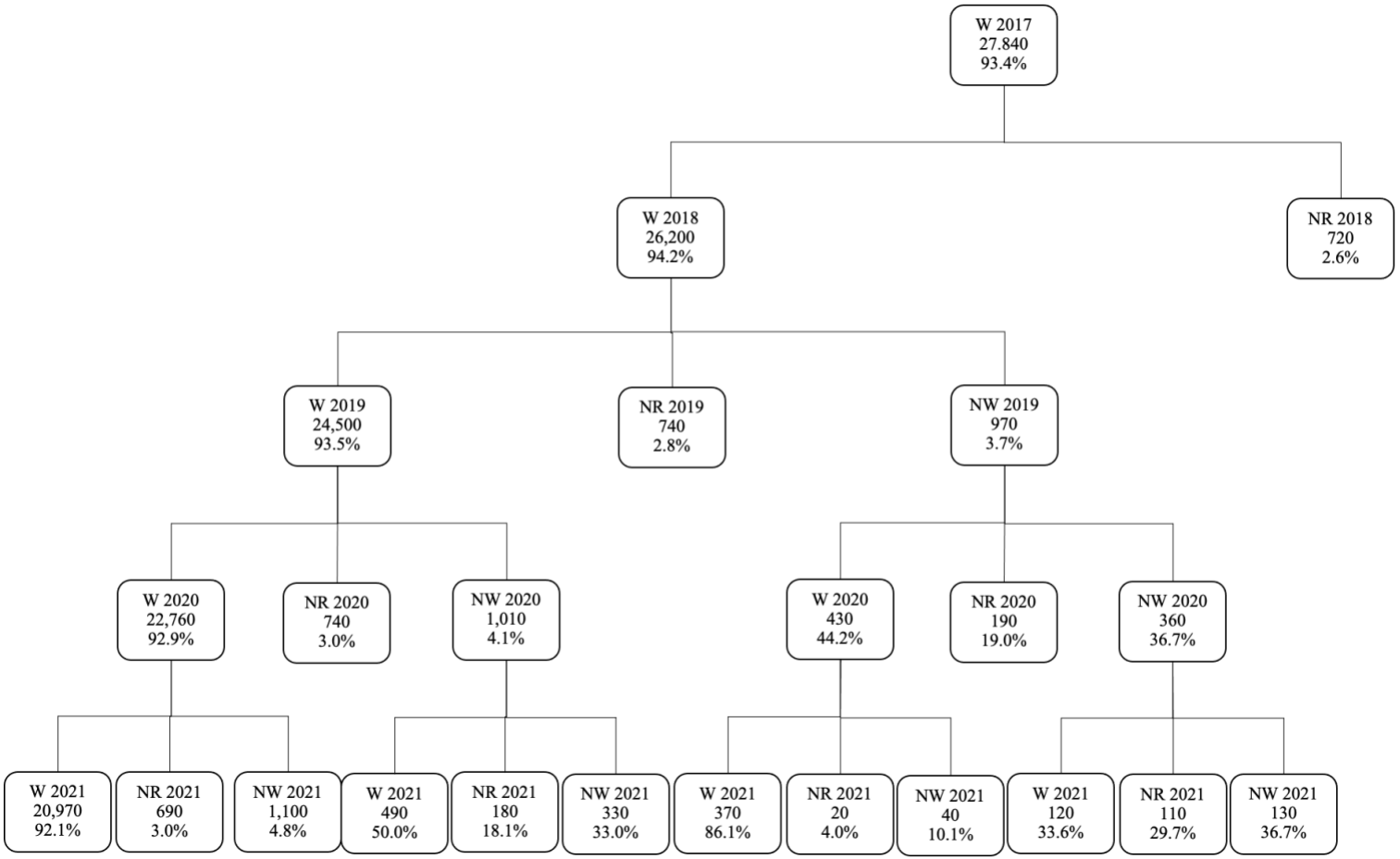
Notes: "W" = employed in at least one Ontario nursing job, "NW" = registered active without employment, and "NR" = not registered or registered inactive. Not registered or registered inactive is an absorption state; once a nurse does not register or registers inactive, we assume they do not return to the profession. The first number is the number of observations, and the second number is the corresponding percentage. All observations have been rounded to the nearest ten for confidentiality. N/A = "not available" and is suppressed due to confidentiality.

Appendix 4.2 Figure 3: 2013 Employment Dynamics Among Registered Nurses (RNs) in Ontario Part 3 - (W 2013, NW 2014, NW 2015, NW 2016, NW 2017)



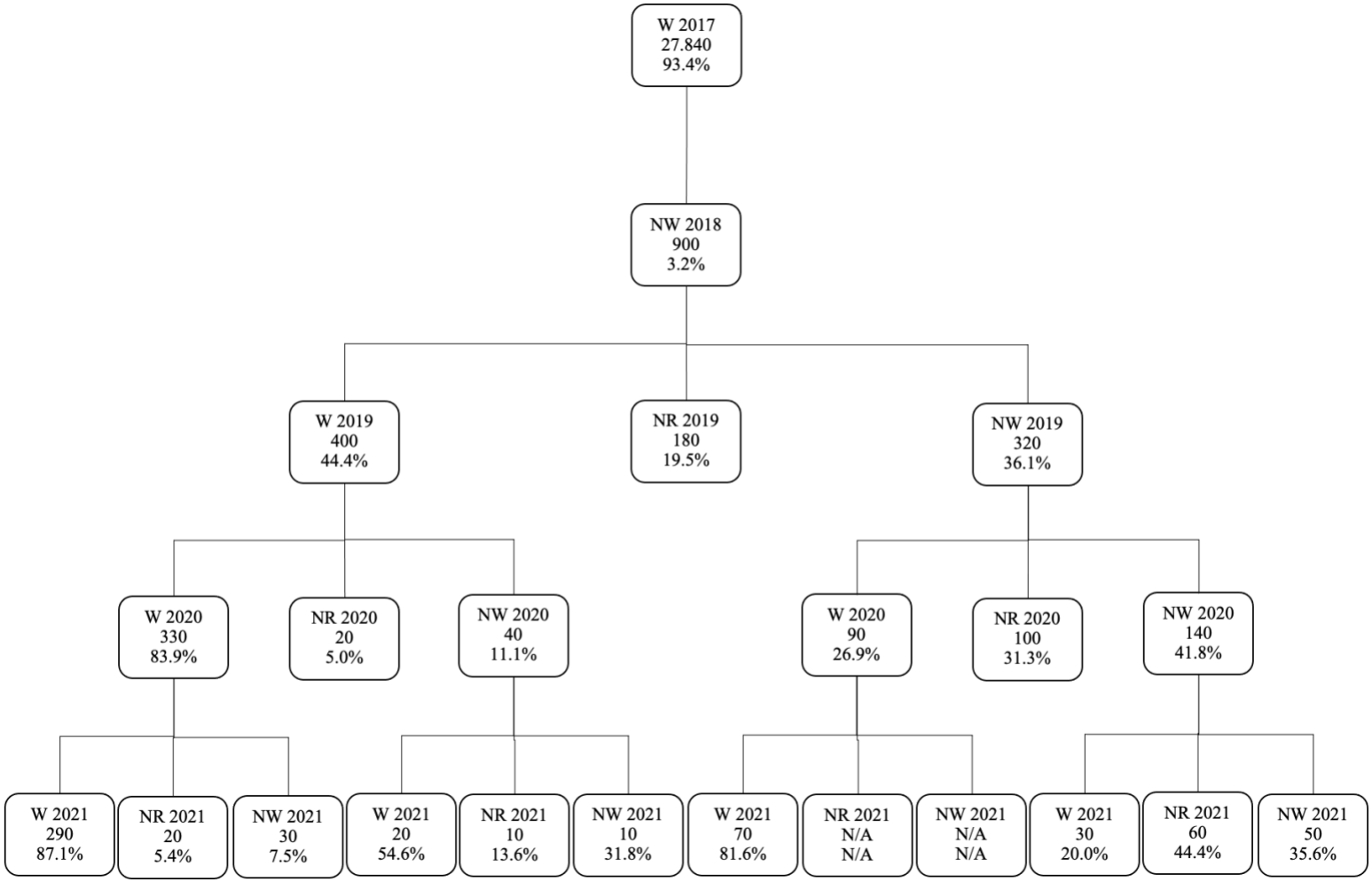
Notes: "W" = employed in at least one Ontario nursing job, "NW" = registered active without employment, and "NR" = not registered or registered inactive. Not registered or registered inactive is an absorption state; once a nurse does not register or registers inactive, we assume they do not return to the profession. The first number is the number of observations, and the second number is the corresponding percentage. All observations have been rounded to the nearest ten for confidentiality. N/A = "not available" and is suppressed due to confidentiality.

Appendix 4.2 Figure 4: 2013 Employment Dynamics Among Registered Practical Nurses (RPNs) in Ontario Part 1 - (W 2013, W 2014, W 2015, W 2016, W 2017)



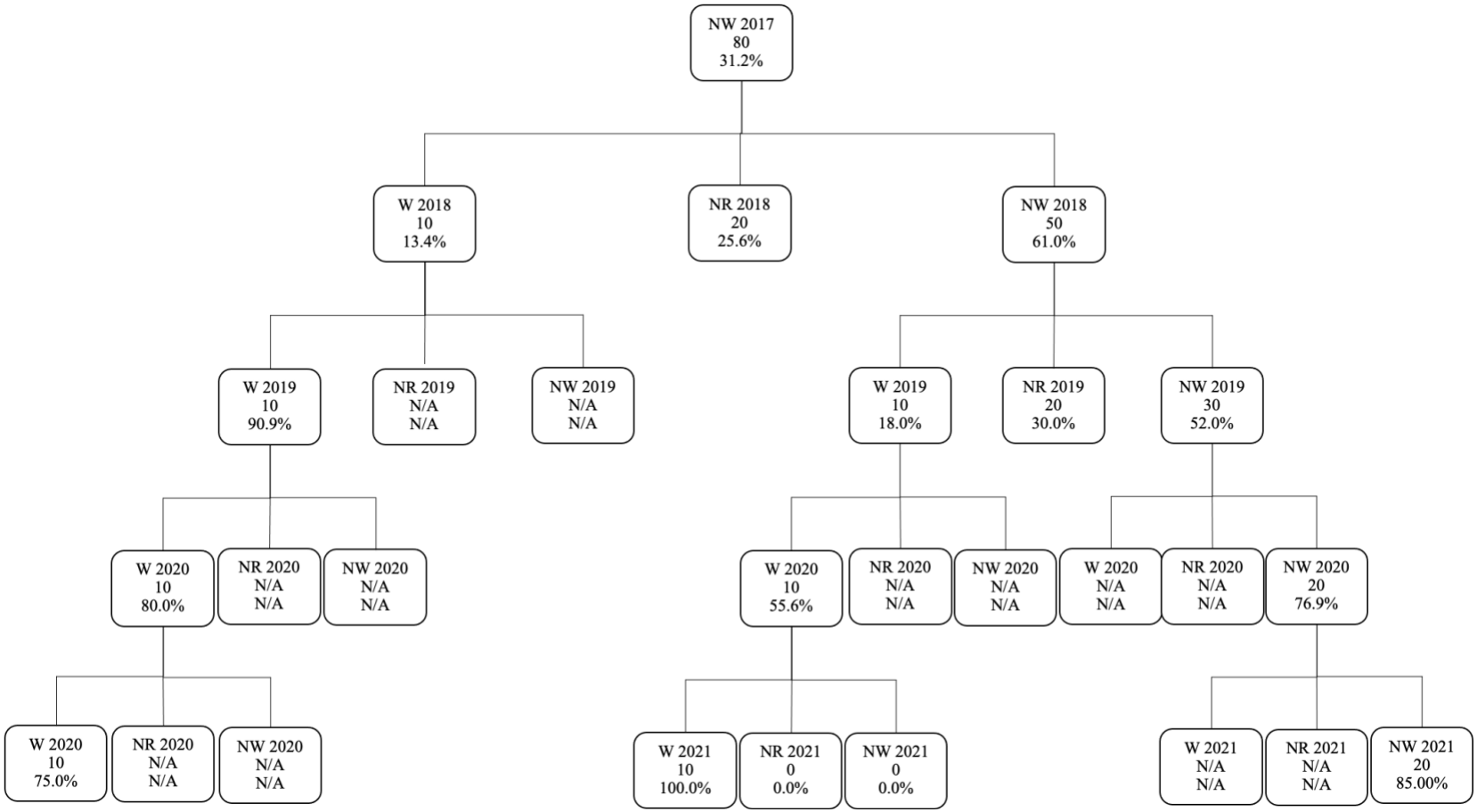
Notes: "W" = employed in at least one Ontario nursing job, "NW" = registered active without employment, and "NR" = not registered or registered inactive. Not registered or registered inactive is an absorption state; once a nurse does not register or registers inactive, we assume they do not return to the profession. The first number is the number of observations, and the second number is the corresponding percentage. All observations have been rounded to the nearest ten for confidentiality. N/A = "not available" and is suppressed due to confidentiality.

Appendix 4.2 Figure 5: 2013 Employment Dynamics Among Registered Practical Nurses (RPNs) in Ontario Part 2 - (W 2013, W 2014, W 2015, W 2016, W 2017)



Notes: "W" = employed in at least one Ontario nursing job, "NW" = registered active without employment, and "NR" = not registered or registered inactive. Not registered or registered inactive is an absorption state; once a nurse does not register or registers inactive, we assume they do not return to the profession. The first number is the number of observations, and the second number is the corresponding percentage. All observations have been rounded to the nearest ten for confidentiality. N/A = "not available" and is suppressed due to confidentiality.

Appendix 4.2 Figure 6: 2013 Employment Dynamics Among Registered Practical Nurses (RPNs) in Ontario Part 3 - (W 2013, NW 2014, NW 2015, NW 2016, NW 2017)



Notes: "W" = employed in at least one Ontario nursing job, "NW" = registered active without employment, and "NR" = not registered or registered inactive. Not registered or registered inactive is an absorption state; once a nurse does not register or registers inactive, we assume they do not return to the profession. The first number is the number of observations, and the second number is the corresponding percentage. All observations have been rounded to the nearest ten for confidentiality. N/A = "not available" and is suppressed due to confidentiality.

Conclusion

The COVID-19 pandemic has affected healthcare systems, especially the healthcare workforce, across the globe. Many reports suggest the pandemic has exacerbated health human resource deficiencies across Canada, especially in the nursing profession (e.g., chronic shortages, high turnover and attrition, and excessive rates of part-time, casual, and private agency employment).

I investigate if claims of health human resource deficiencies in the Ontario nursing sector are accurate using Ontario Ministry of Health data (the Health Professions Database [HPDB]), which derives from college registration data. This thesis consists of four essays, with each examining labour market practices and trends among Ontario registered nurses (RNs), and registered practical nurses (RPNs). First, I examine the rate of multiple jobholding, part-time and casual employment, and the mismatch between actual and preferred employment status among nurses in long-term care home (LTCHs) and five comparator sectors (e.g., hospitals, primary care, home care). Second, I compare nursing job instability (e.g., job turnover) in LTCHs and six comparator healthcare sectors. Third, I determine the share of agency employed nurses, and the rate of nurses that transition from non-agency jobs to agency employment. Finally, in contrast to job turnover, I determine historical occupational turnover (i.e., nurses leaving the profession as opposed to changing jobs) in the nursing sector overall to establish if the pandemic may have led to abnormally high attrition in the profession.

Chapter 1 examines the rate of multiple jobholding, part-time and casual employment, the mismatch between employment status and preference (e.g., involuntary part-time or casual employment), and other individual characteristics (e.g., languages spoken in practice, location of first practice) among Ontario RNs and RPNs in 2019 and 2020. Most claims of excessive multiple jobholding and part-time or casual employment in LTCHs lack comparator sectors.

Thus, I compare nurses employed in LTCHs (in the first reported job) to five healthcare sectors. I find approximately 19.0 percent of RNs and 21.0 percent of RPNs in LTCHs held multiple jobs, which is only 2.5 percentage points above the provincial average among RNs, and almost identical to the provincial average among RPNs. However, nurses in LTCHs, especially RNs, are much more likely to be involuntary part-time or casual (i.e., they prefer full-time work but are employed part-time or casually), and internationally educated.

Chapter 2 investigates job instability, measured by job turnover and the number of years a job-worker match exists, in LTCHs and other healthcare sectors. The 2014-2019 average annual turnover rate in LTCHs was 25.7 percent for RNs, and 22.9 percent for RPNs, compared to provincial averages of 21.3 percent (RNs) and 29.4 percent (RPNs). In 2020, turnover increased the most in LTCHs and supportive housing in 2020. Though, these sectors were the only two impacted by a single site restriction, making it difficult to disentangle pandemic and restriction effects. Similar to turnover rates, compared to other healthcare sectors, the numbers of years a job-worker match exists fell in the middle of the distribution among LTCH RNs, and was the second highest (only behind hospitals) among RPNs.

Chapter 3 documents the count and share of agency employed (i.e., at least one job at a staffing agency) nurses from 2011-2021. I also determine the rate at which nurses transition into agency employment, and compare individual and employment characteristics (especially hours of practice) among agency and non-agency nurses. For both sets of nurses, the proportion of agency nurses and the agency transition rate decreased slightly in 2020 before increasing towards pre-pandemic levels in 2021. I find agency nurses tend to be slightly older and prefer casual employment hours compared to their non-agency counterparts. While I do not find evidence of an increasing share of agency employed nurses, mean hours of practice increased among both

agency and non-agency nurses in 2020 and 2021, which may explain part of the increase in public spending on agency nurses.

Chapter 4 measures occupational turnover, as opposed to job turnover (Chapter 2), and compares pre-pandemic rates (2014-2019) to those in 2020 and 2021. From 2019-2021, I find a modest increase in attrition by about 0.8 (RNs) and 1.1 (RPNs) percentage points. Occupational turnover is much lower than job turnover, where prior to the pandemic (2014-2019) the attrition rate ranged from about 6.1 to 7.2 percent (RNs) and 6.6 to 7.5 percent (RPNs). I also distinguish between permanent and temporary exits: nurses who register as active with regulatory body (but are without Ontario nursing employment) and nurses who register inactive or do not register. Throughout the data period, a much larger share of attrition derives from nurses who register active without employment, and such nurses are significantly more likely to return to the profession compared to nurses who register inactive or do not register.

This thesis seeks to ratify claims of reported health human resources deficiencies in the Ontario nursing sector. Perhaps surprisingly given media reports, I find the LTCH sector does not differ substantially from the norms of other healthcare sectors in terms of the rate of multiple jobholding, part-time and casual employment, and job instability among RNs and RPNs. However, nurses in LTCHs are significantly more likely to prefer full-time employment, while being employed part-time or casually. Moreover, the rate of agency employment, job turnover, and profession turnover did not significantly increase during the first two years of the pandemic. However, this thesis only includes data up to 2021, and policymakers should continue to monitor retention and other labour market trends (e.g., involuntary part-time or casual employment) as the COVID-19 pandemic may have a lagged effect on the nursing sector.